DOCUMENT RESUME

ED 474 790 PS 031 197

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TITLE Looking through Time: A Longitudinal Study of Children's Media Violence Consumption at Home and Aggressive Behaviors at School.

PUB DATE 2003-04-00

NOTE 19p.; Paper presented at the 2003 Biennial Meeting of the Society for Research in Child Development (70th Anniversary, Tampa, FL, April 24-27, 2003). This research was funded in part by the Laura Jane Musser Fund.

PUB TYPE Reports - Research (143) -- Speeches/Meeting Papers (150)

EDRS PRICE EDRS Price MF01/PC01 Plus Postage.

DESCRIPTORS *Aggression; Antisocial Behavior; Attribution Theory; Behavior Problems; Beliefs; Childhood Attitudes; *Children; Longitudinal Studies; *Mass Media Effects; Sex Differences; Teacher Attitudes; *Violence

IDENTIFIERS Media Exposure; Risk Factors

ABSTRACT

Many studies have shown that media violence has an effect on children's subsequent aggression. This study expands upon previous research in three directions: (1) by examining several subtypes of aggression (verbal, relational, and physical); (2) by measuring media violence exposure across three types of media (television, movies/videos, and video games); and (3) by measuring media violence exposure and aggressive/prosocial behaviors at two points in time during the school year. Two hundred thirty-six third- through fifth-grade children were surveyed. Findings indicated that children who consumed more media violence early in the school year were found to be more verbally aggressive, relationally aggressive, and physically aggressive later in the school year (by self-report, peer nomination, and teacher nomination; controlling for sex). Children who consumed more media violence early in the school year were also more likely to have a hostile attribution bias later in the school year, and to be less prosocial later in the school year (by peer- and teacher-nomination). Media violence exposure was described as a risk factor for aggressive beliefs and behaviors, and it was concluded that media violence exposure in combination with other risk factors for aggression (e.g., hostile attribution bias, sex, prior aggression) can produce an effect greater than any single risk factor. (Author/HTH)

Looking Through Time: A Longitudinal Study of Children's Media Violence Consumption at Home and Aggressive Behaviors at School

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Paper presented at the Biennial Conference of the Society for Research in Child Development (April, 2003), Tampa, Florida

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Abstract

Many studies have shown that media violence has an effect on children's subsequent aggression. This study expands upon previous research in three directions: (1) by examining several subtypes of aggression (verbal, relational, and physical), (2) by measuring media violence exposure across three types of media (television, movies/videos, and video games), and (3) by measuring media violence exposure and aggressive/prosocial behaviors at two points in time during the school year. Two hundred thirty-six 3rd through 5th grade children were surveyed. Children who consumed more media violence early in the school year were more verbally aggressive, relationally aggressive, and physically aggressive later in the school year (by self-report, peer nomination, and teacher nomination; controlling for sex). Children who consumed more media violence early in the school year were also more likely to have a hostile attribution bias later in the school year, and to be less prosocial later in the school year (by peer- and teacher-nomination). Media violence exposure is described as a risk factor for aggressive beliefs and behaviors, and it is argued that media violence exposure in combination with other risk factors for aggression (e.g., hostile attribution bias, sex, prior aggression) can produce an effect greater than any single risk factor alone.

Introduction

A significant number of studies have shown that media violence has an effect on children's subsequent aggression (see Bensley & Eenwyk, 2001 and Wilson, Smith, Potter, Kunkel, Linz, Colvin, & Donnerstein, 2002, for recent reviews). Violent media can take many forms, ranging from television programming and movies to video games and other interactive activities. This study examines a number of these different media formats. Previous studies of the impact of media violence on childhood aggression have been limited by a focus on physical forms of aggression, which tend to be more common among boys. Accordingly, less is known of the impact of media violence on aggression in girls.

This study expands upon previous research by examining subtypes of aggression in relation to violent media. In particular, research has established relational aggression as a point of contrast with physical forms of aggression (see Crick et al., 1999, for a review). Children who spread rumors, exclude peers, and engage in other relationship-oriented aggression are different than those who simply hit or kick to aggress against another. Relational aggression has been defined as "behaviors that harm others through damage (or the threat of damage) to relationships or feelings of acceptance, friendship, or group inclusion" (Crick, 1996). Studies show that relational aggression is associated with a significant level of negative consequences for both perpetrators and their victims (see Crick et al., 1999, for a review).

Physical and relational forms of aggression are moderately correlated, which is to be expected (given that they are both forms of aggressive behavior). Nonetheless, relational aggression emerges as a distinct form of aggression and studies have begun to focus on the possible differential correlates of these subtypes (Crick et al., 1999). The current research separately considered both forms of aggression.

