



insulting) and *indirect, social, or relational* aggressive behavior<sup>1</sup> (e.g., spreading rumors). The current study had three goals: 1) to ascertain how aggression-supporting cognitions might mediate the effects of environmental and emotion regulation factors on aggressive behavior in a school setting; 2) to assess whether social cognitions about direct and indirect aggression differentially predict the respective behaviors with which they are theoretically associated (i.e., direct versus indirect aggression); and 3) to examine the fit of a mediational model across gender and school context (i.e., urban or suburban school district).

### **The Roles of Environmental and Emotion Regulation Factors in Aggressive Thinking: A Social-Cognitive Perspective**

Our research integrates two contemporary views of how environmental influences; temperamental predispositions, emotional states, and regulation; and mental information structures shape children's social behavior. We apply these views specifically to the study of aggressive behavior. First, social cognitive information-processing models [SCIP; Crick and Dodge, 1994; Huesmann, 1988, 1998] posit that environmental socializers (e.g., exposure to aggressive models), biological predispositions (e.g., anger proneness), and situational instigators (e.g., provocation) interact to activate an aggression-supporting cognitive style (e.g., beliefs approving aggression), leading an individual to exhibit a stable pattern of aggressive behavior. A second complementary view integrates the role of emotion processes (e.g., emotional experience and regulation) in the relation between environmental influences, cognitive processes, and social behavior [Lemerise and Arsenio, 2000; Eisenberg et al., 1999, 2000]. According to Lemerise and Arsenio [2000], emotional states and emotion regulation can influence children's abilities to process social information.

By integrating those models, we propose that environmental conditions (i.e., exposure to violence, victimization) and emotion regulation variables (i.e., anger control, impulsivity) influence the emergence of an aggression-supporting cognitive style. For example, children who have been exposed to high levels of aggression are more likely to develop the belief that aggression is an appropriate response to social conflict [Huesmann, 1998]. Regarding the role of emotion regulation, Lemerise and Arsenio [2000] suggested that children who are prone to strong emotional experience might become too overwhelmed to consider alternative responses other than aggression during a social conflict situation. Once formed, this aggression-supporting cognitive style is thought to mediate the relation between biosocial risk factors and actual aggressive responding.

### **Empirical Links Between Environmental and Emotion Regulation Factors and Aggressive Behavior**

A good deal of empirical research has confirmed the importance of environmental and emotion regulation factors in understanding aggressive behavior. With regard to environmental factors, researchers have found that children exposed to violence (e.g., witnessing violence toward others) show higher rates of concurrent and future aggressive behavior than non-exposed youth [Miller et al., 1999]. Furthermore, this relation holds even when variance contributed by other stressful life events is controlled [Attar et al., 1994]. Some research has

<sup>1</sup>There has been considerable debate about the label for this type of aggression [e.g., Björkqvist, 2001]. The behaviors considered here are both indirect (the identity of the perpetrator is not clear) and relational (they use relationships to hurt others). We use the term "indirect," but recognize that other labels might apply.

found that exposure to violence through victimization is also linked to aggressive behavior [e.g., Schwartz et al., 2001], whereas other studies have failed to establish this relation [e.g., Perry et al., 1988]. There is some evidence [Roecker Phelps, 2001] that being the target of aggression (particularly indirect aggression) might be associated with higher rates of internalizing behaviors, in addition to increased aggressive behavior.

A number of studies also have demonstrated the relation between emotion regulation (i.e., behavioral or affective self-control) and aggression. For example, anger proneness has been linked to aggressive behavior [Cornell et al., 1999], as has an inability to control anger [Furlong and Smith, 1994]. In part, this might be because angry individuals use aggression to regulate their emotional states [Bushman et al., 2001]. The relation between anger and social functioning has also been shown to exist over time, supporting a causal relationship. For example, Eisenberg et al. [1999] found that children's anger expressions at age 4–6 predicted socially inappropriate behavior, such as aggression, up to 4 years later. Furthermore, anger might contribute differentially to different types of aggression. For example, in male sexual offenders, anger and anger control were related to verbal aggression, but not to physical aggression [Smallbone and Milne, 2000].

Recent research has begun to clarify the relation between different aspects of emotion regulation and externalizing behaviors such as aggression in children [e.g., Derryberry and Rothbart, 1997]. For example, effortful control (including the ability to focus attention voluntarily and inhibit behavior) and impulsivity, though correlated, appear to have unique (and perhaps additive) effects on aggressive behavior [Eisenberg, et al., 2001]. One possibility that has not been well explored empirically is that involuntary aspects of emotion regulation (e.g., impulsivity) might influence aggression in a direct fashion, whereas the influence of more voluntary aspects of emotion regulation (e.g., anger control) might be indirect, mediated through other variables, such as the way a child thinks about a given social situation.

### **The Mediating Role of Social-Cognitive Information-Processing Variables**

Studies based on the theoretical view that social cognitive-information processing styles serve as mediators between “background variables” (i.e., environmental and emotion regulation factors) and aggressive behavior have generated empirical support for this hypothesis. For example, in one study [Marcus et al., 2001], although direct effects were also found, about half of the effect of exposure to interparental conflict on aggressive behavior at school was mediated through social cognitions such as approval of retaliation. Similarly, Gomez et al. [2001] observed that the relation between children's ratings of maternal behavior and teachers' ratings of child behavior was partially mediated by the SCIP variables of hostile bias and aggressive response selection.

Several social-cognitive information-processing variables are thought to influence an individual's behavior in potentially aggressive situations. Drawing on prior work by Huesmann [1988] and Crick and Dodge [1994], Huesmann [1998] presented a unified model describing four steps in this process. In the first step, the individual attends to and evaluates cues from the environment. One of the most thoroughly considered social cognitions of this type is the hostile attribution bias [Dodge and Frame, 1982; Orobio de Castro et al., 2002] by which individuals perceive hostile intent in an ambiguous situation.

