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Longitudinal Relations between Children's Exposure to Television Violence and Their Aggressive and  
Violent Behavior in Young Adulthood: 1977-1992

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Abstract

While the relation between television violence viewing and aggression in childhood has been clearly demonstrated, only a few studies have examined this relation from childhood to adulthood, and these studies of children growing up in the 60s reported significant relations only for males. The current study examines the longitudinal relations between television violence viewing at ages 6 to 10 and adult aggressive behavior about 15 years later for a sample growing up in the 70s and 80s. Follow-up archival data ( $N = 450$ ) and interview data ( $N = 329$ ) reveal that childhood exposure to media violence predicts young adult aggressive behavior for both males and females. Identification with aggressive media characters and perceived realism of television violence also predict to later aggression. These relations persist even when the effects of socio-economic status, intellectual ability, and a variety of parenting factors are controlled.

## Longitudinal Relations between Children's Exposure to Television Violence and Their Aggressive and Violent Behavior in Young Adulthood: 1977-1992

Over the past 40 years a body of literature has emerged which strongly supports the notion that media violence viewing is one factor contributing to the development of aggression. The majority of empirical studies have focused on the effects of watching dramatic violence on television and film. Numerous experimental studies, many static observational studies, and a few longitudinal studies all indicate that exposure to dramatic violence on television and in the movies is related to violent behavior (Huesmann & Miller, 1994; Huesmann, Moise, & Podolski, 1997). Furthermore, a substantial body of psychological theory has developed explaining the processes through which exposure to violence in the mass media could cause both short and long term increases in a child's aggressive and violent behavior (Bandura, 1977; Berkowitz, 1993; Eron, 1963; Huesmann, 1988; Huesmann, 1998; Zillmann, 1979). Long-term effects with children are now generally believed to be primarily due to long-term observational learning of cognitions (schemas, beliefs, and biases) supporting aggression (Berkowitz, 1993; Huesmann, 1988, 1998) while short-term effects with adults and children are recognized as also due to priming (Huesmann, 1998), excitation transfer (Zillmann, 1983) or imitation of specific behaviors. Most researchers of aggression agree that severe aggressive and violent behavior seldom occurs unless there is a convergence of multiple predisposing and precipitating factors such as neurophysiological abnormalities, poor child rearing, socioeconomic deprivation, poor peer relations, attitudes and beliefs supporting aggression, drug and alcohol abuse, frustration and provocation, and other factors. The evidence is already substantial that exposure to media violence is one such long-term predisposing and short-term precipitating factor. The current longitudinal study adds important additional empirical evidence that the effects of childhood exposure to media violence last into young adulthood and increase aggressive behavior at that time for *both* males and females.

### *Theoretical Background*

In discussing the alternative theoretical perspectives that have emerged to explain the obtained

relations between exposure to violence (family, community, or mass media) and subsequent aggressive behavior in the observer, it is important to distinguish between short term effects and longer term effects.

In recent theorizing long term relations have been ascribed foremost to the acquisition through *observational learning* of three social-cognitive structures: schemas about a hostile world, scripts for social problem solving that focus on aggression, and normative beliefs that aggression is acceptable (Bushman & Huesmann, 2001; Huesmann, 1988, 1998). Building on the accumulating evidence that human and primate young have an innate tendency to imitate whomever they observe (Butterworth, 1999; Wyrwicka, 1996), these theories propose that very young children imitate almost any specific behaviors they see. Observation of specific aggressive behaviors around them increases the likelihood of children behaving exactly that way (Bandura, 1977; Bandura, Ross, & Ross, 1963a). Proactive-instrumental aggressive behaviors in children 2 to 4 years old generally appear spontaneously (Tremblay, 2000) as may hostile temper-tantrums. However, the observation of specific aggressive behaviors at that age leads to the acquisition of more coordinated aggressive scripts for social problem solving and counteracts environmental forces aimed at conditioning the child out of aggression. As the child grows older, the social scripts acquired through observation of family, peers, community, and mass media become more complex, abstracted, and automatic in their invocation (Huesmann, 1988). Additionally, children's social cognitive schema about the world around them begin to be elaborated. In particular, extensive observation of violence around them biases children's world schemas toward attributing hostility to others' actions (Comstock & Paik, 1991; Gerbner, Moss, Morgan, & Signorielli et al., 1994). Such attributions in turn increase the likelihood of children behaving aggressively (Dodge, 1980; Dodge, Pettit, Bates, & Valente., 1995). As children mature further, normative beliefs about what social behaviors are appropriate become crystallized, and begin to act as filters to limit inappropriate social behaviors (Huesmann & Guerra, 1997). Children's own behaviors influence the normative beliefs that develop, but so do the children's observation of the behaviors of those around them including those observed in the mass media (Guerra, Huesmann, Tolan, Van Acker, & Eron, 1995; Huesmann, Guerra, Zelli, & Miller,

1992; Huesmann, 1999). In summary, social-cognitive observational-learning theory postulates long-term effects of exposure to violence through the influence of exposure on the development of aggressive problem solving scripts, hostile attributional biases, and normative beliefs approving of aggression.

A major alternative or complementary theory to explain long-term effects is desensitization theory. This theory is based on the empirical fact that most humans seem to have an innate negative emotional response to observing blood, gore, and violence. Increased heart rates, perspiration, and self-reports of discomfort often accompany such exposure (Cline, Croft, & Courier, 1973; Moise-Titus, 1999). However, with repeated exposure to violence, this negative emotional response habituates, and the observer becomes "desensitized." The presumption is that lack of a negative emotional response to observing violence also indicates a flat response to planning violence or thinking about violence. Thus, proactive-instrumental aggressive acts become easier to commit.

There are two other quite different theoretical perspectives that have attempted to explain long-term relations between exposure to violence and aggression without hypothesizing any direct effect of violence viewing on aggression. One theory is that aggressive behavior or a correlate of aggressive behavior stimulates exposure to violence and that engenders the observed relation between them. Observational studies of aggressive children do show that the aggressive child is likely to provoke others who then respond aggressively to the child creating a violent environment that the child "observes." For media violence, however, the usual assumption is that the aggressive child simply "likes" watching media violence more than other children do (Atkin, Greenberg, Korzenny, McDermott, 1979; Fowles, 1999; Goldstein, 1998). Drawing on social comparison theory, Huesmann (1988, 1995, 1998) has elaborated on this theme by suggesting that aggressive children feel happier and more justified if they believe they are not alone in their aggression, and viewing media violence makes them feel happier because it convinces them that they are not alone.

The other alternative theory that has been widely discussed is best described as the "third" variable theory. A wide variety of demographic, family, and personal characteristics are known to be

correlated both with television viewing and with aggression, e.g., social class, IQ (Comstock & Paik, 1991). These theories suggest that the observed long-term positive relations between aggression and exposure to media violence are spurious and are derived by their joint association with one of more of these third variables.

These "third" variable explanations should not be confused with the developmental perspectives on the observational learning and desensitization theories which also assign important roles to parenting, intellectual ability, and social class as contributors to both exposure to violence and acceptability of aggressive behavior. Lower SES and lower IQ children are known to watch more TV (Comstock & Paik, 1991) probably for multiple reasons including social norms, cost of alternative entertainments, and frustration with more intellectually demanding tasks. Parents' TV habits and child rearing practices also influence the child's TV habits (Comstock & Paik, 1991). Of course, early parenting factors such as harsh punishment, rejection of the child, and lack of discipline are also known to influence subsequent aggression by the child (Tremblay, 2000). The difference is that these factors are not viewed as explaining away the "effect" of exposure to violence on aggression but as explaining individual differences in exposure to violence and individual differences in the strength of the effect.

Any of these theoretical processes might also contribute to the shorter term relations between exposure to violence and aggressive behavior. However, two other processes have been widely discussed as playing a role in short-term relations: *priming* and *arousal* processes. The observation of stimuli that have been paired in the past with observed violence or that inherently suggest violence (e.g. weapons) activates memory traces for aggressive scripts, schemas, and beliefs sufficiently to make their utilization more probable (Berkowitz, 1993; Josephson, 1987). A provocation that follows *priming* stimulus is more likely to stimulate aggression as a result of the priming. While this effect is short-lived, the primed script, schema, or belief may have been acquired long ago and may have been acquired in a completely different context.

To the extent that observed violence (real world or media) arouses the observer, aggressive

behavior may become more likely in the short run for two other possible reasons -- excitation transfer (Zillmann, 1979; 1983) and general arousal (Berkowitz, 1993; Geen & O'Neal, 1969). First, a subsequent provocation may be perceived as more severe than it is because the emotional response stimulated by the observed violence is misattributed as due to the provocation (Zillmann, 1979; 1983). Such, excitation transfer could account for a more intense aggressive response in the short run. Alternatively, the increased general arousal stimulated by the observed violence may simply reach such a peak that the ability of inhibiting mechanisms such as normative beliefs to restrain aggression is reduced (Berkowitz, 1993).

It is important to recognize that these theoretical processes are not mutually exclusive. It is perfectly possible that observational learning, desensitization, priming, and excitation transfer all contribute to the observation of violence stimulating aggression while at the same time more aggressive children do like to watch more violence. However, there is one theory that is incompatible with all of these. Catharsis theory (Feshbach & Singer, 1971; Fowles, 1999) would predict that violence viewing should be followed by reductions in aggression. Since the empirical evidence for any such negative relation is almost non-existent (see Huesmann et al., 1991; Paik & Comstock, 1994), catharsis theory seems untenable at this time.

### *Empirical Background*

In contrived experimental studies, children (both boys and girls) exposed to violent behavior on film or television behave more aggressively immediately afterwards (see reviews by Comstock, 1980; Geen, 1983, 1990; Geen & Thomas, 1986). The typical paradigm is that randomly selected children who are shown either a violent or non-violent short film are observed afterwards as they play with each other. The consistent finding is that children who see the violent film clip behave more aggressively towards each other (Bjorkqvist, 1985; Josephson, 1987) or towards surrogate objects (Bandura, Ross, & Ross, 1961, 1963a, 1963b). In these settings exposure to violent film scenes clearly causes more aggressive behavior by children immediately afterwards.

The demonstration of a relation between the observation of dramatic television/film violence and the commission of aggressive behavior has not been limited to the laboratory. Evidence from field studies has clearly shown that the amount of television and film violence a child is regularly watching is positively related to the child's aggressiveness. Children who watch more violence on television and in the movies behave more violently and express beliefs more accepting of aggressive behavior (see reviews by Anderson, 1977; Chaffee, 1972; Comstock, 1980; Hearold, 1979; Huesmann, 1982; Huesmann & Miller, 1994; Paik & Comstock, 1994; Wood, Wong, & Chachere, 1991). While the correlations are modest by the standards used in the measurement of intellectual abilities (average = .41 for experiments and .19 for field studies, Paik & Comstock, 1994), the correlations are highly replicable and are substantial by public health standards (see Rosenthal, 1986). For example, as a comparison, the correlation between cigarette smoking and lung cancer was .34 in Wynder and Graham's (1950) classic study. Moreover, the correlation between childhood exposure to media violence and childhood aggression is highly replicable even across researchers who disagree about the reasons (e.g., Huesmann, Lagerspetz, & Eron, 1984; Milavsky, Kessler, Stipp, & Rubens, 1982) and across countries (Huesmann & Eron, 1986).

While these one-shot field studies showing a correlation between media violence viewing and aggression suggest that the causal conclusions of the experimental studies may well generalize to the real world, longitudinal studies with *children* can test the plausibility of long-term predisposing effects more directly. In perhaps the first longitudinal study on this topic, initiated in 1960 on 856 youth in New York State, Eron, Huesmann, Lefkowitz, and Walder (1972) found that boys' early childhood viewing of violence on TV was statistically related to their aggressive and antisocial behavior ten years later (after graduating from high school), even controlling for initial aggressiveness, social class, education, and other relevant variables (Lefkowitz, Eron, Walder, & Huesmann, 1977). A 22 year follow-up of these same boys revealed that their early aggression predicted later criminality at age 30 and that early violence viewing also was independently but weakly related to their adult criminality (Huesmann, 1986, 1995).

A more representative longitudinal study was initiated by Huesmann and his colleagues in 1977 (Huesmann & Eron, 1986; Huesmann, Lagerspetz et al., 1984). This three-year longitudinal study of children in five countries also revealed that the television habits of children as young as first-graders also predicted subsequent childhood aggression, even controlling for initial level of aggression. In contrast to earlier longitudinal studies, this effect was obtained *for both boys and girls* even in countries without large amounts of violent programming such as Israel, Finland, and Poland (Huesmann & Eron, 1986). In most countries the more aggressive children also watched more television, preferred more violent programs, identified more with aggressive characters, and perceived television violence as more like real life than did the less aggressive children. The combination of extensive exposure to violence coupled with identification with aggressive characters was a particularly potent predictor of subsequent aggression for many children. Still, there were differences among the countries. While the synchronous correlations were positive in all countries, the longitudinal effect of violence viewing on aggression was not significant for girls in Finland or for all children in Australia. In Israel, there were significant effects for children living in a city but not for children raised on a kibbutz.

A few longitudinal studies have seemed to produce results at odds with the thesis that media violence causes aggression, but closer inspection of most of these studies reveals that their results are not discrepant, but simply not strongly supportive of the thesis. (For a review, see Huesmann & Miller, 1994). For example, while NBC's longitudinal study of middle-childhood youth conducted in the 1970s (Milavsky et al., 1982) only reported significant regression coefficients for 2 out of the 15 critical tests of the causal theory for boys, an additional 10 are in the predicted direction. Furthermore, for girls 3 out of the 15 critical tests were significant and an additional 7 were in the predicted direction.