A second area of interest in the current study is that of social information processing styles related to exposure to media violence. In particular, we were interested in the possible relation of media

violence to the formation of intent attributions. Previous research has demonstrated that the association between hostile attributional bias and social maladjustment is quite strong, and has been demonstrated with children of all ages (see Crick & Dodge, 1994, for a review). In particular, physically aggressive children tend to exhibit a hostile attributional bias, in which they tend to infer hostile intent from the actions of others, even when intent is ambiguous and might be benign. This style of processing understandably contributes to the development and maintenance of aggressive behavior. This research is also limited in regard to consideration of aggressive girls, as the focus of such studies tends to be aggressive boys. In contrast, Crick (1995) has shown that relationally aggressive children also tend to exhibit hostile attributional biases, although social context matters a lot. In particular, Crick (1995) demonstrated that instrumental conflicts (e.g., a peer breaking your toy) are more salient and provocative for physically aggressive children whereas relational conflicts (e.g., a peer fails to invite you to his birthday party) tend to elicit a response consistent with a hostile attributional bias in relationally aggressive children. Social information-processing theory suggests that violent media might activate cognitive structures, "making it more likely that other incoming information would be processed in an 'aggression' framework, possibly increasing aggressive behavior" (Bensley & Eenwyk, 2001). Considering that many children seem to be predisposed to assume hostility in ambiguous situations, violent media has the potential to be a destructive contributing factor. Thus, we examined relationships between violent media habits and hostile attributional bias (for instrumental and relational conflict situations) in the current study.

A Theoretical Model for Long-term Effects of Media Violence Exposure

Anderson and colleagues (Anderson & Dill, 2000; Anderson & Bushman, 2002) have developed the General Aggression Model (GAM) to explain theoretical links between media violence exposure and aggressive cognitions, attitudes, and behaviors. This model describes a "multi-stage process by which personological (e.g., aggressive personality) and situational (e.g., video game play and provocation) input variables lead to aggressive behavior by influencing several related internal states and the outcomes of automatic and controlled appraisal (or decision) processes" (Anderson & Dill, 2000, p. 773).

GAM differentiates between short- and long-term effects of media violence on children. In the short-term, GAM predicts that violent media exposure can affect aggressive thoughts, feelings, and behaviors. Regarding long-term exposure to violent content, GAM suggests that this may result in the development, over-learning, and reinforcement of aggression-related knowledge structures. These knowledge structures include vigilance for enemies (i.e., hostile attribution bias), aggressive action against others, expectations that others will behave aggressively, positive attitudes towards use of violence, and the belief that violent solutions are effective and appropriate. Repeated exposure to graphic scenes of violence is also postulated to be desensitizing. Furthermore, it is predicted that long-term media violence consumers become more aggressive in outlook, perceptual biases, attitudes, beliefs, and behavior than they were before the repeated exposure.

Several longitudinal studies of exposure to violent television have shown a strong relationship between early TV violence exposure and later aggression. In perhaps the best known of these studies, Huesmann and his colleagues (e.g., Lefkowitz, Eron, Walder, & Huesmann, 1972) followed a cohort of children starting in the third grade. When these same children were measured 11 years later, at age 19, exposure to TV violence in third grade predicted higher levels of aggression at age 19 ($r = .31$). The reverse was not true, however: aggression in the third grade did not predict consumption of television

violence at age 19 (r = .01). This relation held even after statistically controlling for IQ, SES, and overall amount of TV viewing, however it was true only for boys. It is possible that the effect was only seen with boys because both the types of aggression seen on TV in the 1960s and the types of aggression studied were primarily physical aggression, which is more typical of boys than girls. Later longitudinal studies have shown the effect with both boys and girls, however. For example, in a study of 557 participants (Huesmann, Moise-Titus, Podolski, & Eron, 2003), childhood TV-violence viewing in first and third grades significantly predicted adult physical aggression 15 years later for both men and women (r = .17 and .15, respectively). It also predicted adult "indirect" aggression for women (indirect aggression is similar but not identical to relational aggression studied here; r = .20).

Fewer studies have looked at short-term longitudinal changes in aggressive beliefs and behaviors in relation to media violence exposure, and none have looked across multiple media. Children now have many more media options than were available when the longitudinal studies above were begun. Besides broadcast and cable television, children now can easily watch their favorite movies repeatedly on videotape or DVD, and children are also spending an increasing amount of time playing video games (Gentile & Anderson, 2003). The present study was designed to measure children's media violence exposure across three media (TV, movies/videos, and video games). The GAM predicts that heavy exposure to media violence will have several outcomes that could be measured in a longitudinal design. First, media violence exposure (MVE) should predict increases in children's aggressive beliefs, such as hostile attribution biases. It also should predict increase in children's aggressive behaviors, and should predict decreases in children's prosocial behaviors.

The current research tested three hypotheses regarding violent media exposure derived from GAM.

Hypothesis 1: Media violence exposure will be significantly positively correlated with aggressive beliefs (i.e., hostile attribution bias) and behaviors, and significantly negatively correlated with prosocial behaviors at any one point of time.

Hypothesis 2: Media violence exposure will be significantly positively correlated with *later* aggressive beliefs (i.e., hostile attribution bias) and behaviors, and significantly negatively correlated with later prosocial behaviors.

Hypothesis 3: Aggressive beliefs and behaviors will be not be significantly correlated with *later* media violence exposure.

Method

Participants

Two hundred and thirty-six 3rd (n = 81), 4th (n = 44), and 5th grade (n= 111) students participated in the study. Students were recruited from four Minnesota schools, including one suburban private school (n = 41), two suburban public schools (n = 168), and one rural public school (n = 27). The sample was almost evenly divided between boys and girls, with 48% of the children being female (52% male). Participants ranged in age from 7 to 11 years of age (M = 9.65; SD = 1.10). Ninety-one percent of the respondents classified their ethnic background as Caucasian (which is representative of the region). Participants were treated in accordance with the "Ethical Principles of Psychologists and Code of Conduct" (American Psychological Association, 1992).

