Reassessing Media Violence Effects Using a Risk and Resilience Approach to Understanding Aggression

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Public discourse about the effect of violent media on aggression has become contentious. We propose that violent media effects can best be understood within a risk and resilience framework that considers multiple factors that facilitate or inhibit aggression. In a prospective study, 430 third through fourth grade children, their peers, and their teachers were surveyed twice during the school year, about 6 months apart. Six risk/protective factors for aggression were measured: media violence exposure (TV, movies, video games), physical victimization, participant sex, hostile attribution bias, parental monitoring, and prior aggression. Each Time 1 risk factor (including media violence exposure) was associated with an increased risk of physical aggression at Time 2, whereas protective factors were associated with a decreased risk. There was also a Gestalt-type effect, where the combination of risk factors was a better predictor of aggression than the sum of their individual parts. The results offer strong support for a risk and resilience framework for aggression. Results also suggest that the effects of media violence exposure may be underestimated by standard data analysis procedures. Exposure to media violence acts similarly to other risk factors for aggression and therefore deserves neither special acclaim nor dismissal as a risk factor.

Keywords: aggression, risk factors, media violence, media, longitudinal study

"As Hillary [Clinton] pointed out in her book, the more children see of violence, the more numb they are to the deadly consequences of violence. Now, video games like 'Mortal Kombat,' 'Killer Instinct,' and 'Doom,' the very games played obsessively by the two young men who ended so many lives in Littleton, make our children more active participants in simulated violence."

—Bill Clinton, former U.S. president. Statement made April 24, 1999, in President's radio address following the Columbine High School shooting in Littleton, Colorado.

"Playing a violent game won't turn you into a psycho, a murderer or a serial killer. Most studies show that very clearly on the contrary violent games allow players to express themselves. It's like an outlet for them in a way. All these violent actions that are said to have been inspired by playing violent video games are nothing but the expressions of issues unrelated to video games."

—Guillaume de Fondaumiere, former president of the French National Video Game Association. Statement made November 16, 2009, interview with Digital Games on digitalgames.fr.

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Public debate on the link between violent media and aggressive and violent behavior is often contentious. Media violence effects are usually only discussed publicly in response to extreme events such as school shootings. This results in a culprit mentality, in which people seek to identify "the cause" of the tragedy. However, violent behavior is extremely complex, and no single factor can predict it. We suggest that media violence effects on aggression and violence can be best understood within

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a risk and resilience approach that considers several risk factors.

Several theoretical models describe the psychological mechanisms through which media violence can influence later behavior (Bandura, 1977; Berkowitz, 1984; Dodge, 1980; Huesmann, 1986). Fundamentally, the psychological processes all rely on learning. With repeated exposure to media violence, one can predict perceptual, cognitive, and emotional responses (Maier & Gentile, 2012). An example of a perceptual response is the tendency to perceive ambiguous actions by others as hostile—called a *hostile attribution bias*. Research shows that with repeated exposure to violent media, ambiguous events are perceived as being more hostile (Gentile, Coyne, & Walsh, 2011). Cognitive responses include beliefs, such as the belief that aggression is normal (Huesmann & Guerra, 1997), and scripts, such as expecting that retaliation is the most typical response to being provoked (Anderson et al., 2004). Emotional responses include feelings of anger (Bushman & Geen, 1990). Most data and theory focus on these psychological-level mechanisms and effects. The public discussion, however, is often at the macro level, such as focusing on population-level violent crime statistics. This has allowed the public debate to focus on issues such as whether parents are good or bad parents, rather than on understanding the multicausal nature of aggression. In our view, aggression should be viewed as a public health issue, with violent media being viewed as just one of many potential risk factors.

Medical science overcomes similar difficulties in describing complex multicausal systems by focusing on the *pattern of risk and protective factors*. This macro-level theoretical approach is sometimes called a risk and resilience approach. For example, scientists consider a number of risk factors for heart disease (e.g., smoking, alcohol consumption, high-fat diet, exercise, family history of heart disease), although the standard statistical analyses usually focus on each factor independently.

Although there have been several calls to consider aggression within a risk-factor public health approach (Browne & Hamilton-Giachritsis, 2005; Centers for Disease Control & Prevention, 2008; Dodge & Pettit, 2003; Gentile & Sesma, 2003; U.S. Surgeon General, 2001), one critic has recently dismissed this approach, saying that it is "nonscientific" because it is "fundamentally unfalsifiable" (Ferguson, 2009, p. 118), although he does endorse a multivariate approach elsewhere (Ferguson, San Miguel, & Hartley, 2009). The present research demonstrates that testable and falsifiable hypotheses can be generated from a risk and resilience model. This article does not claim to provide a novel theory but to provide novel tests of the risk and resilience approach, as well as demonstrating whether media violence exposure acts similarly to other known risk factors for aggression.