### *The Current Study*

As the above review indicates, over the past several decades the correlation between television violence viewing and childhood or adolescent aggression has been unambiguously demonstrated. It has also been clearly confirmed that in the short run exposure to violence causes an increase in immediate

aggressive behavior. These effects have been obtained repeatedly for both boys and girls. The few completed longitudinal studies have also suggested that there is a long-term effect of early childhood exposure on aggression later in childhood, in the teen years, and, less strongly, into adulthood. However, these longer term effects have only been found for boys in the existing studies which were initiated in the 1960s.

The current study is a follow-up of the 1977 longitudinal study of 557 children growing up in the Chicago area that we described above and have reported on elsewhere (Huesmann & Eron, 1986; Huesmann, Lagerspetz et al., 1984). Our aim was to investigate the long-term relations between viewing media violence in childhood and young adult aggressive behavior. The study was designed to provide data that could be used to compare the relative plausibility of the violence effects theories described above (observational learning theory or desensitization theory) with the plausibility of the preference for violence or "third" variable theories. However, the study was not designed to contrast observational learning theory with desensitization theory. Additionally, the examination of the "third" variable hypotheses in this study, as always, is limited by the potential third variables included in the study.

In the follow-up study we tracked down as many of the original boys and girls in that USA study as we could find 15 years later when they were in their early twenties. We interviewed them, interviewed their spouses or friends, and collected data on them from state archives. In this article we address four major questions with data from this follow-up: 1) To what extent does early childhood exposure to media violence predict young-adult aggression and violence? 2) Are there gender differences in the predictability? 3) Does the extent to which the child viewer identifies with the aggressive character or believes the plot is realistic affect the strength of the prediction? and, 4) To what extent does any long term relation seem to be due to more aggressive children simply liking to watch violence or seem to be due to some environmental, family, or personal "third variable" that stimulates both childhood violence viewing and childhood and adult aggression?

## Method

*Participants and Procedure*

The data which we are analyzing in this paper were collected on a sample of youth during two time periods in their lives-- an original two-year period when they were in the 1st and 2nd or 3rd and 4th grades and a two-year follow-up period approximately 15 years later when they were in their early 20s. The longitudinal design is summarized in Table 1.

In the original childhood study 557 1st and 3rd graders from public schools in Oak Park, Illinois and two parochial schools in Chicago, Illinois were tested and interviewed at least twice, in the spring of their 1st and 2nd grade years (younger cohort) or in the spring of their 3rd and 4th grade years (older cohort). These interviews occurred in the spring of 1977 and 1978. The children were interviewed in their classrooms and peer-nomination measures were obtained about observed behaviors including aggression. The children's scores over the two year period were averaged to provide more accurate single estimates of their TV viewing habits and aggressive behaviors during that early period. In addition, most parents were interviewed once during this two year period, and data on the intellectual ability of the children were obtained from school records. The exact procedures for participant selection and testing are described in Huesmann and Eron (1986). Essentially all 1st and 3rd graders in Oak Park and all 1st and 3rd graders in the two Chicago schools formed the pool from which participants were recruited. We obtained active parental permission for 758 children or about 76% of the eligible children, and collected the initial two years of data on 557 or about 73% of the permission participants. These 557 children constitute the initial sample for the current 15-year follow-up study.

A subset of 505 of these children was re-interviewed in 1979 in the spring of the younger cohort's 3rd grade year and the older cohort's 5th grade year. Their scores on peer-nominated aggression at that time served as a criterion measure for the longitudinal analyses of childhood effects reported in Huesmann and Eron (1986) and Huesmann, Lagerspetz et al. (1984). However, for the current 15-year longitudinal study we searched for all 557 original participants.

In 1991, when the participants were between 20 and 22 years old, we began the follow-up process. We searched for public archival data on all the original 557 participants, and we attempted to locate and recruit as many as possible for a follow-up interview. Through searches of public drivers' license records and criminal justice records we obtained archival data on 450 of the original 557 participants ( 81%). This is called the archival follow-up sample. Its gender and age composition is shown in Table 1.

The process of locating and recontacting the original participants for interviews was more complex. None of the participants had been contacted during the prior 15 years. We searched phone records, school records, and pursued social networks for over two years. Those participants who were living in the Chicago area were asked to come to the University of Illinois at Chicago to complete the interview. Participants sat at a computer and completed the questionnaire. In addition, they were asked to give the names of the three people who knew them best (excluding parents and siblings) and to rate those people on how well they knew them. If the participant listed his/her spouse, we selected the spouse as the "Other" person to be interviewed; otherwise, we selected the person with the highest rating. With the participant's permission, we then interviewed this "Other" person. Participants were paid \$50 to complete the 3 to 4 hour interview and the "Other" persons were paid \$30 for completing a 1 to 1.5 hour interview.

At the point when no additional participants could be located who were available to do the interview in-person in Chicago, the questionnaire was converted into a combination phone and mail interview. In this version participants were again contacted initially by phone and asked to participate. If they agreed, a short 20-30 minute interview was conducted on the phone and the remainder of the interview was mailed to the person. During the phone interview the participants were also asked to give the names of the three people who knew them best and who were not family members and to rate how well those persons knew the participant. As with the personal participants, we contacted the "Other" person they named who was their spouse or who had the highest rating if they had no spouse (if the participant gave us permission to contact the person) and asked if they would be willing to participate in

our study. If they agreed, they were sent a mail interview. Participants and "Other" persons who participated by phone and mail were paid the same amount for their participation as those who completed the in-person interview.

Using these procedures, between 1992 and 1995 we were able to reinterview a total of 398 participants -- 299 through personal interviews and 99 through phone mail interviews. In addition, we obtained a total of 356 "Other" person interviews (of which 121 were spouses) -- 181 in-person and 175 by mail. However, of the 398 reinterviewed participants, only 329 had provided complete data during the first two waves of the study, i.e. were part of the original 557 sample. Thus our final interview sample size, as shown in Table 1, was 329 -- 153 males and 176 females -- or about 60% of the original Wave 1+2 sample of 557 children. While 40% attrition over a 15 year lag between interviews is about typical for this type of longitudinal research, it requires that some attention be paid to the representativeness of the follow-up sample. Within the sample of 329 there were 299 participants on whom we had obtained a parent interview during the first two waves of the study (161 females and 138 males). There were also 235 who reported that they currently had spouses or "significant others," and we interviewed 121 of these during our "Other" person interviews (65 females and 56 males).

At the time of the follow-up the reinterviewed participants ranged in age from 20 to 25 years, with a mean age of 22 years. The lag since their initial 1st or 3rd grade interview ranged from 15 to 18 years. The reinterviewed sample was split fairly evenly by gender with 153 males and 176 females. While the majority of the reinterviewed sample was Caucasian, about 7.5% belonged to minority groups compared to 12.9% of the original sample. At the time of the interview the participants' level of education ranged from having completed 9th grade to having completed a graduate or professional degree with the average education level being 'some college.' Finally, in terms of SES, the reinterviewed sample was somewhat skewed toward the higher end of the scale, as measured by the Hollingshead (1958) status rating of the participant's father's most recent occupation, with 65.3% having high status jobs, 26.9% having medium status jobs, 5.8% having low status jobs, and 2% having jobs with an unknown status.

One additional question of importance is how do the resampled participants differ from those participants who could not be found after 15 years? We compared the two groups on their initial childhood aggression. The participants on whom we succeeded in locating archival data did not differ significantly from the other participants on childhood aggressiveness. However, the participants whom we succeeded in re-interviewing were less aggressive than those who were lost. This is a typical pattern for longitudinal studies of antisocial and aggressive behavior. The more aggressive and antisocial participants are underrepresented in the follow-up interview. Nevertheless, the reinterview process did not reduce the range of aggression scores (0 to .82 in reinterview sample; 0 to .65 in dropped sample). The reinterviewed sample also scored higher than those not reinterviewed on childhood intellectual ability scores ( $p < .01$ ) and on parents' education ( $p < .001$ ) which again suggests that the reinterviewed sample is a less "at risk" part of the original sample. Given these kinds of resampling differences, we must be somewhat judicious in not *underestimating* effects due to the loss of more aggressive participants. However, the distribution is not likely to bias us toward detecting effects that are not there.

#### *Child Measures (1970s)*

The key original child measures are listed in Table 2 with their reliability coefficients. Details of these measures and the procedures of administering these measures have been published in Huesmann, Lagerspetz et al. (1984) and Huesmann and Eron (1986) and will only be summarized below. Test-retest reliabilities were based on the analysis of a subset of 93 children who were retested one-month after their initial interviews.

*Childhood television violence viewing.* Each year children were presented with 8 lists of 10 television programs and asked to mark their favorite program on each list and how often they watched it - "every time it's on," "a lot, but not always," or "once in a while." As described in Huesmann and Eron (1986), the 80 programs used were the most popular that year according to the Nielsen ratings for 6 to 11-year-old children. They were divided so that each list of 10 had several violent and several non-violent programs and was balanced for Nielsen popularity and time shown. The amount of on-screen

physical violence portrayed on each program was coded by two raters on a 5 point scale from "not violent" to "very violent". The raters were clinical psychology graduate students who were trained to follow a written criterion for what constituted violence, i.e., "visually depicted, physical, interpersonal acts that were intended to harm" (see Huesmann & Eron, 1986). The interrater reliability was .75 (Huesmann & Eron, 1986). Some examples of shows rated as "very violent" are "Starsky and Hutch," the "Six Million Dollar Man," and "Road Runner Cartoon". A child's overall violence score was computed by summing the violence scores for the favorite programs and weighting them by how often they were watched. On the basis of regression analyses predicting concurrent aggression (see Huesmann and Eron, 1986), shows that were watched "every time it is on" were weighted by 10 and shows that were watched "a lot, but not always" were weighted by 1. Shows that were watched only "once in a while" were weighted zero and did not contribute to the violence score.

*Childhood identification with aggressive TV characters.* As described in Huesmann and Eron (1986), children were asked "How much do you act like or do things like" various *adult* aggressive characters, such as the Bionic Woman and the Six Million Dollar Man - "a lot (2), a little (1), not at all (0)." In each year two aggressive male characters and two aggressive female characters were presented. The children only answered questions about characters they had seen. The average identification with *adult* aggressive television characters was then calculated separately for the male and female characters. We used this "believed similarity" identification measure rather than a "wishful" identification measure because, theoretically, believed similarity should produce stronger observational learning from a model (Bandura, 1969).

*Childhood judgements of realism of TV violence.* As described in Huesmann and Eron (1986), children were asked to rate how realistic they judged various violent programs to be. They were given a list of ten violent television shows, including cartoons, and asked, "How true do you think this program is in telling what life is really like: Just like it is in real life (3), A little like it is in real life (2), or Not at all like it is in real life (1)." The average "realism" score for the programs they had seen was then

calculated. Again, our hypothesis was that observational learning would be greater if the viewer perceived the observed behavior as "telling about life like it really is."

*Childhood aggressive behavior.* Aggressive behavior in the first two waves of the study was measured using a modified version of the *Peer Nominated Index of Aggression* (Eron, Walder, & Lefkowitz, 1971; Huesmann & Eron, 1986; Walder, Abelson, Eron, Banta & Laulicht, 1961). In this procedure, each child was asked to report which children in the class engage in ten different aggressive behaviors, such as "starts a fight over nothing" and "pushes and shoves children". It included one indirect aggression item. A child's aggression score was then computed by adding up the number of times the child was named by his/her peers on all ten items divided by the number of students in the class doing the ratings. As Table 2 shows, this scale is extremely reliable with an internal consistency of .97 and a one month test-retest reliability of .91. This scale has been used in a wide variety of studies in different countries with participants of different ages and has shown construct, concurrent, and predictive validity in these settings (Huesmann & Eron, 1986; Huesmann, Guerra, Eron, & Crawshaw, 1994).

*Childhood intellectual ability.* Intellectual ability was assessed for all children in the third-grade with the *California Achievement Test* (Tiegs & Clark, 1970). The test was given as a part of the regular testing program in the schools during the spring of the children's third-grade year. For the younger-cohort a local test, the *Oak Park Reading Readiness test*, was used. Because these scores were on different scales, they were each converted to standard scores within grade to represent one common measure of intellectual ability relative to grade.

#### *Parent Measures (1970s)*

The *parents' educational levels* were recorded from self-reports, and an average of the mother's and fathers' levels was computed to be used as a measure of socio-economic status. Similarly, the *father's occupation* was recorded and coded according to Warner's (1960) scale for socioeconomic status. The scale scores were then reversed; so that a higher score indicated higher socio-economic status. Parents' educational level was chosen to be the primary measure of SES because it took into account both the

mother's and the father's status. Father's occupation was used as a cross-validation measure.

Three measures of self-reported parents' aggressiveness were obtained: 1) *Aggressive personality* as assessed by their average score on scales 4 and 9 of the MMPI (Huesmann et al., 1978; Alpha = .78); 2) *Severe physical aggression* as measured by 3 items about how many times in the last year the parents had "choked, punched, or beaten another adult;" had "slapped or kicked another adult;" or had "threatened or actually cut someone with a knife or threatened or shot at someone with a gun, (Huesmann, Eron, Lefkowitz, & Walder, 1984; Alpha = .60)" and 3) *Fantasizing about aggression* as assessed by an adult version of the aggression scale of the Children's Fantasy Inventory (Rosenfeld, Huesmann, Eron, & Torney-Purta, 1982; Alpha = .80).

Four measures of parenting practices and attitudes during the past year were assessed: *rejection* of the child (Alpha = .62), *nurturance of the child* (not appropriate for Alpha), *harsh punishment* of the child (not appropriate for Alpha), and *mobility orientation* (i. e., willingness to sacrifice to get ahead; Alpha = .63). Most of these parent measures have been described in more detail elsewhere (Eron et al., 1971; Huesmann & Eron, 1986).