Procedure

Data were collected between November 2000 and June 2002. Letters were mailed directly to the parents of students in participating classrooms informing them about the study and requesting consent. Consent levels were at least 70% for all classrooms. Interested teachers volunteered their classrooms for inclusion in the study. Each of the participating classrooms was a mandatory class (i.e., not elective) to reduce the likelihood of self-selection bias.

Each participant completed three confidential surveys: (1) a peer-nomination measure of aggressive and prosocial behaviors, (2) a self-report survey of media habits and demographic data, and (3) a self-report measure of hostile attribution bias. Trained research personnel administered the peer-nomination survey, and classroom teachers were trained to administer the other surveys. The surveys were administered on consecutive days. Teachers also completed one survey for each participating child, reporting on the frequency of children's aggressive and prosocial behaviors.

Each participant (including teachers) completed each of these surveys at two points in time during the school year. The first administration (Time 1) occurred between November and February of the academic year. The second administration (Time 2) occurred between April and May of the year. The time lag between the two administrations was therefore between two and six months.

Assessment of Social Adjustment

Peer Assessment of Social Adjustment. A peer nomination instrument was utilized in order to assess children's social adjustment, and was adapted from a peer nomination instrument that has been used in several previous studies of children's social behavior (e.g. Crick, 1995; Crick & Grotpeter, 1995). This instrument consists of 10 items. Two of these items were the peer sociometric items (nominations of liked and disliked peers), which are used extensively in research of this nature to assess peer acceptance and rejection (see Crick & Dodge, 1994) for a review. The remaining 8 items assess four different types of social behavior: physical aggression (2 item subscale), relational aggression (3 item subscale), prosocial behavior (2 item subscale), and verbal aggression (1 item). See Table 1 for a listing of all of items related to the different subscales. Cronbach's alpha was computed for each of the three subscales with multiple items and was found to be satisfactory: $\alpha = .93$ for physical aggression, $\alpha = .86$ for relational aggression, and $\alpha = .81$ for prosocial behavior.

Teacher Ratings of Aggressive Behavior. Teachers completed a survey assessing children's aggression and prosocial behavior for each child participating in the study. This instrument consists of twelve behavioral subscales, including a variety of behaviors (e.g. aggressive behavior, victimization, prosocial behavior, and others). For the purposes of this study, only the subscales reflecting relational aggression, physical aggression, and prosocial behavior are used in subsequent analyses. These items are listed in Table 2. Cronbach's alpha was computed and found to be satisfactory for each subscale: $\alpha = .93$ for teacher ratings of relational aggression, $\alpha = .94$ for teacher ratings of physical aggression, and $\alpha = .91$ for teacher ratings of prosocial behavior.

Assessment of Media Habits

Violent media exposure. Similar to Anderson and Dill's (2000) approach, participants were asked to name their three favorite television shows, their three favorite video or computer games, and their three favorite movies/videos. For each named media product, participants were asked to rate how

frequently they watched or played on a 5-point Likert scale (1 = "Almost never," 5 = "Almost every day"). Participants were also asked to rate how violent they consider each media product to be on a 4-point Likert scale (1 = "Not at all violent," 4 = "Very violent"). A violence exposure score was computed for each participant by multiplying the frequency of watching or playing each media product by its subjective violence rating, and then taking the mean of the three similar products. Accordingly, media-specific (i.e., Violent TV Exposure, Violent Video Game Exposure, and Violent Movies/Videos Exposure) violence exposure scores were computed for each participant. Finally, an overall violent media exposure score, the mean of all nine products (TV, video games, movies/videos), was also calculated. Cronbach's alpha was computed for the overall media violence exposure scale and found to be satisfactory ($\alpha = .79$). Previous research has confirmed that participants were likely to assess the violence in media products based on the amount of physical violence, rather than relational aggression. People's ratings were most strongly correlated with the graphicness of the portrayal of physical violence, across age, gender, amount of television viewing, and other factors (Potter, 1999).

Preference for violent video games. One item assessed each participant's preference for more or less violent video games by asking, "On a scale from 1 to 5, how much violence do you like to have in video games?"

Amount of television watching and video game play. Participants provided the amount of time they spent watching television and playing video games during different time periods on weekdays and weekends. Weekly amounts were calculated from these responses.

Amount of MTV & professional wrestling watched. Two items asked about participants' frequency of watching MTV or professional wrestling on a four-point verbally anchored Likert scale (from "Almost never watch" to "Watch almost every day").

Assessment of hostile attributional bias/social information processing.

The final survey was an adapted version of a hostile attribution survey that has been reliably used in past research (e.g., Crick, 1995; Nelson & Crick, 1999). This instrument is composed of 10 stories, each describing an instance of provocation in which the intent of the provocateur is ambiguous. The stories were developed to reflect common situations that children and young adolescents might encounter in the school years. Four of the stories depict physical provocations and six represent relational provocations. Participants answer two questions following each story. The first presents four possible reasons for the peer's behavior, two of which indicate hostile intent and two reflect benign intent. The second question asks whether the provocateur(s) intended to be mean or not. This survey relates to the participant's perception of hostility from the outside world. Two scale scores result from analysis of this measure: intent attributions for relational provocation and intent attributions for physical provocations.

