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Author(s): Catherine P. Bradshaw

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October 4, 2004

Dr. Richard Titus
Program Manager
National Institute of Justice
810 7th Street, NW
Washington, D.C. 20531

Dr. Titus:

I am writing to thank the National Institute of Justice for supporting my doctoral thesis research entitled *Social-Cognitive Mediators of the Link between Social-Environmental Risk Factors and Aggression in Adolescence*¹ (Grant 2003-IJ-CX-1016). In August 2004, I successfully defended the enclosed thesis before my doctoral committee at Cornell University.

I also wanted to note that data from this dissertation study have been reported in the following papers currently under review for publication in professional journals and edited volumes.

Bradshaw, C.P. & Hazan, C. Information processing as a link between esteem and aggression. Submitted to *Social Cognition*.

Bradshaw, C.P. & Garbarino, J. Social cognition as a mediator of the influence of family and community violence: Implications for intervention. In *Scientific approaches to youth violence prevention*. New York: Annals of the New York Academy of Sciences.

Bradshaw, C.P. & Hazan, C. Aggression and views of self and others. Submitted to *Journal of Research on Personality*.

Bradshaw, C.P. Social-environmental risk factors and aggression: The role of social cognitive mediators. Submitted to *Child Development*.

Bradshaw, C.P. & Brown, J.S. The onset and development of antisocial and problem behaviors: Implications for youth development approaches. Submitted to *Applied Developmental Science*.

Furthermore, data from this dissertation study have been (or are scheduled to be) presented at the following professional meetings.

Bradshaw, C.P. & Brown, J.S. *Social-environmental risk factors and aggression: The role of social-cognitive mediators*. Poster to be presented at the biennial meeting of the Society for Research on Child Development, Atlanta, GA. April, 2005.

¹ The title of the final dissertation is slightly revised from my original submission which was *Testing a New Mediation Model of the Link between Maltreatment and Reactive aggression in Adolescence*.

- Bradshaw, C.P. *Social-cognitive mediators of the association between risk and delinquent behavior in adolescence*. Paper to be presented at the annual meeting of the American Society for Criminology, Nashville, TN. November, 2004.
- Bradshaw, C.P., Jensen, S.A., & Hazan, C. (2004, March). *The association between perceived rejection and aggressive behavior: Mechanisms in the cycle of violence*. Poster presented at the biennial meeting of the Society for Research on Adolescence, Baltimore, MD.
- Bradshaw, C.P. (2003, November). *Biased information-processing styles of adolescents at risk for developing problems with aggression*. Poster presented at the annual meeting of the American Society of Criminology, Denver, CO.
- Calhoun, G. B., Bradshaw, C.P., & Kinoshita, N. (2003, October). *When sugar and spice isn't so nice: Relational aggression in girls*. Paper presented at the annual meeting of the American Counseling Association's European Branch, Wililngen, Germany.
- Bradshaw, C.P. & Jensen, S.A. (2003, August). *The influence of relational schemas on information-processing and reactive aggression*. Poster presented at the annual meeting of the American Psychological Association, Toronto, Canada.

Enclosed you will find an original copy of my doctoral thesis and three unbound copies of the original. I also have included an abstract and a summary of the study, which are available electronically on the enclosed 3.5 disk.

I recently assumed an Assistant Professorship in the Department of Mental Health at the Johns Hopkins Bloomberg School of Public Health. Please feel free to contact me if you have any questions about the dissertation study or the report summary. I thank you for your support and assistance.

Sincerely,

Catherine P. Bradshaw, Ph.D.
Assistant Professor
410.502.2587
cbradsha@jhsph.edu

Social-Cognitive Mediators of the Link between
Social-Environmental Risk Factors and Aggression in Adolescence

Catherine Pilcher Bradshaw
Cornell University

Abstract

The effect of social-environmental risk factors, such as social rejection and community violence exposure, on aggressive behavior during childhood has been well documented (Dodge et al., 2003; Lynch & Cicchetti, 1998; Margolin & Gordis, 2000), but the specific mechanisms that mediate this association are still unclear. It may be that a set of social-cognitive factors (i.e., general knowledge structures and social information processing) mediates this relation (Dodge et al., 1990). Two studies were conducted to explore the hypothesis that exposure to social-environmental risk factors is associated with aggressive behavior, as mediated by individuals' general views of the self and others, and negatively biased social information processing.

The first study examined the association among general knowledge structures, information processing, and aggression. Data were collected from 125 older adolescents (mean age = 19.9; $SD = 1.6$) regarding their views of the self and others, social information processing, aggression, and personality. While it has traditionally been believed that individuals' negative views of themselves are associated with aggression (Baumeister et al., 1996), we observed that there was a stronger link between overt aggression and negative views of others. This relation was mediated by negatively biased social information processing.

The second study examined the influence of community violence exposure and social rejection by parents and peers on aggression during adolescence. Data were collected from 184 suburban adolescents (mean age = 14.97, $SD = .84$) and their homeroom teachers regarding the youths' social relationships, general knowledge structures, social information processing, and relationally and physically aggressive behavior. Analyses with structural equation modeling indicated that the effect of these two social-environmental risk factors on aggression was partially mediated by negatively biased social-cognitive factors. Social rejection was more closely associated with negative general knowledge structures, which is consistent with attachment theory's (Bowlby, 1973) emphasis on the link between social relationships and internal working models of the self and others. Violence exposure was more closely related to biased social information processing, which is consistent with social learning theory (Bandura, 1973; Huesmann, 1988), whereby witnessing violence influences beliefs regarding the appropriateness of aggression. Implications for youth violence prevention and intervention are discussed.

Social-Cognitive Mediators of the Link between
Social-Environmental Risk Factors and Aggression in Adolescence

Catherine P. Bradshaw

Cornell University

Project Summary

The effects of social rejection and community violence exposure on the onset and persistence of externalizing behavior problems are well documented (for reviews see Garbarino, 2001; Laird, Jordan, Dodge, Pettit, & Bates, 2001; Lynch & Cicchetti, 1998; Margolin & Gordis, 2000). However, it is less clear which specific *mechanisms* mediate these associations. Identifying specific mechanisms associated with these two social-environmental risk factors will shed light on the process by which risk influences aggressive and problem behavior and provide important information regarding the prevention of youth violence. Two studies were conducted to examine the hypothesis that a series of social-cognitive mechanisms mediate the association between these risk factors and aggressive behavior (see Figure 1).

