Pathways to Aggression in Children and Adolescents

MALCOLM W. WATSON
Brandeis University

KURT W. FISCHER
Harvard Graduate School of Education

JASMINA BURDZOVIC ANDREAS
Harvard Medical School

KEVIN W. SMITH
New England Research Institutes

Abstract

In this article, Malcolm Watson, Kurt Fischer, Jasmina Burdzovic Andreas, and Kevin Smith describe and compare two approaches to assessing risk factors that lead to aggression in children. The first, the severe risks approach, focuses on how risk factors form a pathway that leads to aggressive behavior. Within this approach, an inhibited victim-aggressor pattern is hypothesized in which children who share certain characteristics — including high-conflict, low-cohesive families, high levels of harsh parental discipline, high levels of victimization by peers, and high behavioral inhibition — are at risk for developing defensive, reactive aggressive behaviors. The second, the cumulative effects approach, focuses on the accumulated effects of multiple risk factors in leading to aggressive behavior, irrespective of the particular risk factors involved. The authors assess both patterns longitudinally in a community-based sample that includes children from middle childhood to adolescence. They find strong evidence for both pathways. (pp. 404–430)

Among professional jugglers, the ability to keep three items in the air simultaneously, whether the items are tennis balls, ten pins, or rings, is considered easy and virtually automatic. When the number of items is increased, the juggling difficulty increases exponentially. Juggling five items will eliminate most amateur jugglers, and keeping seven or more items in the air is achievable by only the very best. Yet some professional jugglers have developed highly entertaining and successful routines juggling only three items. One such group, *The Flying Karamazov Brothers*, has developed an excellent reputation based (along with their continuous comedy) on their ability to juggle three unusual items in creative routines using several jugglers. The highlight of their act is the attempt to have one person juggle three items brought by the audience. For example, they have simultaneously juggled a slinky, a meat cleaver, and a quart of ice cream without the container. The difficulty comes from the challenging nature of the items that must be kept in the air, not from the number of items.

This description of juggling may serve well as a metaphor for the way various risk factors (or challenges in the lives of children) function to lead to a breakdown of successful and healthy development and the ensuing emergence of psychopathology, in this case severe aggressive and violent behavior. Just as a juggler can handle the challenge provided by keeping three balls in the air simultaneously but lose control when more balls are added, a person may manage a few challenges or problems in his or her life and yet break down when the number of challenges increases beyond some critical limit for that person. Yet the number of risks or challenges is certainly not the only factor that determines whether a child develops psychopathological problems. Obviously, some risk factors or challenges are more debilitating than others; just as a

juggler faces a higher challenge from juggling a meat cleaver and a quart of ice cream than from juggling three tennis balls, so some risk factors are more likely to lead to psychopathological disorders even though only a few risk factors are present. Both the type and number of risk factors make a difference.

The strongest predictor of aggression in late adolescence and adulthood is simply the level of aggression previously shown in childhood (Eron & Huesmann, 1990; Farrington, 1991; Vitaro, Brendgen, & Tremblay, 2002); however, knowing that aggression is stable over time does not tell us what the causes are. Researchers have learned that no single risk factor leads to or causes severe aggression, and thus there is no simple or single prevention of interpersonal aggression (American Psychological Association, 1993; Farrington, 1991). Multiple antecedent factors usually combine to shape aggressive behavior (Pepler & Rubin, 1991), and a good deal of research on the antecedents of aggression has attempted to find which particular patterns or groupings of risk factors lead to aggressive behavior, either through a breakdown of normal functioning or a sidetrack onto a different developmental pathway (Fischer et al., 1997). In other words, one direction in determining the antecedents of aggression has been to look for the most severe or detrimental risk factors and determine how they relate to one another, and, ultimately, how they relate to aggression. We will call this the *severe risks approach.*

Another direction, one that is more controversial, is to look for some critical number of risk factors under the assumption that too many challenges in a child's life will undermine normal functioning. Risk factors, regardless of the specific combinations or patterns or the severity of any given risk factor, accumulate to eventuate in various forms of psychopathology, including severe aggression. Researchers have called this approach the *cumulative risks approach* (Rutter, 1979; Sameroff, Seifer, Baldwin, & Baldwin, 1993).

In this paper, we attempt to accomplish two things. First, we delineate some background conceptualizations and research behind these two approaches to assessing risk factors leading to aggression in children and adolescents. Under the severe risks approach, we hypothesize that there is an important constellation of risk factors that had been greatly overlooked until recent research from school shootings and aggression in schools mobilized researchers to focus on new directions. This hypothesized pattern of severe risks includes an inhibited temperament coupled with victimization from either parents or peers, or both. We believe that one cannot fully understand patterns of risk factors leading to aggressive behavior without also considering patterns leading to victimization. In some highly problematic cases, the person who is victimized is at higher risk for becoming aggressive, and thus victimization and aggression co-occur in the same person. The individuals falling into this pattern can be thought of as victimized aggressors, and knowing more about the pattern, we believe, can inform educators and researchers who are concerned with preventing violence in our schools. In addition, the cumulative risks approach informs us of the problem of multiple risks accumulating in an individual's life to push that person over the edge toward violent behavior. Therefore, we first present a description and conceptualization of these two approaches.

The second purpose of this paper is to review some recent findings from our longitudinal study of antecedents of aggression in children and adolescents that demonstrate the importance of both the severe risks and the cumulative risks approach. Even though we have not exhaustively assessed all aspects of the pattern that we will describe, we believe we have provided some evidence for the pattern and also evidence for both approaches to aggression, and that our findings are useful for educators and researchers. We begin with a description and conceptualization of the two approaches and of an inhibited, victim-aggressor pattern, which leads to aggressive behavior.

Conceptualization of the Two Approaches to Pathways to Aggression

The Severe Risks Approach

We believe that the majority of evidence regarding antecedent risk factors points to the existence of combinations of risks that, when they appear together or in sequence, lead down developmental pathways to the most severe aggressive problems. Most of the risk factors in childhood and adolescence that are known to lead to the development of aggression are environmental influences, such as family practices, neighborhood influences, socialization experiences, influence of the media, poverty, and gang membership, and research has understandably focused more on these external factors (Deater-Deckard, Dodge, Bates, & Pettit, 1996; Denham et al., 2000; Eron & Huesmann, 1990; Moffit & Caspi, 2001; Straus, 1979; Straus & Gelles, 1990). However, internal or individual-level factors also put children at risk for aggressive outcomes, including biological and hereditary factors, emotional and cognitive attributes, and temperamental and personality factors (Bernstein & Watson, 1997; Caspi & Silva, 1995; Moffit & Caspi, 2001; Vitaro et al., 2002). A particular pattern or pathway leading to early aggression usually includes both external and internal factors, often with internal attributes acting as mediators of the environmental milieu in which the child is developing (Huesmann, 1986; Slaby, 1997; Slaby & Guerra, 1988). In one recent longitudinal study, for example, Guerra, Huesmann, and Spindler (2003) found that the children's level of exposure to violence, which is an environmental risk factor (Richters & Martinez, 1993), led to changes in children's

beliefs about aggression, such as whether aggression is legitimate or not (Dodge & Coie, 1987; Slaby & Guerra, 1988), which was then associated with subsequent increased aggression and increased aggressive fantasy (i.e., another internal attribute that seems to exacerbate aggressive behavior).