Based on procedures delineated by Fitzgerald and Asher (1987), the children's responses to the attribution assessments were summed within and across the stories for each provocation type. Possible scores ranged from 0 through 12 (0-8 for the instrumental subscale and 0-12 for the relational subscale). Finally, Cronbach's alpha was computed for each of these scales and found to be satisfactory: intent attributions for relational provocations ($\alpha = .80$), intent attributions for physical provocations ($\alpha = .73$), and overall hostile attribution ($\alpha = .82$).

Results

Overall as measured at Time 1, children are spending an average of 23.0 hours per week watching television ($SD = 14.9$), and 11.1 hours per week playing video games ($SD = 13.5$). These averages mask important sex-correlated differences, however. Third through fifth grade boys watch more television ($M = 26.4$, $SD = 16.1$) than girls ($M = 19.5$, $SD = 12.8$; $t(223) = 3.5$, $p < .001$). Boys also play video games for significantly more time ($M = 16.0$, $SD = 15.5$) than girls ($M = 5.8$, $SD = 8.1$; $t(224) = 6.1$, $p < .001$).

Single Point in Time Correlations

The first column of Table 3 presents the results from the first measurement. At Time 1, media violence exposure (MVE) is significantly and positively correlated with hostile attribution bias, self-reported physical fights, peer-nominated verbally, relationally, and physically aggressive behaviors, and teacher-nominated physically aggressive behaviors. MVE is significantly and negatively correlated with prosocial behaviors (both peer- and teacher-nominated).

The second column of Table 3 presents the results from the second measurement. At Time 2, media violence exposure (MVE) is significantly and positively correlated with hostile attribution bias, self-reported physical fights, peer-nominated verbally and physically aggressive behaviors, and teacher-nominated physically aggressive behaviors. MVE is significantly and negatively correlated with prosocial behaviors (both peer- and teacher-nominated).

Looking Forward and Backward in Time Correlations

The third column of Table 3 presents correlations when predicting Time 2 variables with media violence exposure at Time 1. At Time 1, media violence exposure (MVE) significantly and positively predicts later hostile attribution bias, self-reported physical fights, peer-nominated verbally, relationally, and physically aggressive behaviors, and teacher-nominated physically aggressive behaviors. Time 1 MVE significantly negatively predicts prosocial behaviors (both peer- and teacher-nominated).

The fourth column of Table 3 presents correlations between Time 1 variables and Time 2 MVE. At Time 2, media violence exposure (MVE) is significantly and positively correlated with Time 1 self-reported physical fights, peer-nominated physically aggressive behaviors, and teacher-nominated physically aggressive behaviors. Time 2 MVE is significantly negatively correlated with Time 1 prosocial behaviors (both peer- and teacher-nominated).

Predicting Time 2 Aggression from Time 1 Media Violence Exposure, controlling for Sex

Because sex has consistently been found to be predictive of aggressive beliefs and behaviors, controlling for sex of the child is a stricter test of the relation between earlier media violence exposure and later aggression. A series of step-wise regressions were conducted, in which child sex was entered in step 1, and Time 1 MVE was entered in step 2. The results of these analyses are displayed in Table 4.

Across all analyses, MVE at Time 1 is a significant predictor of Time 2 variables even after controlling for sex (Table 4). Specifically, Time 1 MVE predicts later overall hostile attribution, self-reported physical fights, peer-nominated verbally, relationally, and physically aggressive behaviors, teacher-nominated relationally and physically aggressive behaviors, and prosocial behaviors (both peer- and teacher-nominated). Overall, all models were statistically significant.

Predicting Time 2 Aggression from Time 1 Media Violence Exposure, controlling for Sex and Prior Aggression

A more conservative test of the directional hypothesis that Time 1 MVE predicts later aggressive beliefs and behaviors would be to control for prior aggressive beliefs and behaviors -- in effect, predicting *changes* in those beliefs and behaviors. This conservative approach was adopted through series of step-wise regressions, in which child sex was entered in step 1, Time 1 aggressive variables were entered in step 2, and Time 1 MVE was entered in step 3. The results of these analyses are displayed in Table 5.

Media violence exposure at Time 1 significantly predicts Time 2 overall hostile attribution bias, controlling for sex and Time 1 hostile attribution bias (Table 5). Time 1 MVE significantly predicts peer-nominated verbally aggressive behavior and physically aggressive behavior, even controlling for sex and Time 1 verbally and physically aggressive behavior, respectively. Overall, all models were statistically significant.

Exploratory Correlations between Aggressive Behaviors and viewing MTV or Wrestling

Although we are most interested in the overall level of violent content exposure, some recent research has suggested that certain types of programming (i.e., MTV and professional wrestling) may have measurable effects themselves (e.g., Robinson, 1998). As is shown in Table 6, at Time 1, children who watch MTV more regularly are more likely to report being involved in physical fights, are rated by peers as more verbally, relationally, and physically aggressive, are rated by teachers as more relationally and physically aggressive, and as less prosocial.

