

Articles

Media Violence Associations with the Form and Function of Aggression among Elementary School Children

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Abstract

Although the association between media violence exposure (MVE) and physical aggression (PA) has been well studied, few studies have examined the link between MVE and other subtypes of aggression. The purpose of this study was to examine the relation between MVE and reactive and proactive subtypes of both PA and relational aggression (RA). Six hundred and forty-one third to fifth grade students reported on their exposure to media violence. RA and PA were assessed by peers and teachers. Reactive and proactive subtypes of RA and PA were assessed by teacher reports. Findings revealed a significant positive association between MVE and overall PA and RA. The relation with RA was stronger for girls than for boys. When predicting the functional subtypes of aggression, higher MVE was associated with lower reactive RA, higher proactive RA, and higher reactive PA, and MVE was unrelated to proactive PA. The implications of the findings for future research are discussed.

Keywords: media violence; physical aggression; relational aggression

Introduction

Aggression is often classified according to the form that it takes. For many years, research focused primarily on physical forms of aggression. More recently the field has expanded to include an additional form: relational aggression (RA), which is an attempt to harm others through damaging or controlling relationships (Crick & Grotpeter, 1995). Although this classification (physical, relational) is necessary for an understanding of the *form* of aggression, it is also important to explore the *functions* of aggression to understand why children and adolescents engage in aggression and to determine the predictors, correlates, and adjustment outcomes of these different functional subtypes of aggression.

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The main distinction in terms of function of aggression has been between reactive and proactive aggression. Reactive aggression is often defined with respect to the frustration-aggression model (Berkowitz, 1993; Dollard, Doob, Miller, Mowrer, & Sears, 1939) as an outburst or retaliatory/defensive response to frustration or being provoked and is associated with high levels of arousal and emotion (Crick & Dodge, 1996; Dodge & Coie, 1987). For example, in a sample of second grade boys and girls, Hubbard et al. (2002) found that reactive physical aggression (PA; but not proactive aggression) was associated with physiological arousal (measured by skin conductance reactivity) and anger expressed nonverbally (e.g., punching fist into hand). In contrast, proactive aggression, which stems from social learning theory (Bandura, 1973), is defined as behavior that is deliberate, goal-oriented, reinforced, and often associated with a lack of arousal or emotion (Crick & Dodge, 1996; Dodge & Coie, 1987).

These functional subtypes of aggression are often highly correlated. In a recent meta-analysis of studies of children and adolescents, Card and Little (2006) found an average correlation of .68 between reactive and proactive aggression, with a range of $-.32$ to $.95$. In a separate meta-analysis, the average correlation was found to be .64 (range of $-.10$ to $.89$; Polman, de Castro, Koops, van Boxtel, & Merk, 2007). Despite this high correlation, evidence exists for the distinction between these two functions. For example, in a study of third through sixth grade boys, Poulin and Boivin (2000) empirically demonstrated that a two-factor model (making the distinction between reactive and proactive aggression) fit their data better than a one-factor model (which combined the two types together). In their meta-analysis, Polman et al. (2007) found that how aggression was measured was associated with the magnitude of the correlation between the constructs, such that observations, experimental tasks, and questionnaires that disentangled forms and functions of aggression produced lower correlations between reactive and proactive aggression than methods that did not disentangle form and function. That is, questionnaires that did not break down forms of aggression (relational, physical) in addition to functions of aggression (proactive, reactive) produced higher correlations than those that separated aggression into these subtypes. In one study of fifth through tenth graders, Little, Jones, Henrich, and Hawley (2003) demonstrated that after controlling for relational and overt aggression, proactive and reactive aggression were orthogonal.

One cognitive process that has been hypothesized to contribute to reactive and proactive aggression is social information processing (SIP). SIP involves the cognitive processes that may contribute to children behaving in specific ways (Crick & Dodge, 1994). For example, how a child cognitively appraises a social situation may contribute to how that child responds in that situation. In Crick and Dodge's (1994) SIP model there are six steps involved: encoding cues, interpreting cues, clarifying goals, response access, response decision, and behavioral response. Because reactive aggression is thought to be a reaction to provocation, the second step, interpretation of cues, is thought to be particularly important in reactive aggression. That is, it has been hypothesized that children who are reactively aggressive show a hostile attribution bias (HAB), in which they attribute hostile intentions to ambiguous peer situations (Crick & Dodge, 1996; Dodge & Coie, 1987). On the other hand, proactive aggression has been thought to relate more to the response decision aspect of SIP, such that proactively aggressive children will show expectations for positive outcomes of aggressive acts (Crick & Dodge, 1996; Dodge & Coie, 1987).

Although we recognize that other distinctions between forms and functions of aggression could be made, empirical studies of these hypotheses have shown general

support for the distinctions described here. Studies of elementary school-age children have supported the idea that reactively aggressive children show higher levels of HAB than non-aggressive children (Crick & Dodge, 1996; Dodge & Coie, 1987). For example, in a sample of first and third grade boys, Dodge and Coie showed that boys high on reactive aggression demonstrated more retaliatory aggressive responses to ambiguous situations compared with proactively aggressive children and non-aggressive children, and that HAB was related to the rate of reactive aggression (but not proactive aggression). Dodge, Lochman, Harnish, Bates, and Pettit (1997) found that reactive aggression was related to more aggressive problem solving (defined as selecting aggression to solve a social dilemma) in a sample of boys and girls followed from kindergarten to third grade. In a study of third grade boys, Hubbard, Dodge, Cillessen, Coie, and Schwartz (2001) found that the association between hostile attribution bias and aggression was dyadic in nature. Controlling for generalized processes, they found that hostile attribution biases directed towards a specific peer were associated with reactive PA towards that same peer. Finally, there is evidence that proactively aggressive children expect more positive outcomes for aggressive acts than non-proactively aggressive children, based on studies of kindergarten through third grade children (Dodge et al., 1997) and 9- through 12-year-old children (Crick & Dodge, 1996). In a sample of incarcerated adolescent boys, Smithmyer, Hubbard, and Simons (2000) found that proactive PA (but not reactive aggression) was associated with positive outcome expectancies of aggression (e.g., achieving a goal, peer approval).