There are apparently several pathways like this one that lead to an aggressive outcome in children's development (Moffitt & Caspi, 2001). Another pathway may consist of a child having unrealistically high self-esteem paired with high exposure to violence, a cognitive bias to attribute aggressive intent to others, and an impulsive temperamental style, a pattern that may lead to chronic bullying (Baumeister, Bushman, & Campbell, 2000; Bernstein & Watson, 1997; Schwartz, Dodge, & Coie, 1993). Yet another pattern seems to involve high parental aggression toward their children in the form of physical punishment or child abuse, which may be associated with other negative family behaviors and with a child's negative self concepts that put the child at risk for becoming aggressive (Calverley, Fischer, & Ayoub, 1994; Deater-Deckard et al., 1996; Fischer & Ayoub, 1996). Indeed, Cicchetti and Rogosh (1990) have argued that equifinality exists throughout development; that is, identical developmental outcomes can arise from different combinations of life experiences and individual characteristics.

- A Profile of School Shooters as an Important Pattern within the
  Severe Risks Approach

Among the various combinations of characteristics and risk factors that lead to aggression in children and adolescents is one particular pattern of risk factors that may be extremely important as a pathway leading to aggression, a pattern that was essentially overlooked until the recent spate of school shootings (e.g., the incidents in Springfield, Oregon, and Jonesboro, Arkansas, in 1998, and in Littleton, Colorado, in 1999) motivated people to search for a common profile in these school shooters. In this hypothesized pattern or pathway of risk factors, we see a combination of environmental factors being mediated by internal, temperamental variables, which then leads to aggression and sometimes to extreme violence. This pathway includes a combination of both aggressive tendencies and a history of being victimized.

In order to describe this pathway, we turn to a discussion of school shooters. McGee and DeBernardo (1999) and Harter and Whitesell (2001), among others, have assessed the psycho-social characteristics associated with school shooters, in particular the two boys at Columbine High School in Colorado, perhaps the most famous of the recent cases of school shootings. They described what amounts to a profile of these adolescents that provides a starting point for describing our hypothesized risk pattern, a profile that is fairly consistent across school shooters. Based on their profiles, these shooters showed 1) a withdrawn, non-assertive style in relation to most of their peers, a style in which the perpetrators were perceived and acted as loners; 2) a history of being victimized, teased, taunted, humiliated, and rejected by the more mainstreamed peers; 3) generally low self-perceptions along with unstable self-esteem; 4) generally dysfunctional families in which parents were either unaware of this set of problems or had conflicted relationships with their sons; 5) a high level of aggressive and suicidal ideation, including fantasizing about and planning for aggressive action; and 6) a high interest in and access to guns and skill and experience using guns, gained in part from practice shooting in violent video games. Interestingly, when the first few school shootings occurred, many people were surprised that these perpetrators were indeed so withdrawn, so quiet, so unlike the stereotyped mental images we have of belligerent bullies and overt gang members.

- A Hypothesized, Inhibited, Victim-Aggressor Pattern

If we take these characteristics of school shooters as a starting point, we can compare them to risk factors that seem to form a pathway leading to inhibited, victimized aggressors. The first factor described was a socially withdrawn, non-assertive style. Many researchers have studied introversion-extroversion as one of the most stable of what is called "the big five" personality constructs (Costa & McCrae, 1994; Digman, 1990), while others have studied behavioral inhibition and its opposite, uninhibition, as comprising one of the most stable temperamental styles in infancy and early childhood (Kagan, 1997). Although some of these researchers have argued that introverted, inhibited, and shy children are less likely to become aggressive and perhaps are more likely to be victims of aggression (e.g., Kagan, 1997; Schwartz, Snidman, & Kagan, 1996), some recent findings (discussed below) indicate that some inhibited children with certain environmental experiences seem to be predisposed to aggression.

- Behavioral Inhibition as a Characteristic of the Inhibited, Victim-Aggressor Pattern

To understand this pattern, we must first understand the construct of *behavioral inhibition.* Kagan (1997) has defined behavioral inhibition as a stable, inborn characteristic of some children's temperament in which the child displays a dominant style of approaching the world and interacting with others that is highly cautious, wary, and fearful. In reality, these inhibited children are highly sensitive to changes in environmental stimuli and may act with caution because their world is a constant, overwhelming source of sensory change and challenge. Kagan's and others' research indicates that, based on the control of

the amygdala in the brain in processing sensory input and sending out signals to instigate emotional arousal, inhibited children are highly reactive to sensory change (Schwartz, Wright, Shin, Kagan, & Rauch, 2003). Although they are behaviorally inhibited, neurologically these individuals are hypersensitive and hypervigilant to environmental changes. Because of their sensitivity to sensory changes, these children often act fearful and shy when new objects or people enter their world or when they are required to adapt to new surroundings or situations. For example, inhibited children and adolescents often smile less, talk less, and show more anxious symptoms when interacting with a stranger. They also have been found to exhibit more school phobia than uninhibited individuals (Kagan, 1997).

As might be expected, at the opposite end of this temperamental spectrum are children who are behaviorally uninhibited. These children are not so sensitive to environmental stimuli and change, and show a low emotional arousal and reaction to novelty. They act in a much more fearless, exploratory manner. These style differences initially show no differences in frequency across the sexes, nor do they correlate with intelligence or developmental scores, but they do influence the way children approach and deal with the world, as might be expected, and they also influence the way others treat these children (Goldsmith & Harman, 1994).

At first blush, it would seem logical that inhibited children would be less likely to have externalizing problems, to act out, and to be aggressive, but perhaps be more likely to be victimized and picked on by peers. Paradoxically, this is not always the case. The behavioral effects of temperament are dependent on a complex array of social-cultural factors, such that some children may find a particular temperamental style adaptive in a given context, while the same style may be maladaptive in another context. Nevertheless, it is true that early temperament to some extent predicts long-term personality traits. Caspi and Silva (1995) found that temperament at three years of age predicted personality in young adulthood. Furthermore, Vitaro et al. (2002) found that children who at age six were more withdrawn, reactive (i.e., highly sensitive and emotionally reactive to both social and nonsocial stimuli, much as the inhibition pattern is defined), and excitable later showed more aggression as a defensive reaction to perceived threats. This connection was especially strong in those children who had a history of harsh and abusive parenting.

There are also findings supporting the connection between an inhibited temperament and defensive aggression that come from research with adolescent males who were incarcerated for delinquency and violence. Before Kagan and others identified an inhibited temperamental style, Megargee (1966) found evidence that those incarcerated males who had rigid inhibitions, were less impulsive, and didn't express their emotions showed more extreme violence, though not necessarily as frequently, than those who seemed to have low inhibitions and were more impulsive (see also Salekin, Ogloff, & Salekin, 2002). He believed that the *overcontrolled aggressive type*, compared to the *undercontrolled aggressive type*, as he called them, held in their aggressive tendencies until the intensity of the perceived threat or provocation overcame their inhibition. In addition, he believed that these inhibited types, because they did not normally deal with aggressive feelings, had not learned alternative means of dealing with them.

Inhibited children are likely to show more avoidance of negative social interactions and more negative attributions about themselves (Hencke, 1996). Fox (1991, 1994) found that children with high right frontal lobe activation (as is found in inhibited children) may be less able to express negative affect and less able to modulate their affect in general. Perhaps because of these difficulties in emotion regulation, these children may be more withdrawn from and more rejected by their peers (Rubin, Chen, & Hymel, 1993).

This pattern corresponds with the second characteristic in the profile of school shooters mentioned above of being more frequently teased, humiliated, and rejected by peers, and demonstrates how, in the chain of causal risk factors, victimization can lead to aggression. These inhibited children also sometimes show negative perceptions of self (see Hencke, 1996), the third characteristic in our profile of school shooters. The first three characteristics of school shooters, then, form a pattern of withdrawn loners, who are teased and rejected and who have unstable and low self-esteem.