Children who watch professional wrestling more regularly show a similar pattern of results, although it is more focused on physical aggression as opposed to relational aggression (Table 6). At Time 1, children who watch wrestling more regularly are more likely to report being involved in physical fights, are rated by peers as more verbally and physically aggressive, are rated by teachers as more physically aggressive, and are rated as less prosocial by both peers and teachers.

Discussion

Most of the hypotheses we advanced were supported by the results. At both Time 1 and Time 2, violent media exposure was significantly positively correlated with (1) hostile attribution bias, (2) self-reported physical fights, (3) peer-nominated verbal, relational, and physical aggression, and with (4) teacher-nominated physical aggression (Table 1). Similarly at both Time 1 and Time 2, VME was significantly negatively correlated with peer- and teacher-nominated prosocial behavior. Although significant, the correlations at Time 2 were generally lower than those at Time 1. Because this study involved repeated measures, it is possible that by Time 2, participants were beginning to guess the intent of the study and may have modified their Time 2 responses to be more socially appropriate. Although this is a potentially serious weakness of this study, if true, it would only serve to lower the ability to predict Time 2 attitudes and behaviors from Time 1 MVE. Yet, in accordance with Hypothesis 2, Time 1 MVE significantly predicted Time 2 (1) hostile attribution bias, (2) self-reported physical fights, (3) peer-nominated verbal, relational, and physical aggression, (4) teacher-nominated physical aggression, and (5) peer- and teacher-nominated prosocial behavior (Table 1).

It could be argued that a correlation between early media violence exposure and later aggression is spurious because of sex-correlated differences. Boys are more likely to be physically aggressive and are also more likely to consume media violence. However, MVE at Time 1 was a significant predictor of hostile attribution bias, aggressive behaviors (self-reported, peer-nominated, and teacher-nominated), and prosocial behaviors (peer- and teacher-nominated) even after controlling for sex (Table 2).

A more conservative series of tests is shown in Table 3, in which each variable at Time 2 was predicted by sex, that same variable at Time 1, and media violence exposure. This series of tests goes beyond predicting later aggressive behaviors with earlier MVE, and looks at *change* in aggressive behaviors as predicted by early MVE. Fewer of these more conservative tests reached levels of statistical significance, but four key tests were significant. Time 1 MVE is a significant predictor of hostile attribution bias at Time 2 even after controlling for sex and hostile attribution bias at Time 1. Time 1 MVE is a significant predictor of peer-nominated verbal aggression and physical aggression at Time 2 even after controlling for sex and peer-nominated verbal aggression and physical aggression (respectively) at Time 1. Time 1 MVE is also a significant negative predictor of teacher-nominated prosocial behavior at Time 2 even after controlling for sex and teacher-nominated prosocial behavior at Time 1. A similar analysis with self-reported physical fights was marginally significant. Therefore, early media violence exposure not only predicts later aggressive behaviors, but predicts that children who consume more media violence early in the school year will become *more aggressive* and *less prosocial* by later in the school year. These results are consistent with the long-term predictions of the GAM.

Hypothesis 3, that Time 2 MVE would not be correlated with Time 1 attitudes and behaviors was only partially supported. Time 2 MVE was significantly positively correlated with (1) self-reported physical fights, (2) peer-nominated physical aggression, (3) teacher-nominated physical aggression, and significantly negatively correlated with (4) peer- and teacher-nominated prosocial behavior. However, fewer correlations were significant predicting Time 1 attitudes and behaviors from Time 2 MVE than predicting Time 2 attitudes and behaviors from Time 1 MVE. The most likely interpretation of these data is that our hypothesis that aggressive behavior does not predict later MVE is at least partially incorrect. Instead, as others have suggested (e.g., Donnerstein, Slaby, & Eron, 1994; Huesmann & Miller, 1994), there is a bidirectional relationship between MVE and aggressive behaviors, at least in the short-term. It may be that over the long term (e.g., 11 years in Lefkowitz et al., 1972), there is no relation between early aggressive behavior and later MVE, but there is in the short-term (e.g., up to 6 months in this study). This dilemma presents another possible interpretation. It may be that there is little or no "true" relationship between early aggressive behavior and later MVE, but when measured with a short interval between administrations, there is high test-retest reliability. This reliability would be evidence of stability in both MVE and aggressive behavior in the short-term; this would help to explain why we find evidence of early aggressive behavior predicting later MVE but Lefkowitz et al., (1972) did not.

These results are surprisingly robust given the short time lag between survey administrations (2 - 6 months). Many studies have shown immediate effects of violent media (for reviews, see Strasburger & Wilson, 2003; Gentile & Anderson, 2003) on aggressive beliefs and behaviors. Other studies have shown long-term changes of aggressive behaviors related to MVE. Yet, to our knowledge, no studies have documented the shortest amount of time needed to find *changes* in aggressive beliefs and behaviors related to MVE. While the present results should be considered to be preliminary, they do suggest that

MVE may be related to measurable changes in children's hostile attribution biases, verbally and physically aggressive behaviors, and prosocial behaviors in as short a time as six months.