In the second step, individuals search for and retrieve scripts (internalized guides for behaving in particular situations) that are relevant to the situation. These scripts are created

through observation and direct learning experiences, and include information about how individuals are likely to act and feel in this situation [Huesmann, 1998]. One variable that is likely to influence the availability of aggressive scripts is the extent to which the individual engages in aggressive fantasizing [Eron, 2001] or mental rehearsal, which serves to reinforce scripts even in the absence of aggressive behavior or situational provocation.

In the third step, an individual evaluates the scripts on three key dimensions [Boxer and Dubow, 2002] including whether the action is acceptable (normative beliefs, retaliation approval), whether the plan will achieve the desired goal (outcome expectancies), and whether the individual is able to carry out the actions as planned (self-efficacy). In the fourth step, an individual evaluates the environment's response to the action. For example, a child might decide that he or she does not care about getting into trouble for acting aggressively, and thus an aggressive script will be maintained [Huesmann, 1998].

Prior empirical research supports the link between certain social cognitions and aggressive behavior. However, as noted above, it is also important to recognize the role of emotion regulation factors in the association between social cognition and aggression. Lemerise and Arsenio [2000] maintained that emotional responses help an individual narrow the choices among possible responses to a situation, and to prioritize these options. Furthermore, those authors suggested that past experience might encourage individual differences in emotion processes. These issues are especially relevant in the study of aggressive behavior because the social situations that elicit aggression are emotionally arousing for children, and are often ambiguous or uncertain, conditions that intensify the role of emotion in determining action.

The current study thus aims to integrate emotion regulation factors such as anger control with a SCIP model of aggression by examining the ways in which social-cognitive variables might mediate the effects of both environmental and emotion regulation factors on aggressive behavior. However, in any study of aggression, it is also important to attend to two additional variables that have been shown to exert an effect on the expression of aggressive behavior: gender and social-economic context.

## **The Role of Gender**

Gender has frequently been shown to moderate the display of aggressive behavior. In general, research has found that indirect aggression (i.e., using social relationships to cause harm such as through gossip or peer exclusion) is the most frequently used aggressive strategy among girls, whereas direct physical and verbal aggression is more frequent among boys [Österman et al., 1998]. It is fairly clear that boys use more direct aggression than girls [e.g., Maccoby and Jacklin, 1974]. The results of studies on indirect aggression are not as clear-cut: although the majority of researchers has found that girls use more indirect aggression than boys [Crick and Grotpeter, 1995; Lagerspetz et al., 1988], other researchers have found no gender difference [Delveaux and Daniels, 2000] or that boys used more indirect aggression than girls [David and Kistner, 2000].

Gender differences have also been found in the effect of exposure to violence on aggression. O'Keefe [1997] found that whereas community and school violence both predicted acting-out behaviors in boys, only school violence predicted acting-out behavior in girls. The research on gender differences in the relation of social cognitions to aggressive behavior is not conclusive. For example, Österman et al. [1999] found that for boys, an

external locus of control correlated with aggressive behavior, whereas for girls it did not; Halloran et al. [1999] found the opposite to be true.

Finally, boys' and girls' social cognitions might differ depending on the type of aggression in question. For example, girls tend to think that indirect aggression is more hurtful and hostile than do boys [Crick, 1995]. In other research, Crick and Werner [1998] found that boys gave more positive evaluations of direct aggression, whereas girls provided more positive evaluations of indirect aggression. Furthermore, those researchers found that direct and indirect aggressive behaviors were related to the respective social cognitions (i.e., the directly aggressive boys and girls evaluated direct aggression more positively, the indirectly aggressive boys evaluated indirect aggression more positively).

### **The Role of Neighborhood/Contextual Factors**

There has been a recent increasing focus on youth deemed to be "at risk" for negative mental health outcomes due to characteristics of the neighborhoods in which they reside [e.g., Eron et al., 1994]. Urban socioeconomically disadvantaged youth, many of whom are from ethnic minority groups, are at disproportionately higher risk for child maltreatment, delinquency, violence, substance use, and academic failure [Garbarino, 1992; Guerra et al., 1995]. Guerra et al. [1995, p. 519] suggested that such environments might engender aggression-supporting beliefs in children "as a means of gaining status, material rewards, or simply coping with fear of victimization." These authors found that poverty was associated with normative beliefs about the appropriateness of aggression in a sample of urban elementary school children; in turn, aggression-supporting beliefs were related to aggressive behavior. Thus, beyond the potentially more immediate effects of exposure and victimization, socioeconomic context is an important background variable in the development of aggression.

There is also reason to believe that variables proposed to predict problem behaviors directly or indirectly operate differently in different contexts (e.g., ethnic groups, neighborhoods). For example, in a predominantly Caucasian middle-class sample, Dubow and Tisak [1989] found a positive relation between peer support and school grades; in an urban sample of at-risk youth, Cauce et al. [1982] found that peer support was related negatively to grade-point average and positively to absenteeism. Those findings might reflect divergent peer norms in the two samples. Thus, in addition to mean differences between urban and suburban youth on some risk factors for aggressive behavior (e.g., exposure to violence), it is possible that mediating variables play different roles in each group.

### **The Present Study**

The goal of the present study was to examine pathways that link environmental (i.e., exposure to aggression and victimization) and emotion regulation (i.e., anger control, impulsivity) factors to children's aggressive behavior in school. The predictors were hypothesized to be both directly associated with aggressive behaviors and indirectly associated with aggressive behavior through the social cognitions described above. Based on our theoretical conceptualization of the relation among biopsychosocial risk, social cognition, and aggressive behavior, we expected that the mediated pathways would be stronger than the direct pathways.

A second goal was to examine if social cognitions about direct and indirect aggression differentially predicted these two types of behavior. It was predicted that beliefs about direct aggression would predict direct aggression more strongly than indirect aggression, whereas beliefs about indirect aggression would predict indirect aggression more strongly than direct aggression.

A final goal was to ascertain if the links among potential mediating variables were consistent across subgroups of the sample. Specifically, we compared boys to girls and urban to suburban students. Specific predictions were not made, because little research has examined gender or neighborhood context differences in the relations among self-regulatory variables, environmental factors, SCIP mediators, and aggressive behavior.

