

Television Violence and Aggressive Behavior

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In the 10 years since the Surgeon General's studies were undertaken, research on television violence and aggressive behavior has continued at an accelerated rate. The empirical findings that led the Surgeon General to his conclusion of "a causal relation between viewing violence on television and aggressive behavior" have mostly been confirmed by recent research. But the controversy regarding the explanation of these results has not subsided, and there is little evidence that significant programming changes have been stimulated by the results. One explanation may be that too much emphasis has been placed on the collection of empirical data and too little on the organization of these data into a coherent theoretical framework.

While many explanations have been offered for the observed relations between television violence and aggression, few have been elaborated formally. Too often researchers have used terms such as observational learning, catharsis, or desensitization very loosely. Instead of developing detailed models of the psychological processes postulated to mediate the television violence—aggression relation, researchers have concentrated on collecting data. The outcome has been a large body of data that is difficult to fit into any comprehensive explanatory model. Few, if any, process theories have been negated, because none has been developed formally enough to be readily falsifiable. The emphasis has been on describing relations between variables rather than on discovering and elucidating processes.

In this review,¹ I present the recent research concerning the several processes hypothesized to account for the relation between violence viewing and aggressiveness. Such an organization of evidence may provide the means

for a clearer understanding of the relation between violence viewing and aggression and stimulate the formalization of process models. Future research should be guided by such models.

At least five kinds of processes have been postulated to explain the relation between violence viewing and aggression: (1) observational learning through which aggressive behaviors depicted on television are learned by a viewer; (2) catharsis through which a viewer's "drive" to perform aggressive behaviors is reduced by watching actors behave aggressively; (3) changes in emotional or physiological arousal and responsiveness that are engendered by violence viewing and affect aggressiveness; (4) attitude changes that result from exposure to television violence and that then affect behavior; and (5) justification processes in which violence is watched by aggressive children because it provides an opportunity to rationalize their own aggressive behavior as the norm.

Three of these processes, observational learning, attitude change, and justification, clearly predict that a positive relation obtains between violence viewing and aggression. The proposed theories concerning arousal generally are assumed to yield the same prediction but possess some inherent contradictions that might be used to explain an opposite outcome. The catharsis process would seem to predict a negative relation between violence viewing and aggression, but it is so broadly defined that a positive relation probably need not negate it. Therefore, before specific evidence relevant to each process is presented, the evidence concerning the existence of a positive or negative relation between violence viewing and aggression without reference to the cause is reviewed.

At this time, it should be difficult to find any researcher who does not believe that a significant positive relation exists between viewing television violence and subsequent aggressive behavior under most conditions. Comstock (1980) reports that about 50 laboratory ex-

¹ Lefkowitz and Eron contributed substantially to the development of the ideas presented in this paper. This research has been supported in part by Grants MH-28280 and MH-31886 from the National Institute of Mental Health.

periments showing a positive relation between violence viewing and immediate aggression had been published by the time the Surgeon General's Committee report was written. While negative results are less likely to be published, the replicability of the basic laboratory result (that exposure of a child to certain kinds of media violence increases the immediate likelihood of certain aggressive responses) was beyond challenge at this point. More controversial are the data collected outside the laboratory. If no evidence were found in the field of a positive relation between a child's television violence viewing and aggressive behavior, it would be hard to maintain that the observational learning of aggressive behaviors had a major impact on society. However, the majority of survey data available at the time of the report to the Surgeon General already indicated that there was a positive correlation. As Chaffee's (1972) review demonstrated, differences in sampling procedures and techniques for measuring violence viewing or aggressive behavior seem to have substantial effects on the strength of the relation found; nevertheless, highly significant positive correlations ranging from .15 to .30 are most common.

A number of observational field studies have been conducted since the report to the Surgeon General, and, like the previous surveys, most have provided evidence of a positive relation between violence viewing and aggression (Lefkowitz and Huesmann 1980). Three of them deserve special attention. In a project funded by the Columbia Broadcasting System (Belson 1978) collected data on 1,650 teenage boys in London. Though he did not obtain longitudinal data, on the basis of analyzing matched subgroups, he concluded that "the evidence . . . is very strongly supportive of the hypothesis that high exposure to television violence increases the degree to which boys engage in serious violence" (p. 15). More causally conclusive are the data of Singer and Singer (1980). They followed a sample of 3- and 4-year-olds over the course of a year and carefully measured a number of variables at four different times. A variety of different multivariate analyses of these data all point to the same conclusion—that television viewing, particularly violence viewing, is a cause of heightened aggressiveness in children of that age. The Singer investigation is particularly noteworthy because the researchers distinguished between the different processes by which media violence might affect children and attempted to test the role of a number of cognitive and familial mediators in the relation. Also, of special significance is a 5-year longitudinal study by McCarthy et al. (1975), in which data from 732 children were obtained, clearly supporting the hypothesis that television violence viewing is related to aggression. All of their data on children's aggression, including conflict with parents, fighting, and delinquency, were positively correlated with a frequency-

weighted violence score. Unfortunately, since television viewing data were not collected in the first wave of the study, no causal analyses could be undertaken. However, the finding that amount of television viewed was positively related to aggression was particularly interesting. While older studies (Eron 1972; Robinson and Bachman 1972) had found no relation between total amount of viewing and aggression, the study by McCarthy et al. and two other studies reported below all found positive relations between simple frequency of television viewing and aggression.