Research has also demonstrated that the distinction between reactive and proactive aggression is important for predicting adjustment outcomes. For example, in a recent meta-analysis, Card and Little (2006) found that reactive aggression was more strongly linked to maladjustment than was proactive aggression. In this meta-analysis, reactive aggression was related to all of the adjustment outcomes examined (e.g., internalizing problems, emotion dysregulation and ADHD symptoms, delinquency, low social preference and peer acceptance, peer rejection and victimization) after controlling for proactive aggression. In contrast, proactive aggression was related to only delinquency and peer rejection after controlling for reactive aggression. In sum therefore there is considerable evidence for the importance of studying the distinction between reactive and proactive aggression.

Reactive and Proactive RA

Whereas past research on reactive and proactive aggression has largely focused on physical forms of aggression, more recently researchers have begun to study reactive and proactive subtypes of RA. As previously mentioned, RA occurs when the relationship is used as the vehicle of harm and includes behaviors such as excluding, spreading rumors, and ignoring (Crick & Grotpeter, 1995). Reactive RA is typically defined in a similar way to reactive PA in that it is carried out in retaliation to provocation and associated with anger/arousal. For example, reactive RA includes behaviors such as spreading rumors about a peer who has wronged the individual or ignoring someone with whom the individual is angry or upset (see Little et al., 2003). Proactive RA is similar to proactive PA in that it is goal-directed behavior. An example of proactive RA would be an individual saying he/she will not be friends with someone anymore unless their friend does what he/she says (see Little et al., 2003). Therefore, reactive and proactive subtypes of aggression are similar across form in terms of their function.

Research that has been conducted examining reactive and proactive RA has demonstrated that this distinction is helpful in understanding how RA is related to adjustment outcomes in samples ranging from as young as preschool-age children (Ostrov & Crick, 2007) to adolescents (Prinstein & Cillessen, 2003). With respect to cognitive and emotional correlates, in a sample of detained adolescent girls, Marsee and Frick (2007) found that reactive RA was more strongly associated with poor emotion regulation and anger associated with perceived provocation than was proactive RA. In contrast, they found that proactive RA was more strongly associated with callous-unemotional traits and positive expectations for the outcome of aggression than was reactive RA. These findings are consistent with the previously mentioned SIP findings for PA.

In order to understand aggression from a developmental perspective better, it is important to examine how these functional subtypes of RA and PA may be differentiated according to different risk factors, correlations, and outcomes. One area that has been examined as a possible risk factor for and correlate of aggression is exposure to violent media. Therefore the aim of the current study was to explore how media violence exposure relates to functional subtypes of both RA and PA.

Aggression and Media Violence

Media violence exposure has been extensively studied in relation to engagement in PA. When people are asked to rate how 'violent' media are, they tend to focus on PA (Potter, 1999). Therefore, although we will use the term 'media violence' in this article, we assume that it comprises physically aggressive acts broadly defined, and not solely 'violent' acts, which are generally defined as PA that could cause extreme harm. Hundreds of studies have demonstrated that media violence exposure (MVE) increases the risk of physically aggressive behavior, both in the short term and in the long term (for reviews, see Anderson & Bushman, 2002; Anderson et al., 2003; Gentile, 2003). Several meta-analyses have been conducted on this large literature, and all have demonstrated that media violence is one important risk factor for PA (Comstock & Scharrer, 2003). Media violence has been demonstrated to increase aggressive thoughts, affect, arousal, and behaviors (e.g., Anderson & Bushman, 2001). The effects have been demonstrated in experimental studies, correlational studies, field experiments, and in long-term longitudinal studies (e.g., Anderson & Bushman, 2002).

Several theories can explain the effects of MVE. Most of these theories have focused on different aspects or levels of analysis, such as observational learning (e.g., social learning theory; Bandura, 1973), neural priming (e.g., cognitive-neoassociation theory; Berkowitz, 1993), cognitive schemata (e.g., script theory; Huesmann, 1986, 1988), arousal (e.g., excitation transfer theory; Zillman, 1983), and emotional responses (e.g., desensitization; Smith & Donnerstein, 1998). Some of these theories focus on short-term or immediate effects, whereas others focus on long-term effects. Recently, Anderson and his colleagues created the general aggression model (GAM), which incorporates all of these domain specific theories into one broader model (Carnagey & Anderson, 2003).

The present focus is on long-term relations between MVE and aggressive behaviors. The GAM posits that repeated exposure to any aggressive stimulus (including media violence) is likely to have effects on teaching, rehearsing, and reinforcing one or more of five aggression-related constructs. These include increasing or reinforcing (1) aggressive beliefs and attitudes, (2) aggressive perceptual schemata (such as hostile

attribution bias), (3) aggressive expectation schemata, (4) aggressive behavior scripts, and (5) emotional and physiological desensitization to aggression. By including multiple domain-specific aspects, the GAM makes it clear that MVE can have both specific and generalized effects.

