

---

## Contextual social–cognitive mediators and child outcome: A test of the theoretical model in the Coping Power program

---

JOHN E. LOCHMAN<sup>a</sup> AND KAREN C. WELLS<sup>b</sup>

<sup>a</sup>University of Alabama; <sup>b</sup>Duke University Medical Center

### Abstract

This study tests the contextual social–cognitive model, which has served as the basis for the Coping Power program, an indicated preventive intervention with at-risk preadolescent boys at the time of transition from elementary to middle school. The contextual social–cognitive model assumes that aggressive children have distortions in their social–cognitive appraisals and deficiencies in their social problem solving skills and that their parents have deficiencies in their parenting behaviors. To test this model, boys were identified as being at risk on the basis of fourth grade and fifth grade teachers' ratings of children's aggressive and disruptive behaviors, and interventions were delivered at the end of elementary school and the beginning of middle school. The intervention effect on delinquency, substance use, and school behavior outcomes was at least partially mediated through intervention-produced changes in child and parent variables that were targets for the intervention. These analyses provided unique support for the assumptions in the contextual social–cognitive model that changes in these mediating processes, even among high-risk boys, can have a meaningful impact on later negative outcomes.

Prevention research is obviously important for testing the ability of interventions to prevent specified negative outcomes, but an additional, often neglected, role of prevention research is to provide tests of the theory that provides the basis for the intervention (Cicchetti & Toth, 1992; Koretz, 1991). Prevention research has a unique capacity to test causal mechanisms derived from basic research (Koretz, 1991) and, in particular, to examine the malleability of components of the developmental model used to create the intervention (Kellam & Rebeck, 1992). Mediating processes within the developmental model

can be tested, with the mediating process serving as the proximal target of the intervention and the distal target being the later negative outcome, such as drug use or delinquency (Kellam and Rebeck, 1992; Koretz, 1991).

This article describes mediational processes, and especially change in mediational processes, that can reduce participants' risk for later antisocial behavior. The role of children's aggressive behavior as a risk marker and a contextual social–cognitive model for the development and maintenance of children's aggressive behavior will be discussed. This contextual social–cognitive model (Lochman & Wells, 1996, 2002) serves as the basis for the Coping Power program, and the conceptual model will be evaluated at a 1-year follow-up assessment.

---

The completion of this study was supported by a grant from the National Institute for Drug Abuse. Additional support was provided by grants from the Center for Substance Abuse Prevention, the U.S. Department of Justice, and the Centers for Disease Control and Prevention.

Address correspondence and reprint requests to: John E. Lochman, PhD, Department of Psychology, Box 870348, University of Alabama, Tuscaloosa, AL 35487; E-mail: jlochman@gp.as.ua.edu.

### Childhood Aggression as a Risk Marker

Children's aggressive behavior has emerged as a central focus in prevention research, as well as in treatment services and research

(Lochman, Dane, Magee, Ellis, Pardini, & Clanton, 2001; Lochman & Wells, 1996). Childhood aggression has been conceptualized as a risk marker on the developmental trajectories leading to a variety of negative adolescent outcomes such as delinquency, substance use, and conduct problems in school and community settings (Hinshaw, Lahey, & Hart, 1993; Loeber, 1990). Aggressive children have been found to be at risk for subsequent delinquent and criminal behavior and poor school adjustment (Stattin & Magnusson, 1989; Tremblay, Masse, Perron, Leblanc, Schwartzman, & Ledingham, 1992). Coie, Lochman, Terry, and Hyman (1992) have found that aggressive behavior in third grade predicts self- and parent-reported externalizing behavior and teacher-rated school maladjustment in middle school, and these predictive effects of elementary school aggression persisted through the high school years (Coie, Terry, Lenox, Lochman, & Hyman, 1995). Children's aggressive behavior in elementary school has predicted their delinquent behavior against others and their substance use in the high school years (Lochman & Wayland, 1994). The timing of the initiation of aggressive behavior problems in children affects outcomes, and youth who engage in the most persistent, severe, and violent antisocial behavior are most likely to initiate their delinquent behavior in childhood rather than adolescence (Lahey et al. 1998; Moffit, 1993).

### **Contextual Social-Cognitive Model of Processes Leading to Adolescent Antisocial Behavior**

Adolescent antisocial behaviors, such as substance abuse and delinquency, can be conceptualized in a developmental framework to be the result of a set of familial and personal factors (Patterson, Reid, & Dishion, 1992), with children's aggressive behavior often being part of that developmental course (Lochman & Wells, in press). This developmental course is set within the child's social ecology, and an ecological framework is needed to guide preventive efforts (Conduct Problems Prevention Research Group, 1992; Tolman, Gorman-Smith, Huesmann, & Zelli, 1997). Al-

though the trajectory toward delinquency, substance abuse, and school problems may extend back to innate characteristics such as temperament, (i.e., Tarter, Alterman, & Edwards, 1985) and to broad contextual factors such as violence and drug activity within neighborhoods, the focus here will be on malleable, formative, and proximal factors in the child's social and psychological development and immediate family context that relate to child aggression and problem behaviors and later delinquency and substance abuse.

Loeber (1990) theorizes that poor parenting practices contribute to children's aggression, and as aggressive behavior patterns become entrenched, later sequelae on the trajectory to substance abuse and conduct disorder occur. In early to middle childhood, increasingly oppositional children can experience highly negative reactions from teachers and rejection from peers, and they develop impaired social-cognitive processes. Children's academic progress and their social bond to school weakens, and by early adolescence they become more susceptible to deviant peer group influences. By adolescence, this trajectory results in a heightened risk of substance use, delinquent acts, and school failure (Loeber, 1990). Thus, two relevant sets of potential mediators of adolescent delinquency and substance abuse include child level factors including their lack of social competence and poor social-cognitive skills, and parent level contextual factors including poor caregiver involvement and discipline with the child. The contextual social-cognitive model tested in this paper assumes that changes in these child- and parent-level variables can impact the children's subsequent important outcomes during adolescence.

#### *Children's social-cognitive processes*

The social-cognitive model serving as the conceptual framework for the child component of the Coping Power program began as a model of anger arousal (Lochman, Nelson, & Sims, 1981), which was primarily derived from Novaco's (1978) work with aggressive adults (Larson & Lochman, in press; Lochman, Magee, & Pardini, in press). In this con-

ceptualization of anger arousal, which stressed sequential cognitive processing, the child responds to problems such as interpersonal conflicts or frustrations with environmental obstacles (i.e., difficult schoolwork). However, it was not the stimulus event itself that provoked the child's anger and response, but rather the child's cognitive processing of and about that event. This first stage of cognitive processing (appraisal) was similar to Lazarus' (Smith & Lazarus, 1990) primary appraisal stage, consisting of labeling, attributions, and perceptions of the problem event plus the child's subsequent anger. The second stage of processing (problem solution) was similar to Lazarus' (Smith & Lazarus, 1990) secondary appraisal, consisting of the child's cognitive plan for his or her response to the perceived threat or provocation. The anger arousal model indicated that the child's cognitive and emotional processing of the problem event and of his or her planned response led to the child's actual behavioral response (ranging from aggression to assertion, passive acceptance, or withdrawal) and to the positive or negative consequences that the child experienced as a result.

The current social-cognitive model of children's aggression (Lochman, Whidby, & FitzGerald, 2000) underlying the child component of the Coping Power program evolved in large part because of research on aggressive children's social information processing (Crick & Dodge, 1994). Aggressive children have cognitive distortions at the appraisal stage of social-cognitive processing because of difficulties in encoding incoming social information and in accurately interpreting social events and others' intentions. They also have cognitive deficiencies at the problem solution stage of social-cognitive processing, generating maladaptive solutions for perceived problems and having nonnormative expectations for the usefulness of aggressive and nonaggressive solutions to their social problems.

At the appraisal stage of processing, aggressive children have been found to recall fewer relevant cues about events (Lochman & Dodge, 1994), base interpretations of events on fewer cues (Dodge et al., 1986), selectively attend to hostile rather than neutral cues

(Gouze, 1987; Milich & Dodge, 1984), and recall the most recent cues in a sequence with selective inattention to cues presented earlier (Milich & Dodge, 1984). Aggressive children have been shown to have a hostile attributional bias, because they tend to excessively infer that others are acting toward them in a provocative and hostile manner (Katsurada & Sugawara, 1998; Lochman & Dodge, 1994). Lochman and Dodge (1998) found that aggressive boys have underperceptions of their own aggressive behavior, as well as distorted overperceptions of other's aggression. As a result, aggressive boys develop attributions that their peers have relative responsibility for conflict rather than assuming responsibility themselves. Hostile attributional biases tend to be more prominent in reactively aggressive children than in proactively aggressive children (Dodge, Lochman, Harnish, Bates, & Pettit, 1997).

At the problem solution stage of social-cognitive processing, aggressive children offer fewer competent verbal problem solutions (Dunn, Lochman, & Colder, 1997), including verbal assertion and compromise solutions (Joffe, Dobson, Fine, Marriage, & Haley, 1990; Lochman & Dodge, 1994; Lochman & Lampron, 1986), and more aggressive and direct action solutions (Lochman & Lampron, 1986; Pepler, Craig, & Roberts, 1998; Waas & French, 1989) to hypothetical vignettes describing interpersonal conflicts. Aggressive children cognitively generate more aggressive strategies in part because they expect that aggressive behavior will lead to desired outcomes (Lochman & Dodge, 1994; Perry, Perry, & Rasmussen, 1986). These deviant outcome expectations for aggressive behavior have been found to be more associated with proactive than reactive aggressive behavior (Dodge et al., 1997). Beliefs about the acceptability of aggressive behavior have been found to lead to deviant processing of social cues, which in turn then lead to children's aggressive behavior (Zelli, Dodge, Lochman, Laird, & Conduct Problems Prevention Research Group, 1999), indicating that these information processing steps may have recursive, rather than strictly linear, effects on each other.

Schemas have been proposed to have a significant impact on the information processing steps within the social cognition model underlying cognitive-behavioral interventions with aggressive children (Lochman et al., 2000, in press; Lochman, White, & Wayland, 1991), consistent with the proposed role for schemas within social information-processing models (Crick & Dodge, 1994). Schemas account for how organisms actively construct their perceptions and experiences, rather than merely being passive receivers and processors of social information (Ingram & Kendall, 1986). Schemas have been defined in somewhat different ways by various theoreticians and researchers, but they are commonly regarded as consistent, core beliefs and patterns of thinking (Lochman & Lenhart, 1995) and can include individuals' generalized expectations about themselves and others. These underlying cognitive structures can form the basis for individuals' specific perceptions of current events (De Rubeis & Beck, 1988). Lochman and Dodge (1998) found that aggressive boys' perceptions of their own aggressive behavior was primarily affected by their prior expectations, whereas nonaggressive boys relied more on their actual behavior to form their perceptions. These results indicate that the schemas of aggressive boys about their aggressive behavior are strong and compelling, leading them to display cognitive rigidity between their expectations and perceptions. The aggressive boys' perceptions of their behavior, driven by their schemas, were relatively impermeable to actual behavior and instead were heavily governed by the boys' preconceptions.