Finally, two measures of parent TV usage were collected in the parent interviews: *parents' TV viewing frequency* as estimated by the parents, and the *parents' TV violence viewing* based on their self-reports of programs watched (see description below under adult measures and Huesmann & Eron, 1986).

#### *Adult Measures (1990s)*

Only a subset of all the adult measures administered are used in this paper. They include a self-report measure of TV-violence viewing and multiple measures of aggressive and antisocial behavior assessed from different sources.

*Adult television violence viewing.* During the personal or phone interviews, participants were asked to report their three favorite regularly scheduled TV programs during the current year and how frequently they watched them. All three programs were then coded for their level of violence using a scale from 0 (no visible or 'off-camera' violence) to 4 (high visible violence). Again the raters were

psychology graduate students who were trained to rate shows on the basis of the same written criterion employed in the first two waves of the study. Raters were instructed to rate the shows on the basis of the frequency of violence which is visually depicted, physical, intentional and interpersonal and to rate only those programs which they had viewed themselves. They were instructed to ignore verbal violence, accidental violence and violence by animals in nature programs. However, violence by cartoon characters was counted. Twenty-seven different raters evaluated the 1272 programs and videos that participants listed. Raters were instructed to rate only those programs that they had viewed enough to be familiar with the content. The mean rating from all the raters who had viewed the show (two being the minimum acceptable) was then used. Two approaches to intercoder reliability were used: interrater correlations and the average discrepancy from the mean rating. The interrater correlations ranged from .39 to .96 with a mean of .78 (using Fishers' z). The average absolute discrepancy from the mean rating was .34 with no discrepancy being greater than .61.<sup>1</sup> A participant's adult violence viewing score was computed as the average violence rating for the participant's 3 favorite regularly scheduled TV programs, weighted by the frequency of viewing each show.<sup>2</sup> This approach has been used in a variety of other studies both for parents' reports of a child's violence viewing (Eron et al., 1971; 1972) and for adult reports of their own violence viewing (Eron et al., 1972; Lefkowitz, Eron, Walder, & Huesmann, 1978). Violence viewing measured in this way has been shown to correlate moderately with other viewing and behavior variables in expected directions in several samples from different countries (Eron et al., 1972; Huesmann & Eron, 1986; Huesmann, Lagerspetz & Eron, 1984; Lefkowitz et al., 1978) lending it construct validity.

*Adult aggressive behavior.* Data about the participants' current aggressive behavior were obtained from three sources: self-reports, 'Other-person'-reports, and archival state data. The measures used in the participant interview and the 'Other person' interview are listed in bottom half of Table 2 along with their internal consistency reliability coefficients. The scaling schemes used for most of these adult measures and the means and SDs for males and females are shown below in Table 3.

For indirect, verbal, and mild physical aggression, participants were asked to report the

frequency of engaging in various behavior when they "had problems with or got very angry at another person" (Bjorkqvist, Osterman, & Kaukiainen, 1992). The *indirect aggression* scale included 6 items such as how often the participant responded by "taking the person's things" and "trying to get others to dislike the person." The *verbal aggression* scale included 4 items such as how often the participant responded by "calling the person names" and "belittling the person's physical abilities or looks." The *mild physical aggression* scale included 3 items such as how often the participant responded by hitting, kicking or shoving the person. The *general aggression* scale (Huesmann & Eron, 1986) included 12 items based on the original peer-nomination scale for children but rewritten for adults. It included such questions as "how often do you give the finger to others," "how often do you start a fight over nothing," and "how often do you take other people's things without asking." The response scale for all of these frequency measures ranged from 0 for "never" to 4 for "very often." The *severe physical aggression* (Huesmann, Eron, Lefkowitz, & Walder, 1984) scale included 3 items about how many times in the last year the participant had "choked, punched, or beaten another adult;" had "slapped or kicked another adult;" or had "threatened or actually cut someone with a knife or threatened or shot at someone with a gun".

The participants were also asked to report how frequently they *aggressed against their 'spouse'* (or significant other) using Straus's conflict tactics scale (Straus, Gelles, & Steinmetz, 1980), and they were assessed on *antisocial/aggressive personality* with scales F, 4, and 9 from the MMPI personality inventory (Huesmann, Lefkowitz, & Eron, 1978). The reliability for all of these rating scales are respectable as shown in Table 2. We also asked the participants to report their frequency of traffic violations and of committing different kinds of specific crimes and whether they ever had been arrested or convicted. For this we used questions from the National Youth Survey (Elliott, Dunford, & Huizinga, 1987).

As described above, a close friend, spouse, or "significant other" of the participant was also interviewed and asked to rate the participant's frequency of engaging in aggressive behavior on the first

five rating scales described above as well as to report on the participant's specific criminal and antisocial acts. If they were the participants spouse or significant other, they were also asked to complete Straus's conflict tactics scale (Straus et al., 1980). This procedure has been used successfully in past studies (Huesmann et al., 1984) and is advantageous because it provides an alternative source of information in addition to self-report. The reliability for these "Other" person rating-scale aggression measures is also shown in Table 2 and ranged from .53 to .85.

#### *Archival Measures of Aggression*

Lastly, archival data, including criminal conviction records and moving traffic violation records were obtained for each participant from state records. We used the existence of an Illinois driver's license record as the mechanism for defining the sample on whom the state might have criminal records. In other words, if someone with a driver's license did not appear in the criminal conviction registry, they were coded as having no "official" convictions. For the archival, self-report, and other-report data on specific arrests or convictions we also computed a "violence" score (based on Rossi et al., 1974). Rossi's system yields scores which range from 0 for a crime involving no violence, e.g., embezzlement, to 1.92 for a highly violent crime, e. g., homicide. To get driving violation data, we searched for traffic records in Illinois and other states that would give us access. We assigned a participant a score of zero for moving traffic violations if we obtained access to their record in at least one state, and they had no violations.

## Results

#### *Composite Aggression Score*

One of the first questions to be resolved is whether the multiple adult interview measures of adult aggression can be combined into a single measure of aggressive behavior that can be used in the major analyses. A key question in constructing such a composite is whether to measure aggression differently for males and females. Over the past decade substantial evidence has accumulated suggesting that females are more likely to engage in indirect forms of aggression, males are more likely to engage in direct physical aggression, and both genders are about equally likely to engage in verbal aggression

(Bjorkqvist, Lagerspetz, & Kaukiainen, 1992; Lagerspetz, Bjorkqvist, & Peltonen, 1988; Lagerspetz & Bjorkqvist, 1992)<sup>3</sup>. Because we wish to compare relations in males and females, we did not want to construct different measures of aggression for the two genders, but we also did not want to construct one measure that was biased toward assessing aggression in males. Our solution was to construct a composite measure from multiple indicators of aggression that assessed both direct and indirect forms of aggression.

We constructed a structural model, displayed in Figure 1, for such a composite from our 11 self-report and other-report rating scale measures of aggression and estimated its parameters from the correlations in the sample of our follow-up participants who had complete data on these measures ( $N = 325$ ). As shown in Figure 1, the structural measurement model fits the adult aggression data well (Chi Square = 28.9,  $df = 26$ ,  $N = 325$ ,  $p = .32$ , RMSE = .026) and gives weight to both typically male and typically female behaviors. From this model we derived a factor score regression equation which was used to estimate the latent aggression score for each participant with complete data. For participants who only had self-reports or only had "Other-person" reports, we derived a regression prediction of the composite from only those elements they did have.

The composite aggression score within the sample of 329 participants has a mean of 0 with a standard deviation of .7. However, the distribution is substantially positively skewed (1.9) as is typical for scales of aggression with scores ranging from a minimum of -1 to a maximum of 4. Thus, the median score is -.25, and the 25th and 75th percentiles are -.5 and +.23 respectively.

In Table 3 the mean scores on the composite, its major components, and some other measures of aggressive behavior are displayed for male and female participants along with the scale for each measure. One can see that males score higher on most questions about serious physical aggression and criminality, but females score higher on indirect aggression. Males and females score about equally on verbal aggression, general aggression, and aggression toward spouses no matter who reported it. These results are consistent with previous research on gender difference in aggression and add construct validity to the composite measure. Overall, on composite aggression, males score slightly but significantly higher.

The composite measure of aggression correlates significantly with independent archival indices of aggression, confirming its validity. Archival state records indicated that both males and females who score higher on our composite measure of aggression have committed more moving traffic violations ( $r = .29, N = 152, p < .001$  and  $r = .14, N = 169, p < .07$  respectively) while males who score higher have also been convicted of more crimes ( $r = .18, N = 150, p < .03$ ). The composite measure also correlates with other-reported and self-reported indices of specific antisocial and violent acts. Both males and females who scored higher on the composite are more likely to have assaulted their spouses according to the reports of their spouses ( $r = .71, N = 56, p < .001$  and  $r = .65, N = 65, p < .001$ ). In addition, those males and females who score higher on our composite measure of aggression are more likely themselves to report having engaged in criminal behavior ( $r = .33, N = 150$  and  $N = 174, p < .001$  for each gender). The more aggressive males also report having been arrested more times ( $r = .49, N = 153, p < .001$ ).

In summary, the composite measure seems to be a valid measure of aggressive adult behavior for both males and females. It encompasses a wide variety of different kinds of aggressive behavior, and while highly aggressive males and females may score high on different dimensions, both will score high on the composite. Consequently, the composite measure will be the adult criterion measure of aggression used in all subsequent analyses.

#### *Correlations Between Childhood Violence Viewing and Adult Composite Aggression*

In Table 4 the correlations between adult aggression and the early television viewing variables are shown. One can see that for both males and females, *childhood television violence viewing correlates significantly with the composite measure of adult aggression 15 years later*. In addition, childhood perceptions that TV violence reflects real life and childhood identification with same-sex aggressive characters significantly correlate with adult aggression 15 years later. The table also shows the correlations between the childhood TV measures and the subscales (see Figure 1) measuring physical aggression and indirect aggression. As expected, early TV-violence viewing correlates with physical aggression for both males and females but with indirect aggression only for females. Furthermore,

identifying with aggressive female characters correlates with a female's indirect aggression but not with her physical aggression. Given that female characters on television in the 1970s tended to display more indirect aggression than direct aggression, this finding is also not surprising.

In Figure 2 the meaning of these correlations with composite aggression is illustrated with a series of bar graphs. For each childhood television variable, the participants were partitioned into three categories: those scoring in the upper 20% on the TV variable, those scoring in the middle 60% and those scoring in the lower 20%.<sup>4</sup> Then the mean aggression score was plotted for the participants in each category. The figures reveal that in each case the upper 20% of participants on the childhood TV measure scores substantially higher on aggression 15 years later. Females in the high childhood TV violence group, the high childhood TV realism group, and the high childhood identification with same-sexed aggressive character group all score significantly higher on adult aggression 15 years later. The same is true for males in the high groups. One can conclude from these figures that the correlations between childhood TV-violence viewing and adult aggression to a great extent result from the higher aggressive behavior of the adults who were the highest violence viewers as children.

#### *Relations to Specific Aggressive Behaviors*

How do these longitudinal relations of early violence viewing with adult composite aggression translate into relations with specific aggressive behaviors? Given the overall significance of the effects on the composite aggression score, it seems justified to examine effects on specific items indicating the aggressive behaviors of most social concern. Therefore, we compared the participants who were in the high violence viewing group during childhood (the upper 20%) with all other participants on a number of very specific serious aggressive behaviors in the categories of spouse abuse, physical aggression, criminal activities, and driving violations. Because most of these specific antisocial or aggressive behaviors occur with very low-frequency, we classified the participants into those who reported engaging in the behavior at least once during the past year and those who said they had not done so during the past year. In Table 5 the results for eight specific behaviors are displayed.

One can see that males who were high violence viewers as children are significantly more likely to have "pushed, grabbed, or shoved their spouses," to have responded to an insult by shoving the person, to have been convicted of a crime (according to state records), and to have a traffic violation (according to state records). For example, males who were high violence viewers in childhood were convicted of crimes at over three times the rate of other males. Females who were high violence viewers as children are more likely to have thrown something at their spouse, to have responded to someone who made them mad by shoving, punching, beating, or choking the person, to have committed some type of criminal act, and to have a moving traffic violation. For example, females who were high violence viewers as children reported having "punched, beaten, or choked" another adult at over four times the rate of other females. Of course, there are many other specific behaviors on which the high and low violence viewers did not differ significantly. However, there was not a single aggressive behavior on which high violence viewers scored significantly lower than medium and low violence viewers.

#### *Predicting Adult Aggression from Childhood Violence Viewing*

These correlations and frequencies demonstrate clearly that childhood exposure to media violence is related to adult aggression. To gain a better understanding of the meaning of these longitudinal relations, we computed multiple regressions in which the relation of early violence viewing to later aggression is examined after controlling for the effects of early aggressive behavior. Essentially these regressions examine the contribution of early TV-violence viewing to "change" in aggression<sup>5</sup>. The regressions for girls are shown in Table 6 and the regressions for boys in Table 7.

The first regression in each table shows how adult aggression at the time of our follow-up can be predicted from childhood aggression and cohort (i.e., age at time of the childhood testing). Each subsequent regression equation in these tables examines whether a childhood TV viewing variable can improve the prediction of adult aggression over what was predicted from early aggression. As Regression 2 in these tables shows, for both males and females early exposure to TV violence significantly predicts adult aggression even when childhood aggression is partialled out of the relation. Moreover, as

Regressions 3 and 4 illustrate, the same can be said for identification with aggressive TV characters and perception that TV violence is realistic. Even after the effects of early aggression in predicting later aggression are partialled out, each of these TV viewing variables significantly predicts aggression when the participants are in their early 20s. For both males and females early TV-violence viewing, identification with same-sex aggressive characters, and perception that TV violence is realistic all predict increases in aggressive behavior beyond what one would expect from their early aggressiveness. However, for both genders the additive effect of all three predictors is not much greater than the individual contributions ( $R^2 = .102$  for females;  $R^2 = .133$  for males).

