Effects of a school-based social–emotional competence program: Linking children's goals, attributions, and behavior

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Abstract

This study examined the effects of the *Second Step* social–emotional learning program and addressed the relations between social cognitions and prosocial and antisocial behavior. Children ($N = 1,253$) in intervention and control groups were assessed by teacher ratings, self report, and observation in two conflict situations. Intervention children were more likely to prefer prosocial goals and give egalitarian reasons for satisfaction than control children. Intervention children also required less adult intervention, and behaved less aggressively and (among girls) more cooperatively. Teacher ratings of social behavior showed improvement over time. Individual and dyadic behavior varied as a function of goals, hostile attributions, and attitude concordance within dyads. Findings are discussed with respect to social-cognitive models of aggression and prosocial behavior.
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1. Introduction

Teachers spend a considerable amount of time mediating disputes between students (Johnson & Johnson, 1996). Students' conflicts often elicit aggressive, oppositional behaviors directed toward peers and adults. Such behaviors compromise the learning environment and are associated with later conduct

problems, substance use, and school failure (Coie, Lochman, Terry, & Hyman, 1992; Miller-Johnson, Lochman, Coie, Terry, & Hyman, 1998; Pepler & Rubin, 1991). A growing body of evidence suggests that programs that focus on promoting protective factors and mitigating risk can reduce multiple problem behaviors (see reviews by Durlak, 1995; Greenberg, Domitrovich, & Bumbarger, 2001).

Like antisocial behavior, prosocial behavior has important implications for the social and school-related adjustment of children. Whereas aggressive and oppositional behavior are associated with school problems, prosocial behavior (e.g., empathic, socially responsible behavior) has been linked to higher grades and test scores (see reviews by Wentzel, 1996; Wentzel & Wigfield, 1998), peer acceptance (Wentzel & Erdley, 1993), and high status (Coie, Dodge, & Kupersmidt, 1990). Cognitively-based models of social–emotional learning (Bandura, 1986; Crick & Dodge, 1994; Kendall, 1993) posit that similar cognitive and affective processes underlie positive and negative social behaviors. Like aggression (see review by Coie & Dodge, 1998), prosocial behavior shows considerable stability from preschool to young adulthood (Eisenberg et al., 1999), suggesting that early intervention might provide long-term benefits. Elementary school programs under various labels (e.g., social competence, violence prevention, conflict resolution training and character education) have emerged to promote socially responsible behavior and discourage aggressive behavior.

1.1. Promoting prosocial behavior: The role of motivation and social cognition

Researchers have long realized that behavior deficits may be due to either an inability to perform competently or insufficient motivation to do so (Bandura, 1986). When applied to interventions, this suggests that effecting behavioral change may require alterations in motivation, in addition to promotion of social skills. Social cognitions such as goals, beliefs, and attributions appear to play a strong motivational role with respect to behavior.

1.1.1. Social goals

Erdley and Asher (1999) have argued that teaching cognitive, affective, and behavioral skills will be insufficient to promote positive behavior unless training also promotes the adoption of prosocial goals. Few investigations have addressed the socialization of goals, however (see review by Wentzel, 1996), and there is no consensus regarding the likelihood of changing children's goals through intervention. Working with adolescents, Lochman, Wayland, and White (1993) conclude that social goals are enduring characteristics that are not amenable to change by psychoeducational interventions. In contrast, Jarvinen and Nicholls (1996) suggest that changing beliefs about the behaviors that foster successful relationships will lead to changes in social goals. Research is needed to determine whether school-based interventions can encourage the adoption of positive goals, and whether those goals are related to positive school behavior.

Goal preferences are associated with important, real-world outcomes. Children who endorse prosocial goals in conflict situations have higher levels of social functioning (Murphy & Eisenberg, 1996) and more friends than children who endorse retaliation goals (Rose & Asher, 1999). Control, domination, and hostile goals are typical of aggressive children (Boldizar, Perry, & Perry, 1989; Erdley & Asher, 1996, 1999; Slaby & Guerra, 1988) and predictive of substance use, self-reported crime, peer rejection, depression, and inattentive behavior (Lochman et al., 1993). In addition, Stein and Albro's (2001) goal-based model of argument provides a framework for understanding how social goals can influence children's approaches to interpersonal conflict. An arguer who believes that maintenance of a

relationship is more important than "winning" should be motivated to compromise or submit. When relationship goals are weaker, the arguer's actions are likely to emphasize instrumental gains or the establishment of dominance. Indeed, a preference for relationship maintenance goals is associated with a preference for prosocial strategies to resolve conflict, whereas self-interested, controlling, and retaliatory goals are linked to hostile or aggressive strategies (Chung & Asher, 1996; Delveaux & Daniels, 2000). These findings suggest that social goals are important targets for intervention.