Social Cognition and Aggression

Social cognition is broadly defined as the way people make sense of and respond to their social world (Fiske & Taylor, 1991; Kunda, 1999). Prior empirical and theoretical research suggests that there are two main components of social cognition that may be both affected by social-environmental risk factors and influence aggressive behavior. The first component is *general knowledge structures*. These include individuals' views of themselves, other people, and the world more broadly. These views are typically referred to as social schemas by social psychologists (Kunda, 1999) and internal working models by attachment theorists (Bowlby, 1973). A second major component of social cognition that has been linked with aggression is *social information processing* (Dodge & Rabiner, 2004). This includes the way people perceive social situations and interactions, make judgments about other people's intents or motives, and make decisions about how to respond in those situations (Crick & Dodge, 1994; Dodge, Pettit, McClaskey, & Brown, 1986).

Although previous research on social cognition has rarely addressed etiology and development, there is some literature which suggests that social relationships and environmental experiences may influence the development of these processing patterns (Crick & Dodge, 1994). According to attachment theory, negative general knowledge structures of the self and others (i.e., internal working models; Bowlby, 1973) are influenced by the consistency and responsiveness of the primary caregivers during early childhood. From these experiences, the child concludes whether or not other people generally respond to calls for support and comfort, are dependable, and will be available when needed. Also from these experiences, the child infers whether or not she/he is worthy of support from others (Bowlby, 1973).

Attachment theory also proposes that under extreme conditions, such as neglect, abuse, or severe disciplinary practices, children develop negative views of the self and others (Cicchetti & Toth, 1995). It is likely that these general knowledge structures influence the way maltreated children process ambiguous and potentially threatening social interactions (Burks, Laird, Dodge, Pettit, & Bates, 1999). Longitudinal research by Dodge and colleagues has shown that children who have experienced harsh physical punishment are at greater risk for displaying negatively biased social-cognitive processing styles and aggressive behavior (Dodge, Bates, & Pettit, 1990; Dodge, Pettit, Bates, & Valente, 1995). However, it is less clear whether these same effects occur for non-physical and milder forms of maltreatment, such as parental rejection.

While attachment theorists and researchers examining general knowledge structures have traditionally focused on experiences with the primary caregiver during infancy and early childhood (Bretherton & Munholland, 1999), I examined whether rejection experiences during adolescence have a similar and perhaps reinforcing effect on negative views of the self and/or others and aggressive behavior. I also extend this association to include social rejection by peers. For many youth, relationships with peers serve as a source of social support, but for aggressive youth, they may serve as an additional source of risk (Dodge et al., 2003; Schwartz, McFadyen-Ketchum, Dodge, Pettit, & Bates, 1998). Consequently, I hypothesized that adolescents who have experienced rejection by both peers and parents would demonstrate the highest levels of aggression and that these effects would be mediated by aspects of social cognition.

Study I

To begin examining social cognition as a possible mechanism by which psychological maltreatment influences the development of aggressive behavior, I explored the association

among general knowledge structures, information processing, and aggression. Considerable research has been conducted on one aspect of general knowledge structures of the self – self-esteem (Baumeister, 1993). There is ongoing debate regarding the role of self-esteem in aggression (Baumeister, Smart, & Boden, 1996). Although it is commonly believed that aggressive individuals have unfavorable views of self (i.e., low self-esteem), there is little empirical evidence to support this notion (Baumeister, 2001; Baumeister, Campbell, Krueger, & Vohs, 2003; Baumeister et al., 1996). To the contrary, there is a growing body of research indicating that aggressive youth often possess higher self-esteem than their non-aggressive peers (Lochman & Dodge, 1994; Olweus, 1992).

Baumeister and colleagues (2003) contend that high self-esteem individuals constitute a heterogeneous group; some are aggressive, whereas others are not. According to relational cognition theory (Baldwin, 1992, 1995), it is the combination of self and other views that influences the way people interpret, organize, and respond to social information. Those with negative self and/or other views tend to be sensitive to, and possibly are continuously searching for, information that is consistent with and confirming of their expectations (Baldwin, 1992).

Compared to research on self-esteem and aggression, there has been relatively little work on the association between aggression and views of others. One notable exception is a multi-site longitudinal study of school children (i.e., Child Development Project), that provides preliminary support for such an association. Aggressive youth were found to have hostile or negative views of other people (Burks, Dodge, Price, & Laird, 1999; Burks, Laird, Dodge, Pettit, & Bates, 1999). Furthermore, several studies indicate that, even after controlling for intellectual abilities, aggressive children and adolescents have distorted information-processing styles, including attention to and interpretation of social cues, selection of solutions to social situations, expectations of situational outcomes, and perceptions of their own aggressive behavior (for a review see Crick & Dodge, 1994). If aggression-prone individuals have generally negative views of others, this could explain why they are more likely than non-aggressive individuals to interpret ambiguous social interactions as hostile and to behave in a manner that increases the likelihood of an aggressive response (Burks, Dodge et al., 1999; Burks, Laird et al., 1999; Dodge & Frame, 1982; Huesmann, 1988; Nasby, Hayden, & DePaulo, 1980; Slaby & Guerra, 1988; Zelli, Dodge, Lochman, & Laird, 1999).

Some researchers have argued that it is not simply views of self or views of others that influence behavior, but rather the interaction of the two (Baldwin, 1992, 1995). Building on this notion, as well as Baumeister and colleagues' (1996) findings, I employed an information-processing paradigm to examine the joint influence of self and other views on aggression. Specifically, I tested a model in which the association between negative self and other views and aggression is mediated by negatively biased social information processing (Burks, Laird et al., 1999) (see Figure 2). I hypothesized that negative views of other people would be associated with aggressive behavior, as mediated by negatively biased information processing styles.

Sample and Data Collection

Data were collected from 125 male and female older adolescents ($M = 19.9$ years old, $SD = 1.6$) living in upstate New York. Participants completed several measures including a commonly used assessment of trait-level verbal and physical aggression (Aggression Questionnaire; Buss & Perry, 1992). Participants also completed assessments of their views of self (Rosenberg Self-Esteem Inventory; Rosenberg, 1965) and views of others (Schema Assessment of Typicality; Burks, Laird et al., 1999). To assess negatively biased social information processing styles, I revised a hypothetical situations task that was originally developed for use with younger children by Dodge and Frame (1982). Participants were presented with four vignettes, each of which involved ambiguous behavior on the part of a peer (i.e., the peer holds the participant's lunch, uses his/her pencil, spills a drink on the participant, hits the participant with a ball). After reading each scenario, participants were instructed to write a brief statement regarding their interpretation of the provocateurs' intent and the participants' likely response.

Hostile attribution bias was assessed by the degree of hostility participants inferred regarding the peers' intent. Hostility was rated on a seven-point scale, with low scores assigned to positive motives and high scores assigned to aggressive motives (Cronbach alpha (α) = .77).