- Provocative Victims

Although most bullies are thought of as showing a profile distinct from their victims (Bernstein & Watson, 1997), a type of aggressor who is both a bully and a victim, sometimes called a *provocative victim*, has recently caught the attention of researchers (Espelage & Swearer, 2003). They are more likely to suffer from Attentional Deficit Hyperactivity Disorder, to be quick tempered, to fight back, and, importantly, to be victimized by peers and to be loners. In other words, they seem to combine the profiles of both bullies and victims and to share some of the attributes of the children we have been describing in our inhibited, victim-aggressor pattern.

- The Pattern Related to Reactive Aggressors

Although we discuss this pattern as if it is a new discovery, researchers have long compared two types of aggressors, one of which overlaps in many ways with our proposed pattern. Some time ago, Lorenz (1966) differentiated two types of aggression in animals, which corresponded to types of aggression in humans. First, he noted a predatory aggression, which was instrumental in meeting the individual's needs. Second, he noted a counter-offensive aggression, which was accompanied by high emotional arousal and occurred in the face of threats. More recently, these distinctions have been called *proactive* and *reactive* aggression (Crick & Dodge, 1996; Dodge & Coie, 1987). Reactive aggressors not only show more emotional arousal, they also show more biases in their attribution of hostile intent to others. In other words, they seem to use aggression as a defense against the hostile threats that they perceive (often incorrectly) as coming from those around them, and, again, they often have experienced more child abuse from their parents and more victimization from peers (Schwartz et al., 1998; Shields & Cicchetti, 1998).

In summary, in our view, some of these inhibited, victimized children seem to become hyperaggressive to hold at bay the perceived negative, aggressive elements of their environment. In other words, they resist being victimized by becoming aggressive. Rubin, Hymel, LeMare, and Rowden (1989) found that children who were rejected by peers not only withdrew more from friends but were also more aggressive than other children. Again, the situation may be exacerbated when these children grow up in an aggressive, abusive environment (Arcus, 2001; Shields & Cicchetti, 1998; Vitaro et al., 2002), which corresponds to the fourth characteristic in the school-shooter profile, having dysfunctional families.

The last two characteristics in the profile of school shooters, having high aggressive ideation and fantasies and having interest in and access to guns, may be exacerbating factors that put these victim-aggressors at particularly high risk for actually carrying out serious aggressive acts.

The Cumulative Risks Approach

The second major approach to assessing pathways to aggression is to look for some cumulative effect of multiple risks piling up, one on top of another, until they reach some critical level so that the individual deviates from an optimal developmental pathway and instead responds with aggressive behaviors. As was mentioned earlier, any search for a single or even a very few "magical" risk factors that are necessary and sufficient in leading to aggression has proven futile. Any single risk factor, even the most severe, like some of those mentioned above, seems to have only limited detrimental effects if experienced in isolation. It may well be that the total number of risk factors present, regardless of the particular risks or any particular combination, most strongly predicts negative outcomes, and that this cumulative risk may indeed be the most deleterious factor to optimal development.

In order to counter what we have called the severe risks approach, some researchers began searching for evidence of many risks accumulating to form a cumulative risk when they were aggregated (Rutter, 1979; Sameroff et al., 1993). Although these studies focused on problematic outcomes other than aggression and violence (e.g., Burchinal, Roberts, Hopper, & Zeisel, 2000, focusing on deleterious cognitive development, and Pungello, Kupersmidt, Burchinal, & Patterson, 1996, focusing on school adjustment problems), there should be no reason why the effects of cumulative risk would not also include development of a pathological, aggressive style.

The process hypothesized in the cumulative risk approach is fairly simple. Because the child is required to cope with multiple, co-occurring, and usually chronic risks from various sources, the mastery of normative developmental tasks is thwarted. Some researchers have used the construct of *allostatic load* to explain this process (e.g., Evans, 2003). Allostasis is defined as a process related to homeostasis in which there are perturbations to homeostatic equilibrium in the organism, such as those brought about by the stresssors of disease and trauma, and the organism must make changes in the system in order to maintain equilibrium. Adaptation and balance come through constant adjustment and change (usually viewed as changes in physiological mediators such as hormones and neurotransmitters). This allostatic process achieves equilibrium in the short run; however, with repeated cycles of change and adjustment, of turning on and shutting off hormones, for example, the body or system experiences a good deal of wear and tear (Sterling & Eyer, 1988). This wear and tear is seen as allostatic load, which over time leads to maladaptive and pathological developmental outcomes. For example, these processes can lead to loss of brain functions that affect short-term memory (Seeman, Singer, Rowe, Horowitz, & McEwen, 1997). What may happen is that the body overreacts to the perturbations, and the overreactions my lead to the chain of maladaptive outcomes. This indeed may be what happens when perturbations from numerous risk factors accumulate, causing the individual to have underdeveloped normative behaviors and to overreact by repeatedly using aggressive behaviors to deal with the challenges.

It should be noted that the cumulative risk approach does not necessarily negate the deleterious effects found from specific severe risks. As we mentioned in our initial metaphor of juggling, specific, severe, and dangerous combinations of risk factors and the total number of risk factors may both lead down pathways toward aggression and violence. Next we describe some of our findings that illustrate both approaches to aggression and also provide evidence for some aspects of the inhibited,

victim-aggressor pattern.

Our Longitudinal Study of Antecedents of Aggression

The Sample and Interviews

We developed a community-based, representative sample in order to assess pathways to aggression in a normative sample of families in different ethnic groups and with different socioeconomic status (SES). We sampled the entire city of Springfield, Massachusetts, because we believed that Springfield provided a microcosm of ethnic groups, families, and neighborhood problems found in many U.S. cities. Unlike most targeted samples used to test for aggressive outcomes, ours was not a sample necessarily at high risk for aggression. The advantage of such a community-based sample, in addition to the increased ability to generalize the findings to a larger population, was that we could compare risk factors and relations across a wide range of families, those that would not be expected to be highly aggressive as well as those that would be expected to be aggressive. However, the disadvantage of using such a sample was that we did not have neat groups, such as entire classrooms, within which to make comparisons. For example, peer ratings of all other students or teacher comparisons were not available when children were spread across an entire city, with only a few attending any one school.

A computer randomly selected women between the ages of twenty-five and forty-four from available street lists that included all residents of the city. In preliminary assessments, we had found that women at these ages have the highest probability of having children between ages seven and thirteen, our target sample. We over-sampled women in some zip codes that were known to have higher numbers of certain ethnic/racial groups in order to achieve an approximately equal number of European American, African American, and Latino families in the sample. After mailing letters introducing the study, called the "Springfield Child Development Project (SCDP)," we also made phone calls to reach as many individuals as we could of those who had been randomly selected. Many were unreachable by mail or telephone, but of those who could be reached, 93.8 percent completed the eligibility screening. Of those, 510 were eligible because they had children in the targeted age group. (If a woman had more than one eligible child, we randomly selected one child for the study.) Of the 510 eligible families, 440 (86.3%) agreed to take part in the study, although only 391 continued to Time 2. Figure 1 shows the ethnic/racial group by sex distribution of the sample at the baseline interview, who also were interviewed at a later follow-up. Figure 2 shows the age distribution of the sample at the baseline interview. One can see that, for the most part, we achieved the balanced distribution across ethnic group, sex, and age that we sought.

Experienced researchers interviewed the mothers and the targeted children in each mother-child dyad in their homes. The interview consisted of a verbal part and a written questionnaire, and was conducted separately for the mother and the child. Some measures were collected from the mother interview, and some from the child interview. The entire in-home interview lasted approximately 90 minutes. Participants were paid a small honorarium for their participation.