#### *Interactive Effects of the TV Viewing Scales on Later Aggression*

We next examined whether the identification with same-sex aggressive characters or the perception that TV violence is realistic not only had main effects on aggression but exacerbated the effects of viewing TV violence. We had found such an interactive effect for boys during childhood in the early waves of this study (Huesmann et al., 1984). To test for such effects, we expanded the regressions in Tables 6 and 7 that predict adult aggression to include the interactive effect of childhood TV-violence viewing with identification with same-sex aggressive characters and with perception that TV violence is realistic. For females we found no significant interactive effects. For males, however, we found a significant effect for both interactions. As shown in Table 8, identifying with aggressive male TV characters and perceiving that TV violence is realistic each exacerbated the effects of viewing TV violence on later aggression. Specifically, post-hoc decomposition of the interaction showed that for a boy who scores one SD above the mean on identification with aggressive characters, the standardized partial slope of adult aggression on his childhood violence viewing is .463. However, for a boy who scores at the mean on identification, the slope is only .185. The corresponding slopes for boys high and at the mean on perception of TV violence as realistic are .392 and .217 respectively. In other words, for boys, both identification with aggressive male characters and perception that TV violence is realistic significantly exacerbate the relation between childhood violence viewing and adult aggression.

*Testing Cross-lagged Effects from Childhood to Adulthood*

The analyses presented thus far suggest that childhood TV-violence viewing is predictive of serious adult aggression and violence for both males and females even after controlling for initial aggressiveness of the child. The effect is exacerbated for boys who identify with aggressive males in the programs they watch. These results support the hypothesis that the causal effects of media violence that have been demonstrated in the laboratory extend into real life from childhood to adulthood. However, one might wonder if aggressiveness might be stimulating violence viewing as much as violence viewing is stimulating aggression.

To test this possibility we constructed longitudinal structural models for males and females in which we simultaneously predicted adult aggression from childhood TV-violence viewing and adult TV-violence viewing from childhood aggression. The parameters of these structural models are based not just on the longitudinal correlations between aggression and violence viewing but also on the contemporaneous correlations in childhood and adulthood. In Table 9 we present the complete set of observed correlations for males and females on which the model will be based.

The significant correlations in Table 9 between childhood violence viewing and childhood aggression for both males and females replicate those reported previously for this study with the complete Wave 1 and 2 sample (Huesmann & Eron, 1986). For both males and females the correlations between childhood violence viewing and adult aggression are also significant (as reported earlier in Table 4). However, only for females does adult violence viewing correlate with adult aggression ( $r = .23$ ,  $p < .01$ ). Correspondingly, females' adult violence viewing is predicted significantly by their childhood violence viewing ( $r = .16$ ,  $p < .05$ ), while males' adult TV-violence viewing is not predicted from their childhood violence viewing. For the developmental theoretical perspectives that emphasize early childhood as the important period for observational learning the lack of a correlation between adult viewing and adult aggression is not unexpected and has been the frequent finding when the criterion measure of aggression is actual behavior (Bushman & Huesmann, 2001; Comstock & Paik, 1994; Eron

et al., 1972). The more unusual finding here is that there is a significant relation for adult females. The other somewhat surprising finding is the lack of significant negative correlations between parents' social status, as measured by parents' education level, and the aggression and violence viewing of their children. When father's occupation was substituted as the indicator of SES, significant correlations did appear between SES and a boys' childhood aggression ( $r = .19, p < .05$ ) and their later adult violence viewing ( $r = .19, p < .05$ ); however, for females the previously significant correlations between SES and adult aggression and violence viewing disappeared.

The structural models estimated from the violence viewing and aggression data above are shown in the upper panels of Figure 3 (for males) and Figure 4 (for females). In these models one way paths are only hypothesized when the predictor is measured in time before the criterion. The model for males is an excellent fit with a non-significant Chi-square statistic and a low root mean square error, Chi-sq (2) = .018,  $p < .89$ , RMSE = .003. The model for females is adequate but not as good a fit, Chi-sq (2) = 6.45,  $p < .02$ , RMSE = .047. However, for both genders the path coefficients from childhood TV-violence viewing to adult aggression are positive, statistically significant, and about twice the magnitude of the non-significant path coefficients from childhood aggression to adult TV-violence viewing. While the positive, non-trivial path coefficients from early aggression to adult TV-violence viewing suggest that more aggressive children may have some tendency to turn to watching more TV violence, the much bigger effect implied by these models is that early childhood exposure to TV violence *stimulates increases* in young adult aggressive behavior in both males and females.

An important issue in evaluating such structural models concerns the possibility that a construct is not measured reliably and therefore cannot predict or be predicted well by other constructs. The lack of correlations for males between early TV violence viewing and adult TV violence viewing and between adult TV violence viewing and adult aggression for both genders generates some concern along this line. However, the adult TV violence viewing was found to have substantial one-month test-retest reliability in a pilot test ( $r = .70$ ), and it did correlate with a number of other variables in the current study that are not

being investigated in this paper (e.g.,  $r = .16$ ,  $p < .01$  with normative beliefs approving of aggression). Therefore, these concerns can be somewhat alleviated though one must be someone judicious about concluding that early aggression has no effect on adult violence viewing.

*Controlling for SES and Intellectual Ability in the Longitudinal Models*

One might ask the extent to which these relations might be explained by demographic characteristics, such as the educational level or socio-economic status of the family. Lower income and lower educational status have generally been found to correlate both with more exposure to TV in general and media violence in particular (Comstock & Paik, 1991; Eron et al., 1972; Huesmann & Eron, 1986). They also often correlate with greater risk for violent and aggressive behavior (Berkowitz, 1993). Similarly, a child's intellectual ability might also be hypothesized to account for some of the longitudinal relation between childhood exposure to media violence and adult aggression. Scores on IQ and achievement tests are known to be negatively correlated with both TV-violence viewing and aggression (Comstock & Paik, 1993; Huesmann & Eron, 1986; Huesmann, Eron, & Yarmel, 1987). Some studies have suggested that observed longitudinal relations between violence viewing and aggression might be completely explained by these factors (e.g., Milavsky et al., 1982; Weigman, Kuttschreuter, & Baarda, 1986).

The models in the bottom panels of Figures 3 and 4 test this hypothesis. The parents' education and the child's intellectual ability as assessed during Waves 1 and 2 of the study are introduced into the longitudinal structural models as control variables with paths to every other variable. The resulting models for males and females both provide a good fit as indicated by the non-significant Chi-Square statistics and low root mean squared errors.<sup>6</sup> Furthermore, for both males and females the paths from childhood exposure to TV violence to adult aggression remain significant while the paths from early aggression to adult TV-violence viewing are not significant. For males the difference between the two paths is larger with the control variables introduced; for females the difference is smaller. In both cases, the most plausible conclusion is that childhood exposure to TV violence is stimulating an increase in

adult aggression regardless of initial aggressiveness of the child, intellectual ability of the child, or educational background of the parents. For females, there may well also be a stimulating effect of childhood aggression on later violence viewing, but it is a weaker effect. For males there is little indication of such an effect. Finally, when father's occupation was again substituted for parents' education as a measure of SES, the key paths in the structural models did not change.<sup>7</sup>

*Controlling for Parent Aggression, Parent TV Habits, and Parenting Practices and Attitudes*

As discussed in the introduction, it has been established in the past that a variety of parent behaviors and practices are related both to a child's TV viewing habits and to a child's aggression (Comstock & Paik, 1991; Huesmann & Eron, 1986). The question is whether these parent factors can account for the longitudinal relation between childhood TV violence viewing and young adult aggression. Three measures of parent aggression, four measures of parent child rearing practices, and two measures of parents' TV habits were selected for investigation in this role because of their theoretical significance and likelihood of influence. Each of the nine was introduced into the structural equation models shown at the bottom of Figures 3 and 4 with paths of influence leading to the childhood and adult TV violence variables and the childhood and adult aggression measures. Table 10 summarizes the key path coefficients for the resulting nine new models for males and females.

In every case the path from early exposure to TV violence to adult aggression remained significant. It was never reduced substantially by the introduction of a parent variable. The parent factors did correlate with the child's aggression and TV habits in some cases, but this did not account for the longitudinal relations. For example, for females parent rejection of the child in the 1970s was correlated .23 ( $p < .003$ ) with childhood aggression and .20 ( $p < .009$ ) with childhood violence viewing; however, it did not reduce the path from childhood violence viewing to adult aggression at all. For males parental rejection of the child in the 1970s was correlated .28 ( $p < .001$ ) with childhood aggression, .22 ( $p < .009$ ) with childhood violence viewing, and .14 ( $p < .108$ ) with adult aggression; however, its introduction only reduced the path coefficient from .19 to .18. The implication is not that parent factors are unimportant.

They certainly play a role both in influencing aggression and influencing TV habits. However, these results imply that the parent factors measured probably do not account by themselves for the longitudinal relations from exposure to media violence in childhood to young adult aggression. Of course, there may be other unmeasured parent factors that do play a bigger role in the relation. Also, while the reliability of the measures of some parenting variables was high (e.g. .7 to .8) for most parental aggression measures and TV viewing, it was more modest for others (e.g. .6 to .7 for rejection and mobility orientation), and for some non-scale measures it was uncertain (e.g. punishment and nurturance). More reliable measures of these constructs might have accounted for more of the effects.

### Discussion

In this 15 year longitudinal study of 329 youth, we found that children's television violence viewing between ages 6 and 9, children's identification with aggressive same-sex characters, and children's perceptions that TV violence is realistic were significantly correlated with their adult aggression. This was true for both males and females. It was true for real physical aggression for both genders and for indirect aggression for females. Regression analyses that partialled out the effects of early aggression showed that these childhood TV habits were not just correlated with aggression but predicted increases or decreases in aggressive behavior. For both boys and girls more exposure to TV violence during these ages, greater identification with same-sexed aggressive characters, and a stronger belief that violent shows tell about life "just like it is" predicted more aggression as an adult regardless of how aggressive they were as children.

The longitudinal relations primarily reflected the behavior of the highest violence viewing children. The upper 20% of boys and girls on any of the three child TV viewing variables scored significantly higher than the rest of the participants on adult aggression. Furthermore, they displayed a higher frequency of very serious adult antisocial and violent behaviors.

A longitudinal structural-modeling analysis of the directionality of the effects suggested that it is more plausible that exposure to TV violence is increasing aggression than that aggression is increasing

TV-violence viewing. These structural modeling analyses also demonstrated that the effects are not simply a consequence of lower SES children or less intellectually able children both watching more violence and being more at risk for aggressive and violent behavior. The structural models show that for both boys and girls habitual early exposure to TV violence is predictive of more aggression by them later in life independently of their own initial childhood aggression, their own intellectual capabilities, their social status as measured by their parents' education or their father's occupation, their parents' aggressiveness, their parents' mobility orientation, their parents' TV viewing habits (including violence viewing), and their parents' rejection, nurturance, and punishment of them in childhood. Furthermore, the structural models suggest that being aggressive in early childhood has no effect on increasing a male's exposure to media violence as an adult and only a small effect for girls.

Nevertheless, these results should not lead one to conclude that children's aggressiveness plays no role in their TV and film preferences. The paths from childhood aggression to adult violence viewing were not significant, but they were all positive, and adult violence viewing is not predicted much better by almost any childhood variable. Furthermore, in the childhood waves of this study, the comparable paths from aggression in one year to violence viewing in the next were positive and significant (Huesmann & Eron, 1986, p. 61). These results certainly are consistent with "justification theory" -- that more aggressive children are more likely to watch violent media because it makes their own behavior seem normal. Their subsequent viewing of violence then increases their aggressive scripts, schemas, and beliefs through observational learning and makes subsequent aggression even more likely.

It is particularly interesting that we found longitudinal results that were of about the same magnitude for females as for males. In our 1960 to 1970 (Eron et al., 1972) and 1960 to 1982 (Huesmann, 1986, 1995) studies of New York children, longitudinal effects were only found for boys. One possibility is that the change in social norms for appropriate female behavior that occurred with the feminist movement of the late 1960s and 1970s has disinhibited female aggression. In addition, the increase in aggressive female models in movies and TV might have engendered a stronger observational

learning effect. The combination of these two factors may have led to an increase in the size of the effect for females, making detection easier. It is not that girls were not subject to the observational effect in earlier years. Indeed, they were, as the laboratory experiments showed (Paik & Comstock, 1994). Rather it is that their use of the learned aggressive behaviors or aggressive scripts was inhibited by their existing normative beliefs about appropriate female roles. This explanation is consistent with the information processing perspectives on learning aggressive behavior that Huesmann (1986, 1988, 1998) and Dodge (1980) have offered. According to Huesmann's model, learned scripts for aggressive behavior are not followed if they violate the individual's normative beliefs about what is appropriate for them.

Three notable gender differences in the results were found. First, early TV violence viewing correlated with adult physical aggression for both males and females but with adult indirect aggression only for females. Lagerspetz et al. (1988) have pointed out that indirect aggression is more characteristic of females and more acceptable for them in most societies. The social-cognitive observational learning model suggests that normative beliefs about aggression, hostile biases about the world, and aggressive social scripts are all learned from observing violence. Females do not need to have observed indirect aggression to acquire it from observing violence. They only need to have acquired beliefs more accepting of aggression. This reasoning also suggests that the lack of a finding of a relation between exposure to media violence and female aggression in earlier longitudinal studies may have been due to the failure to measure indirect aggression sufficiently in those studies.