Two types of generalized expectancies, or schemas, that may be critical for children with problem behaviors involve their expectations about their own abilities to successfully resolve problematic situations, indicating their degree of internal locus of control, and their general expectancies for others. Internal locus of control indicates the children's generalized expectation that they have control over their environment as they try to successfully attain valued outcomes (Rotter, 1966), and children with expectations for resolving events more on the basis of internal and than external fac-

tors can have fewer negative effects from traumatic experiences and improved behavioral functioning over time (Seifer, Sameroff, Baldwin, & Baldwin, 1992; Weigel, Wertlieb, & Feldstein, 1989). Person perception involves the internal representations and expectations, or schema, that children form of others (Lenhart & Rabiner, 1995). These generalized impressions of others, including parents and peers, are formed from prior experiences and then come to guide conduct problem children's processing of social information and their social behavior (Matthys, Walterbos, Nijo, & van Engeland, 1989).

#### *Contextual parenting behaviors*

As articulated by Patterson et al. (1992), child aggressive behavior arises most fundamentally out of early contextual experiences with parents who provide harsh or irritable discipline, poor problem solving, vague commands, and poor monitoring of children's behavior. In an extensive review of the risk factors for adolescent antisocial behavior, Hawkins, Catalano, and Miller (1992) identified several parental risk factors that are also directly linked to childhood aggression, including deficient family management practices involving lack of maternal involvement, and inconsistent parenting, (e.g., Kandel & Andrews, 1987). Inconsistency in parental discipline has been linked to child aggression (Kazdin, 1995; Wells, 1995), and irritable, ineffective discipline has been found in families with children displaying overt (oppositional behavior, arguing, and physical aggression) and covert (stealing, lying and truancy) antisocial behavior (Patterson & Stouthamer-Loeber, 1984). Capaldi and Patterson (1991) have found that low parental involvement with children predicted poor adjustment for boys 2 years later. The available evidence suggests that family and parent factors exert a direct effect on adolescent substance abuse and delinquency (Bry, Catalano, Kumpfer, Lochman, & Szapocznik, 1999); in addition, these family factors exert an indirect effect via their association with child aggression and antisocial behaviors, poor social competence, and academic failure (Santisteban, Szapocz-

nik, & Kurtines, 1994). Poor parenting and children's aggressive behavior is bidirectional, with poor parenting both stimulating children's negative behavior and deteriorating in response to increasing negative child behaviors, especially by parents becoming less positively involved and more inconsistent with their children (Kandel & Wu, 1995).

#### *Summary of the state of evidence for the contextual social-cognitive model*

The contextual social-cognitive model is based on three assumptions: (a) children's aggressive behavior is a risk factor for later negative adolescent outcomes, (b) the child and parent processes articulated in the contextual social-cognitive model are related to the children's aggressive behavior, and (c) changes in the contextual social-cognitive processes can impact the later adolescent outcomes. As reviewed here, substantial evidence exists to support the first two of these assumptions. However, it is not clear from existing research that the third assumption is necessarily correct. The current analyses of an intervention, which serves as an experimental manipulation of these child and parent processes, will provide a direct test of this latter portion of the developmental model.

#### **Preventive Interventions with Aggressive Children**

Because childhood aggressive behavior is a risk predictor for later adolescent antisocial behavior and the contextual social-cognitive model addresses processes associated with children's aggressive behavior, preventive interventions can be usefully targeted at the social-cognitive and parenting processes in the model. Using the contextual social-cognitive model described earlier as a conceptual framework for identifying intervention objectives, the Coping Power program (Lochman & Wells, 1996) was developed as a multicomponent preventive intervention for aggressive children. The Coping Power program's child component was derived from the earlier empirically supported Anger Coping program (Lochman, 1992; Lochman et al., 1984). In

one study, the Coping Power program produced lower rates of youth-reported substance use, reductions in proactive aggression, improved social competence, and greater teacher-rated behavioral improvement at the end of intervention, in comparison to children who had not received Coping Power (Lochman & Wells, in press). In a second Coping Power study, which was conducted with aggressive boys, the intervention has produced lower levels of self-reported delinquent behavior, lower levels of parent-reported substance use, and higher levels of teacher-reported behavioral improvement at school at a 1-year follow-up, in comparison to a control condition (Lochman & Wells, 2002). In addition, at the end of intervention, the Coping Power intervention had tended to produce improvements in boys' angry attributions, in boys' expectations that aggressive behavior would produce good outcomes for them, and in the consistency of parents' discipline. It also produced significant improvements in boys' internal locus of control and in their person perception abilities (Lochman & Wells, 2002).

However, it is not clear if intervention effects on outcomes evident in the latter study would be mediated through intervention-produced changes in conceptually relevant mediator variables that were the target of the intervention. The intervention produced changes in theoretically relevant variables that were expected to mediate outcomes and produced changes in key outcome variables at the 1-year follow-up, but these analyses did not confirm whether the changes in presumed mediator variables influenced the outcomes. The developmental model to be tested in this paper assumes that changes in these contextual social-cognitive processes will have direct impact on adolescents' later adjustment. The current paper, using the sample from the second Coping Power study, is designed to address these issues, and to use the prevention trial to test the contextual social-cognitive theory (Koretz, 1991).

#### **Hypothesis**

It is hypothesized that changes in variables derived from the contextual social-cognitive

model, including measures of boys' social-cognitive processes (hostile attributions, outcome expectations for aggression) and schema (internal control, person perception) and measures of parenting practices (inconsistent discipline, parental involvement), will influence the delinquency, parent-rated substance use, and school behavior outcomes 1 year later.

## Method

### *Procedure*

Screening and Time 1 baseline assessment were conducted in the winter of the academic year with two annual cohorts of fourth and fifth grade boys. Intervention began in the spring of that academic year and continued throughout the following academic year, when boys were in either fifth or sixth grade. Intervention thus covered a 15-month period of time. Time 2 postintervention assessments were collected in the summer following the intervention, and Time 3 1-year follow-up assessments were collected in the subsequent summer (when boys had completed either the sixth or seventh grade). Assessment measures were collected from parents either in their home or in our research offices, depending on their preference. Boys' Time 1 measures were collected in their school settings, and the subsequent assessments were conducted at home or in the research offices. Dependent measures were individually administered to primary caretakers and boys by research assistants who were uninformed about the boys' intervention status. Dependent measures were collected from the adults identified as the primary caretaker during the past 6 months (usually the mother, but could be the father, grandparent, other relative, or foster parent).

### *Participants*

*Sample selection.* Boys were selected for potential involvement in this study on the basis of their teacher screen scores. Using a multiple-gating approach (Lochman & Conduct Problems Prevention Research Group, 1995), boys were retained in the high-risk pool if

they surpassed cutoffs on subsequent, more detailed behavioral measures rated by teachers (Aggression subscale from the Teacher Report Form, Achenbach, 1991; completed by 84 fourth and fifth grade teachers in 11 elementary schools for Cohort 1 and by 86 fourth and fifth grade teachers in 12 elementary schools for Cohort 2) and by parents (Aggression subscale of the Child Behavior Checklist; Achenbach, 1991). Screening took place in regular classrooms, not special education classrooms. Further details of the screening process are in Lochman and Wells (2002).

The sample of 183 boys were in the top 22% of boys in teachers' ratings of children's aggressive and disruptive behaviors. There were no significant differences in ethnicity, grade level, teachers' estimates of cognitive ability, or screen score for those children and families who consented to participate (59% of those approached) and those who did not. The 183 boys with consent across the two cohorts were randomly assigned to the child intervention only condition ( $n = 60$ ), the child plus parent intervention condition ( $n = 60$ ), or the control condition ( $n = 63$ ). The children in the control condition received services as usual within their schools. The current analyses will examine the two intervention cells combined together ( $n = 120$ ) in comparison to the control condition. The intervention and control conditions were equivalent at the time of screening on boys' screening score, teachers' cognitive ability estimates, ethnic status (38% Caucasian, 61% African American, 1% other), and grade level (55% fourth grade, 45% fifth grade). Attrition analyses indicate that the sample available for the analyses by Time 3 is representative of the original sample at baseline in terms of the boys' aggression and cognitive abilities, but the followed up sample tended to have a higher rate of minority participants than did those participants who were not available for the follow-up (Lochman & Wells, 2002).

### *Intervention Implementation*

Attendance rates at child group sessions was 83%, and attendance at parent groups was

49%. Implementation measures indicated that intervention staff scheduled 1.4 individual meetings per month with target children to reinforce and support their goal setting efforts and use of intervention procedures. These individual meetings continued for boys who moved during intervention from a school that had groups to a school without groups. For boys who began intervention at the end of fifth grade, the groups they attended were reconstituted in sixth grade due to boys' moves from elementary schools to various middle schools. The Coping Power intervention has two components (parent focus and child focus) that are described in detail elsewhere (Lochman & Wells, 2002; Lochman, Wells, & Murray, in press), as are the methods for monitoring intervention integrity (Lochman & Wells, 2002). The Coping Power child component and the Coping Power parent component interventions are described briefly below.

*Child component.* The child component was a 1.25 year program (Lochman, Lenhart, & Wells, 1996), and the intervention was provided to boys in their school setting during the school day. There were 33 weekly group sessions, and 8 intervention sessions occurred in the first intervention year and 25 in the second intervention year. Group sessions lasted for 40–60 min per session. The group sessions included four to six boys and were led by a grant-funded staff school-family program specialist (with a master's or doctoral degree in psychology or social work) and a school guidance counselor.

The Coping Power child component was primarily derived from a previously evaluated 18 session Anger Coping program (Lochman, 1992; Lochman, FitzGerald, & Whidby, 1999; Lochman, Lampron, Gemmer, & Harris, 1987). The Coping Power child component sessions include a focus on behavioral and personal goal setting, awareness of feelings and associated physiological arousal, use of coping self-statements, distraction techniques and relaxation methods to use when provoked and made angry, organizational and study skills, perspective taking and attribution retraining, social problem solving skills, and dealing with peer pressure and neighborhood-

based problems by using refusal skills. Although the intervention is largely focused on coping with peer-related problems, some sessions directly deal with perspective taking and problem solving with teachers and parents.

*Parent component.* The Coping Power parent intervention (Wells, Lenhart, & Lochman, 1996) consisted of 16 sessions, over the same 15-month intervention period. The parent component intervention was delivered in groups of four to six single parents and/or couples. Groups were led by two grant staff persons (typically one paid staff and one graduate student).

The content of the Coping Power parent component was derived from social learning theory based parent training programs developed and evaluated by prominent clinical researchers in the field of child aggression (Forehand & McMahon, 1981; Patterson, Reid, Jones, & Conger, 1975) with adaptations for the special needs and requirements of this population. Over the 16 sessions, parents learned skills for (a) identifying prosocial and disruptive behavioral targets in their children using specific operational terms, (b) rewarding appropriate child behaviors, (c) giving effective instructions and establishing age-appropriate rules and expectations for their children in the home, (d) applying effective consequences to negative child behavior, (e) managing child behavior outside the home, and (f) establishing ongoing family communication structures in the home (such as weekly family meetings). A final section of the Coping Power parent component includes two sessions on stress management for parents.

#### *Assessment measures*

We assessed three Time 3 outcome measures and five Time 2 targeted intervention change variables that could serve as variables mediating intervention-outcome relations. The Time 3 outcome measurement was multisource, with one completed by parents (boys' substance use), one by teachers (school behavior improvement), and one by children's self-report (delinquency). The potential mediating

variables were assessed at both Time 1 and Time 2.