The U.S. Surgeon General's report on youth violence (U.S. Surgeon General, 2001) states that "the bulk of research that has been done on risk factors identifies and measures their predictive value separately, without taking into account the influence of other risk factors. More important than any individual factor, however, is the accumulation of risk factors" (p. 59). Note that this approach requires a change in how we understand causes of behavior. Rather than relying on the overly simplistic Humean "necessary and sufficient" views of causality (Hausman, 1998), modern science has moved to a stochastic understanding of causality. For example, some people with high cholesterol do not have heart disease, so cholesterol is not a sufficient cause. Furthermore, some people who have heart disease never had high cholesterol, so it is not a necessary cause. Therefore, cholesterol is neither a necessary nor sufficient cause of heart disease. Medical science does not dismiss cholesterol as unimportant, however, because it is one predictable, and therefore important, risk factor for heart disease. In other words, high cholesterol is causally related to heart disease, even if it is neither a necessary nor sufficient cause. Similarly, some people who are aggressive do not consume violent media, and some people who consume violent media are not very aggressive. Nonetheless, exposure to violent media is one predictable, and therefore important, risk factor for aggression, as we show in the present research.

Other researchers have noted that there are several documented risk factors at multiple levels of analysis for aggression and that "no single factor predicts a high proportion of the variance in outcomes" (Dodge & Pettit, 2003, p. 354). Instead, cumulative risk models suggest that the total number of risk factors is a better predictor

than any one factor, although risk factors can be interactive as well as additive. Therefore, to demonstrate the full value of a risk and resilience approach, one should demonstrate not only the increment in risk due to individual risk factors but also the decrement in risk due to individual protective factors. It would also be important to test whether cumulative risk factors have an additive, linear effect or whether they have a multiplicative, interactive effect.

Another issue that clouds the dialogue is a lack of clarity about whether the research focuses on aggression or violence broadly (*aggression* is typically defined as any behavior, physical, verbal, or relational, that is intended to harm others, whereas *violence* is typically defined as an extreme subtype of physical aggression that is likely to result is severe bodily harm). More extreme outcomes usually require many more risk factors and are even harder to predict. Therefore, there are very few studies that show any link between exposure to media violence and violent criminal behaviors, such as homicide or aggravated assault. Nonetheless, media violence exposure can predict aggressive behaviors, such as fighting or bullying behaviors. Although many critics of the research focus on extreme but rare violent criminal behaviors, we focus on more common aggressive behaviors, which can also be harmful.

Risk Factors for Aggression

The present research examines six potential risk factors for aggression. Each was selected on the basis of previous research and theory suggesting that each is related to increased risk of aggression. Most of these are noted as risk factors in the U.S. Surgeon General (2001) and Centers for Disease Control and Prevention (2010) reports on youth violence. The risk factors include:

Hostile Attribution bias

Children who have a bias toward attributing hostility to others' actions are far more likely to behave aggressively (Crick & Dodge, 1994, 1996; Crick, Grotpeter, & Bigbee, 2002). A meta-analysis of 41 studies involving more than 6,000 children showed a strong relationship between hostile attribution of intent and aggressive behavior (Orobio de Castro, Veerman, Koops, Bosch, & Monshouwer, 2002).

Prior Involvement in a Physical Fight

Studies have repeatedly shown that the single best predictor of future aggression is past aggression (Centers for Disease Control & Prevention, 2010). Aggression is quite stable over time and across situations, almost as stable as intelligence (Olweus, 1979). Although this is a strong risk factor, it does not provide explanatory power. In a sense, it is a measure of prior accumulated risk, which is why it is often used as a covariate to control for earlier risk factors.

Prior Physical Victimization

Having been bullied or physically victimized is also a risk factor for future aggression (Centers for Disease Control & Prevention, 2010; Mercer, McMillen, & DeRosier, 2009). There may be many reasons that victims become offenders (and vice versa), although the most common is retaliation (U.S. Surgeon General, 2001).

Participant Sex

Being male is a strong risk factor for physical aggression, and, conversely, being female is a protective factor (U.S. Surgeon General, 2001).

Media Violence Exposure

Five decades of scientific data led to the conclusion that exposure to violent media increases aggression (for a review, see Bushman & Huesmann, 2012). Findings are similar across studies that use very different methodologies. Each research method has its unique strengths and weaknesses, yet across the different methods, there is a convergence of evidence in meta-analytic reviews of each methodology (e.g., Anderson & Bushman, 2002; Anderson et al., 2010; Comstock & Scharrer, 2003; Paik & Comstock, 1994). Experimental studies demonstrate that exposure to media violence causes people to behave more aggressively immediately afterward. Experimental studies have been criticized for their somewhat artificial nature, but field experiments have produced similar results in more realistic settings. However, it is not so much the immediate effects of media

violence exposure that are of concern, but rather the aggregated long-term effects. Longitudinal studies offer evidence of a relationship between media violence exposure as a child and aggressive and violent behavior many years later as an adult.

Parental Involvement in Media

If exposure to media violence is a risk factor for aggression, then parental monitoring of children's media use should act as a protective factor (Austin, 1993; Nathanson, 2001). Conversely, a lack of parental monitoring of children's media should act as a risk factor for aggression (Anderson, Gentile, & Buckley, 2007). Previous research has shown that violent media effects are larger when parents do not monitor what media their children consume and when they do not discuss the content with them (Anderson et al., 2007).