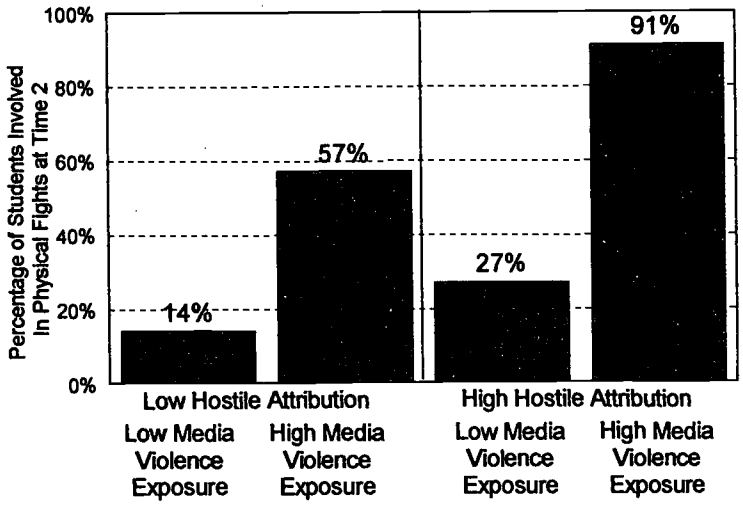
This study is limited by its correlational nature. Although early MVE has been shown to predict later aggressive behaviors controlling for sex and earlier aggression, we were unable to experimentally manipulate children's MVE. Thus, it is possible that a third unmeasured variable is responsible for both the MVE and the increases in aggression over time.

It is also important to note that although this study found a pattern of results consistent with theoretical predictions, the amount of variance in aggressive behaviors explained by MVE is quite limited. As has been argued elsewhere (Gentile & Sesma, 2003), from a developmental perspective, it may be most useful to consider media violence within a developmental risks and resilience approach. From this approach, the question of whether MVE "causes" later aggressive behavior is re-framed to ask what all of the risk factors for aggressive behaviors are (including media violence), and to see how they either combine or interact to predict increases in aggressive behaviors.

Figures 1, 2, and 3 display an illustration of this approach. Each bar represents the percentage of students who at Time 2 report having been involved in a physical fight during the school year. In Figure 1, the students are split by high or low hostile attribution bias at Time 1 and by high or low media violence exposure at Time 1. The high and low groups are the top and bottom thirds of each distribution. As may be seen in Figure 1, both variables matter -- the students who are low on both hostile attribution bias and MVE at Time 1 are the least likely to have been involved in physical fights at Time 2; in contrast, the students who are high on both hostile attribution bias and MVE at Time 1 are the most likely to have been involved in physical fights at Time 2

FIGURE 1

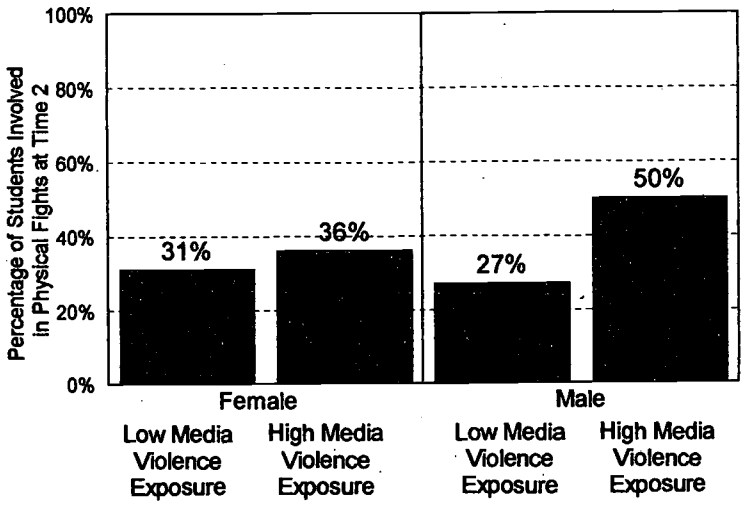
Percentage of students involved in a physical fight at Time 2 as a function of hostile attribution bias (top/bottom terciles) and media violence exposure (top/bottom terciles)



In Figure 2, the students are split by sex and by high or low media violence exposure at Time 1. Again, both variables matter -- overall, boys are more likely to be involved in physical fights, but

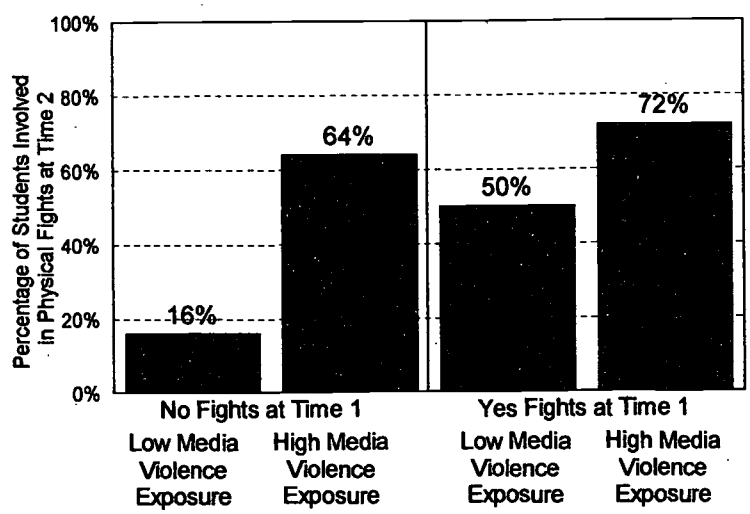
students who consume the most media violence are more likely to be involved in fights regardless of whether they are male or female.