It should be noted that because our data are cross-sectional, the hypotheses under examination are not intended to address causal relations. Rather, these data are intended to aid in obtaining a clearer understanding of the contemporaneous relations among these variables. This study is a critical step in understanding the maintenance of aggression in a school setting.

## **METHOD**

### **Participants and Procedures**

Data were collected from 778 fourth through sixth graders (mean age = 10.9 years,  $SD = 1.0$ ) in two school districts, one urban and one suburban. Participants in the urban district were 417 students (43% male) from four elementary schools. The self-described ethnic composition of the urban sample was 23% Black/African-American, 48% White/Caucasian, 11% Hispanic/Latino-a, 15% bi- or multi-racial, and 3% other. Participants in the suburban district were 361 students (49% male) from four elementary schools and one middle school. The ethnic composition of the suburban sample was 8% Black/African-American, 78% White/Caucasian, 2% Hispanic/Latino-a, 9% bi- or multi-racial, 3% other.

At the discretion of the school administrators, different procedures were used to obtain parent/guardian consent for participation in the two districts. In the urban district, a passive consent procedure was approved and utilized [see Erdley and Asher, 1998, for a discussion of the value of this approach], whereas in the suburban district, an active consent procedure was utilized. At the time of survey administration, students in both districts were given the option of not participating. Few students declined to participate. Two classrooms per grade per school were selected randomly by the school principals to complete the survey. Out of a possible sample of 846 fourth through sixth grade students across the four urban schools included in the study, 52% were selected to participate; of these 97% participated in the survey. Some students in selected classrooms were not included due to absences, parental or student refusals, or incomplete surveys. In the suburban district, out of a possible sample of 979 students across the five schools included in the study, 51% were selected to participate; of these, 72% participated in the survey.

Surveys were administered in a group format in classrooms. At each administration, two members of the research staff (trained psychology graduate students) were present. Although the items were appropriate to the reading level of the students, one staff member read the items and the response choices aloud while another walked around the room to monitor students and provide individual assistance. Surveys took approximately 40 minutes to complete.

## MATERIALS

The self-report measures were compiled in the context of consultation with a school district and reflected areas of concern of teachers and administrators in the schools [see Boxer et al., 2003]. In most cases, scales were adapted from existing measures in one of three ways: 1) representative items were selected from a longer scale; 2) items were modified from an interview format to a paper-and-pencil survey format; or 3) new items were added to measure the construct of indirect aggression. The complete survey packet is available from the authors.

**Environmental Factors.** Exposure to aggression in the school environment [Dahlberg et al., 1998] included *witnessing aggression* (i.e., seeing or hearing about aggressive acts, five items, e.g., “How often have you heard students saying bad things about someone behind their back?”) and *victimization* (i.e., being aggressed against by others, six items, e.g., “How often have other students said mean things to you at school?”). Items asked about both direct (i.e., verbal and physical aggression) and indirect (i.e., social manipulation and exclusion) forms of aggressive behavior in school. Responses to these items were rated on a 4-point scale for frequency in the past year ranging from 0 = “Never” to 3 = “A lot of times.” Coefficient alpha for these items was .70.

**Emotion Regulation.** Two scales were used to measure emotion regulation. Three items adapted from the State-Trait Anger Expression Inventory [Spielberger, 1991] measured participants’ general ability to *control their feelings of anger* (e.g., “I can do things to calm down”). Responses to those items were rated on a 4-point scale ranging from 1 = “All the time” to 4 = “Never.” Coefficient alpha for the items was .78. Another three items [Bosworth and Espelage, 1995, published in Dahlberg et al., 1998] measured participants’ general *tendency to behave impulsively* (e.g., “I do things without thinking”). The response scale for the impulsivity items was the same as that used for anger control. Coefficient alpha for those items was .56.

**Direct and Indirect Aggressive Behavior.** Aggression items were adapted from the Peer Nomination of Aggression [Eron et al., 1971] and the Direct and Indirect Aggression Scale [Björkqvist et al., 1992]. We included five direct aggression (e.g., “How often do you hit or push someone?”) and three indirect aggression items (e.g., “How often do you make up stories and lies to get other kids in trouble?”). Participants rated the frequency with which they engaged in each behavior on a 4-point scale ranging from 0 = “Never” to 3 = “A lot.” For direct aggression, alpha was .76; for indirect aggression, alpha was .61.

**Social-Cognitive Information-Processing Variables.** 1) Items assessing *Aggressive fantasy* [based on Huesmann and Eron, 1986; Rosenfeld et al., 1982] asked participants whether they engaged in mental rehearsal (e.g., “Do you think about having a party and inviting everyone except one kid that you don’t like?”) or pretend-behavioral rehearsal (e.g., “Do you play games where you pretend to use a gun or other weapon on somebody?”) of aggressive scripts, and included both direct and indirect aggressive fantasies. Responses were rated on a 3-point scale, ranging from 0 = “No” to 2 = “A lot.” Coefficient alpha for the 5-item scale was .66. For the three direct fantasy items, alpha was .59; for the two indirect fantasy items, alpha was .47.

2) *Retaliation approval* about the acceptability of using aggression in response to provocation was based on the Retaliation Approval subscale of the Normative Beliefs About Aggression scale [Huesmann and Guerra, 1997]. Participants read three provocation scenarios (physical, verbal, and indirect provocation; e.g., “Pretend one kid hits a second kid”) and were asked to rate how acceptable it would be to respond with verbal, physical, or

indirect aggression (i.e., “Do you think it’s OK for the second kid to *scream at / hit / get others not to like* the first kid?”). Responses were rated on a 4-point scale ranging from 1 = “It’s really wrong” to 4 = “It’s perfectly OK” [to respond with aggression]. Coefficient alpha for the 9-item scale was .90. For direct retaliation approval (six items), alpha was .87; for indirect retaliation approval (three items), alpha was .85.