The present research uses prospective data with multiple informants (participants, peers, and teachers) to test three hypotheses: (1) the presence of any individual risk factor at Time 1 should be associated with an increase in the likelihood of aggression at Time 2; (2) the presence of any individual protective factor at Time 1 should be associated with a decrease in the likelihood of aggression at Time 2, even in the presence of other risk factors; and (3) the presence of multiple risk factors at Time 1 should be associated with an increase in the likelihood of aggression at Time 2 to a greater extent than any individual risk factor. In addition, we tested whether a linear or curvilinear model fit the data better. Note that answering these questions requires a different approach to analysis than the standard approach seeking simply to ask whether media violence exposure predicts future aggression, although that level of analysis has also been conducted with these data (Gentile et al., 2011).

Method

Participants

Participants were 430 children (51% male; M_{age} = 9.7 years, SD = 1.03, range = 7 to 11; 86% Caucasian, which is representative of the region). To obtain a diverse sample, students were recruited from five Minnesota schools,

including one suburban private school (n = 138), three suburban public schools (n = 265), and one rural public school (n = 27). Parental consent was over 70% for all classrooms; child assent was 100%.

Procedure

Children and teachers were surveyed twice in a school year, 6 months apart for most participants. All participants were treated in accordance with American Psychological Association's ethical guidelines.

Assessment of Aggression

Physical aggression was measured using self-reports, peer-nominations, and teacher-reports.

Self-report. Participants were asked to report if they had been involved in a physical fight in the past year (used as a dichotomous variable).

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Peer nominations. A peer nomination instrument was used to assess peer perceptions of aggression (Crick, 1995; Crick, Bigbee, & Howes, 1996; Crick & Grotpeter, 1995). Children were provided with a roster of classmates, with each student given a number. Students were asked to nominate three students for each of several items, by writing the student numbers on the answer form. Confidentiality was stressed to maximize truthful responding and minimize the risk of hurt feelings. Items measured peer acceptance and rejection (2 items), physical aggression (2 items), relational aggression (3 items), prosocial behavior (2 items), and verbal aggression (1 item). Only the Physical Aggression subscale was analyzed in the current study (Cronbach's alpha = .92), as our focus was on physical aggression rather than aggression more broadly defined. The two items asked children to nominate which students in their classes "hit, kick, or punch others" and "push and shove other kids around." Each child was given a z-score, standardized within classrooms, based on the number of nominations he or she received.

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Teacher ratings. Teachers completed a survey assessing the frequency of each child's observed aggression (Anderson et al., 2007). Teachers rated four physically aggressive behaviors for each child: the child hits or kicks peers, threatens to hit or beat up other children,

pushes or shoves peers, and initiates or gets into physical fights with peers (1 = *never true* to 5 = *almost always true*). Responses to the four items were summed to create a total score for each child (Cronbach's alpha = .92).

Composite measure of physical aggression. A composite aggression measure was created by first standardizing the peer nominations of physical aggression, the teacher ratings of physical aggression, and the self-reports of involvement in a physical fight, and then averaging the three standardized *z*-scores. The resulting composite physical aggression score yielded high internal reliability at both Time 1 (Cronbach's alpha = .87) and Time 2 (Cronbach's alpha = .89). Table 1 displays the intercorrelations between these variables at both times. All correlations were positive and significant, demonstrating that self- and other-perceptions of aggressive behavior were concordant.

Assessment of Physical Victimization

Teachers rated three victim behaviors (e.g., gets hit or kicked by peers) for each child (1 = *never true* to 5 = *almost always true*; Cronbach's alpha = .90; Anderson et al., 2007).

Hostile Attribution Bias

Hostile attribution bias was measured with a widely used scenario-based instrument that includes 10 stories, each describing an instance of provocation in which the intent of the provocateur is ambiguous (Crick, 1995; Crick et al., 2002; Nelson & Crick, 1999). The stories were developed to reflect common situations that children might encounter (e.g., a peer spills milk on you in the lunch room). Participants

answer two questions following each story. The first question presents four possible reasons for the peer's behavior, two reflecting hostile intent and two reflecting benign intent. The second question asks whether the provocateur(s) intended to be mean or not. Each measure was scored as 1 if the participant selected a hostile intent, or as 0 if not. Responses were summed within and across the stories for each provocation type (Fitzgerald & Asher, 1987). Possible scores ranged from 0 to 20, with higher scores indicating a greater hostile attribution bias (Cronbach's alpha = .85).

Assessment of Media Variables

Media violence exposure. Participants listed their three favorite TV shows, video games, and movies (Anderson & Dill, 2000; Anderson et al., 2007; Gentile, Lynch, Linder, & Walsh, 2004). For each, participants rated how frequently they watched or played it (1 = *almost never* to 5 = *almost every day*) and how violent it was (1 = *not at all violent* to 4 = *very violent*). An overall violence exposure score was computed for each participant by multiplying the violence rating by the frequency of viewing/playing, and then averaging across the nine responses (i.e., 3 TV programs + 3 video games + 3 movies; Cronbach's alpha = .80). This approach to measuring exposure to media violence has been used successfully with children in other studies (Anderson et al., 2007; Gentile et al., 2004). Importantly, this approach has been validated in research showing that child ratings correlate .75 with expert ratings (Gentile et al., 2009).