Aggressive response generation was assessed by the degree of hostility in what participants reported as their own likely response. This was also rated on a seven-point scale ($\alpha = .64$).

Justification of aggression was assessed by four-items regarding the legitimization of aggressive responses to threat (Huesmann, Guerra, Miller, & Zelli, 1992). Participants indicated

on a seven-point Likert scale the degree to which they agreed with statements, such as “It is OK for me to hit someone if they start a fight on my turf” ($\alpha = .84$).

Results

Correlational analyses indicated that the view of self was not significantly associated with verbal or physical aggression; furthermore, view of self was not associated with any of the three information-processing variables (i.e., hostile attribution bias, response access, justification of aggression). In contrast, view of others was negatively associated with both verbal and physical aggression and two of the three information-processing variables. Because view of self was not associated with any of the mediating variables or either of the two aggression variables, it was dropped from the mediational model. To test my main hypothesis regarding mediation, I modeled social information processing as a latent variable mediating the relation between negative view of others and aggressions. Using structural equation modeling (SEM) procedures, the analyses indicated that the data adequately fit the model, $\chi^2(6, 125) = 6.77, p = .343, \chi^2/df = 1.128, NFI = .972, CFI = .997, RMSEA = .032$ (see Figure 2). The inclusion of the mediating variable reduced the association between negative view of other and aggression to non-significance (from $\beta = .35, b = .26, p < .05$ to $\beta = -.06, b = -.04, p > .3$) (Baron & Kenny, 1986).

The standardized total effect of other-esteem on overt aggression was $.35, p < .05$ (total $(.35) = \text{direct } (-.06) + \text{indirect } (.41)$), with more than 100% of the effect (i.e., indirect/total) $= (.41 / .35)$ occurring through the mediating variable, social information processing (Bollen, 1989; Dodge, Laird, Lochman, & Zelli, 2002). I also tested a series of alternate models with different exogenous and endogenous variables, but none fit the data significantly better than the hypothesized mediational model.

Discussion

Whereas previous research has focused primarily on views of the self (e.g., self-esteem) as a factor in aggression, I examined how participants' views of other people related to aggressive behavior. The SEM analyses indicated that having negative views of others was associated with the way social information is processed and likely contributes to aggressive responses to threat or provocation, as mediated by negatively biased information processing styles. This first study advances previous work by showing that individuals' general views of others are associated with aggression (Burks, Laird et al., 1999), and that views of others may help differentiate high self-esteem individuals who are aggressive from those who are not.

Furthermore, this study provided some of the first evidence that the relation between information processing and aggression occurs not only in childhood, but also in late adolescence.

Study II

I extended this line of research by examining whether social-environmental risk factors (i.e., social rejection and violence exposure) were associated with aggressive behavior, as mediated these two by aspects (i.e., general knowledge structures and social information processing) of social cognition. While previous research has linked negatively biased information-processing with harsh physical punishment during early childhood (e.g., Dodge et al., 1995), I hypothesized that a similar association occurs between milder forms of maltreatment (i.e., parental rejection) and aggressive behavior. I also anticipated that the relation between parental rejection and aggressive behavior would be mediated by negatively biased social-cognitive processing styles (i.e., negative views of the self and others and aggressogenic information-processing patterns) (see Figure 3).

There are, however other possible sources of risk which may influence children's behavior and social-cognitive processing styles. For example, aggressive youths' propensity toward violence often reflects badly on them; they begin to develop an aggressive reputation among their peers (Dodge, Lochman, Harnish, & Bates, 1997). Other youth learn to expect this behavior from the aggressive child and may even begin to reject the child because his or her behavior is perceived as aversive or dangerous. The subsequent rejection likely reinforces and validates the aggressive youth's view of others as hostile. Therefore, I examined peer rejection as a potential risk factor for aggression, as mediated by negatively biased social cognition.

Another source of environmental risk that may influence social-cognitive processing styles is exposure to aggressive stimuli, such as violence in the neighborhood (Huesmann, 1988; Nasby, Hayden, & DePaulo, 1980). In accordance with social learning theory (Bandura, 1973), these types of experiences may reinforce the youths' negative views of others and/or expand their repertoire of potentially aggressive responses to threat.

While social rejection and violence exposure have been identified as risk factors for the onset and persistence of aggressive behavior during childhood (Dodge et al., 2003; Lynch & Cicchetti, 1998; Margolin & Gordis, 2000), the specific mechanisms that mediate these associations are not well understood. There is some theoretical and empirical research which suggests that social-cognitive factors (i.e., general knowledge structures and social information

processing) may mediate the effects of these social-environmental risk factors on aggressive behavior (Dodge et al., 1990). The second study explored the hypothesis that community violence exposure and social rejection by parents and peers are associated with aggressive behavior, as mediated by the adolescents' general views of the self and others, and negatively biased information-processing.

Sample and Data Collection

Data were collected from 184 male and female adolescents (mean age = 14.97, $SD = .84$) enrolled at a suburban high school in upstate New York. The adolescent participants completed the same instruments described in Study I, with the addition of measures of social rejection by parents and peers (Inventory of Parent and Peer Attachment; Armsden & Greenberg, 1987), exposure to violence (Things I Have Seen and Heard Scale; Richters & Martinez, 1990), and relational aggression (Crick & Grotpeter, 1995; Little, Jones, Henrich, & Hawley, 2003). Each participant's homeroom teacher completed assessments of the adolescent's aggressive behavior (Achenbach, 2001) and rejection by peers.

Results

In order to test the hypothesized mediational model (see Figure 1), four latent variables were constructed as follows: *social-environmental risk* was comprised of the violence exposure and social rejection variables; *general knowledge structures* was comprised of the negative view of self and negative view of others measures; *negatively biased social information-processing* was comprised of hostile attribution bias, response generation, and justification of aggression; and *aggressive behavior* was comprised of aggressive behavior and relational aggression.

Analyses with SEM indicated that the hypothesized model best fit the data with a slight modification, $\chi^2(21, 184) = 25.589, p = .223, \chi^2/df = 1.219, NFI = .939, CFI = .988, RMSEA = .035$ (see Figure 3), thus accounting for 70% of variance in aggression (Kline, 1998). The model included an additional link between violence exposure and negatively biased information processing. The inclusion of this link proved helpful for fitting the model, and is supported by social learning theory (Huesmann, 1998). Previous research suggests that witnessing violence is related to aspects of social information processing, in particular the beliefs-related components of justification of aggression and response generation (Shahinfar, Kupersmidt, & Matza, 2001; Huesmann, 1988). The correlational data from the present study indicated a moderate association between violence exposure and aspects of social information processing; the correlations ranged

from $r = .19$ (184), $p < .05$ for hostile attribution bias to $r = .43$ (183), $p < .001$ for justification of aggression.