When one watches an individual example of media violence, one has an opportunity to learn several specific features: what can be used as a weapon and how to use it, what kind of damage can be expected, what to say, etc. If this is all that was learned, however, it would not be interesting. With repeated viewings, however, common elements can be extracted, such as scripts. Scripts are a cognitive knowledge structure that encodes 'what events are to happen in the environment, how the person should behave in response to these events, and what the likely outcome of those behaviors would be' (Huesmann, 1986, p. 15). After scripts have been encoded they can be enacted later. Huesmann (1988) suggests that greater similarity between the situation the child is faced with and the situation in which the script was encoded may increase the likelihood that a script will be retrieved. He notes that although the specific cues of the situation may play a role in triggering scripts, scripts can also be abstract and not connected to any specific cues but may be triggered by more general aggressive cues. After repeated exposures, children may develop more generalized aggressive scripts that do not rely on specific cues or that each relied on different cues (therefore generalizing the script elements). For example, children may learn a general script that is fairly typical in the media—when provoked, one should retaliate.

Although the link between media violence and PA has been well-studied, there may also be a link between exposure to media violence and RA. As children develop more generalized aggressive scripts that are not tied to specific behaviors or specific cues and that are associated with a more 'generalized disinhibition' of aggression, behaviors may appear that were not the specific behaviors originally observed and encoded. Therefore, it is plausible that relationally aggressive behaviors may become part of a more generalized aggression script. This may be particularly true for girls. Research has generally supported the idea that girls are more likely to engage in RA than PA (see Crick & Grotpeter, 1995). Therefore, media violence may contribute to an overall generalized aggressive script, a script that also includes relationally aggressive behaviors. To continue the example, when provoked, children may seek to retaliate, but the form of retaliation is likely to be subject to various individual differences, such as boys being more likely to retaliate with PA but girls being more likely to use RA. Therefore, all children may be affected the same way by media violence, but the way it is expressed may vary between boys and girls (or other individual difference variables). To our knowledge, no previous studies have tested this hypothesis directly.

Although many studies have been conducted examining the link between media violence exposure and PA, only a handful of studies have examined the association between exposure to media violence and RA, and almost none have looked at different functions of aggression (i.e., proactive and reactive aggression). The few studies that have examined these issues have found results consistent with the GAM. For example, in a study of fifth grade girls, Linder and Gentile (2009) found that exposure to television PA was positively correlated with the girls' RA, PA, and verbal aggression (defined as directly insulting or saying mean things to other children), as rated by teachers. In a longitudinal study, Huesmann, Moise-titus, Podolski, and Eron (2003) found that exposure to television violence during childhood was associated with indirect aggression (a similar construct to RA) 15 years later, but only for women. In a short-term longitudinal study of preschoolers, Ostrov, Gentile, and Crick (2006)

examined the association between media violence exposure in the spring and observed aggression later that year in the fall. They found that media violence exposure predicted observed PA, RA, and verbal aggression in boys and observed verbal aggression in girls. Taken together, these studies lend support to the idea that repeated media violence exposure can have both specific and generalized effects, including effects on relationally aggressive behaviors.

The Current Study

The current study was an attempt to examine the relation between exposure to media violence and more specific categories of aggression. Therefore, different forms (relational, physical) and functional subtypes (reactive, proactive) of aggression were examined in association with media violence exposure. The first goal of the study was to attempt to replicate past research by establishing the link between media violence exposure and relational and physical forms of aggression. It was hypothesized that greater exposure to media violence would be associated with higher levels of PA. Furthermore, given the previously described findings of an association between media violence exposure and RA (Huesmann et al., 2003; Linder & Gentile, 2009; Ostrov et al., 2006), it was also hypothesized that greater media violence exposure would be associated with higher levels of RA. It was also hypothesized that this finding might be stronger for girls than for boys. Given the focus of past research on forms of aggression without distinguishing functional subtypes of aggression, the second goal of the study was to examine the association between media violence exposure and reactive and proactive subtypes of PA and RA.

With respect to the functional subtypes of PA, it was hypothesized that MVE would be related to both reactive and proactive subtypes of aggression. That is, if violent media have generalizing effects, these would be seen for PA in general, regardless of the behavioral goal. We also hypothesized, however, that the link would be stronger for reactive PA than for proactive PA. On the media side, most television shows, movies, and video games show some provocation as an explanation/justification for the protagonist's later aggression. Therefore, reactive aggression is modeled regularly in violent media. On the theoretical and empirical sides, children who are reactively aggressive tend to demonstrate a hostile attribution bias in which they attribute hostile intent to an ambiguous peer situation, thus perceiving neutral situations as threatening (Crick & Dodge, 1996; Dodge & Coie, 1987). Research has also demonstrated a link between MVE and SIP, including hostile attribution bias (Anderson, Gentile, & Buckley, 2007; Kirsh & Olczak, 2002a, 2002b). Therefore, MVE may be associated more strongly with reactive PA via SIP mechanisms. In addition, it is likely that many instances of media violence encoded by the child are instances of reactive aggression that are associated with such highly salient cues (response to frustration/provocation, high levels of arousal/emotion). Huesmann (1988) proposes that more salient cues may increase the likelihood of a behavior being encoded as a script. Furthermore, he suggests that a script is more likely to be evoked when the cues in the child's current situation are similar to the cues present when the script was originally encoded. Therefore, if a child feels frustrated or perceives he/she is being provoked, then an aggressive script may be enacted because these highly salient cues are similar to cues that were present when the original behavior was encoded as a script from MVE. Therefore, it is likely that these children will find themselves in situations experiencing high levels of frustration, anger, and arousal, which then may evoke

an aggressive script. Thus, when interpreting the cues in a social situation (Step 2 of the SIP model), the child may access his/her scripts, and this may in turn lead to aggressive responding.