After the baseline (Time 1, or T1) interviews were completed, we followed up with a Time 2 (T2) interview at a one-year interval, when children were between age eight and fourteen. We followed up again with a T3 interview at about five and one-half years after baseline, and then again with a T4 interview at about six and one-half years after baseline. At each follow-up interview, the same basic procedures were followed, with a few developmentally appropriate additions and deletions in the assessment measures. As might be expected, at each follow-up we had some attrition in our sample (i.e., down to 391 participants at T2, 357 at T3, and 333 at T4). However, assessments of SES levels, family configurations, and other demographic and predictor variables indicated no significant systematic differences between those participants who dropped out of the study and those who remained.

Measures

We used measures that fell into four categories. First, we assessed several demographic variables, including sex of child, racial/ethnic group status, SES level, and family configurations. Second, we assessed several family and neighborhood factors. Family factors included assessments of harshness of parental discipline and parents' use of physical punishment (using the Conflict Tactics Scale-CTS; Straus, 1979; Straus & Gelles, 1990, as well as other measures of parental discipline); cohesion and conflict in the family and other family environment measures (using the Family Environment Scale-FES; Moos, 1990; Moos & Moos, 1986). Neighborhood factors included the number and level of gangs, drugs, and guns in the neighborhood and in the home, as well as the violence that children had been exposed to in the neighborhood and the home, including peer victimization (using scales developed by Richters & Martinez, 1993, and Resnick et al., 1997).

Third, we assessed several personal cognitive, personality, and temperament variables, including beliefs about aggression (using a scale developed by Slaby & Guerra, 1988); verbal intelligence (using the WISC-R); global self-worth (using the

FIGURE 1 *Sample at T1: Distribution by Sex and Race of Child (N = 391)*
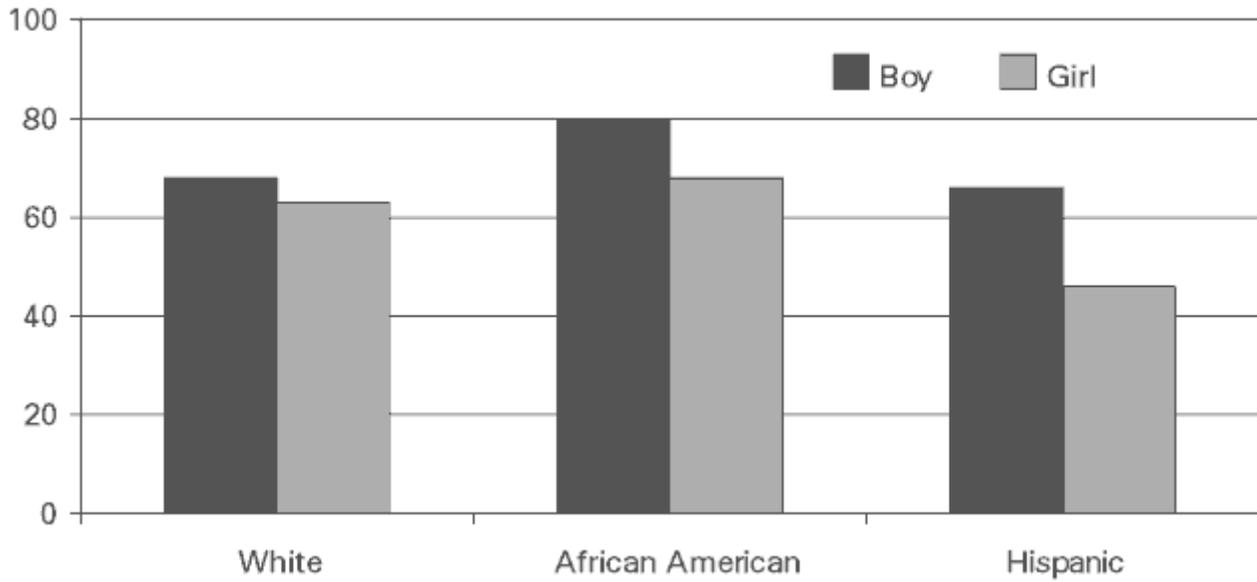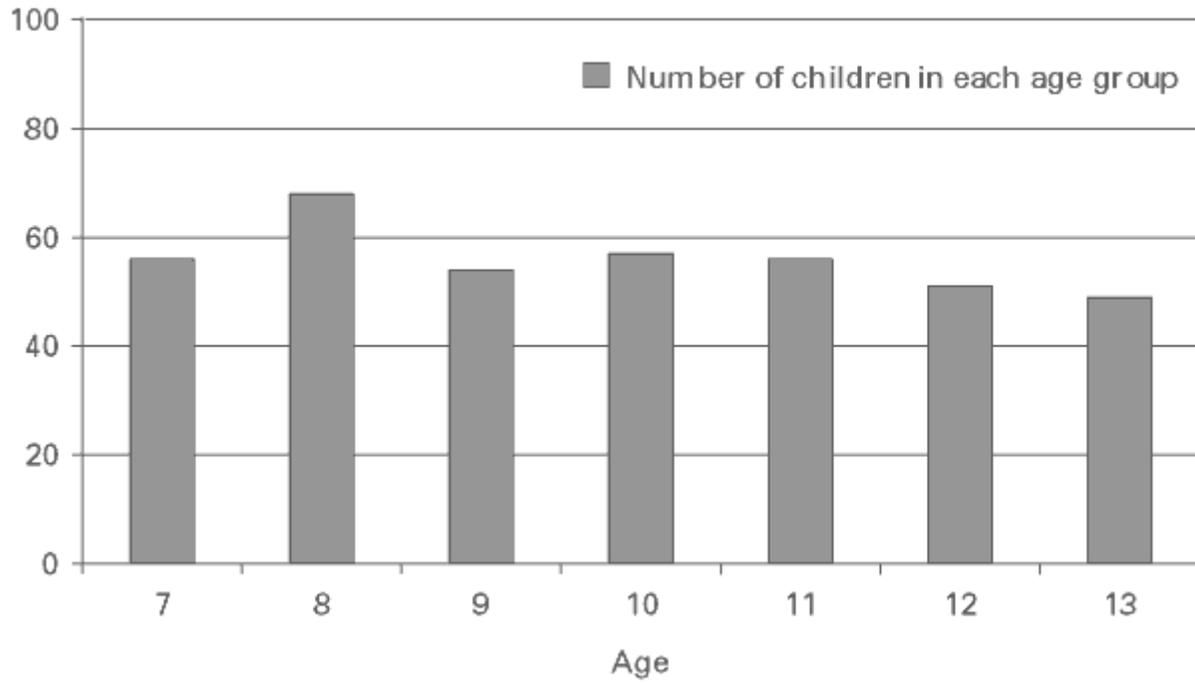
FIGURE 2 *Sample at T1: Distribution by Age of Child (N = 391)*

Global Self-Worth Scale; Harter, 1990); sensation-seeking (using the Sensation-Seeking Scale; Russo et al., 1991; Russo et al., 1993); fantasy predisposition (using the Children's Fantasy Inventory; Rosenfeld, Huesmann, Eron, & Torney-Purta, 1982); and behavioral inhibition (using the Childhood Inhibition Scale; Reznick, Hegeman, Kaufman, Woods, & Jacobs, 1992). It is noteworthy that the behavioral-inhibition scale, though a questionnaire, was based on the behavioral characteristics found for highly inhibited children and focused on children's fearful and wary reactions to novel situations in school, to meeting new friends, and to dealing with fears and negative arousal.