Returning to the mediational model reported in Figure 3, the inclusion of the mediating social-cognitive variables reduced the association between social-environmental risk and aggression from $\beta = .59$, $B = .20$ ($p < .001$) to $\beta = .27$, $B = .09$ ($p < .05$); however, the direct effect was still significant. This indicated that negatively biased social cognition partially mediated the effect of risk on aggression (Baron & Kenny, 1986). Although it was not a case of full mediation, more than 53% of the effect (i.e., indirect/total) = $.314/.588$) occurred through the mediating social-cognitive variables (Bollen, 1989; Dodge et al., 2002). I also tested other alternative models with different exogenous and endogenous variables, but none fit the data significantly better than this model.

Discussion

The primary focus of the second study was to examine the hypothesis that social cognition mediated the effects of social-environmental risk on aggression. The SEM analyses indicated that the hypothesized mediational model fit the data, with one additional link between violence exposure and social information processing (see Figure 3). This association is consistent with social learning theory (Bandura, 1973), which posits that individuals make new connections between what they have witnessed, the context, and their own thoughts and behavior (Huesmann, 1998). Repeated exposure to violence and aggression has been shown to be associated with scripts and beliefs about the use, appropriateness, and effectiveness of aggressive responses to threat. These biased information processing styles in turn increase the likelihood of aggressive behavior (Huesmann, 1988, 1998).

With regard to social rejection, the analyses indicated that it was significantly associated with both aspects of social cognition (i.e., negative general knowledge structures and negatively biased social information processing). These findings are consistent with attachment theory (Bowlby, 1973), which contends that rejection experiences influence the development of negative views of self and others. This study provides some of the first empirical support for this previously theorized relation, and shows that these associations are present in adolescence. Furthermore, the negative views of the self and others were associated with the way social information was processed, in a manner that would likely increase aggressive behavior. Taken

together, these findings support the hypothesis that social-environmental risk factors influence aggression through a series of social-cognitive mediators.

It is important to note that under extreme circumstances, there is likely an adaptive function of negatively biased social-cognitive processing styles. For example, inferring a hostile intent is advantageous for children who are chronically exposed to violence in the community or home. They unfortunately *need* to be “on their guard” because threats are often followed by violence in these contexts (Bell & Jenkins, 1991, 1993; Garbarino, Dubrow, Kostelny, & Pardo, 1992). Similarly, the tendency of abused children to interpret ambiguous behaviors as hostile and to be hypersensitive to cues of threat is theorized to be adaptive, in that it warns the child of potential danger and/or rejection (Dodge et al., 1995; Pollak, Cicchetti, Hornug, & Reed, 2000). Early detection of possible cues of threat provides a narrow window of opportunity for the child to either flee or defend himself/herself (Perry, Pollard, Blakley, Baker & Vigilante, 1995). This negative or aggressive bias is protective, but only given a context of violence. It tends to be problematic when over-generalized or applied in unwarranted situations (Baldwin, 1992; Zelli et al., 1999).

For the participants in Study II, the environmental risks are comparatively lower. Given the low base-rate of serious violence witnessed, it was uncertain whether a significant relation would be observed. But in fact, there was a significant association among community violence, negatively biased social information processing, and aggressive behavior. The strength of the association did not vary by level of severity, thus suggesting that children can be negatively affected by even mild forms of crime and violence, such as seeing gangs, drugs being sold, or someone being arrested. This finding is especially important, for it indicates that violence exposure is an important risk factor for children’s aggression, even at low levels.

Limitations

There are a few limitations that are worthy of consideration. Although the two samples were sufficient in size to perform the SEM analyses (Kline, 1998), a larger sample would provide greater power. The cross-sectional design of the present study precludes firm conclusions about the directionality of these relationships; however, a few longitudinal studies indicate that biased information processing predicts future aggressive behavior. There is likely an interactive and reinforcing effect, such that aggressive behavior elicits future aggressive reactions from others, which in turn reinforces the hostile bias and overall aggressive processing

pattern (Dodge et al., 2003; Dodge et al., 1995; Zelli et al., 1999). Additional longitudinal research is needed to confirm temporal ordering of these variables and to track the development of aggressive behavior and social cognitive processing from childhood, through adolescence, and into early adulthood.

Implications for Prevention and Intervention

Several prevention and intervention programs intend to break the link between social-environmental risk exposure and aggression, by either directly or indirectly influencing aspects of social cognition. One indirect way of preventing youth violence is to reduce the incidence of child maltreatment. While community-wide primary prevention initiatives have met with some success, other smaller programs that target high-risk mothers have been associated with reductions in rates of abuse and neglect (Garbarino & Eckenrode, 1997). Strategies demonstrating such effects include nurse-home visitation for young, low SES, single-parent mothers (Olds et al., 1998) and training to enhance mothers' sensitivity and responsiveness to their infants (van den Boom, 1994). These types of interventions likely influence the child's social-cognitive processes through effects on the caregiver-child bond. The enhanced caregiving abilities increase the likelihood of the child becoming securely attached (van den Boom, 1994), which is associated with more prosocial social-cognitive processing style (Cassidy et al., 1996), emotion regulation abilities, and less aggressive behavior (Cicchetti & Toth, 1995).

With regard to violence exposure, increased supervision and modified parenting behaviors have been shown to attenuate the negative effects of a violent and disordered environment on children (Beyers, Bates, Pettit, & Dodge, 2003; Garbarino, Bradshaw, & Kostelny, in press). For children who have already been exposed, one of the best predictors of how children will adapt is how their parents respond to the violence - both emotionally and behaviorally (Garbarino, 1995; Osofsky, 1995; Richters & Martinez, 1993). Thus, adults need to learn to manage their own responses to community violence in ways that model adaptive behaviors and allow them to be emotionally available to the children around them (Garbarino et al., 1992). This emotional and physical shielding of children from violence exposure may reduce their likelihood of developing negatively biased social-cognitive processing styles.

Other prevention strategies include programs that directly target aspects of social-cognitive processing. One such program, BrainPower, was developed by Hudley and colleagues (1998) to alter the hostile attribution bias in aggressive elementary school children. This program

produced short-term reductions in aggressive behavior, as reported by teachers (Hudley & Friday, 1996). A similar strategy was used with adolescent males and females incarcerated in a secure facility (Guerra & Slaby, 1990). This program targeted the beliefs supporting aggression aspect of social cognition. Post-intervention reports by the facility staff indicated that there were significant reductions in youths' use of violent behavior; however, there were no differences with regard to recidivism rates approximately two years after their release (Guerra & Slaby, 1990). Given that these youth returned to their typically chaotic and violent home environments, it is perhaps not surprising that a program, which focused solely on individuals factors, produced limited effects.