1.1.2. Attributions of hostile goals

Social attributions are another cognitive construct believed to motivate behavior. There is strong evidence that the beliefs individuals have about other people's goals and intentions are important predictors of emotions and behavior. Individuals who attribute others' actions to hostile intent tend to react with blame, anger, and retributive aggression when they are injured, compared to those who infer benign intent or withhold judgment (see Crick & Dodge, 1996 for a review; and Orobio de Castro, Veerman, Koops, Bosch, & Monshouwer, 2002 for a meta-analysis). Interventions have shown promise in reducing hostile attributions and aggression among boys. Sixth-grade aggressive boys placed in a frustration-inducing communication task were less likely to infer hostile intent, less angry, and less verbally aggressive if they had been in a social attribution retraining group. They were rated by teachers as less aggressive, although not more socially skilled than their counterparts in the control group (Hudley & Graham, 1993). A subsequent study with third- to sixth-grade aggressive and non-aggressive boys also showed immediate post-intervention reductions in attributions of hostile goals compared to controls, although these improvements were not maintained at a 12-month follow-up. Teacher ratings of social skills showed no group differences (Hudley et al., 1998). Research is needed to determine the efficacy of social attribution retraining with girls and effectiveness of a school-implemented program with both boys and girls.

1.2. The present study

The first goal of the study was to evaluate the impact of the *Second Step* program (Committee for Children, 1992, 1997), a universal social–emotional intervention, on students' behavior, social cognitions, and affect. The second goal of the study was to test the conceptual basis of the program by examining relations among behavior and motivational constructs. The program is based on the understanding that behaviors are influenced by goals, beliefs, and emotions, as well as information-processing and performance skills (Crick & Dodge, 1994; Lemerise & Arsenio, 2000). The *Second Step* program is designed to both decrease aggressive behavior and increase empathic, socially responsible behavior by (a) fostering children's cognitive, emotional, and behavioral skills; (b) reducing maladaptive beliefs about aggression (Slaby & Guerra, 1988); and (c) promoting positive social goals and values. The basic methodology has been translated into a developmentally sequenced set of activities for preschool through middle school.

Studies using trained observers of preschool classrooms (McMahon, Washburn, Felix, Yakin, & Childrey, 2000) and elementary school playgrounds (Grossman et al., 1997) have found decreased levels of physically aggressive or disruptive behavior in children participating in the *Second Step* program. The playground observations were undertaken as part of an experimental study and also showed more positive social behaviors among *Second Step* participants relative to those in control schools. In contrast, teacher reports of social competence showed no improvements in either of these studies. Finally, middle

and junior high school students reported that social–emotional skills were easier to perform after intervention (Van Schoiack-Edstrom, Frey, & Beland, 2002). Moreover, their normative beliefs (Huesman & Guerra, 1997) were less supportive of physical, verbal, or relational aggression than those of students in the comparison group.

These studies have been limited by their exclusive focus on either behavior or beliefs. Without measuring both simultaneously, researchers were unable to address conceptual questions about the relationship of social cognitions to behavior. The present study (a) tests the specific effects of the intervention on social goals, attributions, satisfaction, and behavior in several contexts; and (b) examines the relations among goals, attributions, and prosocial and antisocial behavior, both individually and in dyads.

1.2.1. The intervention

The *Second Step*: program, consists of commercially available curriculum materials (Committee for Children, 1997a,b), professional staff training, and staff training materials. It translates techniques developed by cognitive behavior therapists and others (e.g., Kendall, 1993; Spivack & Shure, 1974) into an educational framework consisting of classroom activities and generalization efforts throughout the day (Frey, Hirschstein, & Guzzo, 2000). Lessons lasting 25–40 minutes (depending on grade level) are presented by classroom teachers. Using suggested lesson scripts, teachers introduce key concepts through questions stimulated by photo cards or videotaped stories. Performance-based instruction and cognitive interventions are used to foster development in thoughts, feelings, and behavior (Kendall, 1993). Questions are designed to promote perspective-taking and, as the lesson progresses, elicit specific strategies for dealing with the illustrated situations. Teachers and videotapes provide models of the key skills. Children practice specific self-regulatory strategies and behavioral skills with role-playing and other classroom activities. Strategies for cueing, coaching, and acknowledging the targeted behaviors are included in program materials, as well as suggestions for integrating content with the academic program.