Two recent studies of the impact of television on previously unexposed populations have confirmed the positive relation between aggressiveness and television viewing. Williams (1978) collected data in a small community in Canada before and after television was introduced in 1973. She compared these data with data collected at the same times from two communities which had had television for many years. The pre-post increases in both verbal and physical aggression by primary school children were significantly greater for the experimental town than for the two control towns. In a similar study, Granzberg and Steinbring (1980) compared a Cree Indian community into which television was being introduced with a control Indian community and a control Euro-Canadian community. No pre-post differences in levels of aggression between the experimental and control communities, taken as a whole, occurred. But, when children were classified by amount of daily exposure to television, significant differences in aggressive attitudes emerged. The introduction of television into the community increased the aggressiveness of those children who watched a lot of television. In these studies and in the one by McCarthy et al. (1975), amount of television viewed proved to be the critical potentiating variable in elucidating the relation between violent television and aggressive behavior.

A similar conclusion can be drawn from the data Eron and Huesmann collected over the past 4 years with the cooperation of colleagues in several other countries (Eron and Huesmann 1980a; Eron and Huesmann 1980b; Huesmann et al. 1981; Huesmann et al. 1978; Rosenfeld et al. 1978; Eron et al. 1980; Lagerspetz 1979; Fraczek 1980). This longitudinal study involved interviewing and testing a substantial sample of first and third graders, retesting them 1 year later and again after 2 years. The samples studied so far have come from the United States (758 children), Australia (289 children), Finland (220 children), Poland (237 children), and Holland (569 children). While all of the data have not yet been analyzed, results are available from the United States, Finland (Lagerspetz 1979), and Poland (Fraczek 1980). As table 1 reveals, in *each* of these countries significant positive relations have been found between television vio-

(1976) reports no difference in children's aggressiveness as a function of whether the consequences of aggressive acts were shown in a violent film. One of the problems with such studies is that the reinforcing properties of aggression are difficult to manipulate. For some children, aggressive behavior may often produce inherently reinforcing consequences. Hayes et al. (1980) recently showed that even the reflexive movement of objects aggressed against can be reinforcing to the aggressor. These authors also found purely additive effects for imitation and reinforcement on aggression.

A number of researchers attempted to determine the ages at which children are most susceptible to imitating observed behaviors. Eron et al. (1972) argued that, once an individual has reached adolescence, behavioral predispositions and inhibitory controls have become crystalized to the extent that a child's aggressive habits would be difficult to change with modeling. Collins (1973; Collins et al. 1974; Newcomb and Collins 1979) consistently found that young children are less able to draw the relation between motives and aggression and therefore may be more prone to imitate inappropriate aggressive behaviors. Hearold's (1979) review generally supports these views but suggests that modeling might increase again among adolescent boys. Perhaps the more important question, however, is at how young an age children begin to imitate behaviors viewed on television. Experiments by McCall et al. (1977) indicate that children as young as 2 years were facile at imitating televised behaviors, and some imitation was observed in even younger children.

Another factor frequently hypothesized to be implicated in observational learning is the viewer's identification with the actor or actress being modeled. Within the existing literature, however, the evidence is ambiguous on the role that identification plays in observational learning. Bandura et al. (1963a, 1963b) found that both boys and girls more readily imitated male rather than female models. In a longitudinal study with first- and third-grade children, Huesmann et al. (1978) found that, regardless of the child's sex, there are higher correlations of the child's aggressiveness with the child's viewing of male actors' violence than with the child's viewing of female actors' violence. This apparently greater influence of male models on children has been detected in data from Finland (Lagerspetz 1979) and Poland (Fraczek 1980) as well. In those countries, however, females seem to be more affected by female models than they are in the United States.

One of the problems with using gender as a measure of identification with a television model is that aggression is highly correlated with sex-role orientation (Huesmann et al. 1978; Lefkowitz et al. 1977). Girls who are aggressive may in fact identify more with male actors than

with most female actors. An interesting finding from our current cross-cultural study has somewhat changed our perspective on this issue, however. Table 3 shows the correlations between neutral sex-role orientation and aggressiveness for boys and girls over the course of our 3-year study. While the relations between aggression and either a male or female orientation varied greatly with sex and grade, the relation between aggression and neutral orientation was consistently negative. Children who scored high on neutral sex role were ones who were flexible in their choice of games and activities and not bound by societal stereotypes. Perhaps such children are also more flexible in their choice of behaviors in frustrating situations and therefore less aggressive.

Table 3

Correlations Between Preference for Neutral Sex-Typed Activities and Peer-Nominated Aggression

	All Subjects	Maies	Females
U.S.A. (N=758):			
1st grade	-.217****	-.175*	-.197**
2nd grade	-.210****	-.086	-.294***
3rd grade	-.180***	-.151	-.135
4th grade	-.170***	-.200**	-.049
5th grade	-.193***	-.117	-.140
Finland (N=220):			
1st grade	-.204*	-.302**	.083
2nd grade	-.088	-.091	-.074
3rd grade	-.202*	-.111	-.262*
4th grade	-.275***	-.282*	-.232
Poland (N=237):			
1st grade	-.112	-.153	.013
3rd grade	-.251****	-.146	-.283*

* $p < .05$. ** $p < .025$. *** $p < .01$. **** $p < .005$.