Second, while identification with same-sexed aggressive characters and the perception that violent shows tell about life "like it is" predicted adult aggression for both genders, these factors exacerbated the effect of violence viewing only for males. Males who viewed TV violence *and* identified with male aggressive characters or perceived TV violence as true to life were most at risk for adult aggression. The same gender difference had been found earlier for the childhood data relating TV viewing to subsequent aggression (Huesmann & Eron, 1986) -- identification was a moderator for boys but not for girls. Why would this exacerbating effect not occur for females? Theoretically, it is difficult

to believe that identification and perception of realism do not enhance observational learning in girls as well as boys. One possibility is that for girls the relation between early exposure to violence and subsequent aggression is due more to cognitive and emotional desensitization to violence than to observational learning. Desensitization should not depend as much as observational learning on identification or perceptions of realism. Such an hypothesis cannot be tested with the current data but should be examined in future research.

The third notable gender difference was apparent in the structural models. For both males and females there was no significant statistical effect of childhood aggression on adult violence viewing. However, while for males the path coefficient from aggression to violence viewing was virtually zero, for females it was a non-trivial positive value. This suggests that aggressive females may be more prone than aggressive males to use violent media to make them feel better and more 'justified' about their own behavior (Huesmann, 1988). In a culture in which female aggressiveness is still less accepted than male aggressiveness, feeling justified about one's aggressive behavior could well be more important for females than for males.

Although longitudinal non-experimental data do not provide a strong test of causation, they can be used to compare the relative plausibility of alternative causal perspectives. These results are certainly consistent with the observational learning and desensitization theories which predict long term statistical effects of early violence viewing on later aggression after the effects of early aggression are statistically controlled. They are much less consistent with the theoretical perspective that more aggressive children turn to watching more violence because they like it or because it serves as justification for their own aggression (Huesmann, 1982). Only for females was there a suggestion of such a long term effect, and the effect estimate was not significant. The hypotheses that these longitudinal effects could be completely explained by "third" variables such as social class, intellectual ability, parent aggression, or parenting differences also did not receive much support. The effects remained even when the variance due to these factors was partialled out in our regression equations and structural models. However,

intellectual ability and parents' education did seem to account for some of the effect in females. It may be that social norms for female behavior that inhibit the modeling of media violence are related to educational level or intelligence while for males this is not true.

Of course, a variety of parenting factors have been shown in the past to be related to both a child's exposure to media violence and to the child's later aggression, e.g. parents' intellectual ability, social class, parents' viewing habits, parents' aggression (Comstock & Paik, 1991; Potter, 1999). In the current study many of these correlations were again found for at least one gender, e.g. for intellectual ability, parental rejection of the child, parents' frequency of TV viewing. It seems plausible that these factors are indeed influencing both the child's aggressiveness and the child's exposure to media violence. Which child is placed most at risk to be exposed to media violence and to experience other learning conditions that reinforce the lessons taught by media violence is undoubtedly influenced by parent factors. However, given the pattern of results obtained, it is not very likely that the relations between early exposure to media violence and subsequent aggression are completely due to these "third" variables.

The effect sizes for media violence on aggression revealed in this longitudinal study are modest; however, there are few other factors that have been shown to have larger effects. That is not surprising considering the large number of factors that must converge before serious adult aggression occurs. Furthermore, as Rosenthal (1986) has pointed out, a correlation of .20 can represent a change in probability of violence from 50/50 to 60/40, which is large enough to generate social concern.

One might also wonder whether the attrition in the sample could make it unrepresentative and bias the results. This seems unlikely. Archival data were obtained on 80% of the original sample and interview data on 60%. An analysis of the attrition showed that those who were not re-interviewed tended to be slightly more aggressive as children. Thus, it seems more plausible that, if anything, the attrition weakened the relations between TV-violence viewing and aggression.

### ***Implications for Prevention of Violence***

Overall, these results suggest that both males and females from all social strata and all levels of initial aggressiveness are placed at increased risk for the development of adult aggressive and violent behavior when they view a high and steady diet of violent TV shows in early childhood. The obvious follow-up question is whether society can do anything to prevent or at least moderate this effect.

Several points provide us with guidelines. First, we don't need to be as concerned about adults' or even teenagers' exposure to media violence as much as we do with children's exposure. Media violence may have short term effects on adults, but the real long term effects seem to occur only with children. This makes some societal controls more palatable in a society that places a high premium on the rights of adults to watch whatever they want.

Second, we need to be aware that media violence can affect any child from any family. The psychological laws of observational learning, habituation/desensitization, priming, and excitation transfer are immutable and universal. It is not, as some have suggested, only the already violence prone child who is likely to be affected. True, media violence is not going to turn an otherwise fine child into a violent criminal. But just as every cigarette one smokes increases a little bit the likelihood of a lung tumor some day, the theory supported by this research suggests that every violent show increases a little bit the likelihood of a child growing up to behave more aggressively in some situation.

Third, the violent films and programs that probably have the most deleterious effects on children are not always the ones which adults and critics believe are the most violent. What type of violent scene is the child most likely to use as a model for violent behavior? It is one in which the child "identifies" with the perpetrator of the violence, the child perceives the scene as "telling about life like it is," and in which the perpetrator is rewarded for the violence. Thus, a violent act by someone like 'Dirty Harry' which results in a criminal being eliminated and brings glory to Harry is of more concern than a bloodier murder by a despicable criminal who is brought to justice. Parents need to be educated about these facts.

Finally, we must recognize the economic realities of media violence. Violence sells. Both children and adults are attracted to violent scenes by the action and intense emotions. Many of the most

popular shows and popular films for children have contained violence. Violent TV shows appear to be a little cheaper to produce on the average. Hamilton (1998) reports that from 1991-93 the average production fee per hour for network prime time TV programming was about \$1,094K for non-violent shows and \$998K for violent shows – about 10% cheaper in other words. A more telling statistic may be the finding that, among shows with some violence, those with more violence actually cost less. Each additional violent act seems to reduce the cost about \$1,500. Of course, these are only averages for production costs. What really counts is the ability of a TV show to attract enough sponsors to cover its cost or to attract enough syndicated buyers, and the ability of a video game to attract enough buyers to cover its cost. Here, a variety of marketing issues become important. For example, foreign markets become very important in these calculations, and generally violent shows and games are easier to sell in foreign markets than other kinds of games or shows. More specifically, the probability of a show being exported successfully increases about 16% if it is violent (Hamilton, 1998).

The easiest way to reduce the effects of media violence on children, of course, is to reduce children's exposure to such violence. Prevention programs aimed at reducing exposure could obviously be targeted either at the production sources of the violence or at the child receiving the violence. In a society with strong protections for free speech, it is probably always going to be easier to target prevention efforts at the receiving child than at the producer. However, a more informed legal debate is needed on this subject. Broadcasters and film and program makers cannot avoid all responsibility for what children are exposed to. The argument that people watch it; so we give it to them, is not valid in a modern socially conscious society, and it is unrealistic to expect parents to control completely what children watch in a society with multiple TVs in each household, VCRs everywhere, and both parents working. Furthermore, it is the exposure of the 2 to 14 year old child that is of the greatest concern here, as described above. The social value of reductions in exposure of adults and even older teen-agers is probably small compared to the social value of reducing younger children's exposure.

The ongoing v-chip social experiment is one such attempt to reduce children's exposure by giving

parents a mechanism to control what the TV will allow to be broadcast through it. The problem is that the possibilities for this technology were greatly reduced from the start by the producers of violence who managed to scuttle any idea of a content based rating system that would actually allow parents to make judgements on the basis of violent content. Instead, only age guideline ratings are broadcast for most programs. Why did the producers do this? One can only speculate, but it is certainly likely that income from violent shows would be substantially reduced if violent labels were added -- as much because sponsors would withdraw as because parents would actually program them out with the v-chip.

Turning to interventions aimed at the receiving child, a number of possibilities are suggested. Again, of course, simply reducing children's exposure through parental intervention is an obvious approach. However, the theory and results described above suggest a number of approaches aimed at changing the effect of any observed violence on the child as well. Nathanson (1999) has recently found that parental co-viewing and commenting on the programs seems to reduce the effects of TV violence on the child probably because it reduces the child's identification with the perpetrator, reduces the child's perception of the violence as "real," and reduces the likelihood that the child will rehearse the observed violent script in fantasy or play immediately after observation. Huesmann et al. (1983) showed that the effects of violence on 2nd-graders can be reduced by a targeted school-based attitude change intervention that inculcates them with the beliefs that violence on TV does not tell about the world as it is and should not be imitated. A number of interventions based on teaching critical viewing skills in schools are being promoted, though few have yet to undergo rigorous evaluation. One of the problems with many of these interventions may be that they do not focus on those moderating variables that have been shown to be theoretically relevant such as identification by the child with perpetrators, perception of violent acts as justified, and perception of violent scripts as "real world."

While some questions remain to be resolved about the exact extent of the effect of observed violence on aggressive and violent behavior and its importance relative to other causal factors, the current study provides compelling additional evidence that habitual exposure of children to violence in

the media (or in the real world around them) does have lasting effects on their propensity to behave aggressively and violently. Future research should probably be directed much more at elaborating and testing the kinds of interventions that parents, schools, producers, and the government can promote that will mitigate these long term effects.

## References

- Andison, F. S. (1977). TV violence and viewer aggression: A cumulation of study results 1956-1976. *Public Opinion Quarterly*, *41*, 314-331.
- Atkin, C., Greenberg, B., Korzenny, F., & McDermott, S. (1979). Selective exposure to televised violence. *Journal of Broadcasting*, *23*, 5-13.
- Bandura, A. (1969). Social learning theory of identificatory processes. In D. Goslin (Ed.) *Handbook of Socialization Theory and Research*. Chicago: Rand McNally.
- Bandura, A. (1977). *Social learning theory*. Englewood Cliffs: Prentice Hall.
- Bandura, A., Ross, D., & Ross, S. A. (1961). Transmission of aggression through imitation of aggressive models. *Journal of Abnormal Social Psychology*, *63*, 575-582.
- Bandura, A., Ross, D., & Ross, S. A. (1963a). Imitation of film-mediated aggressive models. *Journal of Abnormal and Social Psychology*, *66*, 3-11.
- Bandura, A., Ross, D., & Ross, S. A. (1963b). Vicarious reinforcement and imitative learning. *Journal of Abnormal and Social Psychology*, *67*, 601-607.
- Berkowitz, L. (1993). *Aggression: its causes, consequences, and control*. New York: McGraw Hill.
- Bjorkqvist, K. (1985). *Violent films, anxiety and aggression*. Helsinki: Finnish Society of Sciences and Letters.
- Bjorkqvist, K., Lagerspetz, K., & Kaukiainen, A. (1992). Do girls manipulate and boys fight? Developmental trends in regard to direct and indirect aggression. *Aggressive Behavior*, *18*, 117-127.
- Bjorkqvist, K., Osterman, K., & Kaukiainen, A. (1992). The development of direct and indirect aggressive strategies in males and females. In K. Bjorkqvist & P. Niemela (Eds.), *Of mice and women: aspects of female aggression* (pp. 51-64). New York: Academic Press.
- Bushman, B. J. & Huesmann, L. R. (2001). Effects of televised violence on aggression. In D. Singer & J. Singer (Eds.), *Handbook of children and the media* (pp. 223-254). Thousand Oaks, CA: Sage

Publications.

- Butterworth, G. (1999). Neonatal imitation: existence, mechanisms, and motives. In J. Nadel & G. Butterworth (Eds.), *Imitation in infancy* (pp. 63-88), Cambridge: Cambridge University Press.
- Chaffee, S. H. (1972). Television and adolescent aggressiveness (overview). In G. A. Comstock & E. A. Rubinstein (Eds.), *Television and social behavior: Vol. 3. Television and adolescent aggressiveness* (pp. 1-34). Washington, DC: U.S. Government Printing Office.
- Cline, V. B., Croft, R. G., & Courier, S. (1973). Desensitization of children to television violence. *Journal of Personality and Social Psychology, 27*, 360-365.
- Comstock, G. A. (1980). New emphases in research on the effects of television and film violence. In E. L. Paler & A. Dorr (Eds.), *Children and the faces of television: teaching, violence, selling*. New York: Academic Press.
- Comstock, G. A., & Paik, H. (1991). *Television and the American child*. San Diego, CA: Academic Press.
- Comstock, G. A., & Paik, H. (1994). The effects of television violence on aggressive behavior: A meta-analysis. *Communication Research, 21*, 516-546.
- Crick, N. R., & Grotpeter, J. K. (1995). Relational aggression, gender, and social-psychological adjustment. *Child Development, 66*, 710-722.
- Dodge, K. A. (1980). Social cognition and children's aggressive behavior. *Child Development, 51*(1), 162-170.
- Dodge, K. A., Pettit, G. S., Bates, J. E., & Valente, E. (1995). Social information processing patterns partially mediate the effect of early physical abuse on later conduct problems. *Journal of Abnormal Psychology, 104*, 632-643.
- Elliott, D. S., Dunford, F. W., & Huizinga, D. H. (1987). The identification and prediction of career offenders utilizing self-reported and official data. In J. D. Burchard & S. N. Burchard (Eds.), *Prevention of Delinquent Behavior* (pp. 90-121). Thousand Oaks, CA: Sage Publications.