The large scale Metropolitan Area Child Study (MACS) is another intervention strategy that intends to simultaneously affect the youths' social cognitive style, as well as their school and family environments (Eron et al., 2002). When implemented early, the intervention demonstrated reductions in aggressive behavior for children who attended the urban poor schools, however there have been some iatrogenic effects for participants from inner-city schools (Eron et al., 2002). It is hypothesized that the disorganization, stress, and attitudes supporting violence prevalent in the inner-city schools and communities may have been too extreme and pervasive for the children to have been affected by this level of intervention. Regardless, this program provides additional support for social-cognitive strategies as a promising intervention strategy for children and early adolescents (Eron et al., 2002).

PATHS (Promoting Alternative THinking Strategies) is a widely used school-based program that targets aspects of social cognition (Greenberg, Kusché, & Mihalic, 1998). Through a series of structured lessons and activities, children learn to better recognize and express emotions, understand the perspectives of others, and develop effective problem-solving and decision-making skills. The Resolving Conflict Creatively Program (RCCP) is another such program for elementary school children that has demonstrated reductions in youths' aggressive social cognitions and behaviors (Aber, Brown, & Jones, 2003). The program includes a combination of lessons and activities intended to promote prosocial decision-making, effective conflict resolution strategies, and respect for diversity (Aber et al., 2003). Taken together, these intervention and prevention studies provide support for the effectiveness of programs that target aspects of social cognition, either directly by affecting the child or indirectly through the parents. These effects, however, appear to be greatest when aspects of the youths' context are considered.

Conclusion

While considerable gains have been made in our understanding of the role of social cognition as a mechanism by which rejection and community violence exposure influence aggressive behavior in adolescence, we also need to know more about possible gender differences in these processes and their effects on different types of aggressive behavior committed by youth. Future research should focus on the variations in social environments that encourage the development of negative and aggressive social cognitions. For example, community violence exposure and maltreatment appear to operate through different aspects of social cognition, but they do share some common influences. Consequently, strategies that target several aspects of social cognition and address contextual issues will likely yield the strongest reductions in problem behavior.

An ecological perspective (Bronfenbrenner, 1979) will be useful for examining how individual factors, such as social cognition and physiological reactivity, influence and are influenced by the family, peer group, and community. The transactional nature of aggressive behavior is complex and needs to be considered when intervening with aggressive youth. While early prevention of problem behaviors is preferred (Eron et al., 2002; Yoshikawa, 1994), the research summarized here suggests that adolescence is a sensitive period in human development and may be an opportunity to stem the development of antisocial behavior through interventions that target aspects of social cognition.

Figure 1. Hypothesized mediational model.

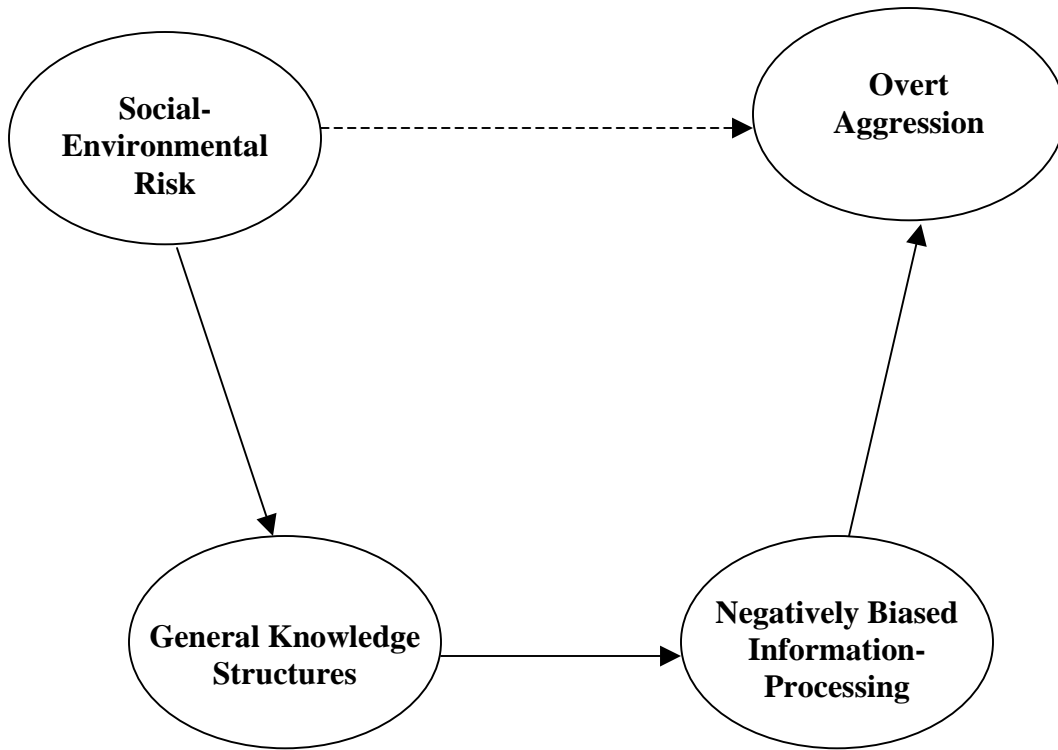


Figure 2. Standardized coefficients for the mediational model with biased information-processing mediating the association between negative view of other and overt aggression. View of other was modeled as a manifest variable (shown in a rectangle) whereas social information processing and overt aggression were modeled as latent variables (shown in ellipses). The total effect is reported in parentheses.