There are three units in the program: Empathy Training, Impulse Control and Problem Solving, and Anger Management. Empathy lessons teach children to notice and interpret relevant contextual and expressive cues (Halberstadt, Denham, & Dunsmore, 2001), including those indicative of benign as opposed to hostile intent (Dodge & Newman, 1981). Emotional understanding, prediction, and communication are taught as core skills. In the second unit, children repeatedly practice generating and evaluating solutions to social problems. Positive goals such as safety, fairness, efficacy, and the social–emotional benefits of mutually rewarding interaction serve as evaluation criteria. Discussions help identify the behaviors that help children sustain enjoyable play and those that interfere. Cognitive-behavioral techniques such as self-talk (Kendall, 1993; Meichenbaum, 1977) and attention control (Derryberry & Rothbart, 1988; Metcalfe & Mischel, 1999) are emphasized in the Anger Management unit. In all units, children practice specific behavioral skills that are meant to serve as building blocks for social problem solving (e.g., resisting negative peer pressure, apologizing, showing appreciation).

1.2.2. Measurement strategy

We took a multilevel, multi-informant approach to assessing the effect of the intervention. We measured behavior with teacher reports, self reports, and direct observations, the first two focusing on individual behavior, the last one on dyadic behavior. Measurement of social cognitions and affect employed hypothetical vignettes and in-the-moment interviews during structured conflicts.

1.2.2.1. Observing behavior during structured conflicts. The use of direct observation is an important addition to the more typical measures of program effectiveness (e.g., Reid, Eddy, Fetrow, & Stoolmiller, 1999; Stoolmiller, Eddy, & Reid, 2000). In the present study, blinded observers coded the interactions of children during structured conflict. Unlike conflicts in schoolyards, those elicited by structured situations offer more challenges to the participants by restricting opportunities to leave (Hartup, French, Laursen, Johnston, & Ogawa, 1993), thus increasing the frequency of typically low base-rate behaviors such as aggression. Explicitly prosocial behaviors are also relatively infrequent and can be difficult to distinguish from routinely sociable behaviors in a fast-paced environment like a school playground (e.g., Grossman et al., 1997).

The two conflict situations used in the current study were structured to elicit either competition or cooperation over the distribution of resources. The first involved negotiations between partners regarding the choices they would make jointly during a "prisoner's dilemma" game. Engaging in mutually cooperative strategies during a dilemma is associated with friendship quality and positive emotional tone in four-year-olds (Matsumoto, Haan, Yabrove, Theodorou, & Carney, 1986). The second, more naturalistic task required the negotiated division of four "thank you" gifts. Questions regarding the control of resources elicit social dominance concerns in some children (Johnson & Johnson, 1996; Shantz & Hobart, 1989), presenting a good opportunity to observe individual differences in aggression and cooperative behavior—differences that we expected to favor the intervention group.

1.2.2.2. Measuring cognitions and affect in the context of structured conflicts. Structured conflicts enable investigators to examine linkages between observed behavior, cognition, and affect. In their classic monograph (Dodge, Pettit, McClaskey, & Brown, 1986), Dodge and colleagues used a staged provocation to predict children's aggressive responses from hostile attributions. Hudley and Graham (1993) used a structured conflict to examine both the effects of attribution retraining and the applicability of attribution theory (Weiner, 1985) to psychoeducational intervention. As predicted by the model, hostile attributions were associated with greater anger and more hostile behavior. Negotiation paradigms offer a particularly rich opportunity to examine complex interaction patterns and test conceptual models simultaneously.

In the current study, social cognitions were measured in conjunction with the observations through individual interviews regarding goals, empathic reasoning, and satisfaction with the outcomes of the prisoner's dilemma game and prize division.

1.3. Hypothesized intervention effects

We expected that posttest comparisons between the intervention and control groups would show benefits of the program with regard to behavior, cognitions, and affect. Table 1 summarizes the measures and specific intervention hypotheses to be described below.