Fourth, we assessed negative developmental outcomes, including level of physical aggression (using the Child Behavior Checklist-CBCL, Aggressor subscale; Achenbach, 1991; Achenbach & Edelbrock, 1981; and another Aggressor Scale; Slaby & Guerra, 1988), and other aggression-related problems (Resnick et al., 1997). Both mothers and children reported on the level and types of aggressive behavior shown by the children.

Results and Discussion

The study used a correlational design, but because of the repeated measures over time, we were able to use predictors at one time to assess outcomes at a later time and thus compare directions of influence and infer some causality from earlier predictor variables to later outcome variables. In general we used structural equation modeling (SEM) to assess hypothesized pathways of predictor or risk variables at earlier assessments to aggression and other problem behaviors as outcomes reported at later assessments. In SEM, it is possible to examine linear relations among variables of interest by examining a path model and associated path coefficients, and then testing whether a hypothesized model was a good fit with the data. Another important feature of SEM is its ability to model true (or "latent") scores, as opposed to not fully reliable observed measures only. This is possible because SEM can account for measurement error, either through the use of multiple indicators of a single psychological construct (such as the use of many measures of family functioning in our sample) or through reliability adjustments of a single indicator (such as the use of a single inhibition scale in our sample). Most of the findings reported below are based on a path model in which risk factors at T1 (baseline assessment) are hypothesized to predict aggression at T2 (the one-year follow-up). In our SEM model (Figure 3), constructs shown in ovals are latent constructs (i.e., constructs where the measurement error was accounted for), and constructs shown in rectangles are observed constructs (i.e., constructs where the measurement error was not accounted for, including variables in which measurement error was expected to be very low or nonexistent, such as sex or race of the child). The arrows connecting all of these constructs represent the direction of a hypothesized path. The darker, bolder lines were placed in the model simply to illustrate the main pathways of interest in our hypothesized, victim-aggressor pattern.

- Severe Risks and the Inhibited, Victim-Aggressor Pattern

We wanted to look for patterns of severe risk factors, those that had a high probability of being particularly deleterious in causing or exacerbating aggressive behavior over time. We wanted to determine which patterns of risk factors were associated with aggression over a year's interval. Figure 3 shows the variables in the general SEM model that we hypothesized might contribute to these pathways. To help clarify Figure 3, note that we systematically ordered all of our T1 predictors in our SEM model. Demographic variables were placed first (in the first column of the model), followed by family and environmental factors, followed by temperamental and personality factors. The last column in the model includes the aggressive outcome measures (tested at T2). We tested the model for goodness of fit, which, although not perfect, was reasonable and acceptable for a complex model like ours. These fit statistics can be seen in the lower-right-hand corner of Figure 3. All three fit indices were .88 or higher, with an RMSEA of .067. The lines in Figure 3 show pathways that have fairly strong and statistically significant path coefficients (> .22); if two constructs are not connected by lines, it means that the hypothesized path was found to be not significant. Note again that some lines are in bold simply to emphasize the most important theoretical hypothesized pathways, not necessarily the statistically strongest paths in the model.

First, some measures did not meet our expectations in predicting later aggressive outcome. Based on previous research (e.g., APA, 1993), there were several variables that we hypothesized would be part of a path leading to high aggression (i.e., gender, with boys showing more aggression than girls; SES, with lower-SES children showing more aggression; and sensation-seeking, with children who showed more risk taking and sensation-seeking tendencies being more at risk for being aggressive). We also expected that ethnic group status and verbal IQ might be related to aggression level. In fact, none of these variables significantly predicted aggressive outcome directly (and, thus, in Figure 3 no lines are shown between these variables and T2 aggression).

However, there were some indirect links. Boys showed more aggressive fantasy than did girls. African American children experienced more physical discipline from their parents. As would be expected, older children experienced less physical discipline, but they also showed more aggressive fantasy. And children with higher SES showed more inhibition, though SES did not directly predict aggressive outcome. Although SES might be thought to predict aggression, we believe that, when one

FIGURE 3 *Structural Equation Model Estimate of Pathways to Aggression (N = 372)*
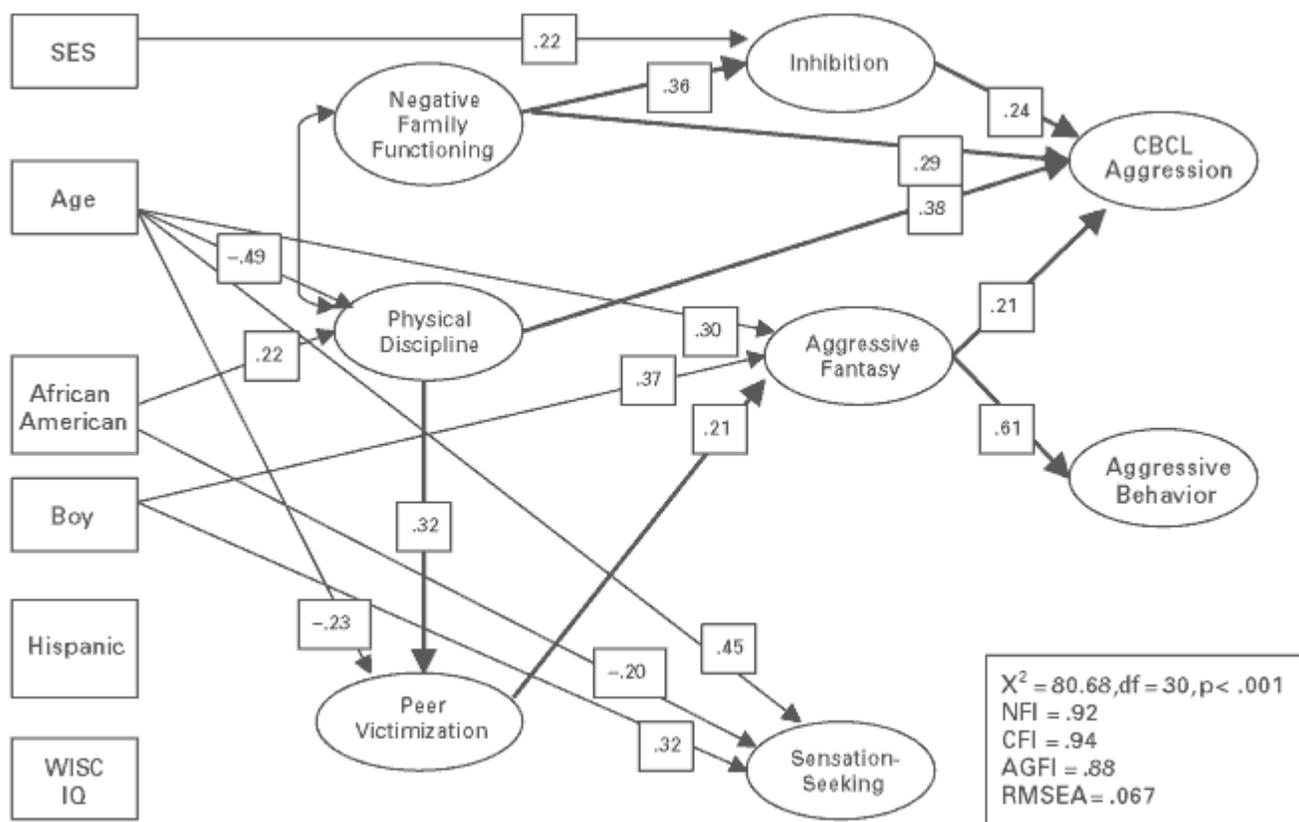
Note: CBCL Aggression is based on mothers' reports; Aggressive Behavior is based on children's self-reports of aggression.

examines a sample of children representing, normative and demographically speaking, a full range of families, as we did, SES is not such an important risk factor. The same thing holds true for ethnic group status. In certain high-risk groups that are already identified as having high rates of aggression, these factors may be predictors, but they weren't for our sample of "garden variety kids." One would also think that boys would show more aggression than girls. In fact they did in our sample (there was a moderate but significant correlation), but they did not show a direct path to aggression in the full SEM model.