3) *Self-Evaluation* following aggressive responding was measured with items adapted from those used by Perry and his colleagues [Egan et al., 1998]. Although Perry and colleagues have identified a number of outcome expectancies linked to aggression, two have consistently emerged as the most highly correlated with aggressive responding and were included here: expectations of negative self-evaluations and victim suffering. Participants read vignettes describing situations in which they might perform direct aggression (e.g., another child cuts in front of the drinking fountain line). Participants then rated how they would feel about themselves and their victims if they acted aggressively (e.g., “Some kids would be upset with themselves if they shoved the kid, but other kids would not be upset. How would you feel about it?”). The composite score for this scale reflected how *upset* participants would be about using aggression, and how *afraid* participants would be about harming the victim. Responses were rated on a 4-point scale, ranging from 1 = “Very sure I would be upset/afraid” to 4 = “Very sure I would not be upset/afraid.” Only direct aggression was measured; coefficient alpha for this 4-item scale was .80.

4) *Efficacy expectation* items were adapted from measures developed by Perry et al. [1988]. These cognitions concerned a participant’s perceived ability to behave aggressively (i.e., enact an aggressive cognitive script). Participants read brief vignettes in which they were asked to imagine using aggression in response to different situations, and then rated how easy it would be for them to enact aggression (e.g., “A kid gets in your way when you’re in a hurry to get all your stuff together and leave at the end of school. Shoving the kid out of your way is \_\_\_\_\_ for you.”). Responses were rated on a 4-point scale ranging from 1 = “Really hard!” to 4 = “Really easy!” Only direct aggression was measured; coefficient alpha for this 2-item scale was .73.

5) *Concern for the consequences* of behaving aggressively was measured with items written for this survey. Participants read a vignette in which they were provoked by a peer (e.g., “Another kid picks on you and starts to push you around”). Participants rated the extent to which they cared about potential consequences for “getting even” (e.g., “If you do something to get even, you might get into trouble at school. How much would you care if this happened?”) on a 3-point scale ranging from 1 = “I would really care!” to 3 = “I would not care at all.” The type of aggression (direct or indirect) was not specified. Coefficient alpha for this 3-item scale was .72.<sup>2</sup>

## RESULTS

### Overview of Analyses

In the first set of analyses, path models were fit using maximum likelihood estimation. The two environmental variables (exposure and victimization) and two emotion regulation

<sup>2</sup>Hostile attribution biases with regard to interpreting the intentions of others were also measured. However, coefficient alpha for these 2 items was only .27. Because the reliability of the scale was very low, this construct was dropped from further consideration.



variables (anger control and impulsivity) predicted the full set of cognitive mediators. These cognitive mediators in turn predicted the aggressive behavior variables. We included direct paths from the environmental and emotion regulation factors to the behavioral variables. We began with a fully saturated model that included paths from each exogenous variable to each endogenous variable. As recommended by Maruyama [1998], confidence intervals (99% level) were computed for each regression path; paths with confidence intervals that did not include zero were retained in the final model.

In the second set of analyses, whenever possible, we broke the variables down into indirect and direct aggression components. The key question of interest in this set of analyses was whether cognitions about indirect aggression would more strongly predict indirect aggressive behavior, whereas cognitions about direct aggression would more strongly predict direct aggressive behavior.

Finally, we explored moderator effects by ascertaining if the same model could be fit to data from boys and girls and from urban and suburban students. Two-group models were tested in which: 1) all parameters were allowed to vary freely for each group; 2) covariance parameters were set equal across groups; and 3) regression parameters were set equal across groups. Changes in chi-square values and degrees of freedom were noted at each step to select the best model.

## Descriptive Statistics

Table I shows means and standard deviations for each of the key study constructs for boys and girls and for urban and suburban students. A series of t-tests revealed lower levels of functioning for boys compared to girls on every scale except exposure to aggression,

**Table I. Means and Standard Deviations by Gender and District**

	Girls		Boys		Urban		Suburban	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
<i>Emotion regulation</i>								
Impulsivity	2.00	.63	2.07	.69	2.06	.72	2.00	.58
Anger control <sup>a</sup>	2.26	.82	2.42	.86	2.39	.88	2.26	.78
<i>Environmental exposure</i>								
Direct victimization <sup>a</sup>	1.21	.82	1.42	.83	1.24	.86	1.37	.78
Indirect victimization	1.10	.80	1.04	.80	1.02	.83	1.13	.77
Exposure <sup>b</sup>	1.78	.65	1.78	.67	1.95	.63	1.58	.64
<i>Social-cognitions</i>								
Self-evaluation <sup>a,b</sup>	2.13	.90	2.47	.95	2.44	.98	2.12	.86
Self-efficacy <sup>a,b</sup>	2.22	.93	2.67	.99	2.53	1.00	2.29	.95
Direct retaliation approval <sup>a,b</sup>	1.79	.69	2.04	.82	2.03	.82	1.77	.67
Indirect retaliation approval <sup>a</sup>	1.56	.75	1.78	.81	1.70	.81	1.61	.75
Direct fantasy <sup>a,b</sup>	.50	.43	.84	.55	.74	.52	.56	.49
Indirect fantasy	.64	.54	.66	.58	.66	.59	.64	.52
Caring about consequences <sup>a,b</sup>	1.47	.53	1.71	.63	1.68	.62	1.46	.52
<i>Aggressive behavior</i>								
Direct aggressive behavior <sup>a,b</sup>	.70	.56	.83	.58	.90	.63	.60	.47
Indirect aggressive behavior	.72	.64	.69	.61	.72	.69	.68	.54

*Note.* *N* (boys) = 351, *N* (girls) = 420. Seven students did not report gender. *N* (urban) = 417, *N* (suburban) = 361. In all cases, higher scores indicate higher levels of the variable. a = gender difference significant at  $p < .01$ , b = district difference significant at  $p < .01$ .

impulsivity, and the three indirect aggression scales (fantasy, victimization, and behavior). The urban students reported higher levels of exposure, fantasizing about direct aggression, and direct aggressive behavior than the suburban students. The urban students also reported holding more aggressive cognitions with regard to self-evaluation, self-efficacy, direct aggression retaliation approval, and caring about consequences of aggression.