*Outcome measures.* Delinquency is assessed by boys' self-reports of their delinquent behavior, using the National Youth Survey (Elliott, Huizinga, & Ageton, 1985). The delinquency section of the survey includes 40 offenses representative of the full range of offenses in the Uniform Crime Reports, and participants indicate they number of times they have performed each of the behaviors in the past year. These offenses are clustered into seven types of delinquency: minor assault, felony assault, robbery, minor theft, felony theft, fraud, and destruction of property. Because a few participants report high rates of some of these behaviors, creating skewed distributions, each of these seven clusters was recoded as a binary variable (as either having occurred or not in the past year), and then the seven binary variables were summed to create an overall delinquency score. Adequate construct validity for self-reported delinquency has been found (Elliott & Huizinga, 1983; Elliott et al., 1985; Lochman & Wayland, 1994).

Parents' reports of youth substance use were assessed with four items indicating the frequency and amount of alcohol and marijuana use that youth displayed in the past year. Because the frequency (six levels of frequency from *never* to *4–7 times per week*) and amount (five levels of amount from *none* to *large*) responses were on different scales, standardized scores were computed for each of the items and then summed to create a parent-reported substance use score.

Teachers rated children's behavioral improvement at school during the follow-up year (Conduct Problems Prevention Research Group, 1999). This Time 3 measure was the mean of two items indicating children's improvement in behavioral problems and in problem solving and anger management, using a 0–6 rating scale (from *has gotten worse* to *great improvement*). The teachers who completed these improvement ratings covering the follow-up year did not know to which condition boys had been assigned, and thus were blind raters.

*Targeted intervention change measures.* There were two measures of boys' social cognitive processes. The attributional measure, adapted from the Lochman and Dodge (1994) attribution measure, assessed children's attributions and anger to two vignettes of peer provocations. The internal consistency of the scale is relatively modest, with alphas of .5 for the attribution response and .6 for the anger response, using the current sample. The 1-year test–retest reliability in our previous use of this measure has been significant but modest for the attributional bias score (.3–.4) and the anger score (.2–.4). The attribution and anger scores were summed to create an angry attribution variable for the current analyses. Attributional biases assessed with vignette measures have demonstrated construct validity (Dodge et al., 1997; Lochman & Dodge, 1994) in discriminating aggressive from non-aggressive children. The Outcome Expectation Questionnaire included six brief vignettes (Perry et al., 1986) in which subjects are asked to indicate their expectation that aggressive behavior will lead to tangible rewards. High scores indicate more antisocial expectations. The subscale assessing children's expectations that aggression will lead to tangible rewards has demonstrated construct validity and was used in this study. In our current research, this subscale has displayed modest internal consistency ( $\alpha = .4$ –.6 at baseline). Adequate and significant test–retest reliability across 1-year intervals was obtained in our prior research (.46–.61).

Two measures assessed boys' schematic beliefs. The Multidimensional Locus of Control scale (Connell, 1985) assesses boys' self-reports of their locus on control, using 1–4 response formats. The scale has demonstrated validity by indicating children's risk for problem behaviors in longitudinal research (Seifer et al., 1992). For this study, the two subscales assessing boys' internal and external locus of control in successfully attaining positive outcomes were used. The external locus of control subscale was reverse-scored and the two subscales were summed, with a higher score indicating greater internality. The internal consistency for the internal success subscale



was .9 and for the external success scale was .6, indicating adequate internal consistency for these constructs. Person perception was assessed with an adaptation of the Object Representation Inventory (Blatt, Chevron, Quinlan & Wein, 1981). Boys responded to questions to describe their mother, their father, and their best friend; for the purposes of this study, the mean of these three items was calculated. The measure evaluates the boys' complexity, integration and diversity of their descriptions of others, and ability to separate their perceptions of others from their perception of self (Blatt et al., 1981). The 9-point coding for each response is based on a hierarchical and developmental approach to the internal representation of significant others. Earlier developmental stages reflect an ego-centric view of others in terms of their abilities to satisfy or frustrate the self. Later developmental stages of internal representation involve viewing others in complex and multifaceted ways, with the self being differentiated or individuated from the parents. Rating levels range from descriptions of the concrete physical attributes of the other person, unidimensional descriptions of the others' external or internal characteristics, to descriptions of others that are more multidimensional and that integrate aspects of the other persons' complex feelings and activities. Findings that the person's perception level assessed with this measure significantly relate to adolescents' social competence and social problem-solving skills (Lenhart & Rabiner, 1995) and to preadolescent children's aggressive behavior (Williams, 1990) support the validity of this measure. The Cronbach alpha for the person perception variable at baseline was .7, indicating adequate internal consistency.

Parenting processes were assessed with the Alabama Parenting Questionnaire (APQ; Shelton, Frick, & Wootton, 1996). The APQ provided subscales assessing inconsistent discipline and maternal involvement for this study. The measure has displayed adequate construct validity in prior research (Colder, Lochman, & Wells, 1997; Shelton et al., 1996; Wootton, Frick, Shelton, & Silverthorn, 1997). For this study, children completed the

Inconsistent Discipline subscale on the APQ using a 5-point scale for each item. The scale has displayed generally adequate internal consistency in the current sample ( $\alpha = .6$ ), and 1-year test-retest reliability in prior longitudinal assessments has been adequate (.57-.64; Lochman & Wells, in press).

## Results

### *Mediation of the intervention effects on the outcome variables*

Path analyses were performed to test the hypothesis that the intervention effects on Time 3 outcomes would be mediated through changes from Time 1 to Time 2 in the targeted intervention change variables. All analyses were conducted with the SAS System's CALIS procedure. These analyses used the maximum likelihood method of parameter estimation, and all analyses were performed on the variance-covariance matrix. The models examined the relationships between the exogenous variables (intervention, ethnic status, grade, screen status, T1 attributions, T1 outcome expectations, T1 internal locus of control, T1 person perception, and T1 parental inconsistency) and the endogenous variables (T2 attributions, T2 outcome expectations, T2 internal locus of control, T2 person perception, T2 parental inconsistency, and T3 outcomes). All variables were manifest variables.

*Delinquency outcome.* Goodness of fit indices for the various models for the delinquency outcome are presented in Table 1. The chi-square statistic included in this table provides a test of the null hypothesis that the reproduced covariance matrix has the specified model structure, and thus fits the data. A non-significant chi-square is an indicator of a good-fitting model. Table 2 also provides two additional goodness of fit indices useful for estimating model fit in small samples (Bentler, 1989; Hatcher, 1994): the Non-Normed Fit Index (NNFI; Bentler & Bonett, 1980), and the Comparative Fit Index (CFI; Bentler, 1989). The CFI may range in value from 0 to 1, with 1 representing the goodness of fit

**Table 1.** Goodness of fit indices for the base intervention effects model and the mediation model for the delinquency outcome

Model	$\chi^2$	df	p	CFI	NNFI
Null model	188.07	105	.001	—	—
Base model	51.53	51	.453	0.994	0.987
Mediation model	42.41	46	.623	1.000	1.099

Note:  $N = 116$ ; CFI, Comparative Fit Index (Bentler, 1989); NNFI, Non-Normed Fit Index (Bentler & Bonnett, 1980).

**Table 2.** Goodness of fit indices for the base intervention effects model and the mediation model for the parent-rated substance use outcome

Model	$\chi^2$	df	p	CFI	NNFI
Null model	180.78	105	.001	—	—
Base model	44.81	51	.717	0.958	1.168
Mediation model	40.02	46	.720	1.000	1.180

Note:  $N = 109$ ; CFI, Comparative Fit Index (Bentler, 1989); NNFI, Non-Normed Fit Index (Bentler & Bonnett, 1980).

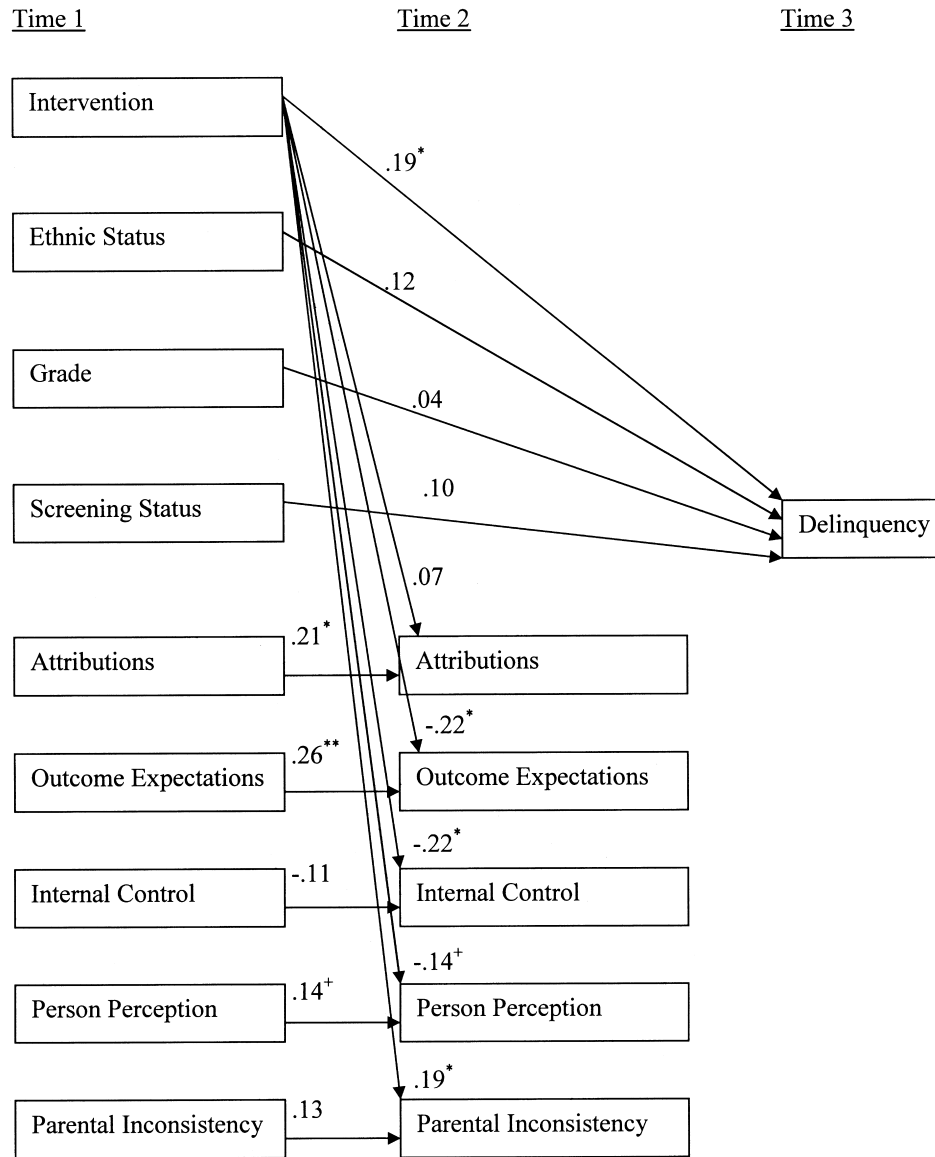
associated with a saturated model (a model of 0 *df* that perfectly reproduces the original covariance matrix). The NNFI may assume values below zero and above one. Values on the NNFI and CFI over .9 indicate an acceptable fit between model and data.

The null model in Table 1 predicts no relationships between any of the variables, and all paths and covariances have been deleted. In small samples, the null model is useful because it may indicate that the null, uncorrelated model may fit the data as well as the theoretical model, thus giving the theoretical model little support (Hatcher, 1994). In Table 2, it is evident that the null model provides a poorer fit than either of the next two models ( $\Delta\chi^2 = 136.54$ ,  $df = 54$ ,  $p < .001$  for the base model;  $\Delta\chi^2 = 145.66$ ,  $df = 59$ ,  $p < .001$  for the mediation model).