Studies measuring other types of identification besides sex role have also yielded ambiguous results for observational learning theories. In studies comparing the race of the actor and viewer, black children have sometimes been found to imitate white models more than black models (e.g., Neely et al. 1973); and in some cases children have been found to imitate adults more than peers (Nicholas et al. 1971) at least at a time long after viewing (Hicks 1965). Even with two peer actors differing greatly in likability, no difference has been found in the propensity of the viewer to imitate either of the actors (Howitt and Cumberbatch 1972). On the other hand, when subjects are asked to assume mentally the role of an actor who is aggressive, they do behave more aggressively (Turner and Berkowitz 1972). While perceived similarity of interest between the model and child can enhance the likelihood of imitation (Rosekrans 1967), the above findings suggest that a simplistic view of identifica-

Table 1

Correlations Between Television Violence Viewing and Peer-Nominated Aggression

	All Subjects	Males	Females
U.S.A. (N=758):			
1st grade . . . . .	.212****	.160*	.210***
2nd grade . . . . .	.234****	.204**	.245****
3rd grade . . . . .	.232****	.191**	.205**
4th grade . . . . .	.224****	.184*	.260****
5th grade . . . . .	.261****	.199*	.294****
Finland (N=220):			
1st grade . . . . .	.141	.026	.139
2nd grade . . . . .	.163	.266*	.022
3rd grade . . . . .	.257***	.038	.052
4th grade . . . . .	.228*	.381***	-.158
Poland (N=237):			
1st grade . . . . .	.227**	.296**	.070
3rd grade . . . . .	.293****	.259**	.236*
p>*.05.	p>*.025.	p>*.01.	p>*.005.

lence viewing and peer-nominated aggressive behavior. In contrast to previous results, which were significant only for boys (Lefkowitz et al. 1977), these positive relations obtained for both boys and girls in both the first- and third-grade cohorts. In these investigations, violence viewing was measured from the child's self-report which, as Chaffee's (1972) survey suggests, may be more valid than the parental reports used in earlier research. The simple frequency of television viewing also correlated highly with aggression. In fact, the best prediction of a child's aggressiveness was derived when the investigators included only the violence scores for programs the child watched "almost always."

Two other field studies published subsequent to the report to the Surgeon General also provided support for the television violence-aggression relation. In a study of adolescents in the United States, Hartnagel et al. (1975) found a significant though low correlation between violence viewing and aggressive behavior. Furthermore, those subjects who perceived television programming as violent or perceived the violence as an effective means to a goal engaged in more violent behavior than did those who did not perceive their favorite show to be violent. Finally, Greenberg (1975) found correlations between violence viewing and aggression in a sample of London school children, correlations that were remarkably similar to those reported for U.S. children.

Several field experiments in which violence viewing was manipulated must also be mentioned. While most of these experiments have had flaws, the majority (Stein and Friedrich 1972; Leyens et al. 1975; Loye et al. 1977) yielded evidence of a positive relation between violence

viewing and aggression. For example, in one recent field experiment (Parke et al. 1977), juveniles in institutions in the United States and Belgium were exposed to 5 days of violent or control films. In both countries, those children who saw the more violent films were observed acting more aggressively during the 5 days. Two well-known field experiments that found no relation (Feshbach and Singer 1971; Milgram and Shotland 1973) demonstrate the difficulty of generalizing the techniques successfully used in a laboratory to a field setting. However, many more plausible explanations exist for the lack of results than that violence viewing and aggressiveness are unrelated (Comstock 1980).

Recently several authors have also generated compilations of the existing research relating violence viewing to aggression (Anderson 1977; Hapkiewicz 1979; Hearold 1979). While such compilations inevitably suffer from averaging the competent studies with the incompetent ones, they provide convenient statistical summaries indicating the overwhelming nature of the evidence for a positive relation between violence viewing and aggression. A few survey studies commissioned by television networks have not yet been published so they are difficult to evaluate (Comstock 1980). One hopes that their major function and the major function of future surveys will be to test some of the specific process models.

In summary, while the strength of the relation changes as a function of situational determinants, population characteristics, and measurement techniques, the evidence seems overwhelming that television violence viewing and aggression are positively correlated in children. The issue is what processes produce this relation.

Observational Learning

According to advocates of observational learning, children learn to behave aggressively from watching violent actors on television just as they learn cognitive and social skills from watching parents, siblings, peers, and others. Since Bandura's original laboratory experiments (Bandura et al. 1961; 1963) suggested the validity of this thesis, a number of experiments and field studies attempted to test and elucidate the theory (Bandura 1977). While the research illuminated some of the conditions under which behaviors portrayed in the media are most likely to be imitated, the actual importance of observational learning in determining the aggressiveness of children has not been settled.

Part of the problem has been that observational learning means different things to different people. Bandura's original definition was narrow and specifically behavioral. It has been expanded by some to include virtually any process by which an observed behavior influences a

viewer. At the same time, many "purists" acted as if observational learning were a distinct process separated from a subject's other cognitive processes. In fact, until recently it was difficult to find evidence that many investigators of observational learning were aware of cognitive psychology. This diversity of understandings of observational learning has hampered the formation of precise models and contributed to some important controversies. For example, the issue of whether children learn a generalized disinhibition of aggression or learn specific aggressive acts becomes less important when one casts these theories in information-processing terms. Current information-processing models of memory provide a perspective in which these theories can be complementary rather than competing.

What is the evidence with regard to observational learning? First, there can be little doubt that in specific laboratory settings aggressive behaviors of actors are imitated by child viewers immediately after viewing. Large numbers of laboratory studies demonstrated this, even before the report to the Surgeon General appeared (Comstock 1980). The question is whether the positive relations observed in field settings can be explained by the imitation of the actors' behavior.