Total screen time. Participants provided the amount of time they spent watching TV and playing video games during three time periods (from when they wake up until lunch, from lunch until dinner, from dinner until bedtime) separately for weekdays and weekends. Weekly amounts were calculated by (a) summing the weekday times and multiplying by 5, (b) summing the weekend times multiplied by 2, and (c) summing these products. TV and video-game times were summed to provide the total amount of screen time (as separate from violent content, and used as a covariate to control for amount, such that analyses of media violence exposure are interpretable as about violent content rather than media exposure broadly).

Table 1
Intercorrelations Among Physical Aggression Variables

	1	2	3
1. Peer report of aggression (continuous)	—	.53	.30
2. Teacher report of aggression (continuous)	.57	—	.28
3. Self-report of fights (dichotomous)	.21	.23	—

Note. Below the diagonal are Time 1 intercorrelations; above the diagonal are Time 2 intercorrelations. All correlations statistically significant at $p < .001$.

Parent involvement in children's media habits. Participants reported how frequently their parents watched TV with them and how frequently they discussed content with their parents (1 = *never* to 5 = *always*). These two items were significantly correlated ($r = .32$, $p < .001$) and were averaged to create a composite (Cronbach's alpha = .45). Although this reliability coefficient is lower than might be expected, recent validity analyses have demonstrated that both parent reports and child reports of parental monitoring are valid for predicting theoretically predicted child variables, such as media violence exposure and school performance (Gentile, Nathanson, Rasmussen, Reimer, & Walsh, 2012).

Results

The goal of this research is not to test whether media violence exposure itself is a significant predictor but instead to demonstrate how risk factors (including media violence exposure) individually and collectively are associated with aggression. Therefore, our analysis strategy does not rely specifically on traditional significance-testing approaches, although that type of analysis strategy demonstrates that media violence exposure is a significant predictor of future aggressive behavior (Gentile et al., 2011). Instead, the analysis approach was to look at how well aggression could be predicted from multiple risk factors and how media violence exposure compares with other risk factors.

Hypothesis 1: The presence of any individual risk factor at Time 1 should be associated with an increase in the likelihood of aggression at Time 2.

Our first hypothesis was that the presence of any individual risk factor should predict aggression at Time 2, even after controlling for aggression at Time 1 and total screen time for TV, videos and video games. We measured this two ways, utilizing different criterion variables. First, we created logistic regression equations (on the full sample) predicting the likelihood of involvement in a physical fight at Time 2 from Time 1 variables (including the Time 1 fight variable). Using a dichotomous fight outcome variable allows us to calculate probabilities of involvement in a fight at Time 2, given certain

starting values of the Time 1 predictor variables, based on the regression equation for the full data set. For this analysis, low risk was defined as scoring at the 5th percentile on a given risk factor, high risk was defined as scoring at the 95th percentile, and average risk was defined as scoring at the 50th percentile (median). These risk definitions are arbitrary but are chosen to illustrate the difference between clearly low risk and clearly high risk amounts of each variable. High, low, and median values were entered into the regression equation, and the resulting probability of involvement in a physical fight at Time 2 was graphed for each. What is graphed is the result of the logistic function—a predicted distribution based on the data rather than a description of our specific sample characteristics—therefore reporting the number of people at each level and confidence intervals would be inappropriate. Figure 1 shows likelihood of involvement in a fight at Time 2, based on whether a person is either low or high risk on each Time 1 factor, holding all other risk factors constant at the median value. Thus, having a high hostile attribution bias at Time 1 is associated with an increased in the risk of involvement in a physical fight at Time 2 from 35% to 42% (odds ratio = 1.35), holding all other risk factors constant and controlling for total screen time. That is, the shift from low to high risk is associated with a 34.5% increase in the likelihood of physical fights. Similarly, being a boy increases the risk from 33% to 45% (odds ratio = 1.66); and high media violence exposure increases the risk from 31% to 62% (odds ratio = 3.63), holding all other risk factors constant and controlling for total screen time.