- Eron, L. D. (1963). Relationship of TV viewing habits and aggressive behavior in children. *Journal of Abnormal and Social Psychology*, 67 (2), 193-196.
- Eron, L. D., Huesmann, L. R., Lefkowitz, M. M., & Walder, L. O. (1972). Does television violence cause aggression? *American Psychologist*, 27, 253-263.
- Eron, L. D., Walder, L. O., & Lefkowitz, M. M. (1971). *Learning of aggression in children*. Boston: Little-Brown.
- Feshbach, S., & Singer, R. D. (1971). *Television and aggression: an experimental field study*. San Francisco: Jossey-Bass.
- Fowles, J. (1999). *The case for television violence*. Thousand Oaks, CA: Sage Publications.
- Geen, R. G. (1983). Aggression and television violence. In R.G. Geen & E.I. Donnerstein (Eds.) *Aggression: Theoretical and empirical reviews, Vol. 2: Issues and research*, (pp. 103-125). New York: Academic Press.
- Geen, R. G. (1990). *Human Aggression*. Pacific Grove, CA: Brooks Cole Publishing.
- Geen, R. G. & O'Neal, E. C. (1969). Activation of cue-elicited aggression by general arousal, *Journal of Personality and Social Psychology*, 11, 289-292.
- Geen, R. G., & Thomas, S. L. (1986). The immediate effects of media violence on behavior, *Journal of Social Issues*, 42, 7-28.
- Gerbner, G., Gross, L., Morgan, M., & Signorielli, N. (1994). Growing up with television: The cultivation perspective. In J. Bryant & D. Zillmann (Eds.), *Media effects* (pp. 17-41). Hillsdale, NJ: Erlbaum.
- Goldstein, J. (1998). *Why we watch: the attractions of violent entertainment*. Oxford: Oxford University Press.
- Guerra, N. G., Huesmann, L. R., Tolan, P., Van Acker, R., & Eron, L. D. (1995). Stressful events and individual beliefs as correlates of economic disadvantage and aggression among urban children. *Journal of Consulting and Clinical Psychology*, 63, 518-528.

- Hamilton, J. T. (1998). *Channeling violence: The economic market for violent television programming*. Princeton, NJ: Princeton University Press.
- Hearold, S. L. (1979). *Meta-analysis of the effects of television on social behavior*. Unpublished doctoral dissertation, University of Colorado.
- Huesmann, L. R. (1982). Television violence and aggressive behavior. In D. Pearl, L. Bouthilet & J. Lazar (Eds.), *Television and behavior: Ten years of programs and implications for the 80's* (pp.126-137). Washington, DC: U.S. Government Printing Office.
- Huesmann, L. R. (1986). Psychological processes promoting the relation between exposure to media violence and aggressive behavior by the viewer. *Journal of Social Issues*, 42, 125-139.
- Huesmann, L. R. (1988). An information processing model for the development of aggression. *Aggressive Behavior*, 14, 13-24.
- Huesmann, L. R. (1995). *Screen violence and real violence: Understanding the link* [Brochure]. Auckland, NZ: Media Aware.
- Huesmann, L. R. (1998). The role of social information processing and cognitive schemas in the acquisition and maintenance of habitual aggressive behavior. In R. G. Geen & E. Donnerstein (Eds.), *Human Aggression: Theories, Research, and Implications for Policy* (pp. 73-109). New York: Academic Press.
- Huesmann, L. R. (1999). The effects of childhood aggression and exposure to media violence on adult behaviors, attitudes, and mood: Evidence from a 15-year cross-national longitudinal study. *Aggressive Behavior*, 25, 18-29.
- Huesmann, L. R., & Eron, L. D. (1986). *Television and the Aggressive Child: A Cross-National Comparison*. Hillsdale, NJ: Erlbaum.
- Huesmann, L. R., Eron, L. D., Berkowitz, L., & Chaffee, S. (1991). The effects of television violence on aggression: A reply to a skeptic. In P. Suedfeld & P. Tetlock (Eds.), *Psychology and Social Policy* (pp. 191-200), New York: Hemisphere.

- Huesmann, L. R., Eron, L. D., Lefkowitz, M. M., & Walder, L. O. (1984). Stability of aggression over time and generations. *Developmental Psychology, 20*, 1120-1134.
- Huesmann, L. R., Eron, L. D., & Yarmel, P. W. (1987). Intellectual functioning and aggression. *Journal of Personality and Social Psychology, 52*, 232-240.
- Huesmann, L. R. & Guerra, N. G. (1997). Children's normative beliefs about aggression and aggressive behavior. *Journal of Personality and Social Psychology, 72*(2), 408-419.
- Huesmann, L. R., Guerra, N. G., Eron, L. D., & Crawshaw, V. B. (1994). Measuring children's aggression with teachers' predictions of peer nominations. *Psychological Assessment, 6*, 329-336.
- Huesmann, L.R., Guerra, N.G., Zelli, A. & Miller, L. (1992). Differing cognitions relating to TV viewing and aggression among boys and girls. In K. Bjorkqvist & P. Niemela (Eds.), *Of mice and women* (pp. 77-87). New York: Academic Press.
- Huesmann, L. R., Lagerspetz, K., & Eron, L. D. (1984). Intervening variables in the TV violence-aggression relation: Evidence from two countries. *Developmental Psychology, 20*, 746-775.
- Huesmann, L. R., Lefkowitz, M. M., & Eron, L. D. (1978). Sum of MMPI scales F, 4, and 9 as a measure of aggression. *Journal of Consulting and Clinical Psychology, 46*, 1071-1078.
- Huesmann, L. R., & Miller, L. S. (1994). Long-term effects of repeated exposure to media violence in childhood. In L. R. Huesmann (Ed.), *Aggressive behavior: current perspectives* (pp. 153-186). New York: Plenum.
- Huesmann, L. R., Moise, J. F., & Podolski, C. P. (1997). The effects of media violence on the development of antisocial behavior. In D. Stoff, J. Breiling, & J. Maser (Eds.) *Handbook of Antisocial Behavior* (181-193). New York: John Wiley & Sons.
- Josephson, W. L. (1987). Television violence and children's aggression: Testing the priming, social script, and disinhibition predictions. *Journal of Personality and Social Psychology, 53*, 882- 890.

- Lagerspetz, K. M., & Bjorkqvist, K. (1992). Indirect aggression in girls and boys. In L. R. Huesmann (Ed.), *Aggressive behavior: current perspectives* (pp.131-150 ). New York: Plenum.
- Lagerspetz, K. M., Bjorkqvist, K., & Peltonen, T. (1988). Is indirect aggression typical of females? Gender differences in aggressiveness in 11- to 12-year-old children. *Aggressive Behavior, 14*, 403-414.
- Lefkowitz, M. M., Eron, L. D., & Huesmann, L. R. (1978). Parental Punishment: a longitudinal analysis of effects. *Archives of General Psychiatry, 35*, 186-191.
- Lefkowitz, M. M., Eron, L. D., Walder, L. O., & Huesmann, L. R. (1977). *Growing up to be violent: A longitudinal study of the development of aggression*. New York: Pergamon.
- Milavsky, J. R., Kessler, R., Stipp, H., & Rubens, W. S. (1982). Television and aggression: Results of a panel study. In D. Pearl, L. Bouthilet, & J. Lazar (Eds.), *Television and behavior: Ten years of scientific progress and implications for the 80's: Vol.2* (pp. 138-157) . Technical reviews. Washington, DC.: Government Printing Office.
- Nathanson, A. I. (1999). Identifying and explaining the relationship between parental mediation and children's aggression. *Communication Research, 26*(2), 124-143.
- Moise-Titus, J. (1999). *The role of negative emotions in the media violence-aggression relation*. Unpublished doctoral dissertation, University of Michigan, Ann Arbor, MI.
- Paik, H., & Comstock, G. A. (1994). The effects of television violence on antisocial behavior: A meta-analysis. *Communication Research, 21*, 516-546.
- Potter, W. J. (1999). *On media violence*. Thousand Oaks, CA: Sage.
- Rosenfeld, E., Huesmann, L. R., Eron, L. D. & Torney-Purta, J.V. Measuring patterns of fantasy behaviors in children. 1982. *Journal of Personality and Social Psychology, 42*, 347-366.
- Rosenthal, R. (1986). Media violence, antisocial behavior, and the social consequences of small effects. *Journal of Social Issues, 42*, 141-154.

- Rossi, P., Bose, C., & Berk, R. (1974). The seriousness of crime, normative structure and individual differences. *American Sociological Review*, *39*, 224-237.
- Straus, M. A., Gelles, R. J., & Steinmetz, S. K. (1980). *Behind closed doors. violence in the American family* (Appendix B). New York: Anchor Press.
- Tiegs, E. W., & Clark, W. W. (1970). *California Achievement Test*. New York: McGraw Hill.
- Tremblay, R. E. (2000). The development of aggressive behavior during childhood: What have we learned in the past century? *International Journal of Behavioral Development*, *24*, 129-141.
- Walder, L. O., Abelson, R., Eron, L. D., Banta, T. J., & Laulicht, J. H. (1961). Development of a peer rating measure of aggression. *Psychological Reports*, *9*, 497-556, (monograph sup. 4-19).
- Weigman, O., Kuttischreuter, M., & Baarda, B. (1986). *Television viewing related to aggressive and prosocial behavior*. The Hague, The Netherlands: Stichting voor Onderzoek van het Onderwijs.
- Wood, W., Wong, F.Y., & Chachere, G. (1991). Effects of media violence on viewers' aggression in unconstrained social interaction. *Psychological Bulletin*, *109*, 371-383.
- Wynder, E.L., & Graham, E.A. (1950). Tobacco smoking as a possible etiological factor in bronchiogenic carcinoma. *Journal of the American Medical Association*, *143*, 329-336.
- Wyrwicka, W. (1996). *Imitation in human and animal behavior*. New Brunswick, NJ: Transaction Publishers.
- Zillmann, D. (1979). *Hostility and aggression*. Hillsdale, NJ: Lawrence Erlbaum Associates.
- Zillmann, D. (1983). Transfer of excitation in emotional behavior. In J. T. Cacioppo & R. E. Petty (Eds.), *Social psychophysiology: a sourcebook* (pp. 215-240). New York: Guilford Press.

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## Footnotes

<sup>1</sup>The mean rating was computed for the  $n$  raters who evaluated the program. Then the average absolute discrepancy between that mean and each individual rating was computed.

<sup>2</sup> The weights for the frequencies were similar to those used with the children's data (see above and Huesmann & Eron, 1986), but were modified to fit the four point scale used for adult responses. Thus, as for children, a show watched "almost every time it is on" was weighted 10, and a show watched "hardly ever" was weighted 0. "Watching sometimes" was treated equivalent to "watching once in a while" for children and was weighted 1. The response "usually," which was not available for children, was weighted at 5, the midpoint between "sometimes" and "almost every time it is on."

<sup>3</sup> Crick and Grotpeter (1995) with minor changes have renamed the indirect aggression construct developed by Lagerspetz and Bjorkqvist as "relational aggression." However, we prefer to use the original label which seems to reflect the kind of aggression more accurately.

<sup>4</sup> Twenty percent was chosen for the size of the extreme groups because any smaller percentage would have produced  $N < 25$  for some groups and reduced power too much. If the mean score for the variables to be plotted differed significantly between genders, we used different cut-points for males and females; otherwise we used the same. The exact cut-point selected was the most extreme score that placed at least 20% in the extreme group for at least one gender.

<sup>5</sup> Analysis of change scores can be viewed as a special case of "analysis of post test with pretest as covariate" in which the regression coefficient for the pretest is fixed at one. By subtracting out from the adult aggression score the maximal prediction from the pretest instead of the simple pretest score, one can interpret the coefficient for early TV violence as representing the contribution of early TV violence viewing to the change in adult aggression from what would have been expected on the basis of childhood aggression.

<sup>6</sup> Parents' education and the child's childhood intellectual ability score were also introduced into the regression equations shown in Tables 7, 8 and 9. For males, their introduction did not change any of

the regression parameters in any table more than 4% . For females, the three positive regression coefficients for early TV viewing on later aggression were reduced slightly (17% on the average) when parents' education was introduced, but all three increased when intellectual ability was introduced.

<sup>7</sup> For males the path from early violence viewing to later aggression became .196 ( $p < .05$ ) while the path from early aggression to later violence viewing remained non-significant at .024. For females the path from early violence viewing to later aggression became .176 ( $p < .05$ ) while the path from early aggression to later violence viewing remained non-significant at .146.