The study by Lefkowitz et al. (1977; Eron et al. 1972) provided the first substantial evidence from a field setting implicating observational learning. Without rehashing tired arguments, the results suggested that observational learning was the most plausible explanation of the positive correlations between violence viewing and aggression. While many researchers have appropriate reservations about the analyses used to extract causal inferences from these longitudinal observational data (Kenny 1972; Comstock 1978), the critiques advocating a complete rejection of the results (e.g., Armour 1975; Kaplan 1972) contained such serious errors of reasoning (Huesmann

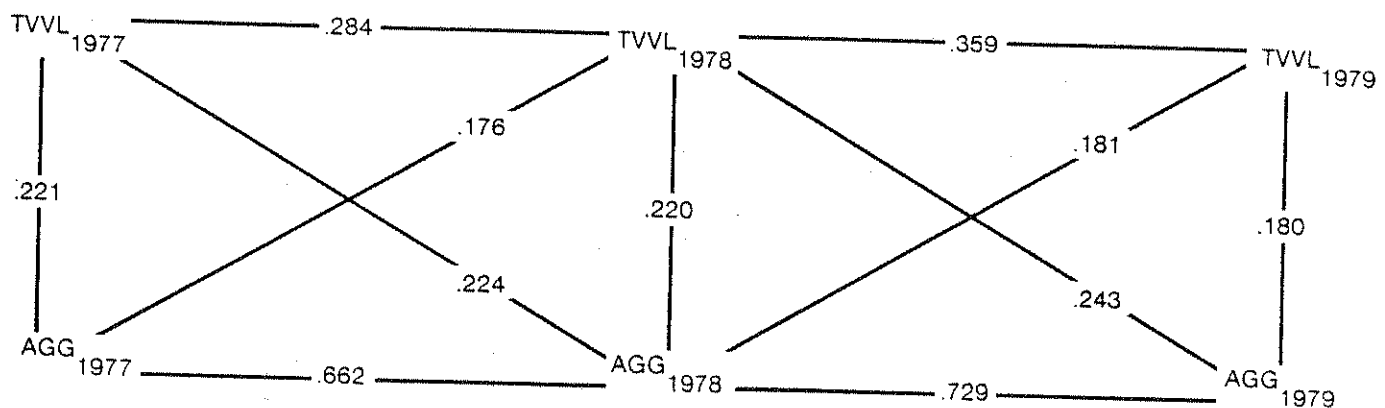
et al. 1973; Huesmann et al. 1979) that they have not had a major impact. Since the study by Lefkowitz et al., a number of other observational studies and field experiments have suggested that violence viewing is a precursor of aggression (Stein and Friedrich 1972; Leyens et al. 1975; Parke et al. 1977; Belson 1978; Huesmann et al. 1979; Singer and Singer 1980). Moreover, we recently found patterns of lagged correlations in our current U.S. sample which mirror our earlier findings (see table 2). However, all of these more recent studies can undoubtedly be criticized on methodological grounds as well. No field study is going to provide the "clean" outcomes available from the laboratory. Nevertheless, these studies are important for the theory of observational learning because their data do not contradict the predictions of the observational learning model.

It has become clear that the extent to which a child imitates an actor is greatly influenced by the reinforcements received by the actor. If the actor is seen being rewarded for aggressive behavior, the child is more likely to imitate that behavior (Bandura 1965; Bandura et al. 1963a; Walters et al. 1963). If the actor is punished for a behavior, that behavior is less likely to be modeled (Bandura 1965; Walters and Parke 1964). This appears to be true for prosocial as well as for antisocial behavior (Morris et al. 1973).

While such vicarious reinforcements influence the probability of the child emitting the actor's behaviors, the persistence of the behavior seems to depend upon the reinforcements the child receives. Interestingly, actual reinforcement does not seem to affect modeled behaviors any differently than it affects behaviors acquired in other ways. Bandura (1965) found that offering a reward for an aggressive act had no greater effect on children who had recently watched the act performed than on control children who had not observed the aggressive act. Linne

Table 2

Cross-Lagged Correlations Between Peer-Nominated Aggression and Television Violence Viewing Obtained in the Current U.S. Data



tion will not aid much in the understanding of observational learning. Rather, it appears that a child is most likely to imitate a model perceived to possess valued characteristics.

Along these lines, a few researchers (e.g., Huesmann et al. 1978; Rosenfeld et al. 1978; Turner and Fenn 1978; Singer and Singer 1980) recently attempted to tie observational learning more closely to theorizing in cognitive psychology. One recent idea about human memory—Tulving and Thomson's (1973) concept of encoding specificity—seems particularly relevant. Tulving argued that the likelihood of an item being recalled depends upon the specific encoding context (acquisition context) being reproduced, including even apparently irrelevant aspects. The idea that many forms of aggressive behavior are elicited by the presence of specific cues is not new (Berkowitz 1974), and there is evidence of the importance of specific cues from a violent film during testing (Geen and Berkowitz 1966; Turner and Fenn 1978; Turner and Layton 1976). Turner and Fenn (1978) analyzed a number of case studies where juveniles seem to have imitated specific criminal acts portrayed on television, e.g., the Boston incident in which a gang burned a woman to death. In each case, they found that highly specific visual cues present in the television program (e.g., a woman carrying a bright red gasoline can) were present in the environment in which the imitated behavior was emitted.

Let us consider what may be happening in information-processing terms. A child is constantly building and storing algorithms for problem solving in his or her memory. One source for the programs he or she constructs is the child's observation of problem-solving behaviors by others. A particular behavior that is observed may never be successfully encoded and stored; even if stored, it may become irretrievable. According to the encoding specificity principle, the retrievability will depend upon the extent to which the specific cues present at encoding are also present at retrieval time. But what determines whether or not an algorithm is successfully stored? Certainly, from information-processing models of memory, one would predict that the more salient a scene and the more a scene is rehearsed, the more likely it is to be stored.