One unanticipated finding was that sensation-seeking, though it varied across different groups of children in our sample (e.g., boys, white children, and older children were higher sensation seekers), did not predict aggression to any degree. We simply did not find children who were wild, sensation-seeking risk takers prone to aggression. If these behaviors surprisingly did not predict aggression in our normative sample, then what did?

If one looks again at Figure 3, one can see two related pathways that lead to aggression. First, negative family functioning (which included low family cohesion and high family conflict) was modestly correlated with parents using more frequent and harsher physical discipline, as is indicated by the double-arrow line between them ($r = .13$). Both of these factors predicted children's physical aggression, as measured by mothers' reports of their children's behaviors on the CBCL. This finding corresponds to other findings in which harsh physical punishment from parents is a strong predictor of children's aggression (e.g., Weiss, Dodge, Bates, & Petit, 1992). In addition, negative family functioning was also associated with higher behavioral inhibition in children, and higher inhibition was associated with higher aggression. In other words, in our sample, families with more conflict and less cohesion had children who exhibited higher inhibition, and these children showed higher aggression.

The second pathway (as can be seen on the lower part of the model in Figure 3) particularly involves harsh physical discipline. Harsher physical discipline by parents was associated with increased peer victimization, as reported by the children. In turn, children who reported experiencing more peer victimization also reported more frequently engaging in aggressive fantasies, which in turn was associated with higher levels of aggression, as reported on the mother-reported CBCL and on the child-reported aggressor scale. Whether one considers the entire model (in Figure 3) as demonstrating one pathway or two related pathways, one can see that the factors leading to aggression suggest the characteristics described earlier for an inhibited, victim-aggressor pattern, which is similar to the school-shooter profile.
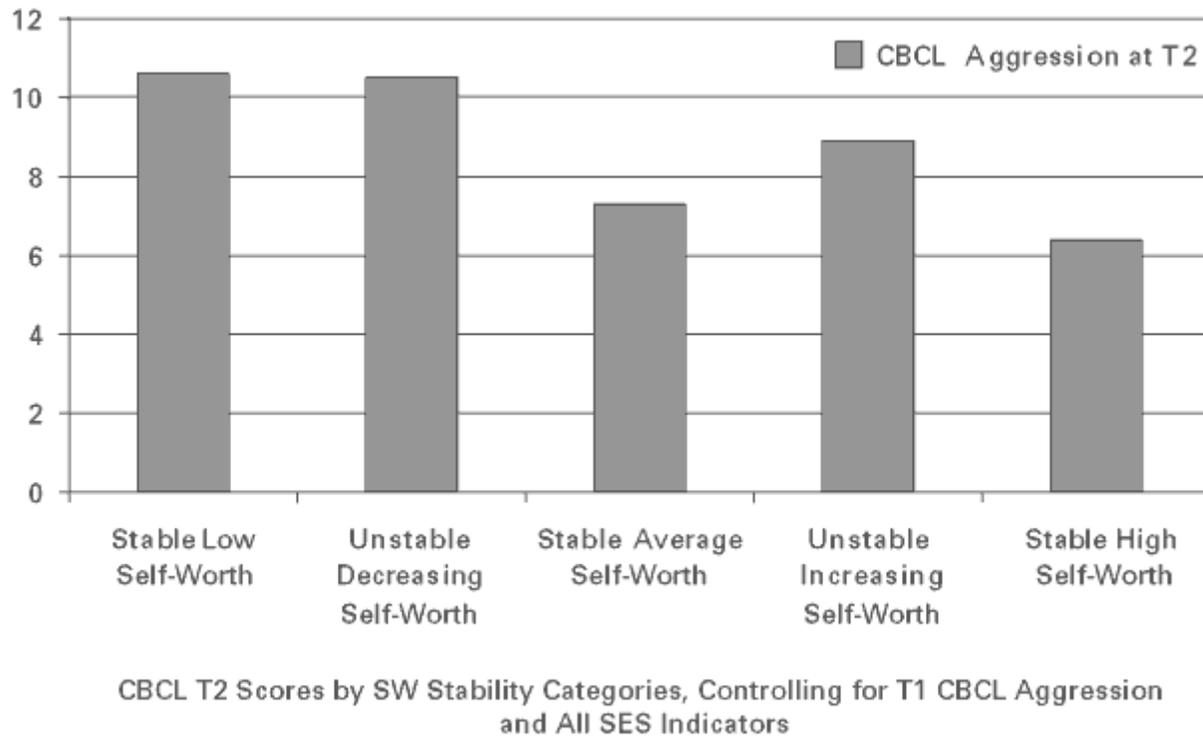
However, with this analysis of the entire sample, most of whose members were low in aggression, as might be expected in a community-based, normative sample, we may have been missing important associations among factors that would only exist for highly aggressive children. Did the pattern we found hold up for the most aggressive children when non-aggressive children were excluded? We followed up on these analyses by comparing only the most aggressive children (as assessed on the CBCL normative comparisons) with those who were at the bottom of the distribution for aggression. We compared these children across all time periods, even into later adolescence. In keeping with our previous findings, the extremely high-aggressive children showed higher inhibition than the low-aggressive children and, in addition, showed lower self-worth and more risk factors related to a dangerous environment (i.e., experiencing significantly more harsh discipline from their parents, both verbally and physically, witnessing higher levels of violence in their homes and communities, and to some extent having more gangs in their neighborhoods and guns in their homes). These findings comparing extreme groups more or less paralleled the findings for the entire sample, and, once again, these factors fit the inhibited, victim-aggressor pattern fairly well and paralleled the school-shooter profile described earlier.

Recall that another factor in the school-shooter profile was a tendency to show low and unstable self-esteem. When we assessed the specific relation between the children's general self-esteem (or self-worth) and their aggression (as measured by the CBCL), we found some interesting relations. Children's sense of self and their aggressive behaviors were related to each other both across and within assessments ($r_{\text{T1 self-worth–T2 aggression}} = -.09$, $p = .06$; $r_{\text{T2 self-worth–T2 aggression}} = -.24$, $p < .001$; and $r_{\text{T1 aggression–T2 self-worth}} = -.23$, $p < .001$). From these correlations, one can see that not only was lower aggression generally associated with a higher sense of self-worth in children, but also that the direction of influence seems to be that lower aggression at T1 predicted higher self-worth at T2, rather than the other way around.

Figure 4 shows the relation from T1 to T2, not only of self-worth, but also its temporal stability with aggression at T2, with T1 aggression and SES controlled for. Children who had low self-worth at both T1 and T2 (i.e., the stable, low self-worth group) had the highest aggression, followed by children whose self-worth fluctuated (i.e., the unstable self-worth group), followed by children with stable average self-worth. Children with stable high self-worth were lowest in aggression. Also, there was a difference in aggression as a function of how children's self-worth was changing over time; children whose self-worth was getting worse (decreasing self-worth) were more aggressive than children whose self-worth was getting better (increasing self-worth).

- Cumulative Risks

FIGURE 4 *Relation of Self-Worth and Its Stability between T1 and T2 to Aggression at T2*

CBCL T2 Scores by SW Stability Categories, Controlling for T1 CBCL Aggression and All SES Indicators

Note: Average CBCL scores at T2 were M = 8.32; SD = 6.07.