Table 1  
*Data Collection Summary*

	Childhood data	Childhood and adult archival data	Childhood, adult archival and adult interview data
Wave	1+2	1+2 -> 4	1+2 -> 4
Year	1976-78	1992-95	1992-95
Older cohort	Age 8-9	Age 23	Age 8-9 -> 23
Males	125	105	71
Females	133	109	83
Younger cohort	Age 6-7	Age 21	Age 6-7 -> 21
Males	144	119	82
Females	155	117	93
Total	557	450	329
Resampling rate		81%	60%

Table 2

*Reliabilities of Key Measures*

Measures	Coefficient alpha for self-report	Coefficient alpha for peer/other-report	One-month test-retest reliability
Childhood measures:			
Peer nominated aggression	---	.97	.91
TV-violence viewing	---	---	.75
ID with aggressive TV characters	.71	---	.60
Perceived realism of TV violence	.86	---	.74
Adult and parent measures:			
Indirect aggression	.66	.75	---
Verbal aggression	.75	.85	---
Mild physical aggression	.69	.78	---
General aggression	.82	.84	---
Severe physical aggression	.59	.53	---
Aggression toward 'spouse'	.78	.72	---
Aggressive personality	.78	---	---
Aggressive fantasy	.80	---	---
Rejection of child	.62	---	---
Orientation toward mobility	.63	---	---



Table 3

*Mean Scores on Major Aggression Variables for Each Gender*

Variable	MEANS		SD	p-value
	Females N=176	Males N=153		
Self-reported:				
Frequency verbal aggression (0 = never to 4 = very often)	.95	1.11	.77	ns
Frequency indirect aggression (0 = never to 4 = very often)	.86	.72	.60	< .04
Frequency mild physical aggression (0 = never to 4 = very often)	.37	.41	.52	ns
Severe physical aggression (# acts in past year from 0 to >= 27)	.57	1.15	2.15	< .02
Frequency general aggression (0= never to 4 = very often)	.94	.94	.46	ns
Aggressive personality (Sum of t-scores on MMPI F49)	178.13	185.19	26	< .02
Aggression at 'spouse' (# acts in past year from 0 to >= 72)	1.92	1.20	4.28	ns
Number of "arrests" in past 5 years (Range is 0 to 30)	.10	.97	2.04	< .001
Mean violence rating of "arrests" (0 = non-violent; 1.92 = homicide)	.01	.06	.21	< .03
Number of criminal acts in past 5 years (Range is 0 to 111)	4.57	15.88	15.7	< .001

<i>Table continues</i>
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Variable	MEANS		SD	p-value
	Females N=176	Males N=153		
Other reported:				
Frequency verbal aggression (0 = never to 4 = very often)	1.05	1.04	.88	ns
Frequency indirect aggression (0 = never to 4 = very often)	.88	.67	.61	< .01
Frequency mild physical aggression (0 = never to 4 = very often)	.20	.32	.46	<.04
Severe physical aggression (# acts in past year from 0 to >= 27)	.25	.61	1.35	< .04
Frequency general aggression (0 = never to 4 = very often)	.83	.82	.48	ns
Aggression at 'spouse' (# acts in past year from 0 to >= 72)	1.32	1.02	2.59	ns
Composite aggression	-.14	.06	.69	<.01
Archival measures:				
% Ever convicted of a crime	N=226	N=224	0.16	< .001
Number of moving traffic violations	.36	1.09	1.52	< .001

Table 4

*Correlations between Childhood TV Violence Measures and Adult Aggression 15-years Later*

Child TV measures	Adult composite aggression		Adult physical aggression		Adult indirect aggression	
	Male (153)	Fem. (176)	Male (153)	Fem. (176)	Male (153)	Fem. (176)
TV violence viewing	.21***	.19***	.17**	.15**	.03	.20***
Perceived realism of TV violence	.22***	.25****	.14*	.14*	.05	.28****
Identification with aggressive females	.15*	.23***	.05	.09	.01	.19**
Identification with aggressive males	.29****	.22***	.14*	.12	.05	.22***

*Note.* Physical aggression is defined in this table as the average of the self and other-rated severe and mild physical aggression scales while indirect aggression is the average of self and other-rated indirect aggression scales. Also, all the correlations with composite aggression remain significant even if the MMPI personality scale is removed from the composite score and only behavioral measures are used.

\* $p < .10$  \*\* $p < .05$  \*\*\* $p < .01$  \*\*\*\* $p < .001$

Table 5

*Differences in Frequency of Spouse Abuse and Serious Physical Aggression "At Least Once" in Past 12 Months for High Childhood Violence Viewers Compared to Other Children*

ITEM	MALES			FEMALES		
	Hi viol viewers (N = 31)	Other viewers (N = 122)	Chi-square sig.	Hi viol viewers (N = 36)	Other viewers (N = 140)	Chi-square Sig
Spouse abuse:						
Pushed, grabbed or shoved your spouse	41.7%	22.2%	$p < .05$	34.6%	21.2%	n. s.
Thrown something at your spouse	20.8%	14.8%	n. s.	38.5%	16.5%	$p < .02$
Serious physical aggression:						
Respond by shoving the person	68.8%	50.4%	$p < .05$	68.6%	43.2%	$p < .01$
Punch, beat, or choke another adult	21.9%	16.9%	n. s.	17.1%	3.6%	$p < .01$
Criminal behavior:						
Self-reported any crime in last year	62.5%	53.4%	n. s.	48.6%	25.9%	$p < .01$
State reported convictions	10.7%	3.1%	$p < .03$	00.0%	00.0%	n. s.
Driving behavior:						
Self-reported moving traffic violations	87.5%	76.3%	n. s.	80.0%	57.6%	$p < .01$
State-reported moving traffic violations	60.0%	39.4%	$p < .01$	28.9%	28.4%	n. s.

*Note.* Chi-square significance test is Fisher's Exact One-sided Test

Table 6

*Predicting Adult Composite Aggression from Childhood Television Variables: Females (N=165)*

PREDICTOR	Standardized regression coefficients			
	Reg 1	Reg 2	Reg 3	Reg 4
Cohort	-.156*	-.163**	-.093	-.075
Childhood aggression	.168**	.125	.125	.133 <sup>+</sup>
TV-violence viewing		.170**		
ID w/ same-sex agg. TV characters			.188**	
Perception TV violence is realistic				.233***
R <sup>2</sup> increase over Reg 1	---	.027**	.031**	.048***
R <sup>2</sup>	.039	.066	.070	.087

\* $p < .10$ . \*\* $p < .05$ . \*\*\* $p < .01$ . \*\*\*\* $p < .001$ .

Table 7

*Predicting Adult Composite Aggression from Childhood Television Variables: Males (N=147)*

PREDICTOR	Standardized regression coefficients			
	Reg 1	Reg 2	Reg 3	Reg 4
Cohort	-.097	-.096	-.055	-.054
Childhood aggression	.200**	.161*	.147*	.164*
TV-violence viewing		.226***		
ID w/ same-sex agg. TV characters			.251***	
Perception TV violence is realistic				.190**
R <sup>2</sup> increase over Reg 1	---	.050***	.059***	.033**
R <sup>2</sup>	.043	.093	.102	.076

\* $p < .10$ . \*\* $p < .05$ . \*\*\* $p < .01$ . \*\*\*\* $p < .001$ .

Table 8

*Predicting Adult Composite Aggression from Childhood Television Variables: Males (N=147)*

PREDICTOR	Standardized Regression Coefficients	
	Reg 5	Reg 6
Initial cohort	-.122	-.072
Childhood aggression	.104	.126
TV-violence viewing	.185**	.217***
ID w/ same-sex aggressive TV characters	.113	
TV-violence viewing X ID w/ same sex aggressive TV characters	.278****	
Perception TV violence is realistic		.175**
TV-violence viewing X Perception TV violence is realistic		.263****
R <sup>2</sup> increase over Reg 2 (Table 7)	.102****	.087****
R <sup>2</sup>	.195	.180

\* $p < .10$ . \*\* $p < .05$ . \*\*\* $p < .01$ . \*\*\*\* $p < .001$ .

Note. Variables in interactions were standardized (centered) within gender before combining.

Table 9

*Longitudinal and Contemporaneous Correlations for Estimating Structural Models Relating TV-violence viewing and Aggression*

Measure	1	2	3	4	5	6
MALES (n ≤ 151)						
1. Childhood peer-nominated aggression	1.0	.18**	.18**	.08	-.05	-.33****
2. Childhood TV-violence viewing		1.0	.21***	-.02	-.12	-.25***
3. Adult composite aggression			1.0	.00	-.06	-.07
4. Adult TV-violence viewing				1.0	-.08	-.13
5. Parents' educational status					1.0	.32***
6. Child's intellectual ability						1.0
(n ≤ 174)						
FEMALES						
1. Childhood peer-nominated aggression	1.0	.28****	.13*	.10	.00	-.31****
2. Childhood TV-violence viewing		1.0	.19***	.16**	-.11	-.19**
3. Adult composite aggression			1.0	.23***	-.17**	-.02
4. Adult TV-violence viewing				1.0	-.23***	-.07
5. Parents' educational status					1.0	.32****
6. Child's intellectual ability						1.0

\* $p < .10$  \*\* $p < .05$  \*\*\* $p < .01$  \*\*\*\* $p < .001$

Table 10

*Structural Model's Cross-lagged Longitudinal Path Coefficients between Childhood Aggression and Adult TV Violence Viewing and between Childhood TV Violence Viewing and Adult Aggression while Controlling for Parent Factors during Childhood*

Parent variable controlled	Males				Females			
	Child TV viol -> adult agg	t-value	Child agg -> adult TV viol	t-value	Child TV viol -> adult agg	t-value	Child agg -> adult TV viol	t-value
Parents' physical agg	0.20	2.41**	0.06	0.62	0.17	2.22**	0.09	1.13
Parents' agg personality	0.19	2.36**	0.07	0.83	0.17	2.17**	0.12	1.48
Parents' agg fantasy	0.21	2.60**	0.04	0.46	0.16	2.14**	0.11	1.33
Parents' nurturance child	0.19	2.40**	0.05	0.56	0.17	2.17**	0.10	1.24
Parents' punishment child	0.20	2.41**	0.06	0.60	0.17	2.29**	0.14	1.68*
Parents' rejection child	0.18	2.12**	0.05	0.56	0.17	2.26**	0.12	1.40
Parents' mobility orient.	0.19	2.32**	0.04	0.50	0.19	2.43**	0.12	1.45
Parents' TV view frq	0.20	2.41**	0.05	0.57	0.15	2.03**	0.12	1.46
Parents' TV violence view.	0.19	2.37**	0.05	0.62	0.16	2.16**	0.12	1.48

\* $p < .10$  \*\* $p < .05$  \*\*\* $p < .01$  \*\*\*\* $p < .001$

## Figure Captions

*Figure 1.* A structural model showing the measurement model for the composite aggression score derived from 11 measures of adult aggressive behavior.

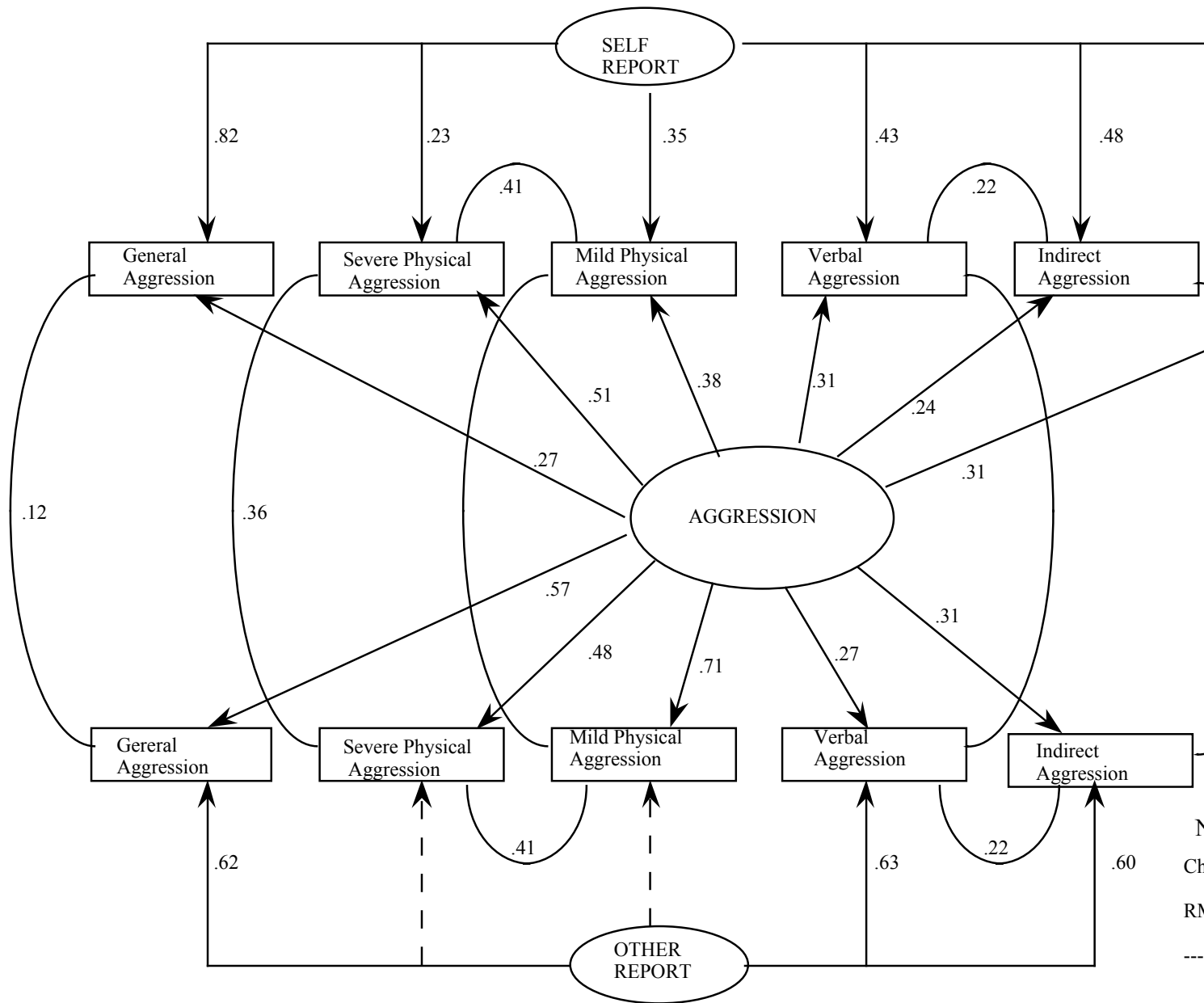
*Figure 2.* Three bar graphs illustrating the relation between childhood TV habits and adult aggression for 153 males and 176 females. The y-variable in these graphs, composite aggression, is positively skewed with a mean of 0, a median of -.25 and an SD of .7. The high, medium and low groups on the x-axis represent the upper 20%, the middle 60% and the lower 20% respectively on the TV measure. The exact cut points were the highest and lowest scores that gave at least 20% in the extreme group. For TV-violence viewing on which males and females scored significantly differently, the cut points were chosen separately for each gender. For the other two TV viewing variables the mean scores did not differ by gender and the same cut points were used for each gender. The females who were high TV violence viewers in childhood score significantly higher on adult aggression than other females ( $t = 2.81, df = 173, p < .01$ ) and the males who were high viewers of TV violence score higher than other males on adult aggression ( $t = 2.80, df = 150, p < .01$ ). Similarly, both girls and boys who thought violent shows told about life "like it really was" grew up to behave more aggressively as adults ( $t = 3.43, df = 173, p < .001$  for girls and  $t = 3.62, df = 150, p < .001$  for boys). Finally, both females and males who identified strongly with same-sexed aggressive characters are significantly more aggressive as adults ( $t = 2.83, df = 162, p < .01$  and  $t = 3.97, df = 144, p < .001$  respectively).