1.4. Hypothesized relationships among social cognitions, behaviors, and satisfaction

1.4.1. Goals and behavior

The current study tests the conceptual underpinnings of the *Second Step* program and extends previous research by examining links between social cognitions and observed behavior. In line with the previous discussion, we expected prosocial goals to predict less aggression, more cooperative behavior, and more satisfaction in the observed conflict situations. It was less clear whether goals measured in the

Table 1
Study variables, measurement context, and hypothesized intervention effects

Variables	Measurement context	Hypothesized effects
Classroom behavior		
Social competence	Teacher report	More competent
Antisocial behavior	Teacher report	Less antisocial
Structured conflicts: beliefs		
Goal preference	Prisoner's dilemma	More prosocial
Expected satisfaction	Prisoner's dilemma	Lower, self-high outcome
		Higher, equal outcome
Post-game satisfaction	Prisoner's dilemma	Higher satisfaction
Satisfaction reasoning	Prisoner's dilemma	More egalitarian
Outcome satisfaction	Prize division	Higher satisfaction
Structured conflicts: behavior		
Cooperative choices	Prisoner's dilemma	More frequently
Cooperative negotiation	Prize division	More frequently
Coercive negotiation	Prize division	Less frequently
Adult intervention	Prize division	Less frequently
Hypothetical social cognitions		
Attributions of intent	Student survey	Less hostile
Intended behavior	Student survey	Less aggressive, more competent

context of a prisoner's dilemma task would also predict teacher-reported social competence or student behavioral intentions.

1.4.2. Goals and satisfaction

Goals help organize an individual's emotional responses to a social outcome by determining which behavioral outcomes are valued and which circumstances prove satisfying or disappointing (Crick & Dodge, 1994; Jarvinen & Nicholls, 1996; Rubin & Krasnor, 1986). Children with prosocial and egalitarian goals may have more opportunities to experience satisfaction than those operating in the zero-sum context of dominance goals. Prosocial goals and behavior may also elicit reciprocal behavior from peers, offering greater avenues for this kind of social reward. Thus, we expected a positive relationship between situation-specific prosocial goals and subsequent satisfaction.

1.4.3. Hostile beliefs and behavior

Based on social-cognitive models and previous research, we anticipated that children with hostile beliefs would be more antisocial and less socially competent, as rated by teachers; have more aggressive intentions in response to a hypothetical provocation; and display more aggression during behavior observations.

1.4.4. Shared goals, beliefs, and dyadic behavior

A further extension of the work on goals and beliefs is the examination of observed dyadic behavior. Research by Coie et al. (1999) has demonstrated that dyad effects are as predictive of aggression as actor or target effects. The current study allowed us to examine joint decision making and negotiation behavior

when the participants shared goals or beliefs, or when they differed. To our knowledge, dyadic processes have not been examined with respect to goals and attributions.

Prisoner's dilemma games conducted between individuals show that shared cooperative goal preferences predict cooperative decision making (McClintock & Liebrand, 1988). We predicted that pairs who shared prosocial goals or less hostile attributions would exhibit more cooperative and less aggressive behavior than pairs who shared self-interested goals or largely hostile attributions. It was not clear, however, how divergent goals would affect links between goals and behavior—whether a person with prosocial goals or benign beliefs would be able to appeal successfully to his or her partner's "better side," or whether the person with self-interested goals or hostile beliefs would heighten self-interested concerns in his or her partner.

2. Methods

2.1. Schools

Fifteen elementary schools (seven K-5th grade and eight K-6th grade) from three cities in western Washington were recruited to participate in the study. Conditions for inclusion were that (a) school personnel agreed to random assignment to either the intervention or control group, and (b) school personnel agreed to refrain from implementing any new social competence programs for the duration of the study. The schools were located in urban districts of two moderately-sized cities, two suburban districts contiguous to the urban districts, and a small city adjacent to a naval base.

Schools in the intervention and control groups did not differ with respect to ethnic makeup or percentage of students receiving free and reduced lunch ($ts < 1$). Three intervention and three control schools had under 20% of their population receiving free or reduced lunch. Four intervention and three control schools ranged from 20% to 50% receiving free or reduced lunch. One intervention and one control school had more than 75% of their population receiving free or reduced lunch. The school populations ranged from 52% to 89% European-American. Asian-American and African-American comprised the next largest ethnic groups (18% and 12%, respectively).

Schools in this area had ready access to research-based programs, and early school contacts revealed that schools were reluctant to agree to a wait-list control design. Therefore, schools assigned to both intervention and control groups received program materials, teacher training, and substitute teachers during training, albeit for different grades. Control schools received these benefits for classrooms that were not in the study. Fig. 1 presents a schematic of the implementation and data collection schedule.