Means were compared, using paired t-tests, for those scales on which information about both direct and indirect aggression was available. Overall, students reported being victims of more direct than indirect aggression [ $t(777) = 9.0, p < .01$ ], holding more positive retaliation approval beliefs towards direct than indirect aggression [ $t(777) = 10.4, p < .01$ ], and engaging in more direct than indirect aggressive behavior [ $t(777) = 3.0, p < .01$ ].

**Whole Sample Path Model Estimation: Indirect Effects of Cognitive Mediators vs. a Direct Effects Model**

Table II shows the bivariate correlations among all of the scales included in this model. Modest to moderate zero-order correlations among variables within domains were obtained. Specifically, exposure to aggression and being victimized were correlated at  $r = .38$ ; anger control and impulsivity were correlated at  $r = .31$ ; and correlations among the social cognitive variables ranged from  $r = .50$  to  $.59$ . Because there was sufficient non-overlap among variables within a domain and because we were interested in the potentially unique roles played by the individual variables, we decided not to include latent constructs for the domains of environmental, emotional, and social cognitive factors.

The results of the best fitting model for the entire sample can be seen in Figure 1. The fit of this model was fair [ $\chi^2(11) = 40, RMSEA = .058, GFI = .99, R^2 = .51$ ]. Aggressive fantasy mediated the relation between all four background variables and aggressive behavior. Both negative self-evaluation and retaliation approval beliefs mediated the relations of exposure to aggression and anger control to aggressive behavior. In addition, both exposure to aggression and impulsivity had significant direct effects on aggressive behavior (.19, .16, respectively). Controlling for all other relations in the model, the two environmental variables (exposure and victimization) correlated with one another .18; and the two emotion regulation variables (impulsivity and anger control) correlated with one another .17.

For comparison purposes, the best fitting direct effects only model was also identified. In this model, environmental, emotion regulation, and social cognitive variables were allowed to

**Table II. Bi-Variate Correlations Among All Scales Included in the Overall Model**

Scale	1	2	3	4	5	6	7	8	9	10
1. Impulsivity	–									
2. Anger control	.31*	–								
3. Victimization	.39*	.17*	–							
4. Exposure	.37*	.32*	.38*	–						
5. Fantasy	.38*	.50*	.26*	.45*	–					
6. Self-efficacy	.21*	.41*	.05	.38*	.54*	–				
7. Self-evaluation	.19*	.39*	.04	.36*	.56*	.59*	–			
8. Retaliation app.	.23*	.40*	.09	.34*	.59*	.50*	.59*	–		
9. Care for conseq.	.18*	.46*	.02	.38*	.52*	.53*	.55*	.50*	–	
10. Aggressive beh.	.43*	.45*	.26*	.48*	.64*	.46*	.51*	.51*	.40*	–

Note. \* $p < .01$ ;  $N = 778$ .

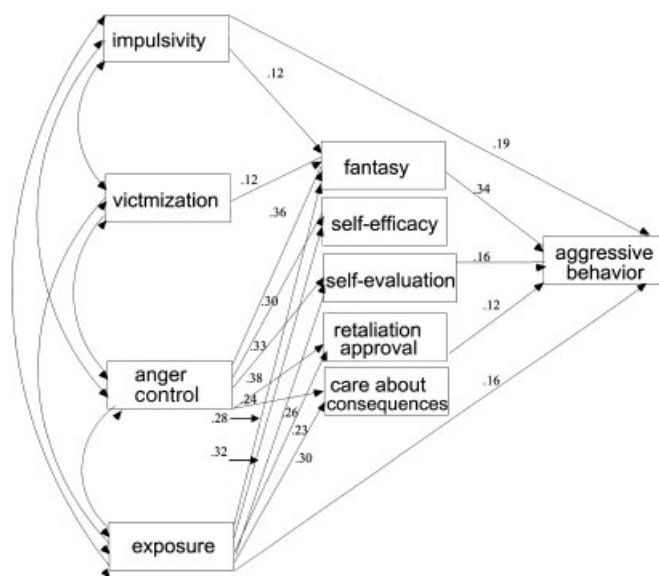


Fig. 1. Standardized loadings for direct and indirect links between environmental exposure, emotion regulation, social cognitions, and behavior for the entire sample ( $N = 778$ ). For clarity, error variances, and correlations between error variances are not shown.

predict aggressive behavior directly. All paths among environmental and emotion regulation variables and social cognitions were set equal to zero. Only significant paths were retained. The fit of this model was substantially worse than that of the previous model [ $\chi^2(24) = 533$ ,  $RMSEA = .17$ ,  $GFI = .90$ ,  $R^2 = .43$ ], with significant direct paths from exposure to aggression, impulsivity, negative self-evaluation, retaliation approval, and aggressive fantasy to aggressive behavior. This provided additional support for the partially mediated model.

### Whole Sample Path Model Estimation: Direct vs. Indirect Aggression

For this model, victimization, retaliation approval, fantasy, and aggressive behavior were decomposed into direct and indirect aggression and the path weights were estimated. Goodness of fit indices suggested that the fit of this model (Fig. 2) was better than that of the first model which did not distinguish between types of aggression ( $\chi^2(32) = 91$ ,  $RMSEA = .049$ ,  $GFI = .98$ ,  $SMC[\text{direct}] = .48$ ,  $SMC[\text{ind}] = .34$ ). In general, social cognitions about direct aggression mediated the effects of background variables on direct aggressive behavior, whereas social cognitions about indirect aggression mediated the effects of the background variables on indirect aggressive behavior. Specifically, both negative self-evaluation and retaliation approval beliefs about direct aggression mediated the relations from exposure and anger control to direct aggressive behavior. Fantasy about direct aggression mediated the relations from exposure to aggression, victimization by direct aggression, anger control, and impulsivity to direct aggressive behavior. Retaliation approval for indirect aggression mediated the relations from anger control to indirect aggressive behavior. Fantasizing about indirect aggression mediated the paths from exposure to aggression, victimization by indirect aggression, and anger control to indirect aggressive