*Figure 3.* Two structural models showing the effects on *males* of TV-violence viewing and aggression in childhood on TV-violence viewing and aggression in adulthood. The models are the same except that parents' education and children's intellectual ability are included in the model in the lower panel.

*Figure 4.* Two structural models showing the effects on *females* of TV-violence viewing and aggression in childhood on TV-violence viewing and aggression in adulthood. The models are the same except that parents' education and children's intellectual ability are included in the model in the lower panel

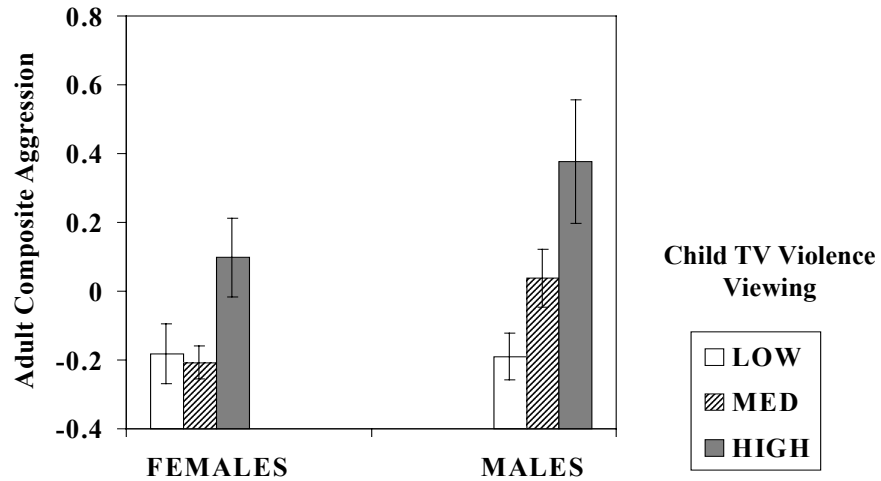


### Measurement Model of Aggression

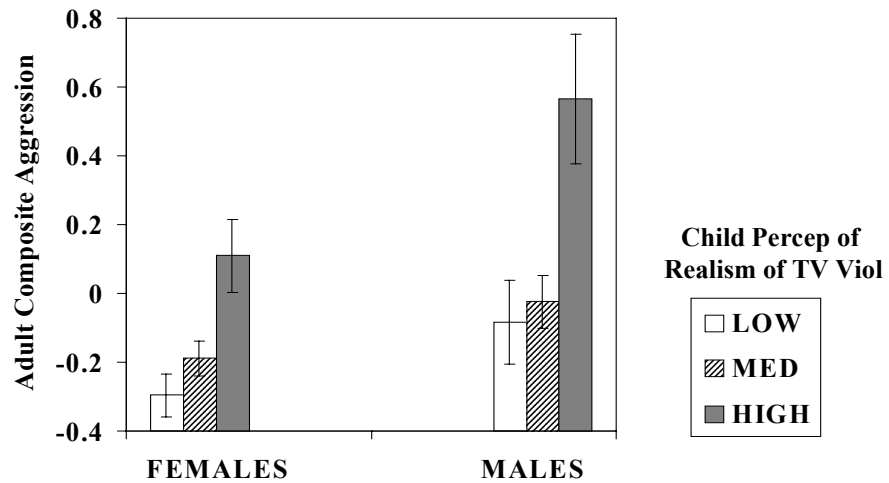


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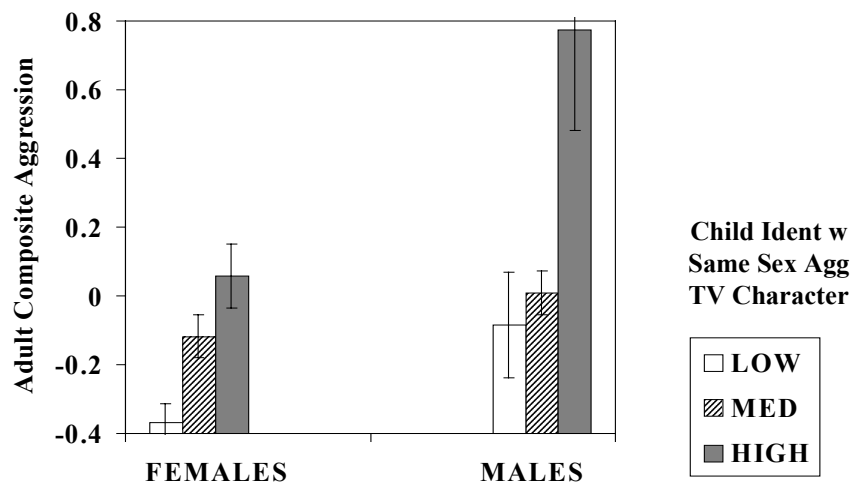
### Adult Aggression vs Childhood TV Violence Viewing



### Adult Aggression vs Childhood Perception of Realism of TV Violence

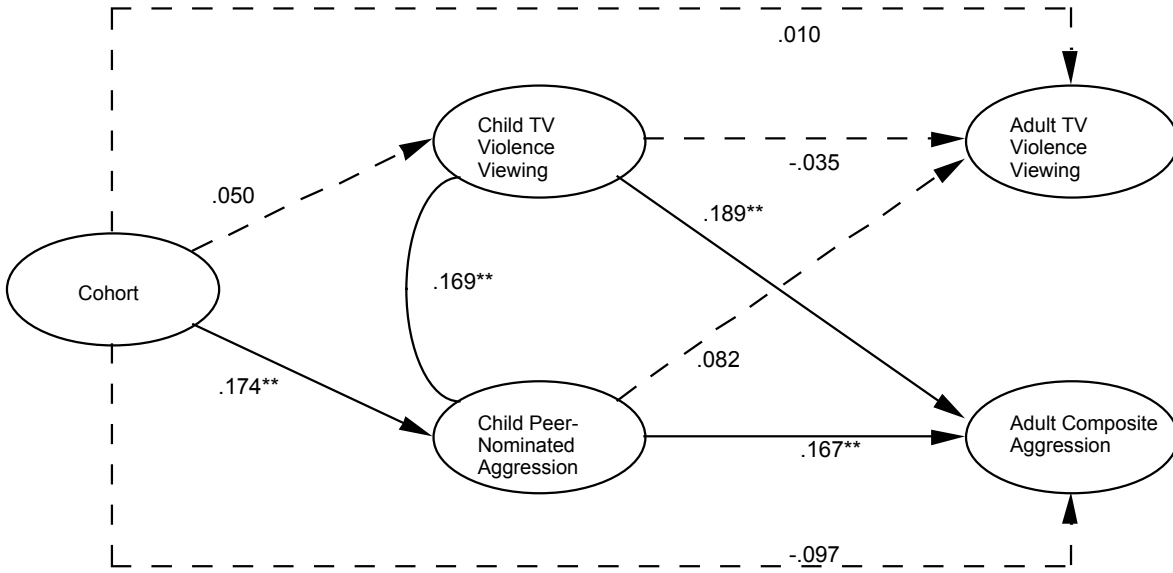


### Adult Aggression vs Childhood Identification with Same Sex Aggressive TV Character

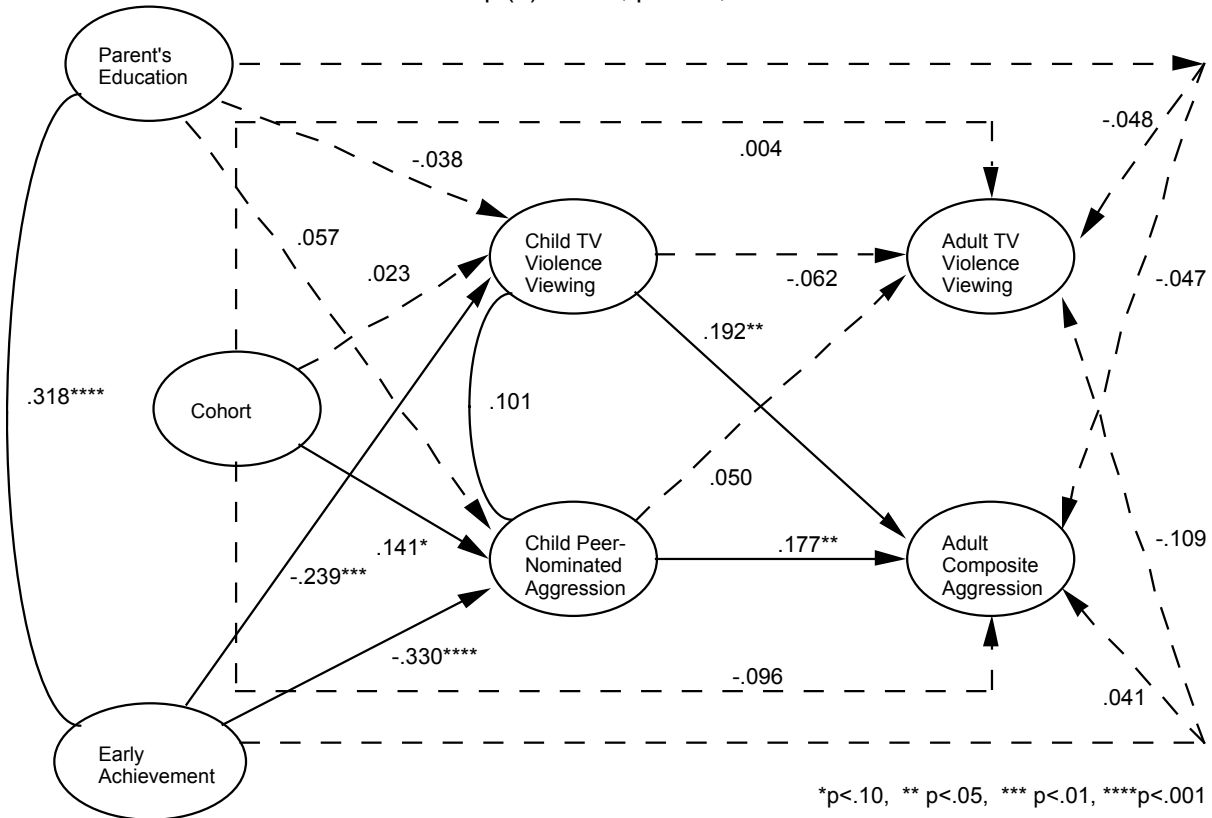


MALES

Chi Sq. (2) = 0.018, p = .89, RMSE = .003



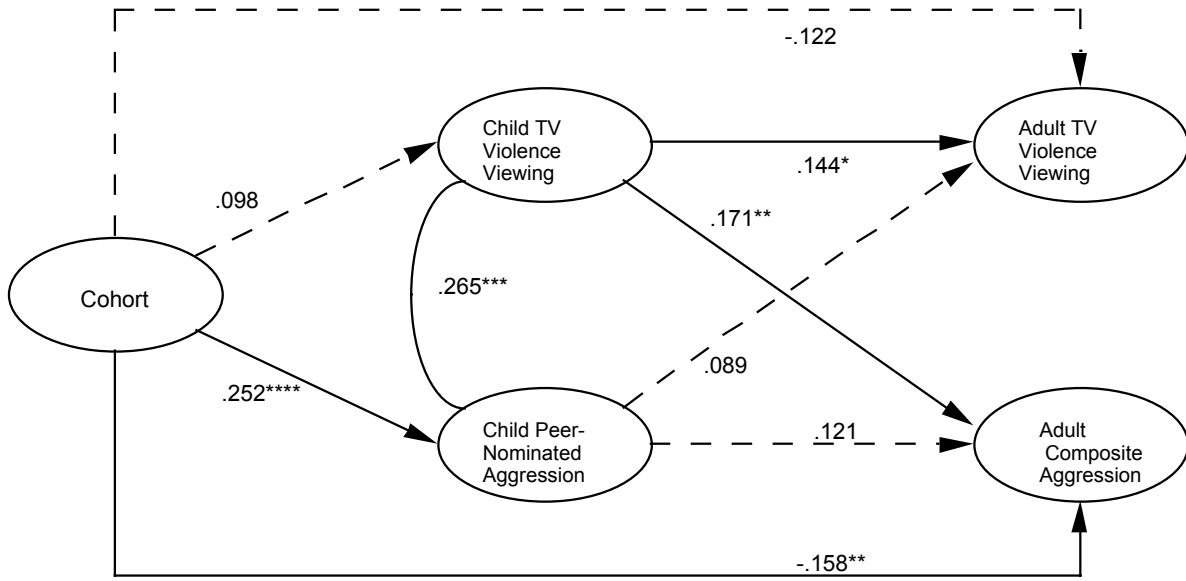
Chi Sq. (6) = 1.71, p = .94, RMSE = .023



\*p<.10, \*\* p<.05, \*\*\* p<.01, \*\*\*\*p<.001

FEMALES

Chi Sq. (2) = 6.45, p = .02, RMSE = .047



Chi Sq. (6) = 5.98, p = .43, RMSE = .035