After assessing patterns of severe risks, we wanted to look for evidence of the effects of cumulative risks, regardless of the particular risks involved. In order to do this, we had to dichotomize all our predictor (risk) variables to show either a risk being present or no risk being present. Simply dividing them using a median split or some such statistical procedure would destroy any validity in the risk factors. For example, what would it mean to say that children who were in the top half of parental punishment suffered from that risk factor while the children in the bottom half did not? Perhaps the threat of a risk comes with any punishment whatsoever, or perhaps there is no risk involved until physical punishment is harsh and used daily. In other words, no simple median split or other statistical way of dividing the group would accurately reflect whether a risk were present or not, as the real prevalence rates could be either inflated (for those less common risks) or understated (for those more common risks) if these risk classifications were solely based on statistical cut-offs. Therefore, we made a determination of what would constitute an objective risk being present for each variable separately. Sometimes we had clinical scores or previous test results to use as guides, but sometimes we had to make practical decisions based on face validity. For example, we decided that if a parent used any physical punishment at all (such as spanking), this constituted a risk factor for parental physical discipline.

After completing factor analyses to determine whether some risk factors were highly related and might be thought to constitute a single risk factor, we devised a final list of risk factors. These factors came from both family and environmental variables and temperamental and personality variables. There were eleven possible risk factors measured in our study that each child could experience. They were: 1) being a boy; 2) playing with toy guns at home; 3) carrying weapons; 4) experiencing parental physical abuse; 5) experiencing parental verbal abuse; 6) experiencing peer victimization; 7) living in a high-conflict home; 8) living in a high-risk neighborhood; 9) having medical problems; 10) approving of aggression as part of one's personal beliefs; and 11) demonstrating aggressive intent in solving interpersonal problems.

We then assessed the relation between the number of risk factors and aggression level at T1 and T2 combined for each child. Figure 5 shows the number of risk factors experienced at T1 on the X-axis. The mean aggression scores (average of T1 and T2 aggression reports) in standard deviations below and above the mean (i.e., zero) for the sample are shown on the Y-axis. As can be seen, there is a general linear relation between the number of risks and the aggression score, with more risks being associated with increases in aggression. With no risks present, children showed very low aggression levels (on average, more than half a standard deviation below the sample mean). When five risks were present, children on average first jumped above the mean in amount of aggression shown. Interestingly, when eight risk factors were present, children on average jumped dramatically to an aggression level that was more than one standard deviation above the mean, and with nine or more risks present, aggression jumped to more than two standard deviations above the mean. It seemed to us that the first dramatic jump in aggression with eight risk factors indicated that some critical level of risks had been reached and that the children now showed a breakdown of optimal functioning (as with our metaphor of the juggler who could no longer keep balls in the air after a critical number had been added), or an allostatic overload.

In addition, we found that the number of cumulative risks was more predictive of aggression than any single risk factor alone or any single domain (e.g., family-level variables or child-level variables) of risk factors. The number of risks present was also more important than any specific constellation or pattern. Cluster analysis for those children who had five or more risk factors present differentiated four risk constellations (i.e., not all children experienced the same set of risks). The four constellations of risks were as follows: 1) parental physical abuse, parental verbal abuse, high-conflict home, high-conflict neighborhood, and approval of aggression; 2) boy, playing with toy guns, carrying weapons, parental physical abuse, parental verbal abuse, peer victimization, high-conflict home, high-risk neighborhood, approval of aggression, and aggressive intent; 3) boy, carrying weapons, parental verbal abuse, high-conflict home, and aggressive intent; and 4) boy, playing with toy guns, parental physical abuse, high-risk neighborhood, and aggressive intent.

There were no statistically significant differences in aggression levels among the four-risk constellations after number of risks was controlled for, indicating that the sheer number of risks explained a great deal of aggression. In addition, no risk appeared to be either sufficient or necessary in explaining elevated aggression problems in children with multiple risks, as no risk factor was common to all four of the clusters. Thus, number of risks, in addition to the previously found severe patterns of risks, was a crucial factor in predicting aggressive outcome. Keep in mind that this pattern occurred across all SES levels and for all three racial/ethnic groups.

- More Evidence for a Cumulative Risks Effect: Risk and Protective Factors

There is another line of research that may also provide evidence for the effects of cumulative risks independent of the specific risks involved. Recently, researchers have begun to investigate what is called resilience in children, which is the degree to which children who have severe or multiple risks leading to problematic outcomes beat the odds and show optimal or healthy development despite these risks (Garmezy, 1985; Masten, Best, & Garmezy, 1990). These are resilient children and we have a lot to learn from them. One way to conceptualize resilience is to think of children having some risk factors but also some protective factors that buffer them against the deleterious effects of the risks. These protective factors, then, do not eliminate

FIGURE 5   *Relation of Number of Risks at T1 to Aggression Averaged across T1 and T2*
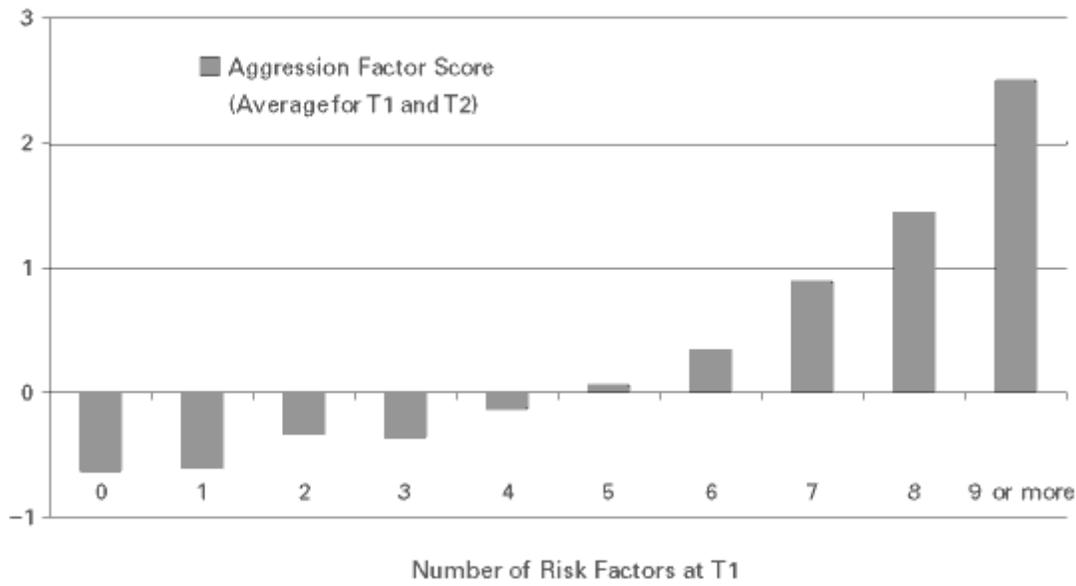
Note: Aggression factor scores are standardized CBCL and Aggressor scores, with $M = 0$, $sd = 1$.

the risks but protect children in the sense that an immunization might protect a child from a disease, not by eliminating the causes of the disease, but by giving the child some added strength to fight off the disease or block its negative effects.

In order to test for the positive, resilience-fostering effects of a protective factor, one must first show that the children in question were exposed to a genuine developmental risk (Luthar & Cicchetti, 2000). Furthermore, the protective factor must be a real protective factor, independent of another risk; in other words, absence of a risk factor cannot be considered a protective factor. In our analyses, we focused on two well-established risk and protective factors for aggression in children: their aggressive beliefs and their family functioning. Researchers have found that a child's aggressive beliefs (i.e., belief that aggression is an effective, justifiable, and useful problem-solving tool) is a severe risk factor leading to aggression (Huesmann & Guerra, 1997; Lochman & Dodge, 1994; Slaby & Guerra, 1988; Zelli, Dodge, Lochman, & Laird, 1999). In an opposite vein, a positive family environment (i.e., a construct consisting of low family conflict, high family cohesion, low parental punishment, and low exposure to violence in the home) is expected to be a protective factor against aggressive outcome. We assessed the relations to aggression (over three time periods) that this combination of risk and protective factors would afford.