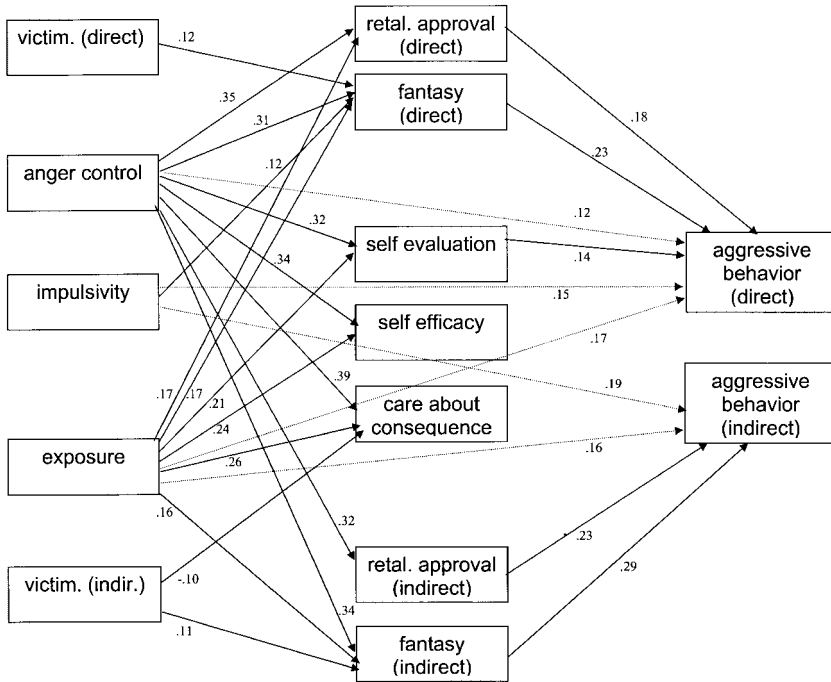


Fig. 2. Standardized loadings for direct and indirect links between environmental exposure, emotion regulation, social cognitions, and behavior for the entire sample ( $N = 778$ ) for both direct (dir.) and indirect (indir.) aggression variables. Dashed lines are direct paths, solid lines are mediated paths.

behavior. Direct aggression was predicted by exposure to aggression, anger control, and impulsivity; indirect aggression was predicted by exposure to aggression and impulsivity. Anger control did not significantly predict indirect aggression.

### Path Model Estimation by Gender

The two-group model was initially fit with a fully saturated model with all parameters (regression weights and covariances) free between boys and girls ( $\chi^2[0] = 0$ ). When the covariances among the exogenous variables and the error variables were set equal for both groups, the model fit became significantly worse [ $\Delta df/\delta \chi^2 = 32/47.6; p < .05$ ]. When the regression paths were constrained to be equal for the two groups, the fit again became significantly worse [ $\Delta df/\delta \chi^2 = 59/83.9; p < .05$ ]. Thus, the paths retained in the final model were determined for each group independently and all parameters were allowed to vary between the groups.

Several significant differences ( $p < .01$ ) in path weights between the two groups emerged (see Table III for direct effects on aggression and Table IV for mediated effects on aggression). For boys, victimization related to only one of the social cognitions (greater victimization related to more anti-aggression cognitions), whereas for girls victimization related to three of the cognitions. Also, for boys impulsivity had a direct effect on indirect aggression only, whereas for girls, impulsivity related to both indirect and direct aggression. Different social cognitions related to behavior for the two groups as well. For boys,

**Table III. Standardized Loadings for Direct Links Between Environmental Exposure, Emotion Regulation, and Behavior Variables for Boys and Girls and Urban and Suburban Students**

	Gender		Location	
	Boys	Girls	Urban	Suburban
Direct Aggression				
Impulsivity	–	.24 <sup>a</sup>	.23 <sup>a</sup>	–
Anger control	–	–	.19	–
Exposure	–	.20	–	.17
Indirect Aggression				
Impulsivity	.21	.23	.29 <sup>a</sup>	–
Anger control	–	–	–	–
Exposure	–	–	–	.21

–indicates that the standardized loading is not significantly different from zero.

<sup>a</sup>Paths are significantly different between groups ( $p < .01$ ).

**Table IV. Standardized Loadings for Mediated Links Between Environmental Exposure, Emotion Regulation, Social Cognitions, and Behavior for Boys and Girls and Urban and Suburban Students**

		Gender		Location	
		Boys	Girls	Urban	Suburban
Anger Control	→ Self-evaluation	.24	.36	.34	.33
Anger Control	→ Self-efficacy	.30	.33	.32	.37
Anger Control	→ Dir. Retal. Approval	.29	.37	.39	.31
Anger Control	→ Ind. Retal. Approval	.26	.30	.38	.23
Anger Control	→ Direct fantasy	.33	.29	.32	.35
Anger Control	→ Indirect fantasy	.29	.39	.37	.31
Anger Control	→ Caring about conseq.	.41	.34	.43	.38
Impulsivity	→ Direct fantasy	–	.15	.18	.24
Direct Victim.	→ Self-efficacy	–	–.14	–	–
Indirect Victim.	→ Self-evaluation	–	–.11	–	–
Indirect Victim.	→ Caring about conseq.	–.11	–.15	–.12	–
Exposure	→ Self-evaluation	.28	.28	.16	.17
Exposure	→ Self-efficacy	.31	.31	.20	.22
Exposure	→ Dir. Retal. Approval	.32	.14 <sup>a</sup>	.13	.14
Exposure	→ Ind. Retal. Approval	.21 <sup>a</sup>	–	–	–
Exposure	→ Direct fantasy	.30	.33	.20 <sup>a</sup>	–
Exposure	→ Indirect fantasy	.24	.19	.19	.19
Exposure	→ Care about conseq.	.32	.28	.19	.21
Self-evaluation	→ Direct Aggression	.32 <sup>a</sup>	–	–	.22 <sup>a</sup>
Self-evaluation	→ Indirect Aggression	.25 <sup>a</sup>	–	–	.16
Dir. Retal. Appr.	→ Direct Aggression	–	.28 <sup>a</sup>	.21	.21
Ind. Retal. Appr.	→ Indirect Aggression	–	.26 <sup>a</sup>	.23	.22
Direct fantasy	→ Direct Aggression	.44 <sup>a</sup>	–	.29	.25
Indirect fantasy	→ Direct Aggression	–	.22 <sup>a</sup>	–	–
Indirect fantasy	→ Indirect Aggression	.31	.35	.29	.25

<sup>a</sup>Parameters are significantly different between groups.

self-evaluation predicted both types of aggression, indirect fantasy predicted indirect aggression, and direct fantasy predicted direct aggression. For girls, indirect fantasy predicted both types of aggression, direct retaliation approval beliefs predicted direct

aggression, and indirect retaliation approval beliefs predicted indirect aggression. The total amount of variance in the two outcomes predicted for each group was about the same (boys:  $SMC[\text{direct}] = .43$ ,  $SMC[\text{indirect}] = .31$ ; girls:  $SMC[\text{direct}] = .41$ ,  $SMC[\text{indirect}] = .36$ ).