2.2. Design and randomization

This study used data taken from a larger study that investigated the *Second Step* intervention over time and with two different cohorts. The data in the present study come from children in the second intervention cohort and in the control group, collected simultaneously.

Due to necessity rather than design, school recruitment extended over two years, the pre-study year and the initial year of data collection for the first intervention cohort. Eleven of the schools
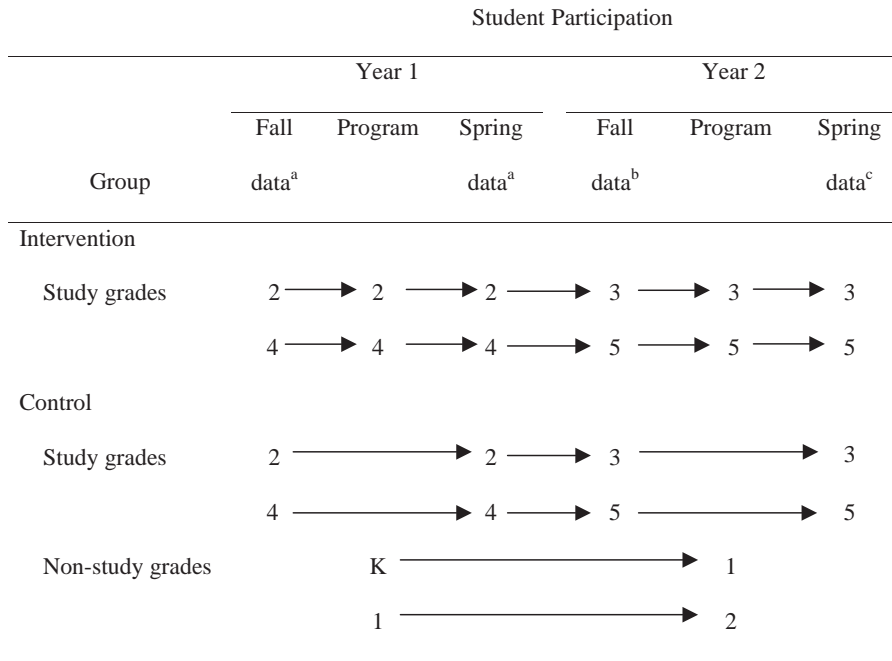
Student Participation

Group	Year 1			Year 2		
	Fall data[a]	Program	Spring data[a]	Fall data[b]	Program	Spring data[c]
Intervention						
Study grades	2 → 2 → 2 → 3 → 3 → 3					
	4 → 4 → 4 → 5 → 5 → 5					
Control						
Study grades	2 ⟶ 2 ⟶ 3 ⟶ 3					
	4 ⟶ 4 ⟶ 5 ⟶ 5					
Non-study grades	K ⟶ 1					
	1 ⟶ 2					

Fig. 1. Data collection and program implementation schedule by grade. Arrows denote chronological time. [a]Teacher ratings and student surveys collected. [b]Teacher ratings collected. [c]Observations, interviews, teacher ratings, and student surveys collected.

were recruited in the pre-study year and randomly assigned to the intervention (two-thirds of sample) or control group (one-third of sample). The four other schools recruited in the first year of cohort 1 data collection agreed to random assignment, although all were assigned to the control group. Functional equivalence between the control schools was examined in preliminary analyses. Post hoc analyses specific to the truly randomly assigned schools further explored the study's internal validity.

2.3. Students

Second- and fourth-grade teachers sent letters home with students requesting parental permission for study participation. Active consent for two years of study participation was obtained for 63% of students ($n = 1,253$). These served as participants in the study, although the program was administered to all students in the intervention classrooms.[1]

Participants were between the ages of seven and eleven and were roughly evenly divided by sex (48.2% female) and grade level (54.6% in second grade) with proportions equivalent in the two groups. There were 620 participants in the intervention group, and 615 in the control group. Attrition over the two years, 25.5% in the intervention group and 28.8% in the control group, yielded samples of 462 and 436, respectively.

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[1] One student did not participate due to parent request.

2.4. Program implementation

Prior to program implementation, 47 second- and fourth-grade teachers participated in an initial two-day training from Committee for Children trainers. They were introduced to program content, and they practiced teaching lessons and exchanged ideas regarding modeling and support of skills throughout the school day. At the beginning of the second year of implementation, 48 third- and fifth-grade teachers received the same training (their first year with the program). Program consultants met with teachers twice monthly to discuss and document program implementation.