The base model in Table 1 refers to the model in which Intervention is hypothesized to have direct effects on the Time 3 delinquency outcome and the Time 2 targeted intervention change variables. Paths between

the exogenous control variables (ethnic status, grade, screen status) and the delinquency outcome variable and between the Time 1 and Time 2 versions of each of the targeted intervention change variables (attribution, outcome expectation, internal locus of control, person perception, parental inconsistency) were included in this base model. In addition, paths were included in the planned base model when the exogenous control variables had significant or trend correlations with Time 2–Time 1 change scores. These correlations indicated that grade was correlated with the attribution change score,  $r(139) = .22$ ,  $p = .01$ ; the outcome expectations change score,  $r(139) = -.13$ ,  $p = .12$ ; the internal locus of control change score,  $r(139) = .33$ ,  $p < .0001$ , and the person perception change score;  $r(139) = -.21$ ,  $p = .01$ ; thus, paths from grade to these four Time 2 variables were included. Table 1 indicates that the base model fits the data well; it has a nonsignificant chi square and CFI and NNFI above .90. The results of this analysis are presented in Figure 1. Consistent with the prior analysis of covariance results, intervention produced significant reductions in the delinquency outcome; had significant effects on outcome expectations, internal locus of control, and parental inconsistency; and tended to improve person perceptions. Covariances were estimated between each pair of exogenous variables, variances were estimated for each of the endogenous variables, and paths were included from grade to the four targeted intervention change variables noted previously (attributions, outcome expectations, internal control, person perception), but for ease of presentation, these paths are not included in Figure 1 or in the figures for the following models.

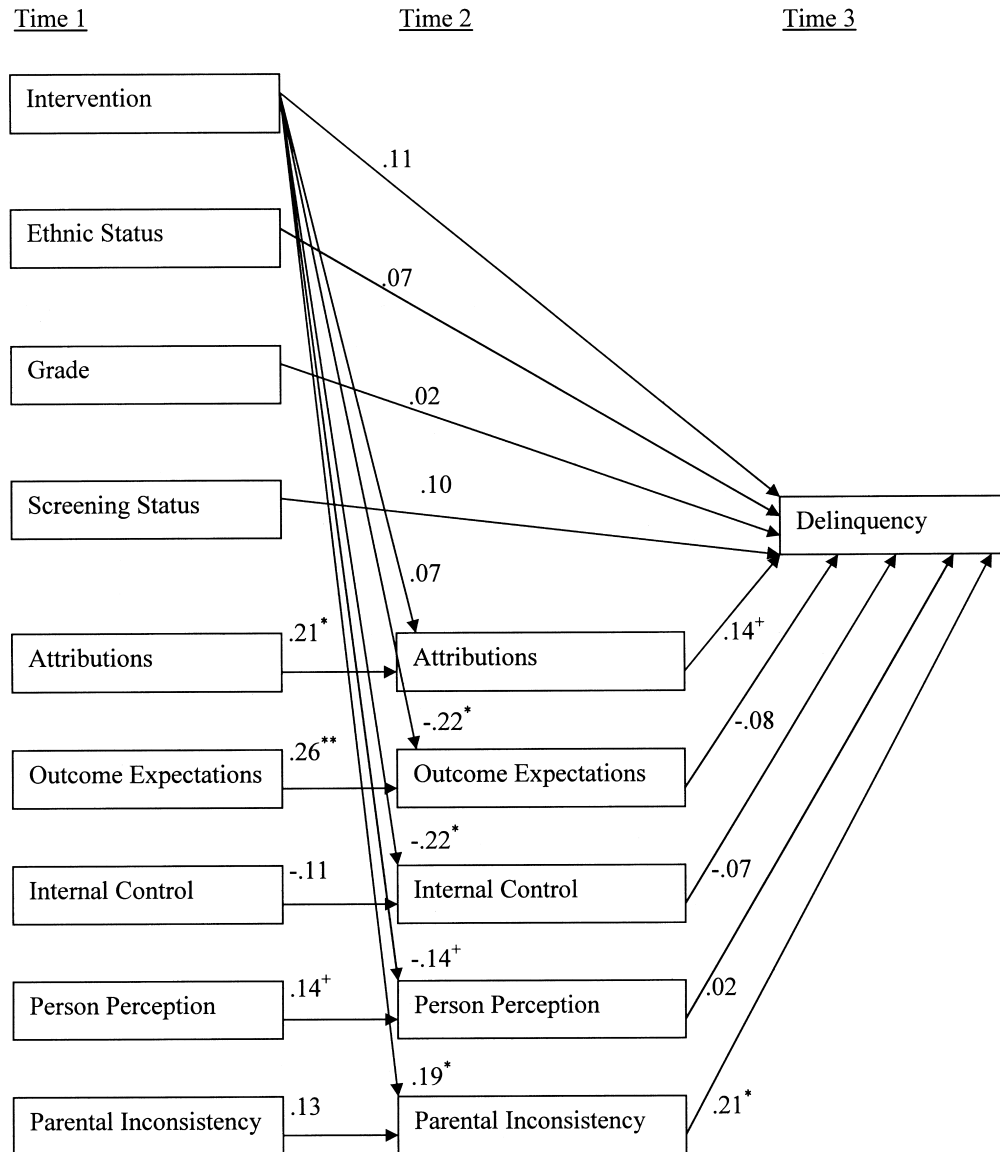
The mediation model in Table 1 refers to the model in which paths from each of the five Time 2 targeted intervention change variables are added to the base model to determine if the addition of these mediation paths will produce a nonsignificant path from intervention to the Time 3 delinquency outcome. The mediation model fits the data well; it has a nonsignificant chi square and CFI and NNFI greater than .90. The results of this analysis are presented in Figure 2. They indicate that



**Figure 1.** The base path analytic model indicating the effects of intervention on Time 3 delinquency and Time 2 targeted intervention change variables. The numbers on the arrows are standardized path coefficients. \*\* $p < .01$ . \* $p < .05$ . + $p < .15$ .

the path from intervention to the Time 3 delinquency outcome changed from being significant in the base model to being nonsignificant in the mediation model. Thus, mediation of the intervention effect occurred through the addition of the five mediating variables. Time 3 delinquency was significantly predicted by lower levels of Time 2 parental inconsistency

and tended to be predicted by lower levels of hostile attributions. The model prediction of Time 3 delinquency increased from  $R^2$  of .058 in the base model to  $R^2$  of .123 in the mediation model, with a  $R^2$  increase of .065. Moreover, the chi-square difference between the two models indicates that this is a better fitting model ( $\Delta\chi^2 = 9.12$ ,  $df = 5$ ,  $p = .10$ ).



**Figure 2.** The mediation model indicating the additional effects of Time 2 mediator variables on Time 3 delinquency. The numbers on the arrows are standardized path coefficients. \*\* $p < .01$ . \* $p < .05$ . + $p < .15$ .

*Substance use outcome.* Goodness of fit indices for the various models for the parent-rated substance use outcome are presented in Table 2. The null model provides significantly poorer fit than both the base model ( $\Delta\chi^2 = 135.97$ ,  $df = 54$ ,  $p < .001$ ) and the mediation model ( $\Delta\chi^2 = 140.76$ ,  $df = 59$ ,  $p < .001$ ).

The base model was constructed in the

same way as in the base model for the delinquency outcome. The base model fits the data well; it has a nonsignificant chi-square and CFI and NNFI above .90, as indicated in Table 3. This model is depicted in Figure 3. Intervention tends to predict lower levels of Time 3 substance use (standardized path coefficient of .16,  $p = .08$ ), significantly predicts

**Table 3.** Goodness of fit indices for the base intervention effects model and the mediation model for the school behavior outcome

Model	$\chi^2$	df	p	CFI	NNFI
Null model	215.81	105	.001	—	—
Base model	54.02	51	.360	0.973	0.944
Mediation model	50.24	46	.309	0.962	0.913

Note:  $N = 120$ ; CFI, Comparative Fit Index (Bentler, 1989); NNFI, Non-Normed Fit Index (Bentler & Bonnett, 1980).

better outcome expectations and more internal locus of control, and tends to predict lower parental inconsistency.

The mediation model in Table 2 fits the data well; it has a nonsignificant chi square and CFI and NNFI greater than .90. However, the mediation model does not provide a significantly greater fit to the data than the base model ( $\Delta\chi^2 = 4.79$ ,  $df = 5$ ). Figure 4 depicts the results of this mediation model. With regard to the critical path for the mediation test, the path from intervention to Time 3 substance use goes from a trend toward significance in the base model to being nonsignificant in the mediation model. The effect of intervention is at least partially mediated by the addition of the five Time 2 targeted intervention change variables, although none of the five Time 2 variables alone predicted the Time 3 substance use outcome. The model prediction of Time 3 substance use has increased from  $R^2$  of .075 in the base model to  $R^2$  of .124 in the mediation model, with a  $R^2$  increase of .049.

*School behavior outcome.* Goodness of fit indices for the various models for the teacher-rated school behavior outcome are presented in Table 3. The null model provides significantly poorer fit than both the base model ( $\Delta\chi^2 = 161.79$ ,  $df = 54$ ,  $p < .001$ ) and the mediation model ( $\Delta\chi^2 = 165.57$ ,  $df = 59$ ,  $p < .001$ ).

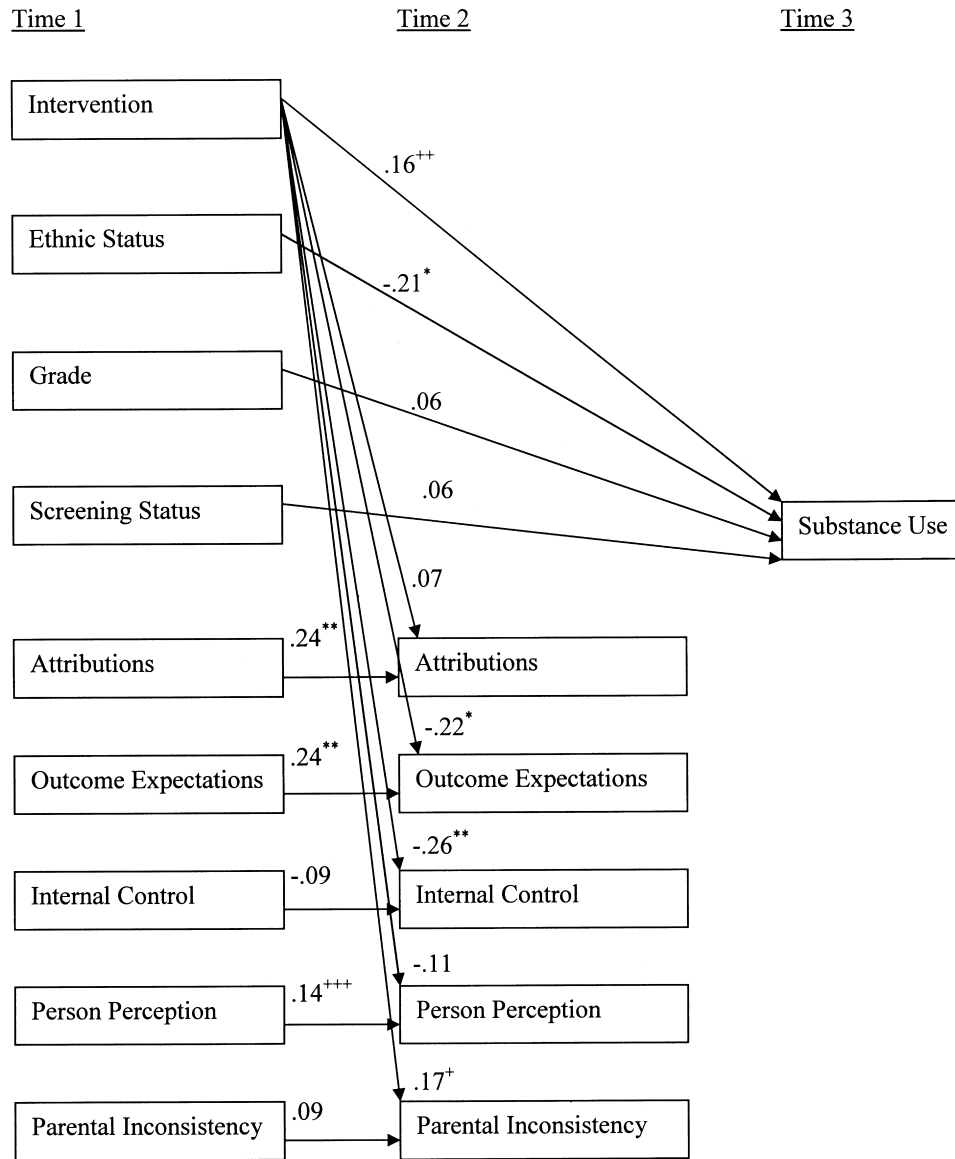
The base model was constructed in the same way as the previous base models. The base model fits the data well, it has a nonsignificant chi square and CFI and NNFI above