As expected, when there was no risk regarding aggressive beliefs and also the presence of positive family protection, aggression was below the mean. This group acted as a baseline by which to compare groups that had a risk factor of aggressive beliefs present. When aggressive beliefs existed as a risk factor and there was no family protection, aggression was more than one standard deviation above the mean of aggression for the entire sample. When there existed no aggressive beliefs (no risk factor) and no family protection, aggression was at the mean for the entire sample. Now, importantly, when there existed aggressive beliefs (a risk factor) and family protection, aggression was also at the mean for the entire sample, demonstrating a protective, buffering effect of optimal family functioning against children's aggressive beliefs.

These results, with the various combinations of risk and protective factors, qualify the effects of cumulative risks. A combination of risk factors and protective factors is another form of the cumulative risk model, one in which the algebraic sum of the factors is important and which likely occurs across various risk and protective factors. Returning to the juggling metaphor, in this case it is as if a second juggler gets involved (the protective, buffer factor) and helps the first juggler keep the objects in the air (despite the large number or difficulty of the objects juggled).

- Assessment of Three Extreme Cases

As a final assessment, we looked at three individuals in our study who had committed violent criminal offenses. Would these most extreme cases illustrate the findings we have presented above? We begin with aggressive outcome. We found that all three cases, all boys, scored well above the clinical cut-off score for aggression on the CBCL at both T1 and T2. This measure did indeed indicate that these boys were highly aggressive. In terms of severe risk factors, two of the three boys showed the presence of risk factors of negative family functioning and harsh parental punishment. Two of the boys also showed high inhibition. All three boys showed high exposure to violence in their environments, and all three had experienced peer victimization. Regarding cumulative risks, these boys had seven, eight, and eleven risks present, respectively. It is illustrative that the most aggressive boy (with a rather extraordinary clinical T-score of 85 on the CBCL Aggression scale) had experienced all eleven risk factors and also had the highest inhibition rating of all three extreme cases reported here. In summary, these three boys were examples of everything going wrong — experiencing severe risks in our hypothesized victim aggressor pattern and a high accumulation of multiple risks.

Conclusions

In our sample of children, we found evidence for both types of problems leading to aggressive behavior. First, when a pattern of severe risks was present, children later showed more aggression. Second, when the number of risk factors accumulated to some breaking point, children also showed dramatic increases in aggressive behavior. A protective factor seemed to buffer the effect of a risk factor, suggesting the importance of a cumulative effect of factors experienced by an individual. Although both processes, a severe risk pattern and a cumulative risk pattern, may lead to aggression, there is no reason to view these processes as mutually exclusive. It may well be that some children and adolescents suffer from both severe risk patterns and cumulative risks being present, as was the case with our three extremely aggressive children. (Think what would happen if one of *The Flying Karamazov Brothers* were required to juggle a combination of seven meat cleavers, slinkies, and quarts of ice cream without any help.)

Keep in mind that these patterns were shown in elementary school–aged children from three different racial/ethnic groups. The sample was a normative, community-based sample, selected at random from the entire population of Springfield, Massachusetts. Thus, no biases were present to select children who were prone to aggression or exhibited special problems.

What we found represented the entire range, geographically, socioeconomically, and racially and ethnically of children in the city. With this sample, we can be more confident in our generalizations to a wide population of children. With these characteristics of the sample in mind, it is important to note that ethnic group made virtually no difference in aggressive behavior. Neither did SES level. Most of the children, thankfully, showed only low levels of aggression, but some did indeed show high levels of aggression in the clinical or pathological range. Furthermore, early risk factors predicted aggressive outcomes at later time periods.

The particular severe risk pathways that we found seem to parallel to some extent the risk factors found in school shooters. Importantly, these particular pathways involve children or adolescents who are also at risk for being victimized by others (by strict or abusive parents or by peers). These children may be more reactive to threats from their environments from the start, and when threats and victimization do occur, they may become defensively aggressive and view their worlds as extremely dangerous places in which to live. Their aggression does not take the form of aggression for pleasure or instrumental or proactive aggression. Instead, these children and adolescents seem to be anxious and victimized individuals, who aggress for different reasons.

The inhibited, victim-aggressor pattern that we have described may include several types of aggressors found in school settings, in particular bully-victims or provocative victims, and also school shooters. Despite the high visibility of cases of school shooters, they are still statistically extremely rare. Remember that the profiles of school shooters were collected retrospectively, which tends to bias us to think that these risk factors inevitably lead to a particular negative outcome (Sameroff & Chandler, 1975). Nevertheless, if we take the school-shooter profiles only as an indication of where to look for patterns and then do prospective assessments, as we did with the longitudinal study, it may well be that what we find is a large number of children who fall into this developmental pathway, even though most of them do not reach extreme levels of violence or even show problematic violence. The school shooters may be only the tip of the iceberg, the most extreme cases; we do believe, however, that this pathway of risk factors puts children at risk for developing aggressive behaviors.

This idea leads to two strong caveats concerning our study. First, our research was able to identify probable pathways to aggression and the risk factors that predicted aggressive outcomes. Nevertheless, this research only identifies probabilities. We simply cannot predict which specific children will turn out to be violent, which will survive severe risks, and which will thrive as resilient individuals. We provide no formula for labeling "pre-aggressive individuals." We only suggest likely risk factors.

Second, we have described a general pattern for inhibited-victim-aggressors, but our research has looked at only some features of this pattern. We hypothesize that such a pattern exists, but clearly more research is needed to determine how pervasive this pattern is and whether all the factors we have described do indeed hold up for large numbers of children. We also need more extensive and varied measures of aggressive outcomes to fully validate the hypotheses. For example, in our study, child-reported variables tended to correlate more highly with child-reported aggression, and mother-reported variables tended to correlate more highly with mother-reported aggression. Those results are to be expected, but we need converging evidence of aggressive outcomes that cut across the various predictor measures (such as was found in our assessment of the three extreme cases).

Related to the problem of having only limited sources of information about predictor and outcome variables, we were not able to obtain ratings, evaluations, or comments from the teachers or peers of these children. It would be especially helpful to have information from teachers regarding the kinds of risk factors they observe in their schools, risk factors that we may have overlooked but that might fit into this and other pathways to aggression. Teachers who know their students best could provide not only valuable assessment but also inform researchers of what to consider as risk factors as we attempt to refine and identify them further. In the same vein, peers provide valuable insights into children's social contexts that are often unknown to parents or teachers.

Despite these caveats, we would argue that the hypothesized pattern of risks leading to aggression, one that follows a pathway through victimization as well, is worth considering, both in future research and in determining the types of children that are targeted for help to alleviate outcomes of aggression and violence.

In conclusion, there have been trends toward intervention and prevention programs related to aggression and violence that have begun to focus on the entire school community — aggressors, victims, bystanders, teachers, parents, and other school workers. We believe that such inclusive interventions are on the right track. Nevertheless, it still seems that "the squeaky wheel gets the grease." Attention is often focused on bullies and known fighters. Yet the inhibited, victim-aggressors we have observed are seldom the squeaky wheels, and they tend to be overlooked and neglected by the system. Awareness of the various and often diverse patterns that can lead to aggression would help those who want to intervene and prevent aggression reach those who need help and probably can be helped, though they may not actively seek it.

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