Our second approach used multiple regression to predict the Time 2 composite (self-report, peer nomination, and teacher report) aggression score from the six risk factors, again controlling for total screen time. Collectively, these accounted for 53% of the variance in Time 2 composite aggression, $F(7, 365) = 58.82$, $p < .001$. The relative importance of each of the predictors cannot be determined by simply examining the size of beta coefficients, as risk factors are collinear (Johnson, 2001, 2004). Johnson's (2001; Johnson & LeBreton, 2004) relative weights analysis was conducted to test the unique contribution of each risk factor to the overall R^2. This analysis estimates the proportionate contribution each pre-
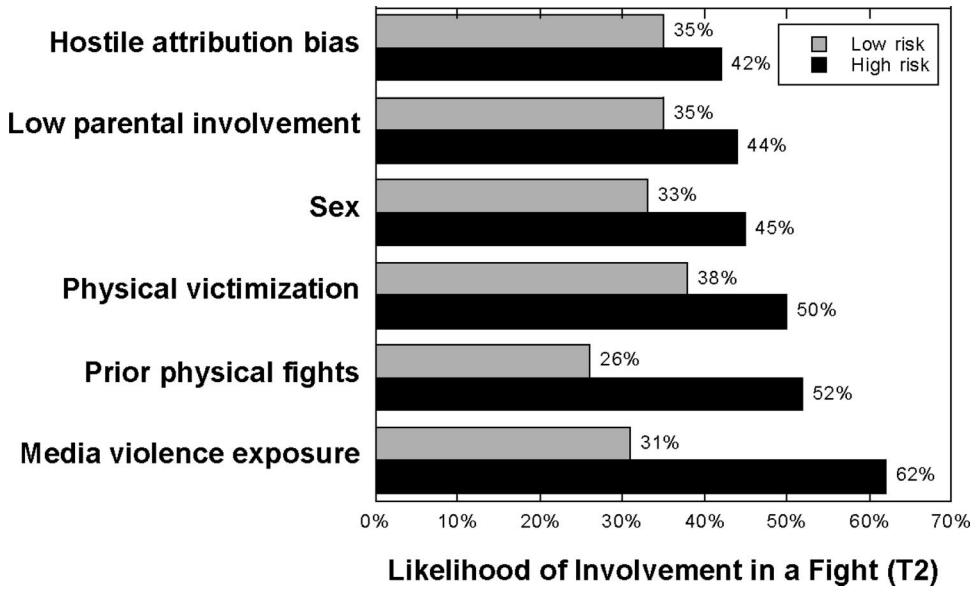
Figure 1. Effect of each risk factor on involvement in a fight at Time 2, holding others constant (controlling for Time 1 total screen time).

dictor makes to the overall R^2 while considering both its unique contribution and its contribution when combined with other predictors, thus partitioning the variance accounted for by each predictor. As shown in Figure 2, consumption of violent media explained 8.1% of the variance in the composite measure of aggression at Time 2, controlling for all other factors.

> *Hypothesis 2:* The presence of any individual protective factor at Time 1 should be associated with a decrease in the likelihood of aggression at Time 2, even in the presence of other risk factors.

Greater parental involvement in children's media habits has been suggested as a protective factor for aggression (Anderson et al., 2007; Gentile et al., 2004; Singer et al., 1999). To test whether protective factors are associated with a decreased risk of aggression, even in the presence of risk factors, we split participants into low, median, or high cumulative risk groups, based on involvement in a prior fight, sex, and physical victimization. Low risk was defined by entering the 5th percentile value for all the three risk factors into the regression equation, whereas the 95th percentile value was entered to demonstrate high risk. As displayed in Figure 3,

parent involvement acts as protective factor for involvement in a physical fight at Time 2, regardless of whether participants' profile is low, median, or high on the other risk factors. This pattern is maintained even when low, median, and high media violence exposure is added as a fourth risk factor.
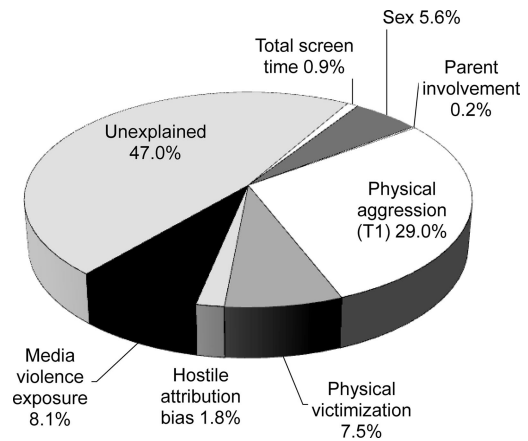