Although cues associated with proactive aggression likely have also been encoded, because these cues may not be as salient (e.g., the situation in which a child has a goal to get something that he/she wants) and because proactive aggression is not associated with the highly salient cues of high arousal and emotion levels, it was hypothesized that reactive aggression would be more strongly associated with MVE than proactive aggression.

With respect to the functional subtypes of RA, there is less empirical work on which to draw, but parsimoniously it seems reasonable to hypothesize that MVE would be associated with RA subtypes similarly to how MVE is associated with PA subtypes. We hypothesized therefore that MVE would be related to both reactive and proactive subtypes, but the association would be stronger for reactive aggression. However, given the limited research on reactive and proactive subtypes of RA, this aspect of the study is best considered to be exploratory.

Method

Participants

Six hundred and forty-one third ($N = 179$), fourth ($N = 170$), and fifth grade ($N = 292$) students and their teachers participated in the study. Students were recruited from seven Minnesota schools, including one suburban private school ($N = 138$), five suburban public schools ($N = 476$), and one rural public school ($N = 27$). Across the schools, the participation rate was 67 percent. The sample was evenly divided between boys and girls, with 52.7 percent of the children being female (47.3 percent male). The average age of child was 9.6 years ($SD = 1.01$). Participants were treated in accordance with APA ethical guidelines.

Procedure

Interested teachers volunteered their classrooms for inclusion in the study. Letters were mailed directly to parents informing them about the study and requesting consent.

Each participant completed a number of surveys as part of a larger study on media violence exposure and aggressive behavior. The measures relevant to the current study were (1) a peer-nomination measure of aggressive behaviors and (2) a self-report survey of media habits and demographic data. Trained research personnel administered the peer-nomination survey, and classroom teachers administered the self-report 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 behaviors.

Assessment of Social Adjustment

Peer Assessment of Social Adjustment. A peer nomination instrument was used to assess children's social adjustment (e.g., Crick, 1995; Crick & Grotpeter, 1995). Children were provided with a roster of classmates, with each student numbered. Students were asked to nominate three students for each of 10 items, by writing the

numbers on the answer form. Confidentiality was stressed to maximize truthful responding and minimize the risk of hurt feelings. Two items were peer sociometric items (nominations of liked and disliked peers), which were used to assess peer acceptance and rejection (e.g., Crick, 1996). The remaining eight items assessed four different types of social behavior: PA (two items), RA (three items), prosocial behavior (two items), and verbal aggression (one item). Only the RA and PA subscales were analyzed in the current study. Each child in a classroom was given a standardized score for each scale. Coefficient alpha was computed for each of the three subscales with multiple items and was found to be satisfactory, $\alpha = .92$ for PA, and $.86$ for RA.

Teacher Ratings of Aggressive Behavior. Teachers completed a survey assessing the frequency of each child's aggressive and prosocial behavior as observed by the teacher, on a five-point scale anchored 'never true' to 'almost always true' (Anderson et al., 2007; Crick, 1996). This instrument consists of 12 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 RA and PA were used. Coefficient alpha was $\alpha = .92$ for teacher ratings of RA and $.92$ for PA.

Teachers also completed a survey assessing the frequency of children's engagement in functional subtypes of aggressive behavior as observed by the teacher, on a five-point scale, anchored 'never true' to 'almost always true' (N. R. Crick, 2009, unpublished data). Four subscales were computed: reactive RA, proactive RA, reactive PA, and proactive PA. Each subscale consists of four items (for a total of 16 items). Sample items include the following: 'When mad at another kid, this child attempts to get even by spreading rumors or mean lies about the kid' (reactive relational), 'This child tries to get what s/he wants by telling friends s/he will not like them anymore unless the friends do what the child says' (proactive relational), 'When mad at another kid, this child attempts to get even by hitting, pushing, or shoving the kid' (reactive physical), and 'This child tries to get what s/he wants by threatening to physically harm another kid unless the kid does what the child says' (proactive physical). Coefficient alpha was $\alpha = .87$ for teacher ratings of reactive RA, $\alpha = .93$ for teacher ratings of proactive RA, $\alpha = .87$ for teacher ratings of reactive PA, and $\alpha = .90$ for teacher ratings of proactive PA.

Assessment of Media Habits

MVE. 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 nominated media product, participants rated how frequently they watched or played on a five-point 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 four-point scale (1 = 'Not at all violent,' 4 = 'Very violent'). An overall violence exposure score was computed for each participant by taking the product of frequency of watching/playing and its violence rating, and then averaging the nine products (TV, video games, and movies/videos). Coefficient alpha was computed for the overall MVE scale and found to be satisfactory ($\alpha = .80$). Prior research has confirmed that when asked to rate the violence in media, participants' ratings most strongly correlate with the graphicness of the portrayal of physical violence, across age, sex, amount of television viewing, and other factors (Potter, 1999). This approach to measuring MVE has been used successfully with children in other studies (e.g., Anderson et al., 2007; Gentile, Lynch, Linder, & Walsh, 2004). Recently, this approach has been validated with child ratings of

violence in video games, with child ratings correlating with expert ratings at .75 (Gentile et al., 2009).

Results

To address the hypotheses, a two-step approach to the analyses was used. Step 1 entailed examining the relation between media violence and the overall aggression constructs (RA and PA) to establish a link before further exploring the functional subcategories of reactive and proactive aggression. Step 2 involved examining the relations between media violence and the reactive and proactive subtypes of RA and PA to determine whether media violence was differentially related to these subtypes.