.90, as indicated in Table 3. This model is depicted in Figure 5. Intervention predicts significantly greater improvement in Time 3 school behavior during the follow-up year (standardized path coefficient of  $-.20$ ,  $p < .01$ ), predicts significantly more internal locus of control and less parental inconsistency, and tends to predict better outcome expectations and person perception.

The mediation model in Table 3 fits the data adequately; it has a nonsignificant chi square and CFI and NNFI greater than .90. However, the mediation model does not provide a significantly greater fit to the data than the base model ( $\Delta\chi^2 = 3.78$ ,  $df = 5$ ). Figure 6 depicts the results of this mediation model. With regard to the critical path for the mediation test, the path from intervention to Time 3 school behavior goes from significance in the base model to a trend toward significance in the mediation model. The effect of intervention is at least partially mediated by the addition of the five Time 2 targeted intervention change variables in the mediation model. Although none of the five Time 2 variables alone significantly predicted the Time 3 school behavior outcome, lower levels of Time 2 hostile attributions tend to predict improved Time 3 school behavior. The model prediction of Time 3 school behavior increased from  $R^2$  of .060 in the base model to  $R^2$  of .090 in the mediation model, with a  $R^2$  increase of .030.

## Discussion

As a developmental theory, the contextual social-cognitive model posits that certain child and parent processes are related to later developmental outcomes in adolescence. The experimental introduction of the Coping Power program, which was designed to directly impact these early developmental processes, provided a direct test of this theory. In this section, the evidence obtained for the contextual social-cognitive model from the current analyses will be reviewed, indicating unique support for one assumption in this model; then the implications for a developmental theory of adolescent antisocial outcomes will be discussed.

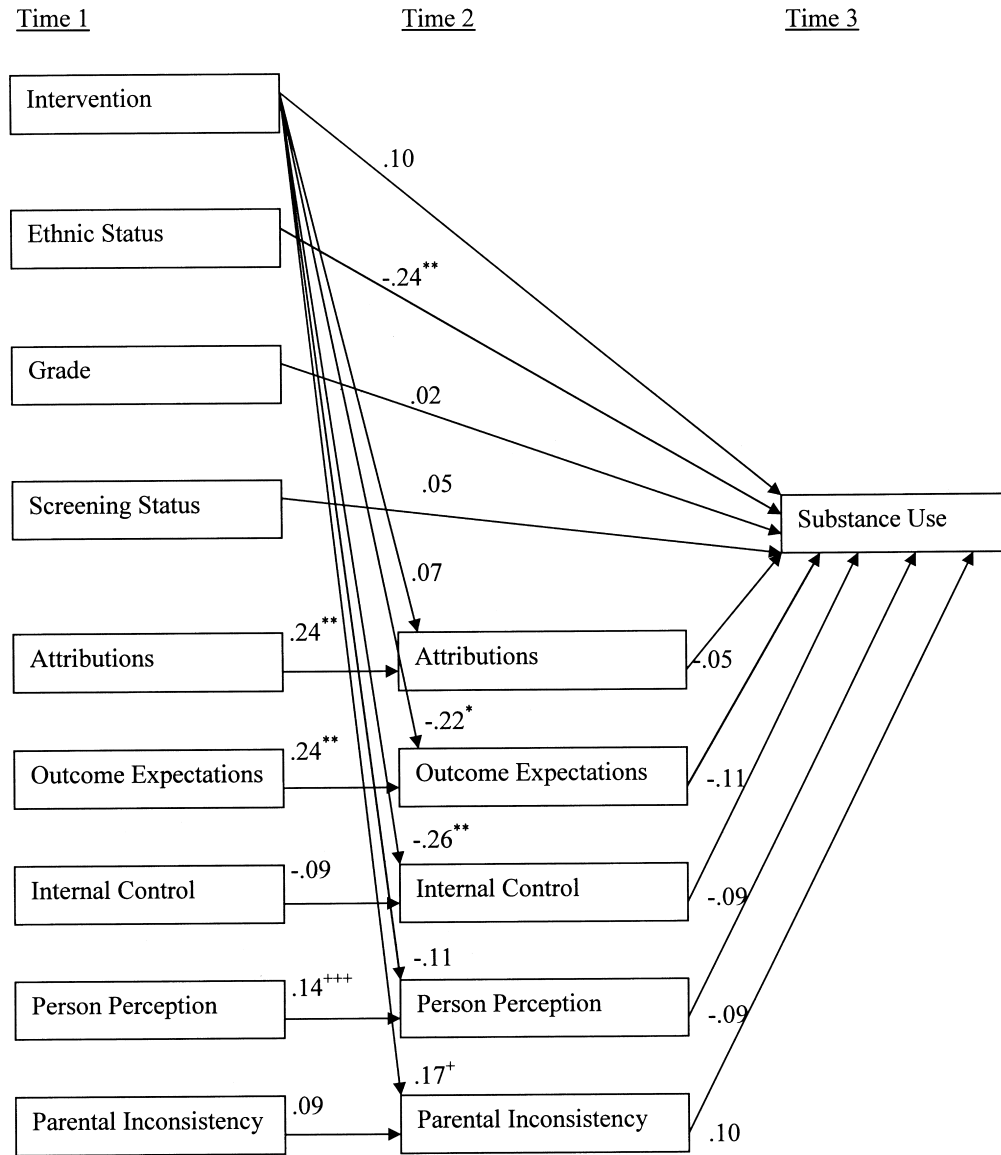


**Figure 3.** The base model indicating the effects of intervention on Time 3 substance use and Time 2 targeted intervention change variables. The numbers on the arrows are standardized path coefficients. <sup>\*\*</sup> $p < .01$ . <sup>\*</sup> $p < .05$ . <sup>+</sup> $p = .07$ . <sup>++</sup> $p = .08$ . <sup>+++</sup> $p = .12$ .

*Mediation of intervention effects: Evidence for the contextual social-cognitive model*

Earlier analyses of intervention effects on postintervention targeted change variables and the 1-year follow-up outcomes (Lochman & Wells, 2002) suggested that the intervention was based on a useful conceptual model (Lochman & Wells, 1996; Lochman et al., 2000). However, these prior analyses did not

indicate whether the targeted change variables in fact mediated the development of the outcomes. The path analyses in this paper were conducted to test the causal relation between these possible mediational processes and developmental outcomes. The results of the path analyses indicated support and validity for the contextual social-cognitive model. These analyses compared base models in which the intervention had direct effects on the Time 3

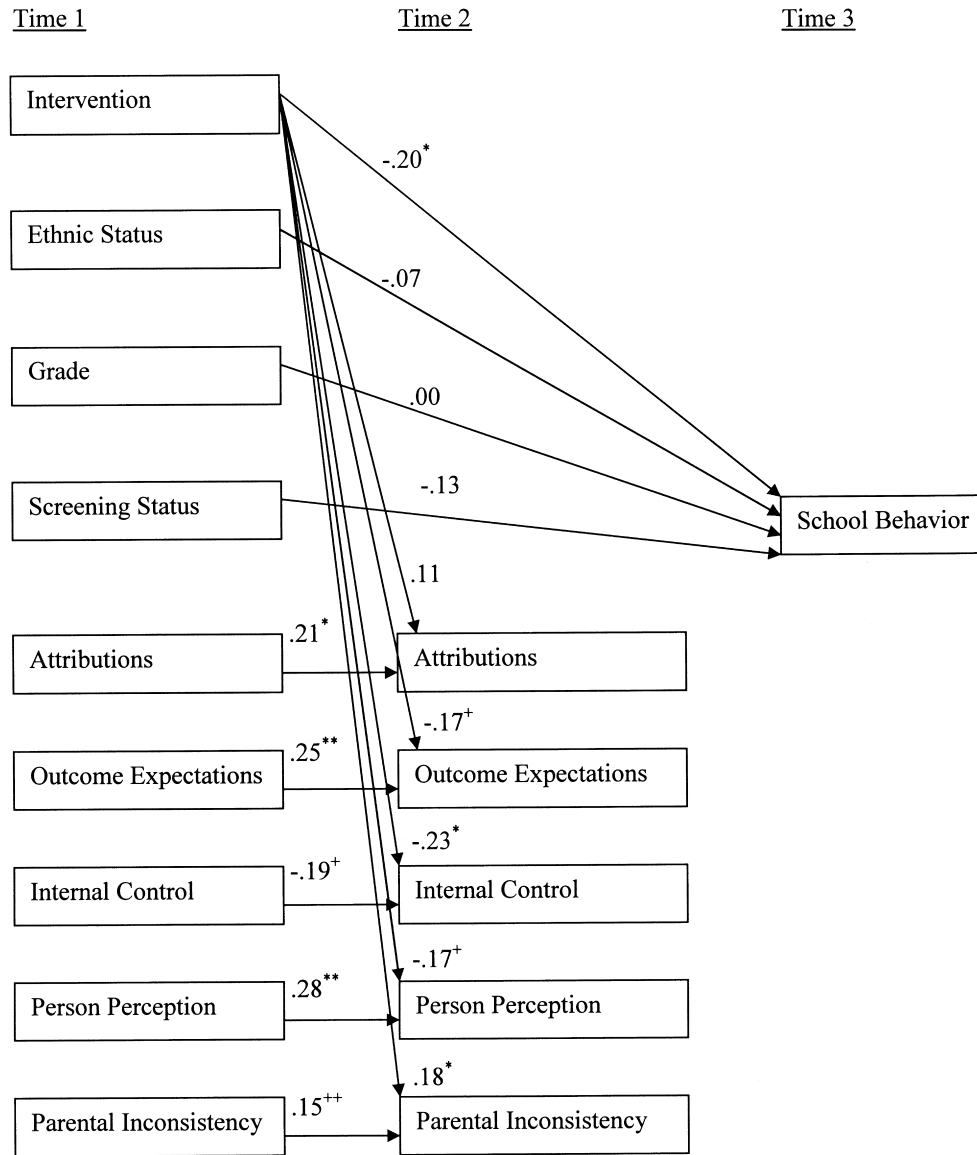


**Figure 4.** The mediation model indicating the additional effects of Time 2 mediator variables on Time 3 substance use. The numbers on the arrows are standardized path coefficients. \*\* $p < .01$ . \* $p < .05$ . + $p = .07$ . ++ $p = .08$ . +++ $p = .12$ .

outcomes to mediational models in which the Time 2 potential mediators' effects on the Time 3 outcomes were added to the models. Mediation of the intervention effects, and hence strong support for the underlying contextual social-cognitive model (Koretz, 1991; Kellam & Rebok, 1992), were determined by: documenting the direct effect of intervention on the outcomes and assessing whether the strength of the direct effect of intervention on

outcomes is clearly reduced when the mediator variables are added to the models, indicating that a portion of the variance attributable to the intervention effect is due to intervention-produced changes in the mediator variables.