Figure 2. Predicting Time 2 physical aggression (composite of self-report, peer-nomination, and teacher-report) from Time 1 risk and protective factors. Percentages are variance accounted for.
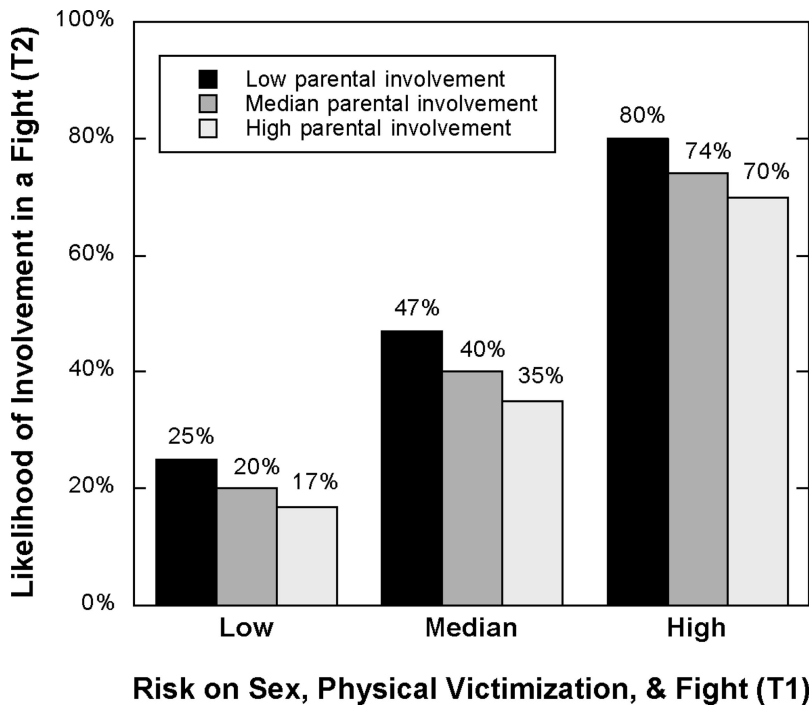
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Figure 3. Effect of parent involvement as a protective factor.

Hypothesis 3: The presence of multiple risk factors at Time 1 should be associated with an increase in the likelihood of aggression at Time 2 to a greater extent than any individual risk factor.

We tested this hypothesis using two approaches. In the first, we hypothesized that if risk factors are cumulative, then the likelihood of aggression at Time 2 should be positively associated with each additional risk factor, and that exposure to media violence should further increase the risk over and above other factors. As displayed in Figure 4, the individuals most likely to behave aggressively at Time 2 are boys with high hostile attribution bias who have previously been involved in a fight, who consume violent media, and whose parents are not involved in their media exposure. Note that exposure to media violence increases the risk of aggression over and above the other risk factors.

We recoded the risk factors to indicate dichotomized risk, following standard approaches to combining multiple risk factors (Boxer, Huesmann, Bushman, O'Brien, & Moceri,

2009; Sameroff, 2000). Risk was defined for these analyses as being at or above the 75th percentile (coded 1), or below the 75th percentile (coded 0). This approach is consistent with the procedures established by investigators working in the risk and resilience tradition (Appleyard, Egeland, van Dulmen, & Sroufe, 2005; Boxer et al., 2009). Figure 5 shows the increase in the likelihood of aggression based on the number of risk factors present. Figure 6 shows that the relation between the number of risk factors and the likelihood of aggression has both a quadratic and linear component, $R^2 = .39$, $F(2, 401) = 125.73$, $p < .001$, and $R^2 = .31$, $F(1, 402) = 178.51$, $p < .001$, respectively.

Discussion

Using prospective data, we demonstrated that exposure to media violence is associated with increased risk of later aggression, that parental monitoring of media can decrease the risk, and that the greatest risk occurs when multiple risk factors are present. The best single predictor of future aggression in this sample of elementary
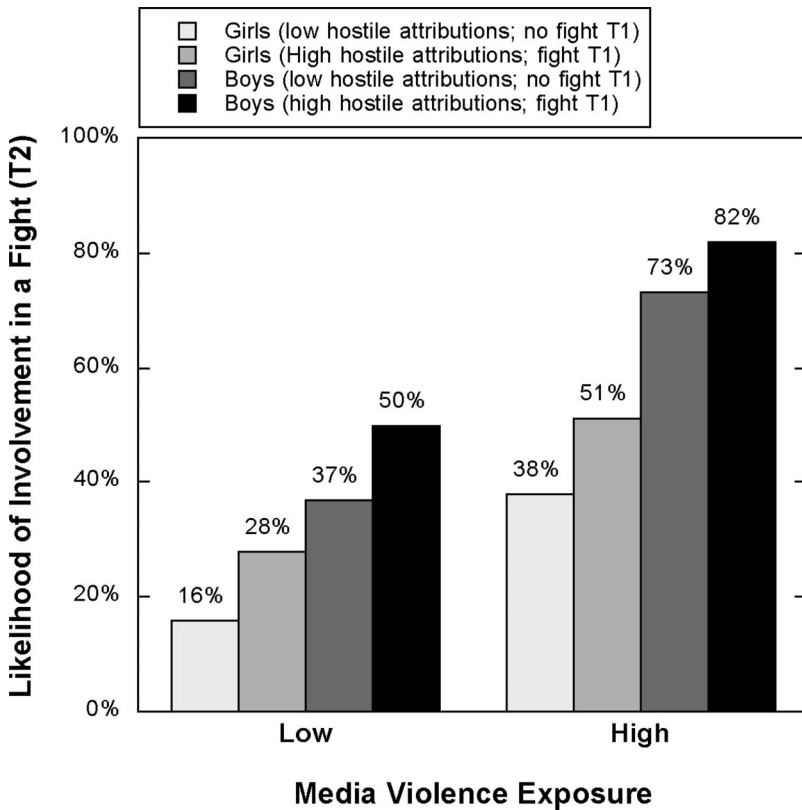
Figure 4. Cumulative risk factors for aggression: hostile attribution bias, prior aggression, sex, and media violence exposure.

schoolchildren was past aggression, followed by violent media exposure, followed by having been a victim of aggression (Figures 1 and 2). The order and relative size of each risk factor is not, however, the main point. The main point is that risk factors increase and protective factors decrease the likelihood of aggression in a predictable manner.