While only a few researchers have moved in this direction, there are data supporting this view. In one of the earliest studies of media comprehension, Holaday and Stoddard (1933) discovered that scenes with particularly salient visual and auditory cues were more likely to be recalled. More recently, Calvert and Watkins (1979) confirmed these results. Of course, comprehension, recall, and recognition of television scenes improve with the viewer's age, but the errors young children make seem to be based on previously stored "scripts" for the situations

(Newcomb and Collins 1979). Cognitive researchers have found that "scripts" (expected behavior sequences) play an important role in guiding the recall of prose (Schank and Abelson 1977; Bower et al. 1979); it is therefore not surprising that they should guide the recall of scenes viewed on television. How is a script formed? It may be based originally on what the child is told or the child's observations of his or her environment. But, eventually, television programs themselves would influence scripts. A child who repeatedly watches television characters interacting violently may store a violent script for social interaction and store algorithms for behaving aggressively in social situations.

Based on this model, Rosenfeld et al. (1978) argued that the rehearsal of specific aggressive acts observed on television through daydreaming or imaginative play could increase the probability that the aggressive acts will be performed. Indeed, in cross-cultural data, it was found that aggressive fantasies are positively correlated with aggressive behavior and in some cases with television violence viewing. This cognitive, information-processing interpretation of observational learning might also explain why violent scenes perceived as unreal are not modeled as readily (Feshbach 1976). The observer stores for later retrieval and rehearsal those scenes that have subjective utility as likely solutions to real social problems. Acts perceived as unreal would not be likely to fulfill this requirement and hence would not be stored. The child's use of aggressive fantasies to rehearse aggressive behaviors should not be confused with the child's use of imaginative play and normal daydreaming. Singer and Singer (1980) found that children who engage in more imaginative play and fantasy in general are less aggressive. One reason may be that these children have rehearsed prosocial behaviors sufficiently for them to become dominant responses.

The foregoing approach has important implications for the controversy over whether television violence disinhibits general aggressive behavior or teaches observers specific aggressive acts. The research on observational learning and cognitive processes suggests that the observed relations between violence viewing and aggressive behavior do not require a disinhibition theory. Children who observe large numbers of aggressive behaviors on television could store and subsequently retrieve and perform those behaviors, when the appropriate cues are present. Even seemingly irrelevant aspects of the scene (e.g., color) could serve as triggering cues. The recall of an aggressive behavior which provides a solution to a problem a child faces may lead to the emission of that behavior. While reinforcement of the behavior increases the likelihood that the child will emit that behavior again, it is not a prerequisite for the behavior. This argument does not mean that disinhibition of aggression cannot

occur. In fact, from an information-processing view, a certain type of disinhibition is plausible and builds on the learning of specific aggressive behaviors. Disinhibition could occur when the child forms an aggressive concept on the basis of his or her observation of numerous aggressive behaviors. If the aggressive concept becomes associated with successful social problem solving, new aggressive behaviors may emerge that are unrelated to the original observed behaviors.

Attitude Change

Another way in which television violence exerts its influence on children is through the molding of children's attitudes. The more television a child watches, the more accepting is the child's attitude toward aggressive behavior (Dominick and Greenberg 1972). Equally important, the more a person watches television, the more suspicious a person is, and the greater is the person's expectancy of being involved in real violence (Gerbner and Gross 1974; 1980). Why? Again, from an information-processing standpoint, attitudes are attributions, rules, and explanations induced from observations of behavior. They serve as heuristics for future behavior. If a child's, or even an adult's, major exposure to social interaction occurs through television, the conception of social reality would quite naturally be based on such observations. The attitudes toward aggression of heavy television viewers would be more positive because they perceive aggressive behavior to be the norm. Perhaps even the perception of what is an aggressive act changes. In a current longitudinal study, Huesmann et al. (1978) have found that the more aggressive a subject is, the more aggressive he or she thinks others are. One problem with the evidence for such effects is the potential correlation of heavy violence viewing with other factors that could cause accepting attitudes toward aggression, e.g., social class and aggression in the environment. Doob and Macdonald (1979) found, for example, that the correlation between fear of victimization and violence viewing becomes insignificant when one controls for neighborhood. Despite such findings, the weight of evidence suggests that television violence can alter one's attitudes toward aggression and that one's attitudes in turn influence one's behavior.

One recent study that cleverly demonstrated the relation between television program material, viewer's attitudes, and viewer's later behaviors was performed in Georgia. Ryback and Connel (1978) examined the relative incidence of unruly behavior among white and black high school students in the weeks before, during, and after the broadcasting of *Roots*. Using a relatively objective dependent measure (number of after-school detentions), they found a significant increase for blacks during

the weeks *Roots* was shown. Apparently, watching *Roots* changed the black students' attitudes about obedience. Another body of evidence has been provided by researchers investigating "desensitization" of viewers. This term, unfortunately, has been used to refer to two quite different processes—attitude change and arousal change. While a fair amount of violence viewing might be required to effect an adult's attitudes, experiments by Drabman and Thomas (1974a, 1974b; Thomas and Drabman 1975) revealed that young children's willingness to accept aggressive behavior in other children can be increased by even brief exposures to violent film scenes. Such accepting attitudes, in turn, make it more likely that the child may behave aggressively and perhaps make it more likely that the child will model aggressive acts. Meyer (1972) reported that, whenever a subject observes violent acts perceived as justified, the probability increases that the subject will act aggressively. If one wishes to use the term "disinhibition," it seems appropriate here. An attitude of acceptance toward aggression and violence can increase the likelihood of aggression and violence being displayed.