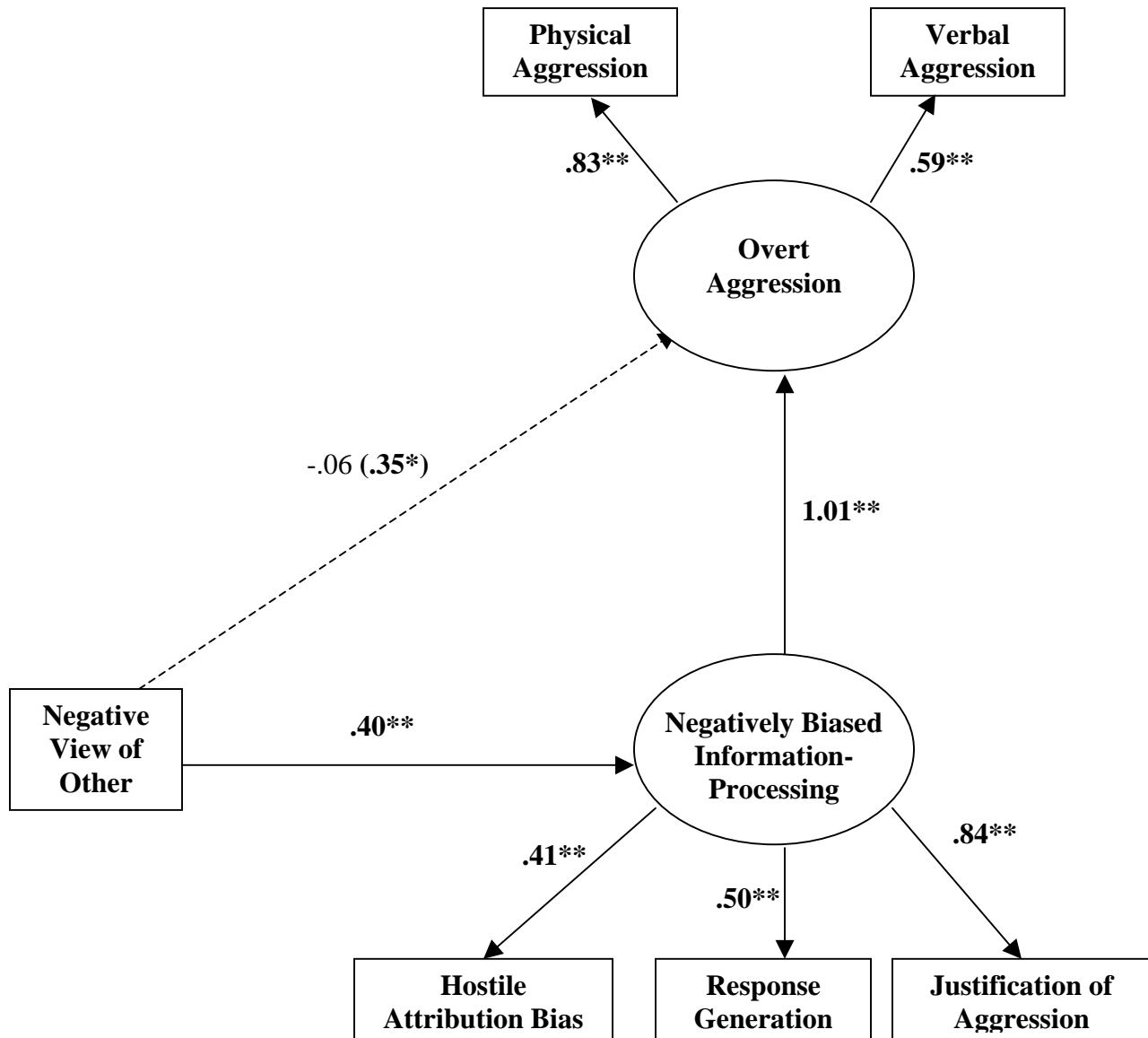
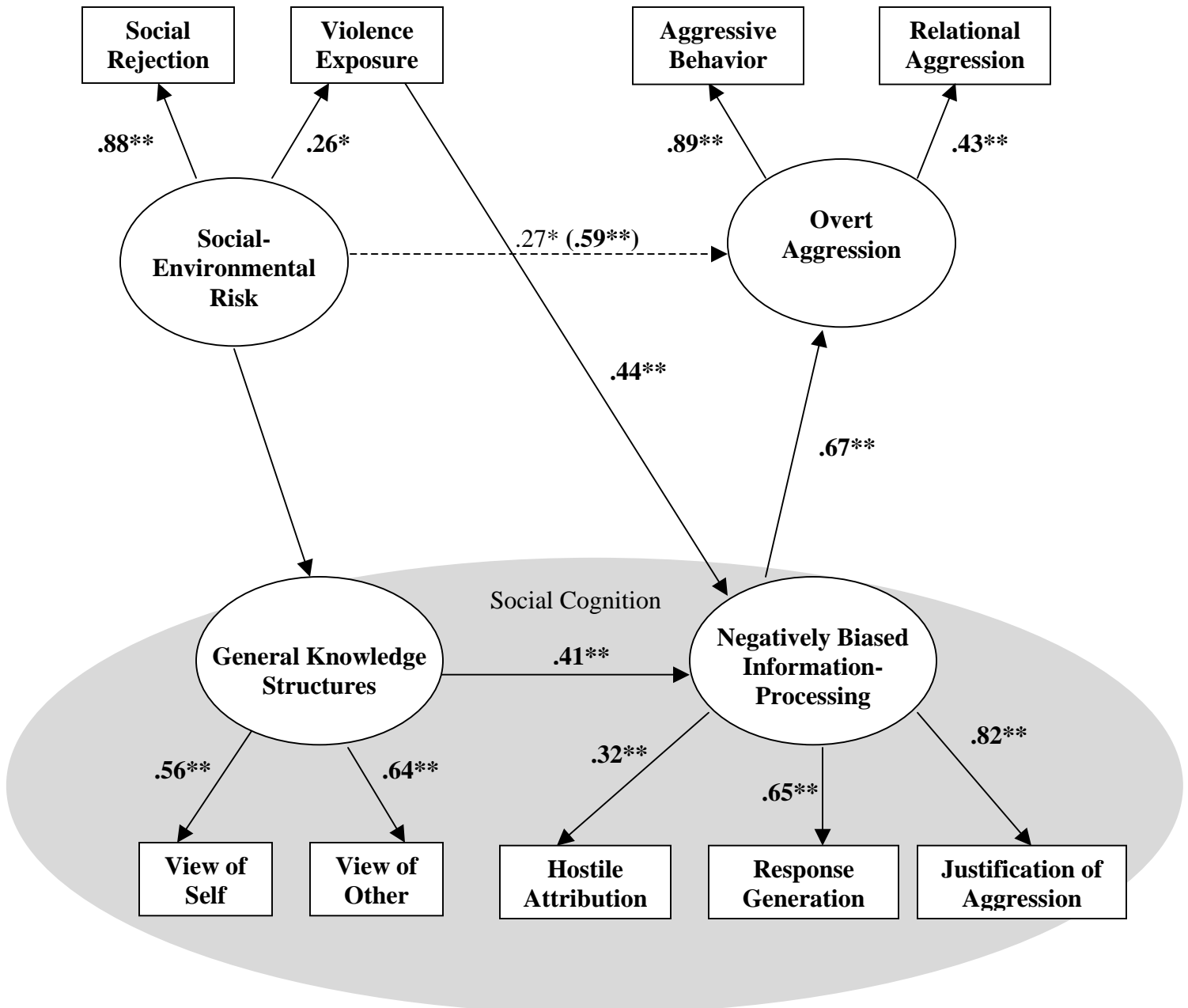


Figure 3. Standardized coefficients for the mediational model in which social-environmental risks, general knowledge structures, negatively biased social information-processing, and aggression were modeled as latent variables (shown in ellipses). The total effect is reported in parentheses.