Perhaps most interesting is the finding that multiple risk factors are not simply additive but can be multiplicative (see Figures 5 and 6). The likelihood of aggression increases more as the number of risk factors increase. Most cumulative risk models have an assumption of equifinality, in that the same outcome can result from any combination of disparate sources and that additive models will therefore work well (Dodge & Pettit, 2003). In contrast, interactive models assume that some combination of risk factors may increase the magnitude of effects to a greater extent, and, therefore, additive models

will not suffice. Our data provide evidence to support both positions. The quadratic model fits better than the linear model, but the linear model provides a very good approximation and fits almost as well. Note that, in this sample, once a child has five of the six risk factors, one can predict, with 84% accuracy, whether he or she will be involved in a physical fight by the end of the school year.

This approach to analysis also provides data on an issue that has been suggested but rarely tested—that traditional effect-size estimates of media violence may overestimate or underestimate the actual amount of variance in aggressive behavior (Anderson et al., 2007; Ferguson, 2010). Most studies use regression to test violent media effects, controlling for several relevant variables (this analysis approach yields $\beta = .16$ with the present data, suggesting 2.6% of variance accounted for in our composite aggression measure). However, be-
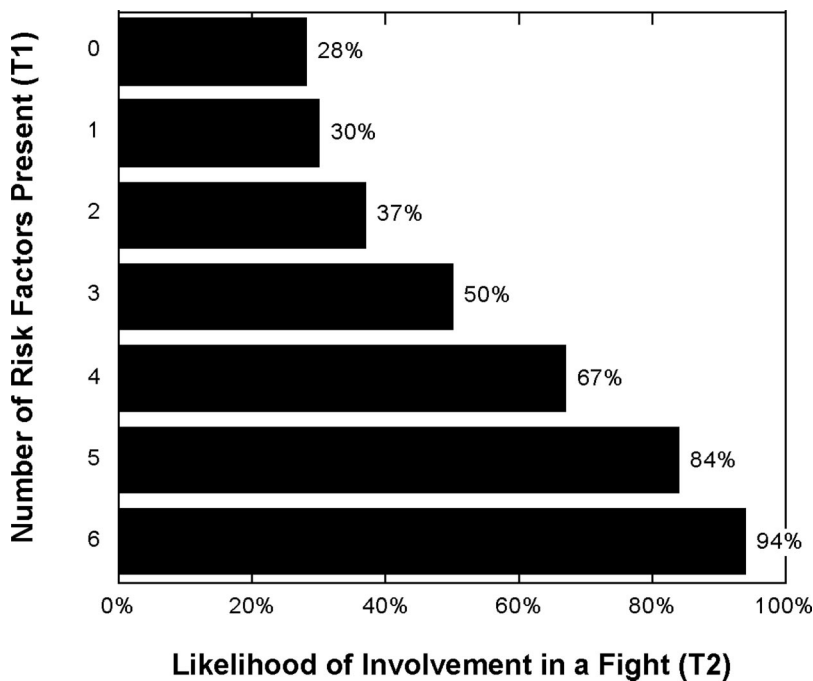
Figure 5. Predicted likelihood of involvement in a fight (Time 2) from number of Time 1 risk factors present.

cause violent media exposure is collinear with prior aggression, participant sex, and other predictors of aggression, controlling for these other factors may underestimate the effect of violent media on aggression. The relative weights analysis, in contrast, provides a more accurate estimate of how much variance in the outcome each predictor accounts for, with violent media exposure accounting for 8.1% of the variance—more than would be found using standard multivariate regression analysis.

Implications

These findings have several important implications. The first is that the risk and resilience approach is a valuable approach for understanding media violence effects. Violent media exposure is not the only factor associated with aggression, or even the most important, but it is one important risk factor. The risk and resilience approach yields testable hypotheses and allows for understanding how media violence may work in combination with other risk factors to predict future aggression. Importantly, it may

allow the rhetoric surrounding the heated "debate" over media violence to cool down. If media violence is understood as just one risk factor among many for aggression, then we can view it as similar to other public health risks. Media violence has somehow achieved what appears to us to be a type of special status. The present analyses demonstrate that it deserves neither special acclaim as a risk factor for aggression nor special denials as being unrelated to aggression. It acts similarly to other known risk factors for predicting aggression and can be moderated by protective factors such as parental involvement (see Figure 3).