Teachers typically taught one or two program lessons per week. The number of lessons varied from 18 to 27, depending on grade. The proportion of program lessons taught during the first year ranged from 42% to 100% ($M = 79\%$, $SD = .17$). The mean was 83.3% in year 2, ranging from 0% to 100% ($SD = .20$). A teacher who completed 50% of the lessons typically had completed the empathy unit and the lessons that taught the basic problem-solving method. A teacher who completed 80% of the lessons (46.3% of teachers in year 1, 67.3% in year 2) would have completed the empathy and impulse-control units, and the basic techniques of emotion regulation. Although a minority of the students received the complete program, we used an intent-to-treat model, including all experimental classrooms in the intervention group.

2.5. Overview of study procedures

As shown in Fig. 1, students were followed through two school years. Each year, program implementation started in late October, and was scheduled to finish in mid-March. Teachers rated student social behavior each October over two years. Surveys of attributions and intended responses to aggression were group-administered in classrooms in October of the first year. Teacher rating forms and student surveys were re-administered in April of each year.

During May and June of year 2 (two to six weeks following survey administration), pairs of children participated in tasks designed to create conflicts between self-interested and prosocial goals. A prisoner's dilemma game was used as a vehicle to assess children's goals, expected outcome satisfaction, joint cooperative choices, outcome satisfaction, and reasoning. A task requiring negotiation over the division of four prizes was used to observe need for adult intervention, coercive behavior, and cooperative behavior, and to assess outcome satisfaction. The dyadic decision-making processes in the prisoner's dilemma and responses in the prize division task were audio taped for later coding.

2.6. Measures and tasks

2.6.1. Teacher-reported social behavior

Merrell's (1993) School Social Behavior Scale (SSBS) asks teachers to report how frequently students engage in each of 32 antisocial and 33 socially competent behaviors. Both of the subscales have high internal consistency (alphas ranged from .91 to .96 for both scales). Test–retest reliability is adequate, with rs ranging from .76 to .82 for social competence and .60 to .73 for antisocial behavior. Stability of scores across raters measured with Pearson product–moment correlations ranged from moderate for social competence (rs from .72 to .83), to low for antisocial behavior (rs from .53 to .71). This suggests that comparisons across school years (and raters) will be less comparable than comparisons within school year.

The SSBS has been shown to discriminate between the behavior adjustment of children classified as emotionally–behaviorally disordered, learning disabled, average, and gifted-talented. Scores on the SBSS correlate highly with other rating scales of school-based social behavior.

Scales were used in analyses if no more than one item was missing per subscale. In such cases, subscale means were substituted for the missing item.

2.6.2. Survey of beliefs and intentions

Surveys administered to students in their classrooms assessed attributions of hostile goals from hypothetical vignettes of ambiguous provocations. Four vignettes were adapted from items developed by Dodge (1980). After hearing themselves described as suffering harm from a peer, students indicated whether the peer's actions (which were ambiguous) were (a) due to unknown or benign intent; (b) "kind of mean"; or (c) "really mean on purpose." Ratings were summed across the four vignettes to create a measure of hostile beliefs.

After rating the intentions of the vignette characters, students rated how likely they were to respond with physical aggression, verbal aggression, and socially competent behavior on a five-point scale. Students also evaluated responses to two additional vignettes in which the intent of the peer was unambiguous (teasing or bullying behaviors). Two forms of the survey, each having four ambiguous and two unambiguous vignettes, were counterbalanced across schools. At each school, forms were alternated with administration (e.g., A, B, A).

2.6.3. Structured conflict: Prisoner's dilemma game

Four same-sex, same-grade children from two different classes were randomly selected and escorted to an unused room on the school grounds. Experimenters explained to each pair of children that they would earn money for their class party while the other pair of children earned money for their own class party (provided by experimenters at the end of the year). For each of eight trials, each pair would choose either a cooperative or exclusively self-interested strategy. When both pairs had made their decisions, they revealed their choices on the experimenter's cue by simultaneously holding up a color-coded card. As shown in Table 2, the earnings for each pair were determined jointly by their selection and that of the other pair. Charts displayed overall and for each trial how much children would earn given the four possible combinations (equal-high, self-high, self-low, and equal-low). Any suggestion of initial confusion (13% of the sample) was followed by clarifying instructions and examples. After each trial, an experimenter sitting with each of the pairs stated the trial outcome and informed the children of the accumulated earnings of each pair.