Another intriguing approach toward measuring the relation between television violence, viewer attitudes, and viewer behavior has been provided by the "mitigation" and "enhancement" studies. In these, researchers have attempted either to reduce or increase the effects of television programs on children by changing the children's attitudes. Friedrich-Cofer et al. (1979) demonstrated that the effects of prosocial television were greatly enhanced when it was coupled with other prosocial teaching. Hicks (1968) discovered that adults' comments about an aggressive scene only influenced the likelihood that a preschooler would imitate the scene so long as the adult was present, while Singer and Singer (1980) reported that a parent's presence, by itself, had no effect. On the other hand, Grusec (1973) found that with older children an adult's comments could have lasting influence.

One of the most dramatic demonstrations of how attitudes can mitigate the effect of violence viewing emerged from a current longitudinal study (Eron and Huesmann 1980b; Huesmann et al. 1981). After the first wave of measurements, children in the upper quartile on television-violence viewing were selected and randomly divided into two groups—the experimental and placebo groups. Over the next 2 years, the experimental children were exposed to two treatments designed to mitigate the effects of television violence. First, at the beginning of the second year, they received three sessions in small groups during which the investigators attempted to teach them how unrealistic television violence was. The children were shown brief excerpts from violent shows and took part in a highly structured discussion of how unrealistic the actors' behaviors were and how their problems could have been solved unaggressively. The placebo group was

shown nonviolent educational excerpts, followed by discussion of their content. Then, at the beginning of the third year, a more formal attitude-change procedure was used with the experimental subjects. Each of the experimental subjects was asked to write a paragraph on "why TV violence is unrealistic and why viewing too much of it is bad." Over the course of two sessions, the children in the experimental group wrote the paragraph, received suggestions and rewrote it, were taped reading the paragraph, and watched a television tape of themselves and their classmates reading the paragraphs. The subjects were told that the tapes were going to be shown to the school children in Chicago. The placebo group also made a tape, but it was about "what you did last summer." Six months after this intervention, the final wave of data on all the children in the study was collected. Remarkably, the mean peer-nominated aggression score for the experimental group was now significantly lower than the score for the placebo group (see table 4). Furthermore, the regression lines for predicting aggression were different within the two groups. Violence viewing was a much more important predictor in the placebo group. Since the children were randomly assigned to each condition, it would appear that changes in the children's attitudes brought on by the intervention engendered the difference in aggressiveness.

Arousal Processes

One might designate the changes in attitudes brought about by frequent violence viewing as a cognitive desensitization to violence. Similarly, there is some evidence to indicate that a real physiological desensitization can

occur. In a quasi-experimental field study (Cline et al. 1973), boys who regularly watched a heavy diet of television violence displayed less physiological arousal in response to new scenes of violence than did control subjects. While these results have apparently been difficult to replicate in the field, Thomas et al. (1977) discovered similar short-term effects in laboratory studies of GSR responses to violence. It should not be surprising that emotional and physiological responsiveness to scenes of violence habituates as other responses do.

It is more difficult to make the case that such habituation would influence the future probability of aggressive behavior. On the one hand, one could argue that arousal heightens the propensity of the person to behave aggressively and television violence increases or perpetuates arousal. Studies by Geen and O'Neal (1969), Zillmann (1971; this volume), and others demonstrate that increasing a subject's general arousal increases the probability of aggressive behavior. While more recent experiments (Baron 1977) placed limits on these results, it might follow that children who watched the least violence previously would be the most aroused by violence and the most likely to act aggressively afterward.

On the other hand, one could argue equally convincingly that the arousal fostered by television and film violence is an unpleasant consequence that serves as a negative reinforcer. In this case, the desensitized heavy violence viewers would be expected to behave more aggressively than those not desensitized. Confusion between these two processes is evident in the writings of communication researchers, some of whom argue that television is making children hyperactive by "overloading" them with stimulation (Halpern 1975), while others claim television is anesthetizing children (Winn

Table 4

Effect of the Intervention on Mean Level of Aggression Over the Course of 1 Year

	Mean Peer-Nominated Aggression (Peeragg)			
	Before (1978)	After (1979)		
Experimental Group (N=59)	154.0	175.3		
Placebo Group (N=58)	158.0	242.8		
Analysis of Covariance				
	Source	df	F	Signif.
Covariates				
	Sex	1	1.23	—
	Grade	1	0.00	—
	Peeragg 1978	1	61.12	.001
Effects				
	Group	1	6.40	.013
Error				
		112		
Total		116		

1977) by "overloading" them with stimulation. Still a third alternative is suggested by the recent research of Tannenbaum (1980) and Hayes et al. (1980) on the self-reinforcing properties of aggression. If we adopt the viewpoint that there is an optimal level of arousal which each individual finds most satisfying, then it follows that aggressive behavior might be used to generate appropriate levels of self-arousal. Since aggressive behavior of necessity produces heightened arousal, the desensitized violence viewer might behave more aggressively in order to achieve the desired level of arousal. Yet, once the higher level of arousal is achieved, the most likely behaviors to be emitted are those most readily retrievable from memory, i.e., the dominant responses (Zajonc 1965). If these are aggressive responses, then aggression continues. Such a model provides a role for arousal both as a precursor and consequence of aggression.