References

- Aber, J. L., Brown, J. L., & Jones, S. M. (2003). Developmental trajectories toward violence in middle childhood: Course, demographic differences, and response to school-based intervention. *Developmental Psychology, 39*(2), 324-348.
- Achenbach, T. M. (2001). *Manual for the ASEBA school-age forms and profiles*. Burlington, VT: Department of Psychiatry, University of Vermont.
- Armsden, G. C., & Greenberg, M. T. (1987). The inventory of parent and peer attachment: Individual differences and their relationship to psychological well-being in adolescence. *Journal of Youth and Adolescence, 16*(5), 427-454.
- Baldwin, M. W. (1992). Relational schemas and the processing of social information. *Psychological Bulletin, 112*, 461-484.
- Baldwin, M. W. (1995). Relational schemas and cognition in close relationships. *Journal of Social and Personal Relationships, 12*(4), 547-552.
- Bandura, A. (1973). *Aggression: A social learning analysis*. Englewood Cliffs, NJ: Prentice Hall.
- Baron, R. M., & Kenny, D. A. (1986). The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51*(6), 1173-1182.
- Baumeister, R. F. (1993). *Self-esteem: The puzzle of low self-regard*. New York: Plenum Press.
- Baumeister, R. F., Smart, L., & Boden, J.M. (1996). Relation of threatened egotism to violence and aggression: The dark side of high self-esteem. *Psychological Review, 103*, 5-33.
- Baumeister, R. F. (2001). Violent pride: Do people turn violent because of self-hate or self-love? *Scientific American, 284*(4), 96-101.
- Baumeister, R. F., Campbell, J. D., Krueger, J. I., & Vohs, K.D. (2003). Does high self-esteem cause better performance, interpersonal success, happiness, or healthier lifestyles? *Psychological Science in the Public Interest, 4*(1), 1-44.
- Bell, C. C., & Jenkins, E. J. (1991). Traumatic stress and children. *Journal of Health Care for the Poor and Underserved, 2*(1), 175-185.

- Bell, C. C., & Jenkins, E. J. (1993). Community violence and children on Chicago's Southside. *Psychiatry, 56*, 46-54.
- Beyers, J. M., Bates, J. E., Pettit, G. S., & Dodge, K. A. (2003). Neighborhood structure, parenting processes, and the development of youths' externalizing behaviors: A multilevel analysis. *American Journal of Community Psychology, 31*(1-2), 35-53.
- Bollen, K. A. (1989). *Structural equations with latent variables*. New York: Wiley-Interscience.
- Bowlby, J. (1973). *Attachment and loss, Vol. II: Separation: Anxiety and anger*. New York: Basic Books.
- Bretherton, I., & Munholland, K. A. (1999). Internal working models in attachment relationships: A construct revisited. In J. Cassidy & P. R. Shaver (Eds.), *Handbook of attachment: Theory, research, and clinical applications* (pp. 89-111). New York: Guilford Press.
- Burks, V. S., Dodge, K. A., Price, J. M., & Laird, R. D. (1999). Internal representational models of peers: Implications for the development of problematic behavior. *Developmental Psychology, 35*(3), 802-810.
- Burks, V. S., Laird, R. D., Dodge, K. A., Pettit, G. S., & Bates, J. E. (1999). Knowledge structures, social information processing, and children's aggressive behavior. *Social Development, 8*(2), 220-236.
- Buss, A. H., & Perry, M. (1992). The Aggression Questionnaire. *Journal of Personality and Social Psychology, 63*(3), 452-459.
- Cicchetti, D., & Toth, S. L. (1995). A developmental psychopathology perspective on child abuse and neglect. *Journal of the American Academy of Adolescent Psychiatry, 34*(5), 541-565.
- Crick, N. R., & Dodge, K. A. (1994). A review and reformulation of social information processing mechanisms in children's social adjustment. *Psychological Bulletin, 115*, 74-101.
- Crick, N. R., & Grotpeter, J. K. (1995). Relational aggression, gender, and social-psychological adjustment. *Child Development, 66*(3), 710-722.

- Dodge, K. A., Bates, J. E., & Pettit, G. S. (1990). Mechanisms in the cycle of violence. *Science*, 250(4988), 1678-1683.
- Dodge, K., & Frame, C. L. (1982). Social-cognitive biases and deficits in aggressive boys. *Child Development*, 53, 620-635.
- Dodge, K. A., Laird, R., Lochman, J. E., & Zelli, A. (2002). Multidimensional latent-construct analysis of children's social information processing patterns: Correlations with aggressive behavior problems. *Psychological Assessment*, 14(1), 60-73.
- Dodge, K. A., Lansford, J. E., Burks, V. S., Bates, J. E., Pettit, G. S., Fontaine, R., et al. (2003). Peer rejection and social information-processing factors in the development of aggressive behavior problems in children. *Child Development*, 74(2), 374-393.
- Dodge, K. A., Lochman, J. E., Harnish, J. D., & Bates, J. E. (1997). Reactive and proactive aggression in school children and psychiatrically impaired chronically assaultive youth. *Journal of Abnormal Psychology*, 106(1), 37-51.
- Dodge, K. A., Pettit, G. S., Bates, J. E., & Valente, E. (1995). Social information-processing patterns partially mediate the effect of early physical abuse on later conduct problems. *Journal of Abnormal Psychology*, 104(4), 632-643.
- Dodge, K. A., Pettit, G. S., McClaskey, C. L., & Brown, M. (1986). Social competence in children. In *Monographs of the Society for Research in Child Development* (Vol. 51).
- Dodge, K. A., & Rabiner, D. L. (2004). Returning to roots: On social information processing and moral development. *Child Development*, 75(4), 1003-1008.
- Eron, L., Huesmann, R., Spindler, A., Guerra, N., Henry, D., & Tolan, P. (2002). A cognitive-ecological approach to preventing aggression in urban settings: Initial outcomes for high-risk children. *Journal of Consulting and Clinical Psychology*, 70(1), 179-194.
- Fiske, S. T., & Taylor, S. E. (1991). *Social cognition*. New York: Random House.
- Garbarino, J. (2001). An ecological perspective on the effects of violence on children. *Journal of Community Psychology*, 29(3), 361-378.
- Garbarino, J. (1995). *Raising children in a socially toxic environment*. San Francisco, CA: Jossey-Bass.