FIGURE 2
Percentage of students involved in a physical fight at Time 2 as a function of sex and media violence exposure (top/bottom terciles)



Similarly in Figure 3, the students are split by whether they had reported being involved in physical fights at Time 1 and by high or low media violence exposure at Time 1. Again, both variables matter – the students who had not been in fights by Time 1 and who were low on MVE at Time 1 are the least likely to have been involved in physical fights at Time 2; in contrast, the students who had been involved in physical fights at Time 1 and also were high on MVE at Time 1 are the most likely to have been involved in physical fights at Time 2.

FIGURE 3
Percentage of students involved in a physical fight at Time 2 as a function of involvement in physical fights at Time 1and media violence exposure (top/bottom terciles)



As these three figures show, no one variable is the "cause" of aggression. Yet, each of these variables, hostile attribution bias, sex, media violence exposure, and prior aggressive behavior is related to future aggressive behavior. As such, each could be described as a risk factor for aggression. One strength of this approach is that it predicts the results shown in Figures 1-3, namely that as risk factors combine, the risk of aggressive behavior increases. A media diet high in violence in combination with other risk factors produces an effect greater than either risk factor alone. This pattern is identical to that found in a study of adolescents, where violent video game play and trait hostility were both measured (Gentile, Lynch, Linder, & Walsh, 2003). Both hostility and violent game play were related to physical fights, but the combination was greater than either alone.

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Table 1. Peer nomination subscale items.

Physical aggression subscale:

- Who hits, kicks, or punches others?
- Who pushes and shoves other kids around?

Relational aggression subscale:

- Who tries to make another kid not like a certain person by spreading rumors about them or talking behind their backs?
- Who, when they are mad at a person, get even by keeping that person from being in their group of friends?
- Who, when they are mad at a person, ignore the person or stop talking to them?

Verbal aggression item:

- Find the number of three kids who say mean things to other kids to insult them or put them down.

Prosocial behavior subscale:

- Who does nice things for others?
- Who tries to cheer up other kids who are upset or sad about something? They try to make the kids feel happy again.

Table 2. Teacher rating subscale items used in this study.

Physical aggression subscale:

- This child hits or kicks peers.
- This child initiates or gets into physical fights with peers.
- This child threatens to hit or beat up other children.
- This child pushes or shoves peers.

Relational aggression subscale:

- When this child is mad at a peer, s/he gets even by excluding the peer from his or her clique or playgroup.
- This child spreads rumors or gossips about some peers.
- When angry at a peer, this child tries to get other children to stop playing with the peer or to stop liking the peer.
- This child threatens to stop being a peer's friend in order to hurt the peer or to get what s/he wants from the peer.
- When mad at a peer, this child ignores the peer or stops talking to the peer.

TABLE 3
Correlations between Violent Media Exposure and Hostile Attribution, Aggressive Behaviors, Prosocial Behaviors, and Parent Involvement

	1 Violent Media Exposure (Time 1 with Time 1)	2 Violent Media Exposure (Time 2 with Time 2)	3 Violent Media Exposure (Time 1 MVE with Time 2 Outcomes)	4 Violent Media Exposure (Time 2 MVE with Time 1 Outcomes)
Hostile Attribution				
Overall Hostile Attribution	.23***	.17*	.25***	.12
Relational Hostile Attribution	.18**	.16*	.24***	.05
Physical Hostile Attribution	.20**	.14^{+}	.19**	.16*
Aggressive Behaviors				
Physical Fights (Self Report)	.18*	.15*	.20**	.20*
Verbal Aggression (Peer Nomination)	.24***	.19*	.34***	.14^{+}
Relational Aggression (Peer Nomination)	.16*	.09	.15*	.03
Physical Aggression (Peer Nomination)	.30***	.23**	.39***	.18*
Relational Aggression (Teacher Nomination)	.08	.09	.01	.00
Physical Aggression (Teacher Nomination)	.32***	.33***	.36***	.22**
Prosocial Behaviors				
Prosocial Behavior (Peer Nomination)	-.30***	-.24***	-.29***	-.27***
Prosocial Behavior (Teacher Nomination)	-.27***	-.33***	-.34***	-.24***

$^{+}p < .10$, $*p < .05$, $**p < .01$, $*** p < .001$

TABLE 4
Step-Wise Regression Analyses:
Time 1 Media Violence Exposure Predicting Time 2 Hostile Attribution, Aggressive, and Prosocial Behaviors, Controlling for Sex