Step 1: Media Violence and Aggression

Correlations. To examine the relation between MVE and overall RA and PA, composite aggression variables were created by averaging *z*-scores of teacher-reported aggression and peer-nominated aggression. The upper part of Table 1 shows the overall correlations between PA, RA, and MVE, and the lower shows the correlations for boys and girls separately. Overall, MVE was correlated only with PA and not with RA; however, when the correlations were computed separately by sex, MVE was correlated with both RA and PA for boys and girls.

Regressions. Regressions were conducted to test the hypothesis that MVE would predict aggression, and that this would be moderated by sex. In the first regression predicting RA, PA was entered first as a control, and then sex, MVE and MVE \times sex were entered as predictors of RA. Each predictor was entered as a separate step to examine *F*- and *R*²-change. The same regression was computed for PA, with RA entered in the first step as a control. In the analyses presented below, all of the final models were significant, unless otherwise stated. Furthermore, in most cases the interactions terms were not significant. Therefore, it will only be noted when the interaction terms were significant. Otherwise, the model not containing the interaction

Table 1. Bivariate Correlation Coefficients for Aggression and Media Violence Exposure

Variable	RA	PA	MVE
<i>Correlations between aggression and media violence exposure (total sample)</i>			
1. RA	1.00		
2. PA	.52**	1.00	
3. MVE	.06	.32**	1.00
<i>Correlations for males (below diagonal) and females (above diagonal)</i>			
4. RA	—	.52**	.17**
5. PA	.69**	—	.17**
6. MVE	.16**	.16**	—

RA = relational aggression; PA = physical aggression; MVE = media violence exposure.

** $p < .01$.

term was interpreted. Regressions were also computed in which the other forms of aggression were not controlled. The results showed largely the same pattern of results (although the regression weights tended to be stronger as would be expected), so only the conservative regressions are presented here.

The two subtypes of aggression were first examined for skew and kurtosis. Neither of the composite variables had a skew statistic greater than 2.00; therefore, no transformations were needed.

As indicated in the upper part of Table 2, when predicting RA, the MVE \times sex interaction term was significant ($\beta = .09, p < .05$), suggesting that sex moderates the relation between MVE and RA. Figure 1 shows the interaction effect plotted at -1 and $+1$ SD of the independent variable. When the regressions were computed separately by sex, the relation between MVE and RA was positive for both boys and girls, but it was stronger for girls ($\beta = .08, p < .10$) than for boys ($\beta = .05, p > .05$).

As shown in the lower part of Table 2, when predicting PA, sex was negatively associated with PA ($\beta = -.42, p < .01$), suggesting that being male was associated with PA. MVE was positively associated with PA ($\beta = .09, p < .05$), suggesting that higher media violence exposure was positively related to PA.

In summary, the results suggest that media violence exposure was related to RA, even after controlling for PA, and that this relation was stronger for girls than for boys. Additionally, exposure to media violence was associated with PA, but this was not moderated by sex.

Step 2: Media Violence and Reactive and Proactive Aggression

The second set of analyses was conducted to test the hypotheses that MVE would be differentially related to reactive and proactive subtypes of RA and PA and that these associations would be moderated by sex.

Correlations. The overall correlations between the four subtypes of aggression and MVE are presented in Table 3. MVE was significantly correlated with reactive PA ($r = .30, p < .01$) and proactive PA ($r = .25, p < .01$) but not with either of the RA subtypes. However, this was not the case when the correlations were examined by sex. For boys, MVE was significantly and positively correlated with proactive RA ($r = .12, p < .05$), reactive PA ($r = .23, p < .01$), and proactive PA ($r = .18, p < .01$) but not with reactive RA ($r = .04, p > .05$). For girls, MVE was significantly and positively correlated with reactive RA ($r = .12, p < .05$), proactive RA ($r = .14, p < .05$), reactive PA ($r = .11, p < .05$), and proactive PA ($r = .14, p < .05$).

Regression Analyses. To test the hypothesis that MVE would differentially predict functional subtypes of RA and PA, four regressions were computed, one for each subtype as the dependent variable. In each regression, the other three functional subtypes of aggression were entered first as controls, followed by sex, MVE, and MVE \times sex. Note that this is an extremely conservative approach, given the high collinearity between the four subtypes—furthermore, if MVE is related to all four (as it theoretically should be), then controlling for any of them also partials out shared variance due to MVE. In the analyses presented below, all of the final models were significant, unless otherwise stated. In all of the regressions, the interaction term was not significant. Only significant predictors are discussed. Less conservative regressions were also computed to ensure that issues of multicollinearity were not responsible for

Table 2. Hierarchical Regression Analysis of Predictors of Aggression Forms Controlling for the Other Form

Step variable	End β^a	$R^2\Delta$	$F\Delta$	Overall df	Overall F	Overall R^2
<i>Predictors of relational aggression controlling for physical aggression</i>						
Model 1		.20	160.71**	1636	160.71	.20
PA	.45**					
Model 2		.12	108.46**	2635	148.16	.32
PA	.60**					
Sex	.37**					
Model 3		.00	2.99 [†]	3634	100.08	.32
PA	.59**					
Sex	.40**					
MVE	.07 [†]					
Model 4		.01	5.21*	4633	76.86	.33
PA	.59**					
Sex	.43**					
MVE	.13**					
MVE \times sex	.09*					
<i>Predictors of physical aggression controlling for relational aggression</i>						
Model 1		.20	160.71**	1636	160.71**	.20
RA	.45**					
Model 2		.22	234.34**	2635	227.01**	.42
RA	.51**					
Sex	-.47**					
Model 3		.01	6.51*	3634	154.82**	.42
RA	.50**					
Sex	-.42**					
MVE	.09*					
Model 4		.00	1.81	4633	116.72**	.42
RA	.50**					
Sex	-.44**					
MVE	.06					
MVE \times sex	-.05					

RA = relational aggression; PA = physical aggression; MVE = media violence exposure.