For the three outcomes that had been influenced by intervention at the 1-year follow-up, the relation between intervention and outcome changed from being statistically significant

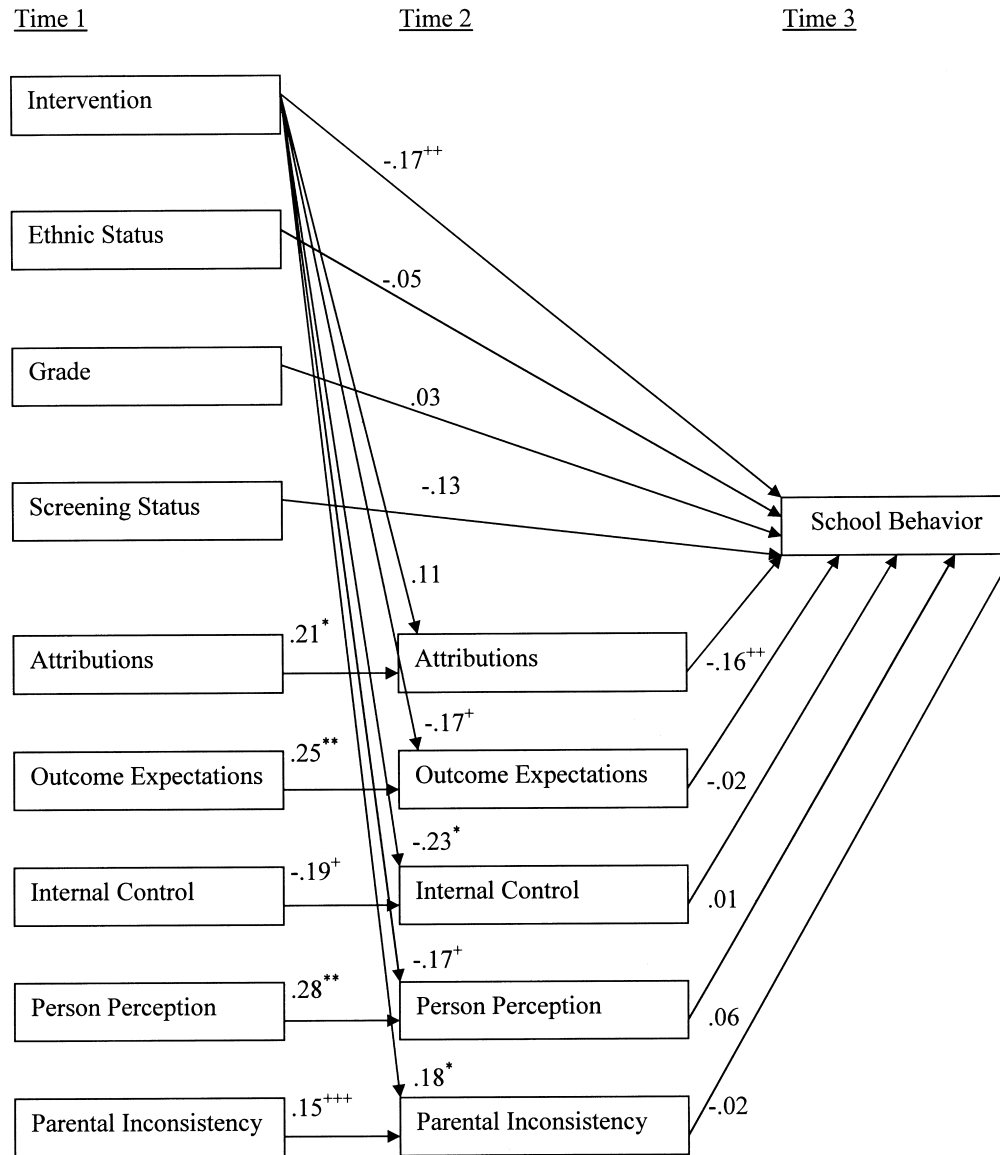


**Figure 5.** The base model indicating the effects of intervention on Time 3 school behavior improvement and Time 2 targeted intervention change variables. The numbers on the arrows are standardized path coefficients. \*\* $p < .01$ . \* $p < .05$ . + $p = .06$ . ++ $p = .10$ .

( $p < .05$ ) to becoming nonsignificant (for delinquency and for school behavior) or from having a trend toward significance ( $p = .07$ ) to becoming nonsignificant (for parent-rated substance use). The amount of variance accounted for by the addition of the mediational paths was modest (3–7%), but the consistent pattern across outcomes supports the general conclusion of evidence for mediation. There was some variability in the strength of the me-

diators' effects on the different outcomes, as the changes in the set of mediational variables (attributions, outcome expectations, internal control, person perception, inconsistent parental discipline) accounted for twice as much of the variance in the delinquency outcome (7%) as in school behavior (3%). Thus, improvements in the child and parent processes assessed in our contextual social-cognitive model were relatively more likely to impact





**Figure 6.** The mediation model indicating the additional effects of Time 2 mediator variables on Time 3 school behavior improvement. The numbers on the arrows are standardized path coefficients. \*\* $p < .01$ . \* $p < .05$ . + $p = .06$ . ++ $p = .07$ . +++ $p = .10$ .

delinquency than children's behavioral outcomes at school and the model, as currently conceptualized, may be somewhat more fitting for delinquency outcomes than for school behavior outcomes. School behavior outcomes can also be expected to be influenced by other more academic and cognitive sets of mediators, and the inclusion of changes in academic variables might lead to better predic-

tion of school behavior outcomes. However, more broadly and across all three outcomes, it is apparent that the changes in processes examined here within our contextual social-cognitive model account for only a portion of the variance in the prediction of these outcomes and that other unexamined processes also clearly contribute to these behavioral outcomes. There is a need for further develop-

ment and expansion of the current version of the contextual social–cognitive model by considering a broader range of child processes (e.g., actual behavioral skills in handling conflicts with peers, developing prosocial relationships with peers, and attaining specific behavioral goals) and parent processes (e.g., other parenting and family processes, including parental involvement, family communication, and parental stress management).

Based on inspection of the path coefficients from the mediators to the outcomes, it is apparent that these mediational effects were primarily due to the full set of mediators postulated by the current model acting on the outcome rather than to specific mediators because none of the specific mediators had strong direct links to all three outcomes in the models. Thus, the current results support the overall contextual social–cognitive model, indicating the joint effect of changes in boys' social–cognitive processes, schemas, and parenting processes on boys' outcomes. Changes in child and parent functioning led to lower levels of boys' negative outcomes. Changes in social–cognitive appraisal processes, involving boys' hostile attributions and resulting anger, and decision-making processes, involving reductions in the boys' expectations that aggressive behavior would lead to good outcomes for them, contributed to the boys' reduced risk for antisocial behavior. Similarly, changes in boys' schemas, involving their beliefs about their degree of internal control over successful outcomes and the complexity of their internal representations of others, and changes in their perceptions of the consistency of the parents' discipline efforts led to lower levels of delinquency, substance use, and school behavioral problems. Consistent with the assumptions of the contextual social–cognitive model used here, boys' engagement in serious problem behavior in the year following their involvement in the Coping Power intervention was affected in part by the improvements in the ways in which they perceived and processed their social world and in their expectations of more consistent and predictable responses from their parents.

Although the general conclusion from

these analyses suggests that the mediating processes operate as a set, the results indicate somewhat stronger roles for two of the mediational variables in the model than was the case for the other three variables. Mediators assessing inconsistent parental discipline and boys' attributional biases had at least trend effects on several of the outcomes. Boys' Time 3 delinquent behavior at the time of follow-up was significantly predicted by their Time 2 perceptions of their parents' inconsistent discipline (controlling for Time 1 perceptions) and tended to be predicted by their Time 2 hostile attributions and resulting anger (again controlling for Time 1 attributions and anger). Specifically, boys who displayed lower rates of delinquent behavior at follow-up had parents who had become more consistent in their discipline practices over the course of the intervention period and tended to have reductions in their levels of hostile attributional biases and anger during the intervention period. Similarly, boys who displayed the greatest behavioral improvements at school during the follow-up year, as rated by teachers who did not know the boys' prior intervention status, tended to have reductions in their levels of hostile attributional biases and resulting anger during the intervention period. Thus, it appears that changes in children's appraisal processes and in the consistency of parental discipline can have especially central effects on boys' outcomes, particularly their rates of delinquent behavior.

#### *Implications for a developmental theory of adolescent antisocial outcomes*

The results indicate that changes in certain child and parent processes can affect a diverse array of adolescent outcomes, including delinquency, substance use, and school behavior. Prior research had found links between these contextual social–cognitive processes and children's aggressive behavior and between children's aggressive behavior and later adolescent antisocial outcomes, but the current analyses have provided support for the other assumption of this model: that changes in these processes can increase or decrease sub-

sequent risk for this diverse array of outcomes. The results provide implications for a developmental model of changes in contextual social-cognitive processes during the preadolescent years that impact antisocial behaviors during the early adolescent years.

*Effects of boys' improved attributions and anger on reduced risk of antisocial behavior.*

Children who have excessive, pervasive attributions about the hostile intentions of others are likely to emit more toxic social behaviors toward the peers and adults around them (Conduct Problems Prevention Research Group, in press). In addition, increases in hostile attributions following perceived provocations have been found to be directly linked to increases in physiological arousal (Craven, Lochman, Phillips, & Barry, 2002). In contrast, as children, even at-risk children, begin to have more tolerant and accurate perceptions of others' intentions during social encounters, they are likely to respond less angrily, emit more prosocial behaviors, and have increased possibilities for developing satisfying social relationships over time.

Anger and associated arousal can flood information processing abilities, leading children to be progressively less able to competently perceive others' intentions and think about adaptive responses to difficult social problems (Lochman, Dunn, & Wagner, 1997). Two general types of anger can be discriminated, one of which involves no cortical processing and is a classically conditioned rage response. The second type of anger is simmering and long lasting; it involves a recursive relation between hostile, often distorted, cortical processing of events and ongoing arousal (Lochman et al., 1997). The presence of simmering anger can be a key element of revenge motives in children, and children who place high value on social goals for revenge have been found to engage in high levels of delinquent behavior (Lochman, Wayland, & White, 1993; Pardini, Lochman, & Frick, 2002). An angry, aroused child is also more likely to use automatic information processing, to then impulsively and quickly retrieve salient, often incompetent responses from

memory (Lochman, Lampron, & Rabiner, 1989; Rabiner, Lenhart, & Lochman, 1990), and to respond with reactive aggression (Dodge et al., 1997). The result of a chronic pattern of attributional biases and impulsive, angry reactions can be seriously deviant and violent behavior among youth (Lochman & Dodge, 1994).