	Variable Entered	Change in R^2	*F Change*	*df*	*p*
Hostile Attribution (Time 2)					
Overall Hostile Attribution	Sex	.01	1.2	1,201	.277
	T1 MVE	.06	12.0	1,200	**.001**
Relational Hostile Attribution	Sex	.01	1.8	1,201	.177
	T1 MVE	.05	10.3	1,200	**.002**
Physical Hostile Attribution	Sex	.00	0.2	1,201	.679
	T1 MVE	.04	7.8	1,200	**.006**
Aggressive Behaviors (Time 2)					
Physical Fights (Self Report)	Sex	.00	0.1	1,178	.757
	T1 MVE	.06	11.0	1,177	**.001**
Verbal Aggression (Peer Nomination)	Sex	.06	13.2	1,211	.000
	T1 MVE	.06	14.6	1,210	**.000**
Relational Aggression (Peer Nomination)	Sex	.00	0.4	1,211	.511
	T1 MVE	.04	8.4	1,210	**.004**
Physical Aggression (Peer Nomination)	Sex	.10	23.4	1,211	.000
	T1 MVE	.07	18.5	1,210	**.000**
Relational Aggression (Teacher Nomination)	Sex	.07	14.4	1,201	.000
	T1 MVE	.02	5.0	1,200	**.026**
Physical Aggression (Teacher Nomination)	Sex	.11	25.6	1,201	.000
	T1 MVE	.05	12.5	1,200	**.001**
Prosocial Behaviors (Time 2)					
Prosocial Behavior (Peer Nomination)	Sex	.11	26.9	1,211	.000
	T1 MVE	.02	5.1	1,210	**.024**
Prosocial Behavior (Teacher Nomination)	Sex	.05	11.3	1,201	.001
	T1 MVE	.07	16.1	1,200	**.000**

Note: T1 = Time 1; MVE = Media Violence Exposure

TABLE 5
Step-Wise Regression Analyses:
Time 1 Media Violence Exposure Predicting Time 2 Hostile Attribution, Aggressive, and Prosocial Behaviors, Controlling for Sex and Prior Hostile Attribution/Behaviors

	Variable Entered	Change in R^2	*F Change*	*df*	*p*
Hostile Attribution (Time 2)					
Overall Hostile Attribution	Sex	.01	1.2	1,199	.273
	T1 Host Att	.35	109.1	1,198	.000
	T1 MVE	.01	4.3	1,197	**.039**
Relational Hostile Attribution	Sex	.01	1.9	1,199	.174
	T1 R Host Att	.36	111.5	1,198	.000
	T1 MVE	.02	5.3	1,197	**.023**
Physical Hostile Attribution	Sex	.00	0.2	1,199	.680
	T1 P Host Att	.22	56.6	1,198	.000
	T1 MVE	.01	2.8	1,197	*.096*
Aggressive Behaviors (Time 2)					
Physical Fights (Self Report)	Sex	.00	0.2	1,134	.638
	T1 Fights	.28	52.5	1,133	.000
	T1 MVE	.02	3.5	1,132	*.063*
Verbal Aggression (Peer Nomination)	Sex	.06	13.2	1,211	.000
	T1 Verbal Agg	.50	237.8	1,210	.000
	T1 MVE	.02	7.3	1,209	**.008**
Relational Aggression (Peer Nomination)	Sex	.00	0.4	1,211	.511
	T1 Rel Agg	.54	245.5	1,210	.000
	T1 MVE	.00	1.3	1,209	.247
Physical Aggression (Peer Nomination)	Sex	.10	23.4	1,211	.000
	T1 Phys Agg	.57	358.3	1,210	.000
	T1 MVE	.02	13.3	1,209	**.000**
Relational Aggression (Teacher Nomination)	Sex	.07	14.2	1,200	.000
	T1 Rel Agg	.51	244.2	1,199	.000
	T1 MVE	.00	0.3	1,198	.601
Physical Aggression (Teacher Nomination)	Sex	.11	25.1	1,200	.000
	T1 Phys Agg	.38	149.3	1,199	.000
	T1 MVE	.01	2.2	1,198	.139
Prosocial Behaviors (Time 2)					
Prosocial Behavior (Peer Nomination)	Sex	.11	26.9	1,211	.000
	T1 Pros Beh	.43	196.9	1,210	.000
	T1 MVE	.01	2.1	1,209	.149
Prosocial Behavior (Teacher Nomination)	Sex	.05	11.0	1,200	.001
	T1 Pros Beh	.42	155.2	1,199	.000
	T1 MVE	.02	7.4	1,198	**.007**

Note: T1 = Time 1; MVE = Media Violence Exposure

TABLE 6
Exploratory Correlations between Viewing MTV or Professional Wrestling and Hostile Attribution, Aggressive Behaviors, Prosocial Behaviors, and Parent Involvement (at Time 1)

	Frequency of Viewing MTV	Frequency of Viewing Wrestling
Hostile Attribution		
Overall Hostile Attribution	.02	.07
Relational Hostile Attribution	.01	.17*
Physical Hostile Attribution	.01	-.03
Aggressive Behaviors		
Physical Fights (Self Report)	.20**	.16*
Verbal Aggression (Peer Nomination)	.22***	.14*
Relational Aggression (Peer Nomination)	.20**	.12^{+}
Physical Aggression (Peer Nomination)	.27***	.13*
Relational Aggression (Teacher Nomination)	.19**	.10
Physical Aggression (Teacher Nomination)	.25***	.20**
Prosocial Behaviors		
Prosocial Behavior (Peer Nomination)	-.10	-.21***
Prosocial Behavior (Teacher Nomination)	-.23***	-.25***

$^{+}p < .10$, $*p < .05$, $**p < .01$, $***p < .001$

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