^a β values are standardized.

[†] $p < .10$, * $p < .05$, ** $p < .01$.

our results (given the correlations between the four subtypes of aggression). In these analyses only the alternative functional subtype within a given form was controlled for. For example, in predicting reactive RA, only proactive RA was entered as a control (and not either of the physical subtypes). The results were consistent across the four regressions, so only the more conservative regressions are presented here.

The four subtypes of aggression were first examined for skew and kurtosis. Proactive PA was the only variable that showed severe skew (skew statistic > 2.00).

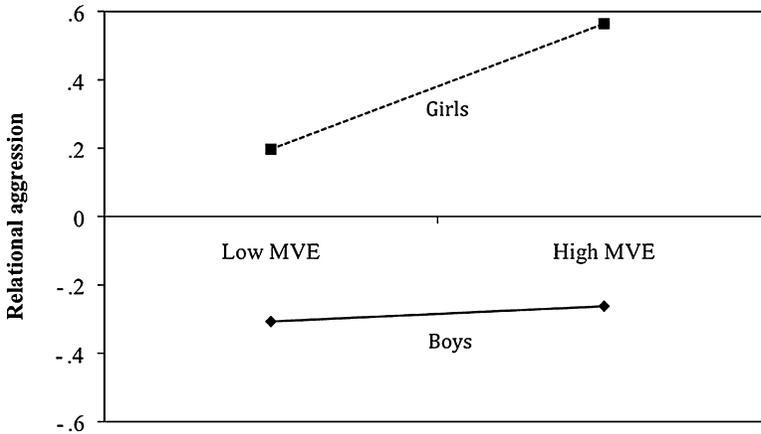


Figure 1. Interaction between Sex and Media Violence Exposure in Predicting Relational Aggression.

Table 3. Bivariate Correlation Coefficients for Aggression and Media Violence Exposure

Variable	1.	2.	3.	4.	5.
<i>Correlations for aggression and media violence exposure (total sample)</i>					
1. Reactive RA	—				
2. Proactive RA	.87**	—			
3. Reactive PA	.50**	.50**	—		
4. Proactive PA	.41**	.46**	.83**	—	
5. Media Violence Exposure (MVE)	-.01	.02	.30**	.25**	—
<i>Correlations for males (below diagonal) and females (above diagonal)</i>					
1. Reactive RA	—	.90**	.56**	.38**	.12*
2. Proactive RA	.82**	—	.56**	.40**	.14*
3. Reactive PA	.64**	.67**	—	.79**	.11*
4. Proactive PA	.59**	.70**	.83**	—	.14*
5. Media Violence Exposure (MVE)	.04	.12*	.23**	.18*	—

RA = relational aggression; PA = physical aggression; MVE = media violence exposure.
 * $p < .05$, ** $p < .01$.

Therefore, a natural log transformation was used for this variable, and the transformed variable was used in analyses in which proactive PA was the dependent variable (the results do not change regardless of whether the variables are transformed or not).

In the regression predicting reactive PA (Table 4), sex was a significant negative predictor ($\beta = -.11, p < .01$), indicating that being male was associated with higher reactive PA. MVE was significantly and positively associated with reactive PA ($\beta = .08, p < .01$). When predicting proactive PA (Table 5), neither sex nor MVE were significant predictors after controlling for reactive PA and the RA subtypes. In the regression

Table 4. Hierarchical Regression Analysis of Predictors of Reactive Physical Aggression Controlling for all Other Subtypes of Aggression

Step variable	End β^a	$R^2\Delta$	$F\Delta$	Overall df	Overall F	Overall R^2
Model 1		.73	512.54**	3576	512.54**	.73
Proactive PA	.77**					
Reactive RA	.26**					
Proactive RA	-.09 [†]					
Model 2		.02	41.59**	4575	421.89**	.75
Proactive PA	.71					
Reactive RA	.26**					
Proactive RA	-.04					
Sex	-.15**					
Model 3		.00	9.77**	5574	344.61**	.75
Proactive PA	.70**					
Reactive RA	.27**					
Proactive RA	-.05					
Sex	-.11**					
MVE	.08**					
Model 4		.00	2.40	6573	288.28**	.75
Proactive PA	.70**					
Reactive RA	.27**					
Proactive RA	-.05					
Sex	-.12**					
MVE	.05 [†]					
MVE \times sex	-.04					

RA = relational aggression; PA = physical aggression; MVE = media violence exposure.

^a β values are standardized.

[†] $p < .10$, ** $p < .01$.

predicting reactive RA (Table 6), MVE was significantly and negatively associated with reactive RA ($\beta = -.07$, $p < .01$). Sex was not a significant predictor of reactive RA. With respect to proactive RA (Table 7), sex was a significant positive predictor ($\beta = .11$, $p < .01$), indicating that being female was associated with higher proactive RA. MVE was significantly and positively related to proactive RA ($\beta = .06$, $p < .01$).