Children who are less aroused are able to use more deliberate information processing, to more carefully review the available solutions in their memory, and to select more competent solutions to enact. The current results extend this model by finding that reductions in boys' hostile attributions and anger in the latter elementary school years can lead to lower levels of delinquency, school problems, and substance use in early adolescence.

*Hostile attributions, anger, and related expectations and beliefs.*

Because children have less hostile attributions, less resulting anger, and less impaired social relations, they may have less difficulty meeting their social goals to affiliate with others. Adolescents who place greater value on affiliation have lower levels of delinquency and substance use (Lochman et al., 1993). These improvements in appraisals of others and in subsequent peer relations can have a variety of additional effects on youths' behaviors, expectations, and values, contributing to an increasing positive spiral. Schematic beliefs and expectations are conservative and relatively resistant to direct change efforts (Lochman & Dodge, 1998). However, progressive positive changes in attributions and anger during social encounters may contribute, over time, to changes in adolescents' social affiliation patterns, beliefs, and expectations, including: (a) turning to less deviant peer groups, thus reducing the risk for delinquency and substance use (Conduct Problems Prevention Research Group, in press). (b) As youth become more able to find satisfaction in their interpersonal relationships, they become less prone to obtaining more immediate and more deviant rewards and satisfactions (e.g., delinquency and substance use) and less likely to try to attain social satisfaction through meeting dominance

goals. (c) As youth begin to react less impulsively, they can place more emphasis on outcomes requiring long-term goals, such as successful attainment of academic goals and engaging in productive behaviors at school to attain these goals. (d) As youth become less impulsively aggressive, they can begin to expect that aggressive, action-oriented strategies are not as likely to lead to satisfying outcomes for them as other, less antisocial, strategies. (e) As youth become less impulsively aggressive, they may also develop enhanced beliefs that they have an internal locus of control over their ability to successfully attain positive outcomes. (f) The development of more positive perceptions of others in general and becoming more sensitive to their internal traits and states ultimately further improves their social relations with others and reduces their isolation from competent peers. The current results indicate that some of these related changes in expectations and beliefs had begun to occur, resulting in potentially more benign schema that can facilitate social information processing in future interpersonal encounters during adolescence. The present study was unable to model the actual temporal order in the occurrence of these changes in information processing and in children's beliefs and expectations; but it is evident that changes in these sets of attributions, expectations, and beliefs can contribute to reduced risk for delinquency, negative school behaviors, and substance use.

*Effects of perceived parental consistency.* As boys begin to perceive that their parents are acting toward them in more consistent ways, they may reduce their involvement in antisocial behavior. Boys who perceive that their parents are becoming more consistent are likely to anticipate that their parents will become more effective in monitoring their behavior and peer associations. The youth are likely to anticipate more systematic consequences for their negative behaviors, contributing to increasing expectations that aggressive, antisocial behaviors will not successfully lead to positive outcomes for them. In contrast, parents' consistent reinforcement of boys' positive behaviors and successful at-

tainment of positive goals can increase motivation for engaging in positive behaviors and contribute to the boys' increasing sense of internal control over successful events in their lives. Thus, high risk boys who perceive that their parents are becoming increasingly consistent during the preadolescent years will be less likely to engage in delinquent behavior than other high risk boys.

### Conclusion

Intervention research served its theory-testing function in these analyses (e.g., Cicchetti & Toth, 1992; Kellam & Rebock, 1992; Koretz, 1991) by illustrating how intervention-produced changes in certain child and parent processes are linked to later developmental outcomes. Although it is not clear which aspect of the intervention contributed to changes in these mediational processes, it is plausible that the parent component of the Coping Power program was instrumental in helping parents set more consistently clear expectations for boys' behavior and provide more consistent consequences for negative and positive behaviors. In a similar way, it is plausible that the child component of the Coping Power program assisted the boys in more carefully and accurately identifying the reasons for peers' and adults' reactions toward them and manage their escalating arousal and anger when experiencing problems in their social interactions.

Despite certain limitations, including the relatively small sample size, the inclusion only of boys in the sample, and the presence of some attrition over time, the current results provide encouraging evidence for the conceptual model underlying the intervention. The mediational analyses indicate that changes in certain social-cognitive processes, schemas, and parenting behaviors have effects on the boys' subsequent delinquency, substance use, and school outcomes, thus supporting the contextual social-cognitive model that served as the conceptual framework for the Coping Power intervention. Future preventive intervention research can be refined to more directly target, in culturally relevant ways, the processes involved in the contextual social-cognitive model described in this paper.

## References

- Achenbach, T. M. (1991). *Manual for the Child Behavior Checklist/4-18 and 1991 profile*. Burlington, VT: University of Vermont, Department of Psychiatry.
- Bentler, P. M. (1989). *EQS structural equations program manual*. Los Angeles: BMDP Statistical Software.
- Bentler, P. M., & Bonett, D. G. (1980). Significance tests and goodness-of-fit in the analyses of covariance structures. *Psychological Bulletin*, 88, 588–606.
- Blatt, S. J., Chevron, E. C., Quinlan, D. M., & Wein, S. (1981). *The assessment of qualitative and structured dimensions of object representations*. Unpublished manual, Yale University, New Haven, CT.
- Bry, B. H., Catalano, R. F., Kumpfer, K., Lochman, J. E., & Szapocznik, J. (1999). Scientific findings from family prevention intervention research. In R. Ashery (Ed.), *Family-based prevention interventions*. (pp. 103–129). Rockville, MD: National Institute of Drug Abuse.
- Capaldi, D. M., & Patterson, G. R. (1991). Relation of parental transitions to boys' adjustment problems: Mothers at risk for transitions and unskilled parenting. *Developmental Psychology*, 27, 489–504.
- Cicchetti, D., & Toth, S. L. (1992). The role of developmental theory in prevention and intervention. *Development and Psychopathology*, 4, 489–493.
- Coie, J. D., Lochman, J. E., Terry, R., & Hyman, C. (1992). Predicting early adolescent disorder from childhood aggression and peer rejection. *Journal of Consulting and Clinical Psychology*, 60, 78–79.
- Coie, J. D., Terry, R., Lenox, K., Lochman, J., & Hyman, C. (1995). Childhood peer rejection and aggression as predictors of stable patterns of adolescent disorder. *Development and Psychopathology*, 7, 697–713.
- Colder, C. R., Lochman, J. E., & Wells, K. C. (1997). The moderating effects of children's fear and activity level on relations between parenting practices and childhood symptomatology. *Journal of Abnormal Child Psychology*, 25, 251–263.
- Conduct Problems Prevention Research Group. (1992). A developmental and clinical model for the prevention of conduct disorder: The Fast Track Program. *Development and Psychopathology*, 4, 509–527.
- Conduct Problems Prevention Research Group. (1999). Initial impact of the Fast Track prevention trial for conduct problems: I. The high-risk sample. *Journal of Consulting and Clinical Psychology*, 67, 631–647.
- Conduct Problems Prevention Research Group. (in press). The Fast Track experiment: Translating the developmental model into a prevention design. In K. A. Dodge & J. B. Kupersmidt (Eds.), *Children's peer relations: A festschrift for John D. Coie*. Washington, DC: American Psychological Association.
- Connell, J. P. (1985). A new multidimensional measure of children's perceptions of control. *Child Development*, 56, 1018–1041.
- Craven, S. V., Lochman, J. E., Phillips, N., & Barry, T. (2002). *Boys' physiological and cognitive processes in response to peer provocation*. Manuscript submitted for publication.
- 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.
- DeRubeis, R. J., & Beck, A. T. (1988). Cognitive therapy. In K. S. Dobson (Ed.), *Handbook of cognitive-behavioral therapies* (pp. 85–135). New York: Guilford Press.
- Dodge, K. A., Lochman, J. E., Harnish, J. D., Bates, J. E., & Pettit, G. (1997). Reactive and proactive aggression in school children and psychiatrically impaired chronically assaultive youth. *Journal of Abnormal Psychology* 106, 37–51.
- Dodge, K. A., Petit, G. S., McClaskey, C. L., & Brown, M. M. (1986). Social competence in children. *Monographs of the Society for Research in Child Development*, 51.
- Dunn, S. E., Lochman, J. E., & Colder, C. R. (1997). Social problem-solving skills in boys with conduct and oppositional defiant disorders. *Aggressive Behavior*, 23, 457–469.
- Elliott, D. S., & Huizinga, D. (1983). Social class and delinquent behavior in a national youth panel. *Criminology: An Interdisciplinary Journal*, 21, 149–177.
- Elliott, D. S., Huizinga, D., & Ageton, S. S. (1985). *Explaining delinquency and drug use*. Beverly Hills, CA: Sage.
- Forehand, R., & McMahon, R. (1981). *Helping the non-compliant child: A clinician's guide to parent training*. New York: Guilford Press.
- Gouze, K. R. (1987). Attention and social problem solving as correlates of aggression in preschool males. *Journal of Abnormal Child Psychology*, 15, 181–197.
- Hatcher, L. (1994). *A step-by-step approach to using the SAS system for factor analysis and structural equation modeling*. Cary, NC: SAS Institute.
- Hawkins, J. D., Catalano, R. F., & Miller, J. Y. (1992). Risk and protective factors for alcohol and other drug problems in adolescence and early adulthood: Implications for substance abuse prevention. *Psychological Bulletin*, 112, 64–105.
- Hinshaw, S. P., Lahey, B. B., & Hart, E. L. (1993). Issues of taxonomy and comorbidity in the development of conduct disorder. *Development and Psychopathology*, 5, 31–34.
- Ingram, R. E., & Kendall P.C. (1986). Cognitive clinical psychology: Implications of an informational processing perspective. In R. E. Ingram (Ed.), *Information processing approaches to clinical psychology* (pp. 3–21). New York: Academic Press.
- Joffe, R. D., Dobson, K. S., Fine, S., Marriage, K., & Haley, G. (1990). Social problem-solving in depressed, conduct-disordered, and normal adolescents. *Journal of Abnormal Child Psychology*, 18, 565–575.
- Kandel, D. B., & Andrews, K. (1987). Processes of adolescent socialization by parents and peers. *International Journal of Addictions*, 22, 319–342.
- Kandel, D. B., & Wu, P. (1995). Disentangling mother-child effects in the development of antisocial behavior. In J. McCord (Ed.), *Coercion and punishment in long-term perspectives* (pp. 106–123). New York: Cambridge University Press.
- Katsurada, E., & Sugawara, A. I. (1998). The relationship between hostile attributional bias and aggressive behavior in preschoolers. *Early Childhood Research Quarterly* 13, 623–636.
- Kazdin, A. E. (1995). *Conduct disorders in childhood and adolescence* (2nd ed.). Thousand Oaks, CA: Sage.
- Kellam, S. G., & Rebok, G. W. (1992). Building developmental and etiological theory through epidemiology.