### Path Model Estimation by School District

The fully saturated two-group model was initially fit with all parameters (regression weights and covariances) free between urban and suburban students. When the covariances among the exogenous variables and the error variables were set equal for both groups, the model fit became significantly worse [ $\delta df/\delta \chi^2 = 32/71.8$ ;  $p < .05$ ]. When the regression paths were constrained to be equal for the two groups, the fit again became significantly worse [ $\delta df/\delta \chi^2 = 59/88.1$ ;  $p < .05$ ]. Thus, the paths retained in the final model were determined for each group independently and all parameters were allowed to vary between the groups.

There were fewer differences between the two school districts than between the two genders, but nevertheless some differences did emerge<sup>3</sup>. For the urban sample, there were direct effects of impulsivity on both direct and indirect aggression. For the suburban sample, exposure had a direct effect on both types of aggression, whereas these paths were not different from zero for the urban group (see Table III). Differences in mediated pathways can be seen in Table IV.

## DISCUSSION

### The Social-Cognitive Mediation of Aggression

Our results lend strong support to the mediational role of social-cognitive variables in predicting aggressive behaviors in school settings. In particular, environmental variables (especially witnessing aggression) and emotion regulation variables (especially anger control) predicted social-cognitive information-processing (SCIP) variables (children's approval of aggression for retaliation, fantasizing about aggression, and self-evaluations that they would not be upset about behaving aggressively), which in turn predicted self-reported aggressive behavior. These findings are consistent with the SCIP models proposed by Huesmann [1998] and Crick and Dodge [1994], the integration of emotion regulation variables into SCIP models as proposed by Lemerise and Arsenio [2000], and the general framework of cognitive-ecological theory [MACS Research Group, 2002].

Important differences emerged in the direct and indirect effects of specific variables on reports of aggressive behavior. Specifically, the effects of impulsivity on aggression were direct, rather than mediated through social cognitions. This suggests that the aggressive behavior of highly impulsive children may not be impacted by the children's beliefs. Victimization had few effects on aggressive behavior, either direct or indirect. Consistent with some other evidence [Roecker Phelps, 2001], children who are victimized might not respond by becoming more aggressive, but might exhibit internalizing problems. One exception to this was that victimization did relate to increased rates of aggressive fantasy, a finding that should be studied in future research.

As predicted, social cognitions about direct aggression (e.g., hitting or yelling at a peer) were stronger mediators of the relation between the predictor variables and direct aggressive

<sup>3</sup>Models were also run that tested the interaction of gender and neighborhood. However, because of small sample sizes, these models were less stable and therefore are not presented here.

behavior, whereas social cognitions about indirect aggression (e.g., spreading rumors about a peer) were stronger mediators of the relation between predictors and indirect aggressive behavior. Specifically, two social-cognitive variables were assessed using items reflective of both direct and indirect aggression: approval beliefs about aggression as retaliation and fantasizing about aggression. Both variables were significant mediators only of the type of aggression to which they uniquely referred. For example, lower levels of anger control predicted beliefs that both direct and indirect aggression were appropriate when provoked; however, retaliation approval beliefs for direct aggression were related only to direct aggression, and retaliation approval beliefs supporting indirect aggression were related only to indirect aggression. Similarly, witnessing peer aggression predicted higher levels of fantasizing about both direct and indirect aggression, but fantasizing about direct aggression predicted only direct aggression, and fantasizing about indirect aggression predicted only indirect aggression.

This set of findings is extremely important, because although a clear theoretical distinction has been drawn between direct and indirect aggression in recent literature, there is only limited empirical evidence thus far that highlights this. Some previous research has shown that direct and indirect aggression can be measured as distinct factors [e.g., Crick and Grotpeter, 1995], and might have unique relations with other variables [e.g., Delveaux and Daniels, 2000]. There is also a small amount of research showing that children think about direct and indirect aggression differently [e.g., Goldstein et al., 2002]. Our findings add to those by showing that not only do elementary school aged children experience direct and indirect aggression differently and distinguish between these two types of aggression in their social cognitions, but that their behavior in each domain is consistent with their unique ways of thinking about that type of aggression. This is in line with the information-processing underpinnings of the theory [Huesmann, 1998]. An environmental (exposure to aggression) or internal (emotional) cue activates some information and the activation spreads through related nodes. Theory would predict and these findings support that information is organized by type of aggression (direct or indirect) and retrieved accordingly. One implication is that interventions designed to change, for example, children's retaliation approval beliefs for direct aggression might not generalize to indirect forms of aggression.

### **Gender and Neighborhood/Context Differences**

Several gender differences emerged. Compared to girls, boys reported higher levels of victimization by physical and verbal aggression, lower anger control, more aggression-supporting cognitions, and more direct aggressive behavior, findings typical of the literature on sex differences in aggression [e.g., Crick and Grotpeter, 1995; Huesmann et al., 1992]. In terms of mediating effects, for both genders, fantasizing about aggression predicted aggressive behavior. But with regard to moderating effects, retaliation approval was a significant mediator for girls, whereas self-evaluations were a significant mediator for boys. Perhaps girls are more attuned to social cues and social norms, especially those that threaten their perceptions of intimacy and connectedness [Tannen, 1991]. Martin and Ruble [1997] suggested that girls perceive themselves as interdependent, whereas boys perceive themselves as independent; the authors emphasized that those differences in self-construals underlie sex differences in social behavior. Thus, beliefs about the appropriateness of aggressive retaliation might be more salient to girls. Boys, on the other hand, seem more likely to reference individual self-perceptions (e.g., being upset with themselves, being afraid of

hurting someone) in aggression-provoking situations. However, because little empirical evidence exists with regard to this finding, these notions are speculative. Replication of this provocative finding is warranted.