Discussion

The findings from this study suggest that MVE may be linked to both relational and physical forms of aggression. Consistent with several decades of study, MVE was related to overall PA. MVE was also linked to overall RA and this was particularly true for girls. Interestingly, sex looks like an important moderator for RA, because when boys and girls were both included in the same model, overall RA was not correlated with MVE, but it was when the correlations were run separately by sex. In the regression analyses, an interaction effect was found between sex and MVE in predicting overall RA, with a stronger association between overall RA and MVE for girls than

Table 5. Hierarchical Regression Analysis of Predictors of Proactive Physical Aggression Controlling for all Other Subtypes of Aggression

Step variable	End β^a	$R^2\Delta$	$F\Delta$	Overall df	Overall F	Overall R^2
Model 1		.71	472.64**	3576	472.64**	.71
Reactive PA	.82**					
Reactive RA	-.15**					
Proactive RA	.18**					
Model 2		.00	1.82	4575	355.44**	.71
Reactive PA	.81**					
Reactive RA	-.14**					
Proactive RA	.19**					
Sex	-.03					
Model 3		.00	.22	5574	284.01**	.71
Reactive PA	.81**					
Reactive RA	-.15**					
Proactive RA	.20**					
Sex	-.04					
MVE	-.01					
Model 4		.00	.33	6573	236.46**	.71
Reactive PA	.81**					
Reactive RA	-.15**					
Proactive RA	.19**					
Sex	-.03					
MVE	-.00					
MVE \times sex	.02					

RA = relational aggression; PA = physical aggression; MVE = media violence exposure.

^a β values are standardized.

** $p < .01$.

for boys. This set of findings supports our theoretical prediction that media violence could have effects that generalize to relational types of aggression, and that sex would moderate the way it is expressed.

The interpretation becomes more complex as aggression is further refined into functional subtypes. The results support the hypothesis that media violence exposure is more strongly linked to reactive PA than to proactive PA. These results were robust, surviving conservative tests in which other aggression forms were controlled. Thus, it appears that children who consume high amounts of media violence are more likely to be physically aggressive toward their peers when they perceive threat or are provoked. Although this is a correlational study and causality cannot be determined from this single study, the existing literature makes it clear that there is a causal and bidirectional relation between MVE and aggressive behavior (Anderson et al., 2003).

With respect to RA, the story is not as clear. There was support for the hypothesis that media violence would relate differentially to reactive and proactive subtypes of RA. As this was the first study of MVE and aggression subtypes, these analyses were

Table 6. Hierarchical Regression Analysis of Predictors of Reactive Relational Aggression Controlling for All Other Subtypes of Aggression

Step variable	End β^a	$R^2\Delta$	$F\Delta$	Overall df	Overall F	Overall R^2
Model 1		.77	642.49**	3576	642.49**	.77
Proactive RA	.84**					
Reactive PA	.22**					
Proactive PA	-.16**					
Model 2		.00	2.21	4575	483.43**	.77
Proactive RA	.82**					
Reactive PA	.23**					
Proactive PA	-.16**					
Sex	.03					
Model 3		.00	9.58**	5574	394.44**	.78
Proactive RA	.83**					
Reactive PA	.24**					
Proactive PA	-.16**					
Sex	.00					
MVE	-.07**					
Model 4		.00	.67	6573	328.61**	.78
Proactive RA	.82**					
Reactive PA	.25**					
Proactive PA	-.16**					
Sex	.01					
MVE	-.06*					
MVE \times sex	.02					

RA = relational aggression; PA = physical aggression; MVE = media violence exposure.

^a β values are standardized.

* $p < .05$, ** $p < .01$.

exploratory. In this case, exposure to media violence was inversely related to reactive RA after controlling for proactive RA and reactive and proactive PA. That is, higher exposure to media violence was associated with lower reactive RA. In contrast, MVE was positively related to proactive RA. These were highly conservative tests, controlling for other aggression forms before entering MVE. It is possible this is an artifact of the collinearity in aggression subtypes—that controlling for other forms overestimates aggression, and MVE ends up correcting for this in the regression. When the other subtypes of aggression are not covaried, MVE is a significant positive predictor of reactive RA ($\beta = .13$, $p < .05$). Another piece of evidence that supports this interpretation is the fact that sex was not a significant predictor for reactive RA or proactive PA, when many other studies show that sex is one of the strongest predictors of RA (and when sex is entered in the first step, it *is* a significant predictor). Although this is certainly possible, it is unclear why it would only happen for reactive RA. Therefore, two other interpretations also seem possible. When people are asked to rate how violent a media product is, they tend to rate based on PA (Potter, 1999). Therefore, our MVE scores are likely to represent primarily exposure to physically aggressive media. This does not

Table 7. Hierarchical Regression Analysis of Predictors of Proactive Relational Aggression Controlling for All Other Subtypes of Aggression

Step variable	End β^a	$R^2\Delta$	$F\Delta$	Overall df	Overall F	Overall R^2
Model 1		.77	648.01**	3576	648.01**	.77
Reactive RA	.83**					
Reactive PA	-.07 [†]					
Proactive PA	.18**					
Model 2		.01	15.64**	4575	502.26**	.78
Reactive RA	.80**					
Reactive PA	-.03					
Proactive PA	.18**					
Sex	.09**					
Model 3		.00	7.48**	5574	407.83**	.78
Reactive RA	.80**					
Reactive PA	-.04					
Proactive PA	.18**					
Sex	.11**					
MVE	.06**					
Model 4		.00	.47	6573	339.63**	.78
Reactive RA	.80**					
Reactive PA	-.04					
Proactive PA	.18**					
Sex	.12**					
MVE	.07**					
MVE \times sex	.02					

RA = relational aggression; PA = physical aggression; MVE = media violence exposure.

^a β values are standardized.