2.6.3.1. Outcome preference, reasoning, and expected satisfaction.   Prior to the eight decision trials, children were audio taped as they indicated their first and second preferences among the four possible outcomes and explained why they preferred their first choice to their second. With the first two outcomes covered, children ranked the remaining two outcomes. These two measures were later combined to form the prosocial goal variable.

To form the four expected satisfaction variables, children rated the satisfaction they expected with each of the four outcomes on a five-point scale that ranged from 1 (DISAPPOINTED!) to 5 (PLEASED!).

2.6.3.2. Joint decision making and outcome satisfaction.   The decision-making process of each pair was audio recorded as they jointly selected a cooperative or self-interested strategy on each of eight

Table 2
Possible trial outcomes for the joint contingency game

Pair B choice	Pair A choice	
	Cooperative	Self-interested
Cooperative	$0.40 ($0.40) Equal-high	$0.50 ($0.20) Self-high
Self-interested	$0.20 ($0.50) Self-low	$0.10 ($0.10) Equal-low

Note: Other pair's choice is in parentheses.

trials. After completing the eight trials and hearing the amounts of money earned for their class and the other pair's class, children rated their overall satisfaction on a five-point scale (DISAPPOINTED! to PLEASED!). They were then asked to explain why they were pleased or disappointed with the outcome.

2.6.4. Structured conflict: Negotiated prize division

In a second, more naturalistic task, each pair of children was offered four "thank-you gifts" that varied in attractiveness (a magnetic travel game, a stylish pop-a-point pencil, a "happy face" eraser, and an undistinguished paper sticker). The children were told they could divide them any way they liked, as long as both children in the pair agreed. Negotiations were audio taped. Experimenters did not comment unless the negotiations stalled with the pair unable to resolve conflict over the division. In that case, experimenters intervened in a set sequence, starting with a single open-ended question, "Any other ideas?" and becoming progressively more directive if negotiations did not resume.

After the prize negotiation, students rated their satisfaction with the outcome on a five-point scale. They were then escorted back to their classrooms.

2.7. Coding and data summary

2.7.1. Responses to interviews during structured conflicts

2.7.1.1. Reasoning about goals and satisfaction. Four research assistants who were blind to condition coded the reasons students gave for their preferred outcome prior to engaging in the prisoner's dilemma game, and their satisfaction (or dissatisfaction) with the outcome after engaging in the game. For each measure, a coding system designed for this study used three ordered categories to represent degree of prosocial reasoning: (a) desire to beat or dominate the other pair (e.g., "We try to beat Ms. Chase's class") as a reason for preferred outcome and "At least we got more than those guys," as a reason for outcome satisfaction; (b) desire to earn absolute highest amount for one's own class ("That way we'll get a lot for our party;" "I wanted to get more than that";) or (c) desire for equality or to earn the most possible for both classes. ("That way there's more for the school;" "At least we both got the same"). Interrater agreement was 86%. Correcting for chance agreement, Cohen's kappa was $\kappa = .80$.

2.7.1.2. Prosocial goals. As shown in Table 2, the self-high outcome would be preferred by those who wanted the highest possible absolute gain and those who wanted a competitive advantage over the other pair. In order to help determine the motivating goal, children's outcome rankings and reasoning were

used to form four ordinal categories reflecting prosocial goals in the prisoner's dilemma task; the categories were the following: (a) dominating—children selected the self-high outcome as most preferred and explained their preference as the desire to dominate the other pair; (b) individualistic—children selected the self-high outcome as most preferred and explained their preference as the desire to earn the largest possible amount; (c) egalitarian—children selected the equal-high outcome as most preferred and the self-high outcome as their second choice; and (d) altruistic—children selected the equal-high outcome as most preferred and the self-low or equal-low outcome (rare) as their second choice. All choices fell into these four categories.

2.7.2. Behavior coding

2.7.2.1. Joint decision making.   The purpose of having children decide their choices jointly on the prisoner's dilemma game was to observe negotiation strategies and spontaneous reasoning (e.g., Frey & Ruble, 1985, 1987). These plans failed as the children gestured and whispered to avoid having their decisions overheard by the other pair. Our ability to transcribe the conversation accurately was severely compromised and we abandoned coding efforts for the game.