Regarding neighborhood differences, the urban sample reported higher levels of witnessing peer aggression at school, aggression-supporting social cognitions, and direct aggressive behavior. These findings are consistent with studies showing more delinquency among youth in disadvantaged urban communities [Garbarino, 1992; Huesmann et al., 1992]. Despite the mean differences in several variables between urban and suburban youth in our sample, there was no consistent evidence that the social-cognitive information-processing variables played different roles in these groups. It is possible that unmeasured neighborhood/socioeconomic differences that are greater within each group than between groups might moderate the relative importance of SCIP mediators. Perhaps specific characteristics of the neighborhood (e.g., informal social control practiced by neighbors; see Sampson et al., 1997) are critical variables affecting the processes involved in SCIP mediation. For example, when consistent anti-violence norms are communicated by multiple neighborhood constituents (e.g., families, schools, faith-based organizations, youth groups), retaliation approval beliefs about aggression might become a more salient mediator of aggressive behavior.

### **Limitations and Directions for Future Research and Application**

Although it is tempting to draw causal inferences from the results presented here, our data are cross-sectional and thus do not imply direction of effects. It is possible that aggressive children elicit more aggressive responses in their environment, thus engendering an aggressive cognitive style through environmental feedback. Alternatively, it is possible that aggressive behavior mediates between emotion regulation variables and social cognitions or that emotion processes act as a mediators between social cognitions and aggressive behavior. There is some empirical support for the latter model [e.g., Graham et al, 1992]. In future research, it might be possible to test an integration of these two models. For example, it might be the case that the emotional style variables included in the current study precede social cognitions, but that more situationally specific emotional reactions, arising from mood or specific cues in the situation, might then mediate the impact of social cognition on behavior. This is consistent with the model proposed by Lemerise and Arsenio [2000] in which there are numerous feedback loops between SCIP and emotion regulation variables.

Also, because only self-report data from children were included in the present study, there might be a response bias; that is, students who hold more aggressive social cognitions also might perceive higher levels of aggression in their environment and report more aggressive behavior. However, school level data [Boxer et al., 2003] suggest that there is high agreement between students' self reports, teachers' reports, and objective data on these issues. For example, in schools where students report engaging in higher levels of aggressive behavior, teachers also report higher levels of student aggression, and school records document higher rates of discipline for aggressive infractions. Furthermore, aggression might be better understood by an individual's beliefs and perceptions about the environment than by more objective measures. For example, a child might describe him/herself as a victim of aggression, and thus view retaliatory aggressive behavior as justified, whereas an outside observer might perceive this child only as aggressive without appreciating the child's sense of vulnerability.

In addition, the reliability of some of the scales used in the present study was lower than might be desirable. There are two likely reasons for this. First, the large number of constructs



included in this model necessitated short scales to measure each construct. Second, the inclusion of indirect aggression necessitated the development of a few new items. Although the reliability of the scales did not preclude the detection of important relations among the variables, future research might be conducted to increase the accuracy of measurement of these constructs.

Finally, based on the preferences of school administrators, different consent procedures were used in the two districts. Thus, it is possible that differences seen between the two districts might reflect the differences in consent procedures. However, the high return rate in the suburban district (72%) diminishes this concern somewhat. Furthermore, as noted, data collected from the teachers in each of these districts corroborated the between-district differences seen in the students' self-reports [Boxer et al., 2003].

The provocative results of this research point to applied recommendations and directions for future research. In the applied realm, this framework highlights important targets for reducing and preventing aggressive behavior. Aggression prevention and intervention programs have utilized general social-cognitive approaches for many years. However, programs typically have not addressed the broad array of SCIP variables that mediate relations between biopsychosocial risk factors and actual aggressive behavior [Boxer and Dubow, 2002]. Rather, programs often focus on one subset of SCIP processes, such as hostile biases [Hudley and Graham, 1993], retaliation approval [Guerra and Slaby, 1990], or social problem-solving skills [Lochman et al., 1993]. Practitioners who work with clinic-referred aggressive youth might benefit from a more complete understanding of SCIP factors that mediate the effects of background variables such as environmental and emotion regulation factors on aggression [e.g., Gomez et al., 2001]. The current research also highlights the need to present SCIP interventions in the context of both direct and indirect aggression, and to take into account demographic variables (e.g., gender, neighborhood context) likely to moderate the mechanisms involved in aggressive behavior. Future research might replicate this approach with attention to the distinction between proactive (i.e., emitted for instrumental gain) and reactive (i.e., emitted as emotional response) aggression as it has been hypothesized that different social cognitive patterns might underlie these two types of aggression [Crick and Dodge, 1996; Dodge, 1991]. It will also be important for future research to measure more adequately hostile attribution biases and examine the role of this important construct as a mediator between background variables and aggressive behavior [see Orobio de Castro et al., 2002 for recommendations regarding assessment techniques]. Our results also underscore the need for and importance of longitudinal research to examine the mediational role of SCIP factors between background variables and aggressive behavior. A recent study by Dodge et al. [2003] found support for a longitudinal model in which Year 4 social cognitions partially mediated the relation between Year 1 social rejection and Year 5 aggressive behavior. These findings underscore the promise of the mediational model in understanding the role of social cognitions in aggressive behavior. Finally, an important future direction will be to examine possible interactions between gender and neighborhood type to explore if, for example, urban girls and rural girls show similar patterns of relations among these variables.

The findings of this study suggest that taking an integrative approach to understanding aggression is extremely beneficial. By simultaneously considering multiple factors and exploring the ways in which these factors operate together to contribute to aggressive behavior patterns, we can achieve a much better understanding of aggressive behavior and more successfully intervene to diminish it.

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