[†] $p < .10$, ** $p < .01$.

mean that no verbally or relationally aggressive behaviors also occur in the same programs/movies/games, but the instrument is predominantly measuring PA. Therefore, it is predictable that MVE should be more strongly and clearly related to PA than to RA. It is also possible that the media model proactive RA more than reactive RA (although no content analyses exist to verify or refute this hypothesis). Therefore, children who consume more media violence may acquire more proactive RA scripts relative to reactive RA scripts. When someone is aggressive toward you, other factors in the encounter are probably stronger predictors of reacting relationally, whereas if you consume a lot of media violence, the most accessible cognitions would be to use reactive PA rather than reactive RA. Further research is needed to test this set of hypotheses, as well as to replicate this somewhat surprising result. A second potential reason for this non-intuitive result may be because we had teachers rate children's aggression. Although this has many strengths, it is also likely that teachers are not able to witness or discriminate all functional subtypes of children's aggression. Specifically, it may be much easier for teachers to rate PA than RA, and easier to rate proactive RA than reactive RA (teachers may not notice the initial provocation and assume the retaliation is an

instance of proactive RA; conversely, it is possible that teachers are better at judging reactive than proactive aggression). This is purely speculative at this point, but if correct, the counterintuitive results with reactive RA may be due to measurement error with that construct for teachers. Although we cannot know exactly why this result was found, it does provide further evidence that reactive and proactive functions of aggression are empirically distinct.

These data provide evidence to support both the specific and the generalized aspects of the GAM. The fact that children who watch more media violence exhibit higher levels of PA is predicted by both the specific and generalized aspects of the theory. The fact that children who watch more media violence exhibit higher levels of RA is predicted by the specific aspects of the theory only if MVE is a proxy measure of relationally aggressive media exposure (which is undetermined in this study, although children's ratings of the violence are highly correlated with expert ratings of PA in media; Gentile et al., 2009). It is predicted by the generalized aspects of the theory if MVE scripts are generalized across situations and aggression forms. This interpretation appears more appropriate, as it also helps to explain why the relation between MVE and RA was stronger for girls than for boys. If what is learned from consuming media violence is not simply specific behaviors, but rather general elements such as to use threats to get what one wants, then the specific form of the threat is likely to be influenced by other factors, such as boys' higher tendency to use PA and girls' higher tendency to use RA.

In interpreting the results, a discussion of the strengths and limitations of the current study is warranted. The study has several strengths. It included multiple informants and a large sample gathered from multiple schools. To our knowledge, this is the first study of media violence as a risk factor for specific subtypes of RA and PA. The study also has several limitations. It is correlational, and cannot determine causal direction (although the results support causal theories). In addition, teachers provided the information about the functional subtypes of aggression. Although teacher reports are often used in the aggression field and generally assumed to be valid, it is possible that the negative relation between reactive RA and MVE is due to an inability of teachers to clearly discriminate when children's RA is reactive. Self reports or peer reports of functional subtypes of aggression would be useful to complement the information provided by teachers in future studies.

Similarly, this study relied on teacher and peer reports of overall RA and PA. Although we view having multiple informants as a strength of the study, we must also acknowledge the limitations of using peer nominations. Both teachers and peers may not see every act of aggression, or their observations may be biased. For example, Ostrov, Crick, and Keating (2005) found that adults show gender bias in identifying young children's relationally aggressive behaviors. Thus, similar to teacher reports, peer reports may not be entirely valid. However, peer reports of RA and PA have been used across many studies and have been shown to be valid (e.g., Crick & Grotpeter, 1995). Therefore, although there are limitations with both teacher and peer reports, we feel that the use of multiple informants strengthens the current study. Future research looking at this topic could include self reports and parent reports to add additional information.

The approach adopted in the current study was to examine functional subtypes within two different forms of aggression, and the correlations were quite high between reactive and proactive RA and between reactive and proactive PA (but are consistent with other studies, see Card & Little, 2006; Polman et al., 2007). These high correlations can make interpreting results somewhat difficult. In a recent meta-analysis,

Polman et al. (2007) found that the correlation between reactive and proactive aggression varied by method. In addition to questionnaires that broke down aggression into forms and functions, both observational studies and experimental tasks were associated with lower correlations than questionnaires that did not look at both forms and functions. Therefore, future studies using these alternative methods of assessing reactive and proactive aggression may also provide relevant information about the association between reactive and proactive RA and PA and MVE.

Many of the correlations between MVE and the aggression subtypes are small in magnitude. This is not surprising considering the complexity of aggression and the multitude of additional factors that may be associated with aggression (e.g., parenting behaviors, abuse/neglect, emotion regulation, the peer context). Furthermore, after controlling for the other aggression subtypes, there is not much variance left to explain given how strongly correlated the different aggression subtypes are. Therefore, we would not expect there to be large correlations between MVE and aggression. Furthermore, Polman et al. (2007) demonstrated that lower correlations are often found when looking only at sub-types of aggression. However, given that the correlations are small, it is prudent to interpret the results cautiously and await replication. Although most (but not all) of the results support the theoretical predictions, this study should be replicated before any strong conclusions could be drawn about MVE and aggression subtypes, particularly for proactive and reactive functions. Furthermore, future studies should also attempt to measure the form and functional subtypes within children's media exposure. It is likely that although there are generalizing effects of MVE, larger relations would be found if we could measure the specific subtypes of both media exposure and behavior.

In conclusion, this study provides a first step toward verifying that there is a relation between MVE and aggression subtypes. Historically, research has focused on PA, but more recently researchers have begun to examine the association between MVE and RA. Had we not included RA in our study, we would have missed a key association between MVE and RA, which was stronger for girls than for boys. Furthermore, our findings demonstrate that the association between MVE and aggression depends on the functional subtype of aggression under examination. Therefore, this study provided evidence for the importance of studying more specific categories of aggression in relation to MVE. Future research is needed to replicate these findings and to expand on this work by examining the specific mechanisms by which there is an effect.

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