- logically based preventive intervention trials. In J. McCord & R. E. Tremblay (Eds.), *Preventing antisocial behavior: Interventions from birth through adolescence* (pp. 162–195). New York: Guilford Press.
- Koretz, D. S. (1991). Prevention-centered science in mental health. *American Journal of Community Psychology, 19*, 453–458.
- Lahey, B. B., Loeber, R., Quay, H. C., Applegate, B., Shaffer, D., Waldman, I., Hart, E. L., McBurnett, K., Frick, P. J., Jensen, P. S., Dulcan, M. K., Canino, G., & Bird, H. R. (1998). Validity of DSM-IV subtypes of conduct disorder based on age of onset. *Journal of the American Academy of Child and Adolescent Psychiatry, 37*, 435–442.
- Larson, J. & Lochman, J. (in press). *Helping school children cope with anger: A cognitive-behavioral intervention*. New York: Guilford Press.
- Lenhart, L. A., & Rabiner, D. L. (1995). An integrative approach to the study of social competence in adolescence. *Development and Psychopathology, 7*, 543–561.
- Lochman, J. E. (1992). Cognitive-behavioral interventions with aggressive boys: Three-year follow-up and preventive effects. *Journal of Consulting and Clinical Psychology, 60*, 426–432.
- Lochman, J. E., Burch, P. P., Curry, J. F., & Lampron, L. B. (1984). Treatment and generalization effects of cognitive-behavioral and goal setting interventions with aggressive boys. *Journal of Consulting and Clinical Psychology, 52*, 915–916.
- Lochman, J. E., & Conduct Problems Prevention Research Group (1995). Screening of child behavior problems for prevention programs as school entry. *Journal of Consulting and Clinical Psychology, 63*, 549–559.
- Lochman, J. E., Dane, H. E., Magee, T. N., Ellis, M., Pardini, D. A., & Clanton, N. R. (2001). Disruptive behavior disorders: Assessment and intervention. In B. Vance & A. Pumareiga (Eds.), *The clinical assessment of children and youth behavior: Interfacing intervention with assessment* (pp. 231–262). New York: Wiley.
- 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*, 366–374.
- Lochman, J. E., & Dodge, K. A. (1998). Distorted perceptions in dyadic interactions of aggressive and nonaggressive boys: Effects of prior expectations, context, and boys' age. *Development and Psychopathology, 10*, 495–512.
- Lochman, J. E., Dunn, S. E., Wagner, E. E. (1997). Anger. In G. Bear, K. Minke, & A. Thomas (Eds.), *Children's needs* (Vol. 2). Washington DC: National Association of School Psychology.
- Lochman, J. E., FitzGerald, D. P., & Whidby, J. M. (1999). Anger management with aggressive children. In C. Schaefer (Ed.), *Short-term psychotherapy groups for children* (pp. 301–349). Northvale, NJ: Jason Aronson.
- Lochman, J. E., & Lampron, L. B. (1986). Situational social problem-solving skills and self-esteem of aggressive and nonaggressive boys. *Journal of Abnormal Child Psychology, 14*, 605–617.
- Lochman, J. E., Lampron, L. B., Gemmer, T. C., & Harris, S. R. (1987). Anger-coping interventions for aggressive children: Guide to implementation in school settings. In P. A. Keller & S. Heyman (Eds.), *Innovations in clinical practice: A source book* (Vol. 6, pp. 339–356). Sarasota, FL: Professional Resource Exchange.
- Lochman, J. E., Lampron, L. B., & Rabiner, D. L. (1989). Format differences and salience effects in assessment of social problem-solving skills of aggressive and nonaggressive boys. *Journal of Clinical Child Psychology, 18*, 230–236.
- Lochman, J. E., & Lenhart, L. (1995). Cognitive behavioral therapy of aggressive children: Effects of schemas. In H.P.J.G. Van Bilsen, P. C. Kendall, & J. H. Slavenburg (Eds.), *Cognitive behavioral approaches for children and adolescents: Challenges for the next century*. New York: Plenum Press.
- Lochman, L. E., Lenhart, L. A., & Wells, K. C. (1996). *Coping Power program: Child component*. Unpublished manual, Duke University Medical Center, Durham, NC.
- Lochman, J. E., Magee, T. N., & Pardini, D. (in press). Cognitive behavioral interventions for aggressive children. In M. Reinecke & D. Clark (Eds.), *Cognitive therapy over the lifespan: Theory, research and practice*. Cambridge: Cambridge University Press.
- Lochman, J. E., Nelson, W. M., & Sims, J. P. (1981). A cognitive behavioral program for use with aggressive children. *Journal of Clinical Child Psychology, 13*, 146–148.
- Lochman, J. E., & Wayland, K. K. (1994). Aggression, social acceptance, and race as predictors of negative adolescent outcomes. *Journal of the American Academy of Child and Adolescent Psychiatry, 33*, 1026–1035.
- Lochman, J. E., Wayland, K. K., & White, K. J. (1993). Social goals: Relationship to adolescent adjustment and to social problem-solving. *Journal of Abnormal Child Psychology, 21*, 135–151.
- Lochman, J. E., & Wells, K. C. (1996). A social-cognitive intervention with aggressive children: Prevention effects and contextual implementation issues. In R. D. Peters & R. J. McMahon (Eds.), *Prevention and early intervention: Childhood disorders, substance use and delinquency* (pp. 111–143). Thousand Oaks, CA: Sage.
- Lochman, J. E., & Wells, K. C. (in press). The Coping Power Program at the middle school transition: Universal and indicated prevention effects. *Psychology of Addictive Behaviors*.
- Lochman, J. E., & Wells, K. C. (2002). *Delinquency and substance use outcomes for the Coping Power Program at the one-year follow-up*. Manuscript submitted for publication.
- Lochman, J. E., Wells, K. C., & Murray, M. (in press). The Coping Power program: Preventive intervention at the middle school transition. In P. Tolan, J. Szapocznik, & S. Sambrano (Eds.), *Preventing substance abuse: 3 to 14*. Washington, DC: American Psychological Association.
- Lochman, J. E., Whidby, J. M., & FitzGerald, D. P. (2000). In P. C. Kendall (Ed.), *Child and adolescent therapy: Cognitive-behavioral procedures*, (2nd ed., pp. 31–87). New York: Guilford Press.
- Lochman, J. E., White, K. J., & Wayland, K. K. (1991). Cognitive behavioral assessment and treatment with aggressive children. In P. C. Kendall (Ed.), *Child and adolescent therapy: Cognitive-behavioral procedures* (pp. 25–65). New York: Guilford Press.
- Loeber, R. (1990). Development and risk factors of juve-

- nile antisocial behavior and delinquency. *Clinical Psychology Review*, 10, 1–42.
- Matthys, W., Walterbos, W., Nijo, L., & van Engeland, H. (1989). Person perception in children with conduct disorders. *Journal of Child Psychology and Psychiatry*, 30, 439–448.
- Milich, R., & Dodge, K. A. (1984). Social information processing in child psychiatric populations. *Journal of Abnormal Child Psychology* 12, 471–490.
- Moffitt, T. E. (1993). Adolescence-limited and life course persistent antisocial behavior: A developmental typology. *Psychological Review*, 100, 674–701.
- Novaco, R. W. (1978). Anger and coping with stress: Cognitive behavioral interventions. In J. P. Foreyet & D. P. Rathjen (Eds.), *Cognitive behavioral therapy: Research and application*. New York: Plenum Press.
- Pardini, D. A., Lochman, J. E., & Frick, P. J. (2002). *Callous/unemotional traits and social cognitive processes in adjudicated youth: Exploring the schema of juveniles with psychopathic traits*. Manuscript submitted for publication.
- Patterson, G. R., Reid, J. B., & Dishion, T. J. (1992). *Antisocial boys*. Eugene, OR: Castalia.
- Patterson, G. R., Reid, J. B., Jones, R. R. & Conger, R. E. (1975). *A social learning approach: Vol. 1. Families with aggressive children*. Eugene, OR: Castalia.
- Patterson, G. R., & Stouthamer-Loeber, M. (1984). The correlation of family management practices and delinquency. *Child Development*, 55, 1299–1307.
- Pepler, D. J., Craig, W. M., & Roberts, W. I. (1998). Observations of aggressive and nonaggressive children on the school playground. *Merrill-Palmer Quarterly* 44, 55–76.
- Perry, D. G., Perry, L. C., & Rasmussen, P. (1986). Cognitive social learning mediators of aggression. *Child Development*, 57, 700–711.
- Rabiner, D. L., Lenhart, L., & Lochman, J. E. (1990). Automatic vs. reflective social problem solving in relation to children's sociometric status. *Developmental Psychology*, 26, 1010–1026.
- Rotter, J. B. (1966). Generalized expectancies and internal versus external control of reinforcement. *Psychological Monographs*, 80, 1–28.
- Santisteban, D. A., Szapocznik, J., & Kurtines, M. W. (1994). Behavioral problems among Hispanic youth: The family as moderator of adjustment. In J. Szapocznik (Ed.), *A Hispanic/Latino family approach to substance abuse prevention* (pp. 19–39). Rockville, MD: Center for Substance Abuse Prevention.
- Seifer, R., Sameroff, A. J., Baldwin, C. P., & Baldwin, A. (1992). Child and family factors that ameliorate risk between 4 and 13 years of age. *Journal of the American Academy of Child and Adolescent Psychiatry*, 31, 893–903.
- Shelton, K. K., Frick, P. J., & Wootton, J. (1996). Assessment of parenting practices in families of elementary school-age children. *Journal of Clinical Child Psychology*, 25, 317–329.
- Smith, C. A., & Lazarus, R. W. (1990). Emotion and adaptation. In L. Previn (Ed.), *Handbook of personality: Theory and research* (pp. 609–637). New York: Guilford Press.
- Stattin, H., & Magnusson, D. (1989). The role of early aggressive behavior in the frequency, seriousness, and types of later crime. *Journal of Consulting and Clinical Psychology*, 57, 70–718.
- Tarter, R. E., Alterman, A. I., & Edwards, K. L. (1985). Vulnerability of alcoholism in men: A behavior genetic perspective. *Journal of Studies on Alcohol*, 46, 329–356.
- Tolan, P. H., Gorman-Smith, D., Huesmann, L. R., & Zelli, A. (1997). Assessment of family relationship characteristics: A measure to explain risk for antisocial behavior and depression among urban youth. *Psychological Assessment*, 9, 212–223.
- Tremblay, R. E., Masse, B., Perron, D., Leblanc, M., Schwartzman, A. E., & Ledingham, J. E. (1992). Early disruptive behavior, poor school achievement, delinquent behavior, and delinquent personality: Longitudinal analyses. *Journal of Consulting and Clinical Psychology*, 60, 64–72.
- Waas, G. A., & French, D. C. (1989). Children's social problem solving: Comparison of the open middle interview and children's assertive behavior scale. *Behavioral Assessment* 11, 219–230.
- Weigel, C., Wertlieb, D., & Feldstein, M. (1989). Perceptions of control, competence, and contingency as influences on the stress-behavior symptom relation in school-age children. *Journal of Personality and Social Psychology*, 56, 456–464.
- Wells, K. C. (1995). Parent and family management training. In L. Craighead, W. E. Craighead, A. Kazdin, & M. Mahoney (Eds.), *Cognitive-behavioral interventions*. New York: Pergamon Press.
- Wells, K. C., Lenhart, L. A., & Lochman, J. E. (1996). *Coping Power program: Parent component*. Unpublished manual, Duke University Medical Center, Durham, NC.
- Williams, J. C. (1990). *An exploration of affect labeling in impulsive, aggressive boys*. Unpublished dissertation, Smith College School for Social Work, Boston, MA.
- Wootton, J. M., Frick, P. J., Shelton, K. K., & Silverthorn, P. (1997). Ineffective parenting and childhood conduct problems: The moderating role of callous-unemotional traits. *Journal of Consulting and Clinical Psychology*, 65, 301–308.
- Zelli, A., Dodge, K. A., Lochman, J. E., Laird, R. D., & Conduct Problems Prevention Research Group (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, 150–166.