Catharsis

Catharsis means so many different things to different psychologists that it is somewhat difficult to evaluate as a model to explain the relations between television violence viewing and aggression. Certainly, aggressive actions can reduce physiological arousal in subjects who have been frustrated (Hokanson and Burgess 1962). On the other hand, no one has produced convincing evidence that a "need to aggress" accumulates over time. Furthermore, there are no data to indicate that watching violent acts reduces arousal or the propensity of one to act aggressively. In fact, the wealth of evidence demonstrating that violence viewing and aggression are positively related contradicts the catharsis hypothesis.

In the current longitudinal cross-cultural study Huesmann et al. found a different kind of evidence that argues against the catharsis model (Rosenfeld et al. 1978). Each child's frequency of aggressive fantasy was measured with a self-report inventory and found to be positively correlated with peer-rated aggressiveness. This was true for boys and girls in both Finland and the United States. While the causal direction of the relation is not yet clear, the data contradict the catharsis hypothesis. Children who fantasize about aggressive acts tend to act aggressively. These data are more in accord with the information-processing view of fantasy as "rehearsal" of behaviors.

It does not follow from our rejection of the catharsis model that a child's aggressiveness could never be reduced by exposure to television violence. The observational learning process, the attitude change process, and the arousal process might conceivably function to reduce aggressive behavior, if certain types of program material

were presented. But these would not be considered catharsis processes by any fair definition of the word.

Justification Processes

The justification hypothesis posits that people who are aggressive like to watch violent television because they can then justify their own behavior as being normal. It is similar to the attitude change process, but it operates in the opposite direction. Television violence viewing does not stimulate the child's aggressiveness; it results from it. A child's own aggressive behaviors normally should elicit guilt in the child, but this guilt could be relieved if the child believed that aggression were normal. Thus, the child who has behaved aggressively watches violent television shows to justify his or her own aggressiveness.

Unfortunately very little research has been conducted to test this model. A number of psychologists have suggested that aggressiveness might be a precursor of violence viewing (e.g., Kaplan and Singer 1976), but most of them have operated in a theoretical vacuum without any process model to explain such an effect. The one recent experiment aimed at assaying whether aggressive behavior might be a precursor of violence viewing unfortunately only demonstrated that subjects who are told to think about aggressive words choose to watch aggressive films afterward (Fenigstein 1979).

The justification model is clearly one on which more research is needed. It is not necessarily antagonistic to any of the other processes discussed and could act in a complementary fashion with them to produce the observed relations between violence viewing and aggression.

Summary

The recent research concerning the relation between television violence and aggressive behavior was discussed within the framework of information-processing models of learning and memory developed in cognitive psychology. Five potential processes were considered: observational learning, attitude change, emotional and physiological arousal, catharsis, and justification processes. Violence viewing and aggressive behavior clearly are positively related, not just in our culture but in other western cultures as well. The weight of evidence strongly suggests that observational learning and attitude change induced by television violence are contributing to the positive relation. Less obvious is the role of arousal processes. Significant relations between arousal, television violence, and aggression have been found, but a compelling process model has yet to be formulated that inte-

tion will not aid much in the understanding of observational learning. Rather, it appears that a child is most likely to imitate a model perceived to possess valued characteristics.

Along these lines, a few researchers (e.g., Huesmann et al. 1978; Rosenfeld et al. 1978; Turner and Fenn 1978; Singer and Singer 1980) recently attempted to tie observational learning more closely to theorizing in cognitive psychology. One recent idea about human memory—Tulving and Thomson's (1973) concept of encoding specificity—seems particularly relevant. Tulving argued that the likelihood of an item being recalled depends upon the specific encoding context (acquisition context) being reproduced, including even apparently irrelevant aspects. The idea that many forms of aggressive behavior are elicited by the presence of specific cues is not new (Berkowitz 1974), and there is evidence of the importance of specific cues from a violent film during testing (Geen and Berkowitz 1966; Turner and Fenn 1978; Turner and Layton 1976). Turner and Fenn (1978) analyzed a number of case studies where juveniles seem to have imitated specific criminal acts portrayed on television, e.g., the Boston incident in which a gang burned a woman to death. In each case, they found that highly specific visual cues present in the television program (e.g., a woman carrying a bright red gasoline can) were present in the environment in which the imitated behavior was emitted.

Let us consider what may be happening in information-processing terms. A child is constantly building and storing algorithms for problem solving in his or her memory. One source for the programs he or she constructs is the child's observation of problem-solving behaviors by others. A particular behavior that is observed may never be successfully encoded and stored; even if stored, it may become irretrievable. According to the encoding specificity principle, the retrievability will depend upon the extent to which the specific cues present at encoding are also present at retrieval time. But what determines whether or not an algorithm is successfully stored? Certainly, from information-processing models of memory, one would predict that the more salient a scene and the more a scene is rehearsed, the more likely it is to be stored.

While only a few researchers have moved in this direction, there are data supporting this view. In one of the earliest studies of media comprehension, Holaday and Stoddard (1933) discovered that scenes with particularly salient visual and auditory cues were more likely to be recalled. More recently, Calvert and Watkins (1979) confirmed these results. Of course, comprehension, recall, and recognition of television scenes improve with the viewer's age, but the errors young children make seem to be based on previously stored "scripts" for the situations

(Newcomb and Collins 1979). Cognitive researchers have found that "scripts" (expected behavior sequences) play an important role in guiding the recall of prose (Schank and Abelson 1977; Bower et al. 1979); it is therefore not surprising that they should guide the recall of scenes viewed on television. How is a script formed? It may be based originally on what the child is told or the child's observations of his or her environment. But, eventually, television programs themselves would influence scripts. A child who repeatedly watches television characters interacting violently may store a violent script for social interaction and store algorithms for behaving aggressively in social situations.