- Garbarino, J. (2001). An ecological perspective on the effects of violence on children. *Journal of Community Psychology*, 29(3), 361-378.
- Garbarino, J., Bradshaw, C.P., & Kostelny, K. (in press). Neighborhood and community influences on parenting. In T. Luster & L. Okagaki (Eds.), *Parenting: An ecological perspective*. Mahwah, NJ: Erlbaum.
- Garbarino, J., Dubrow, N., Kostelny, K., & Pardo, C. (1992). *Children in danger: Coping with the consequences of community violence*. San Francisco: Jossey-Bass.
- Garbarino J., & Eckenrode, J. (1997). Understanding abusive families: An ecological approach to theory and practice. San Francisco: Jossey-Bass.
- Greenberg, M. T., Kusché, C., & Mihalic, S. F. (1998). Blueprints for Violence Prevention, Book Ten: Promoting Alternative Thinking Strategies (PATHS). Boulder, CO: Center for the Study and Prevention of Violence.
- Guerra, N. G., & Slaby, R. G. (1990). Cognitive mediators of aggression in adolescent offenders: II. Intervention. *Developmental Psychology*, 26(2), 269-277.
- Hudley, C., Britsch, B., Wakefield, W. D., Smith, T., Demorat, M., & Cho, S. J. (1998). An attribution retraining program to reduce aggression in elementary school students. *Psychology in the Schools*, 35(3), 271-282.
- Hudley, C., & Friday, J. (1996). Attributional bias and reactive aggression. *American Journal of Preventive Medicine*, 12(5, Suppl), 75-81.
- Huesmann, L. R. (1988). An information processing model for the development of aggression. *Aggressive Behavior*, 14(1), 13-24.
- Huesmann, L. R. (1998). The role of social information processing and cognitive schema in the acquisition and maintenance of habitual aggressive behavior. In R. G. Geen & E. Donnerstein (Eds.), *Human aggression: Theories, research, and implications for social policy*. San Diego, CA: Academic Press.
- Huesmann, R., Guerra, N., Miller, L., & Zelli, A. (1992). The role of social norms in the development of aggression. In H. Zumkley & A. Fraczek (Eds.), *Socialization and aggression*. New York: Springer.
- Kline, R. B. (1998). *Principles and practices of structural equation modeling*. New York: Guilford.

- Kunda, Z. (1999). *Social cognition: Making sense of people*. Boston, MA: MIT Press.
- Laird, R. D., Jordan, K. Y., Dodge, K. A., Pettit, G. S., & Bates, J. E. (2001). Peer rejection in childhood, involvement with antisocial peers in early adolescence, and the development of externalizing behavior problems. *Development and Psychopathology, 13*(2), 337-354.
- Little, T. D., Jones, S. M., Henrich, C. C., & Hawley, P. H. (2003). Disentangling the “whys” from the “whats” of aggressive behaviour. *International Journal of Behavioral Development, 27*(2), 122-133.
- Lochman, J. E., & Dodge, K. A. (1994). Social-cognitive processes of severely violent, moderately aggressive, and nonaggressive boys. *Journal of Consulting and Clinical Psychology, 62*(2), 366-374.
- Lynch, M., & Cicchetti, D. (1998). An ecological-transactional analysis of children and contexts: The longitudinal interplay among child maltreatment, community violence, and children's symptomatology. *Development and Psychopathology, 10*(2), 235-257.
- Margolin, G., & Gordis, A. B. (2000). The effects of family and community violence on children. *Annual Review of Psychology, 51*, 445-479.
- Nasby, W., Hayden, B., & DePaulo, B. M. (1980). Attributional bias among aggressive boys to interpret unambiguous social stimuli as displays of hostility. *Journal of Abnormal Psychology, 89*(3), 459-468.
- Osofsky, J. D. (Ed.). (1997). *Children in a violent society*. New York, NY: Guilford Press.
- Olds, D., Pettitt, L. M., Robinson, J., Henderson, C., Eckenrode, J., Kitzman, H., Cole, B., & Powers, J. (1998). Reducing risks for antisocial behavior with a program of prenatal and early childhood home visitation. *Journal of Community Psychology, 26*(1), 65-83.
- Olweus, D. (1992). Bullying among schoolchildren: Intervention and prevention. In R. D. Peters, R. J. McMahon & V. L. Quinsey (Eds.), *Aggression and violence throughout the life span* (pp. 100-125). Newbury Park, CA: Sage.
- Perry, B. D., Pollard, R. A., Blakley, T. L., Baker, W. L., & Vigilante, D. (1995). Childhood trauma, the neurobiology of adaptation, and "use-dependent" development of the brain: How "states" become "traits". *Infant Mental Health Journal, 16*(4), 271-291.
- Pollak, S. D., Cicchetti, D., Hornung, K., & Reed, A. (2000). Recognizing emotion in faces: Developmental effects of child abuse and neglect. *Developmental Psychology, 36*(5), 679-688.

- Richters, J. E., & Martinez, P. (1990). *Things I Have Seen and Heard: A structured interview for assessing young children's violence exposure*. Rockville, MD: National Institute of Mental Health.
- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton, NJ: Princeton University Press.
- Schwartz, D., McFadyen-Ketchum, S. A., Dodge, K. A., Pettit, G. S., & Bates, J. E. (1998). Peer group victimization as a predictor of children's behavior problems at home and in school. *Development and Psychopathology, 10*(1), 87-99.
- Shahinfar, A., Kupersmidt, J. B., & Matza, L. S. (2001). The relation between exposure to violence and social information processing among incarcerated adolescents. *Journal of Abnormal Psychology, 110*(1), 136-141.
- Slaby, R. G., & Guerra, N. G. (1988). Cognitive mediators of aggression in adolescent offenders: I. Assessment. *Developmental Psychology, 24*(4), 580-588.
- van den Boom, D. C. (1994). The influence of temperament and mothering on attachment and exploration: An experimental manipulation of sensitive responsiveness among lower-class mothers with irritable infants. *Child Development, 65*(5), 1457-1477.
- Yoshikawa, H. (1994). Prevention as cumulative protection: Effects of early family support and education on chronic delinquency and its risks. *Psychological Bulletin, 115*(1), 28-54.
- Zelli, A., Dodge, K. A., Lochman, J. E., & Laird, R. D. (1999). The distinction between beliefs legitimizing aggression and deviant processing of social cues: Testing measurement validity and the hypothesis that biased processing mediates the effects of beliefs on aggression. *Journal of Personality and Social Psychology, 77*(1), 150-166.