This approach allows for a more balanced understanding of the causes of aggression. Figure 7 displays a metaphorical aggression thermometer, in which the "cold" end signifies respectful behavior and the "hot" end signifies violent behavior. No single risk factor can heat it up all the way. In fact, any individual risk factor can probably only move the thermometer one or two notches. This yields two important insights. First, to get to an aggressive behavior
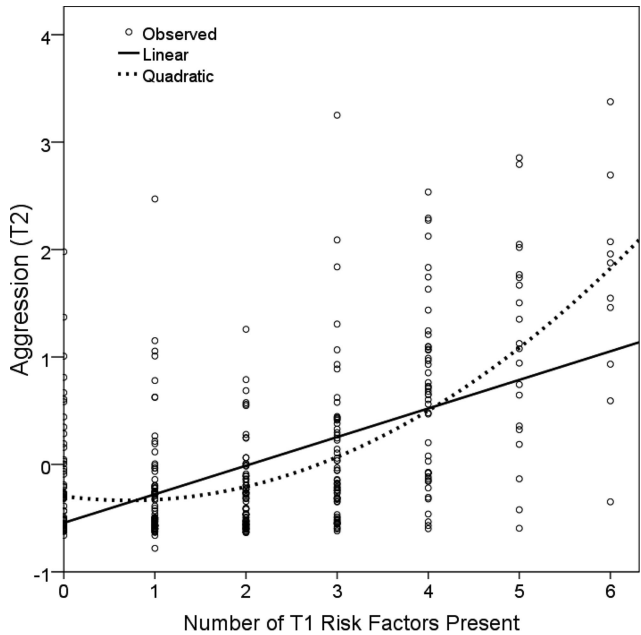
Figure 6. Linear and quadratic relationship between the number of risk factors present at Time 1 and aggression at Time 2 (self-, peer, and teacher reports). Values on the *Y*-axis are z-scores.

that is easily visible (such as violent criminal behavior) requires many risk factors at once and very few protective factors. Second, this helps to explain why most people can say, correctly, that they have consumed a lot of media violence and have never committed a violent crime. Most people have only a few risk factors or also have several protective factors. This means that no matter how much media violence they consume, it can never push the thermometer all the way to the top. Note, however, that this is different from saying that it has no effect. It is having an effect (likely on psychological level variables such as attitudes, desensitization, aggressive normative beliefs, hostile attribution bias, etc.), but not one that will be easily observable in behaviors.
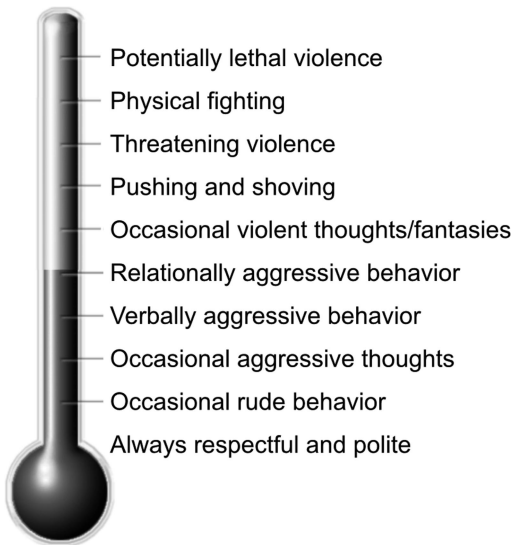
Limitations and Future Directions

The present research has several limitations, which suggest directions for future research. That our self-report of fights is a single item and does not distinguish between being involved as a perpetrator or victim is one limitation, although it is balanced by peer nominations and teacher reports of aggression, which provides not only multiple informants but also conceptual replication between multiple types of aggression measures. It also would be valuable to explore additional measures, including parent reports or direct observation of the risk factors.

Figure 7. Metaphorical aggression thermometer (adapted from Gentile & Sesma, 2003).

It is likely that the relative sizes of some of the risk factors would change if measured differently, and this type of replication is definitely needed. We note, however, that the goal of this analysis was not to estimate specific values for individual risk factors but instead to demonstrate that each risk factor predictes aggression in a systematic way. Another limitation is the nonexperimental nature of the design, which prevents us from drawing causal inferences based on these data, although they are prospective and are concordant with causal theories. Finally, several studies of parental monitoring of media have demonstrated that there are more aspects to monitoring than the two that were measured here (Gentile et al., 2012; Nathanson, 2001; Valkenburg, Krcmar, Peeters, & Marseille, 1999). Future studies should use more comprehensive measures, which would yield a scale with a higher reliability than our two-item scale, and may yield larger effect sizes for parental monitoring than were found in this sample.

Conclusion

Although this study provides support for a risk and resilience approach to understanding media violence, it should not supplant detailed psychological theories of *how* media violence or other risk factors can influence aggression. The risk and resilience approach is a macrolevel theory and therefore does not speak to why risk factors have their effects, nor how they may have effects on different types of psychological mechanisms (e.g., cognition, arousal, affect). Psychological theories are still needed to understand the role of these mechanisms, and several well-tested theories exist (Carnagey & Anderson, 2003). A risk-factor approach, however, may have additional benefits, by communicating the research to a lay audience in a manner that is more understandable and is therefore valuable for discourse both within the scientific community as well as among the general public. A risk-factor approach may also reduce some of the contention in current debates about violent media effects. Exposure to violent media is not the only risk factor for aggression, or even the most important risk factor, but it is one important risk factor.

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