Based on this model, Rosenfeld et al. (1978) argued that the rehearsal of specific aggressive acts observed on television through daydreaming or imaginative play could increase the probability that the aggressive acts will be performed. Indeed, in cross-cultural data, it was found that aggressive fantasies are positively correlated with aggressive behavior and in some cases with television violence viewing. This cognitive, information-processing interpretation of observational learning might also explain why violent scenes perceived as unreal are not modeled as readily (Feshbach 1976). The observer stores for later retrieval and rehearsal those scenes that have subjective utility as likely solutions to real social problems. Acts perceived as unreal would not be likely to fulfill this requirement and hence would not be stored. The child's use of aggressive fantasies to rehearse aggressive behaviors should not be confused with the child's use of imaginative play and normal daydreaming. Singer and Singer (1980) found that children who engage in more imaginative play and fantasy in general are less aggressive. One reason may be that these children have rehearsed prosocial behaviors sufficiently for them to become dominant responses.

The foregoing approach has important implications for the controversy over whether television violence disinhibits general aggressive behavior or teaches observers specific aggressive acts. The research on observational learning and cognitive processes suggests that the observed relations between violence viewing and aggressive behavior do not require a disinhibition theory. Children who observe large numbers of aggressive behaviors on television could store and subsequently retrieve and perform those behaviors, when the appropriate cues are present. Even seemingly irrelevant aspects of the scene (e.g., color) could serve as triggering cues. The recall of an aggressive behavior which provides a solution to a problem a child faces may lead to the emission of that behavior. While reinforcement of the behavior increases the likelihood that the child will emit that behavior again, it is not a prerequisite for the behavior. This argument does not mean that disinhibition of aggression cannot

grates the results. Also undecided is the justification hypothesis—that aggressive people watch television violence because they can then rationalize their own actions as normal. Finally, the available data convincingly con-

tradict the catharsis model. Not only is there no evidence that vicarious participation in aggression reduces aggressive behavior, there is some evidence that it actually increases the likelihood of aggressive acts.

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shown nonviolent educational excerpts, followed by discussion of their content. Then, at the beginning of the third year, a more formal attitude-change procedure was used with the experimental subjects. Each of the experimental subjects was asked to write a paragraph on "why TV violence is unrealistic and why viewing too much of it is bad." Over the course of two sessions, the children in the experimental group wrote the paragraph, received suggestions and rewrote it, were taped reading the paragraph, and watched a television tape of themselves and their classmates reading the paragraphs. The subjects were told that the tapes were going to be shown to the school children in Chicago. The placebo group also made a tape, but it was about "what you did last summer." Six months after this intervention, the final wave of data on all the children in the study was collected. Remarkably, the mean peer-nominated aggression score for the experimental group was now significantly lower than the score for the placebo group (see table 4). Furthermore, the regression lines for predicting aggression were different within the two groups. Violence viewing was a much more important predictor in the placebo group. Since the children were randomly assigned to each condition, it would appear that changes in the children's attitudes brought on by the intervention engendered the difference in aggressiveness.

Arousal Processes

One might designate the changes in attitudes brought about by frequent violence viewing as a cognitive desensitization to violence. Similarly, there is some evidence to indicate that a real physiological desensitization can

occur. In a quasi-experimental field study (Cline et al. 1973), boys who regularly watched a heavy diet of television violence displayed less physiological arousal in response to new scenes of violence than did control subjects. While these results have apparently been difficult to replicate in the field, Thomas et al. (1977) discovered similar short-term effects in laboratory studies of GSR responses to violence. It should not be surprising that emotional and physiological responsiveness to scenes of violence habituates as other responses do.

It is more difficult to make the case that such habituation would influence the future probability of aggressive behavior. On the one hand, one could argue that arousal heightens the propensity of the person to behave aggressively and television violence increases or perpetuates arousal. Studies by Geen and O'Neal (1969), Zillmann (1971; this volume), and others demonstrate that increasing a subject's general arousal increases the probability of aggressive behavior. While more recent experiments (Baron 1977) placed limits on these results, it might follow that children who watched the least violence previously would be the most aroused by violence and the most likely to act aggressively afterward.

On the other hand, one could argue equally convincingly that the arousal fostered by television and film violence is an unpleasant consequence that serves as a negative reinforcer. In this case, the desensitized heavy violence viewers would be expected to behave more aggressively than those not desensitized. Confusion between these two processes is evident in the writings of communication researchers, some of whom argue that television is making children hyperactive by "overloading" them with stimulation (Halpern 1975), while others claim television is anesthetizing children (Winn

Table 4

Effect of the Intervention on Mean Level of Aggression Over the Course of 1 Year

	Mean Peer-Nominated Aggression (Peeragg)			
	Before (1978)	After (1979)		
Experimental Group (N=59)	154.0	175.3		
Placebo Group (N=58)	158.0	242.8		
Analysis of Covariance				
	Source	df	F	Signif.
Covariates				
	Sex	1	1.23	—
	Grade	1	0.00	—
	Peeragg 1978	1	61.12	.001
Effects				
	Group	1	6.40	.013
Error				
		112		
Total		116		

grates the results. Also undecided is the justification hypothesis—that aggressive people watch television violence because they can then rationalize their own actions as normal. Finally, the available data convincingly con-

tradict the catharsis model. Not only is there no evidence that vicarious participation in aggression reduces aggressive behavior, there is some evidence that it actually increases the likelihood of aggressive acts.

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