Table 3
Prize negotiation codes, mean frequencies, examples, and intraclass correlation coefficients

Code	Description
Cooperative	
Check preference $M = .48$	Checks partner's desires without constraining partner's choices ("Do you want the backgammon game?" "What do you want?"). $r = .843$
Prompt $M = .74$	Prompts partner to lead or act on wishes; may be submissive ("If you want this one, it's okay." "Go ahead."). $r = .916$
Check agreement $M = .93$	Checks partner's desires after stating own desire or offering proposal ("I want the game. What do you want?" "You could have this, ok?"). $r = .776$
Coercive	
Aggression $M = 1.23$	Interrupts negotiation with aggression: insults, threats to cheat, refusal to talk (pointedly ignores a question or says, "That's a stupid idea!"). $r = .823$
Demand/whine $M = 2.22$	Tries to impose own preferences without considering the other: demands, bribes, rejection of ideas, whining ("That's mine." "No way!"). $r = .898$
Convincing	
State wants $M = 1.99$	States desires ("I want the game." "I don't want that sticker!"). $r = .810$
Process $M = 1.12$	Suggests a process for decision making ("I think the game and eraser should go together." "Let's put it away and decide on these three."). $r = .900$
Persuade $M = 2.33$	Uses persuasive comments that indicate perspective-taking: explanations, clarifications, offering compensatory proposals ("You could have all three;" "I could use the game because I'm going on vacation"). $r = .934$
Additional codes	
Toy interest $M = 1.37$	Positive or interested comments about prizes ("How does that work?" "Cool!"). $r = .806$
Miscellaneous $M = 7.93$	All other utterances, including expressive noises and comments to the experimenter ("Earth to Bob;" "Could we get two pencils?"). $r = .930$

2.7.2.2. Need for adult intervention in the prize division. Four individuals, blind to group assignment, transcribed and coded negotiation outcome and strategies. The outcome of the prize negotiation was coded as (a) requiring adult intervention for resolution; (b) resolved independently by students (no intervention was required beyond a single prompt, "Any other ideas?"); or (c) not codable due to premature adult intervention (e.g., omitting the non-directive prompt prior to issuing directive statements). Generalizability was acceptable, *ICC r* = .73.

2.7.2.3. Observed negotiating strategies. All phrases uttered by the partners while negotiating the prize division were coded using a simplified version of a coding system developed by DeVries and colleagues (DeVries, Reese-Learned, & Morgan, 1991). Behaviors fell into one of the ten mutually exclusive and exhaustive categories shown in Table 3. These behaviors included three categories of cooperative strategies, three convincing strategies, and two coercive strategies. The aggressive behavior category differed slightly from other codes in that it included non-responses in which one student pointedly ignored or refused to respond to a statement made by the other student. Two additional categories were toy interest and miscellaneous. Intraclass correlation coefficients for the ten codes ranged from .78 to .93.

3. Results

In this section, we examine sample equivalence and present our analytic strategy for the outcome evaluation. We then test the effects of intervention for the entire sample and the randomly assigned sub-sample. Finally, we examine intra-individual relations between behavior and motivational constructs: social goals and attributions of hostile intent.

3.1. Group differences

3.1.1. Sample equivalence

3.1.1.1. Attrition and pre-intervention differences. A 2 (group) by 2 (attrition) multivariate analysis of variance (MANOVA) was performed on all time 1 (baseline) variables: hostile beliefs, behavior intentions, and teacher ratings. Neither the multivariate, $F(6, 830) = 1.47$, *ns*, nor the univariate tests showed a group by attrition interaction. Students who did not complete the study were more likely to give socially competent responses to hypothetical problems at baseline than those who participated for two years, $F(1, 835) = 9.05$, $p < .01$. A significant baseline group difference was found for teacher ratings of antisocial behavior, higher for intervention group students, $F(1, 835) = 5.14$, $p < .05$. Means suggesting lower teacher ratings of student social competence for the intervention relative to the control group did not reach significance ($p < .10$), but also indicated a need to use baseline covariates as appropriate.

3.1.1.2. Within control group equivalence. Preliminary univariate analyses (ANOVA) investigated possible outcome differences between the two sets of control schools, those recruited simultaneously with the first intervention cohort (who were randomly assigned and brought into the study the following year) and those recruited a year later. One-way ANOVAs indicated that only 2 of the 46 analyses showed significant differences. Those recruited first made more hostile attributions at Time 2 (spring 1) than

those in the second recruitment cohort. At Time 4 (spring 2) the pattern was reversed. Since these two differences were not consistent, and the number of differences did not exceed that expected by chance, control schools were treated as a single group.

3.1.2. Analytic strategy

3.1.2.1. Omnibus tests.   Whenever possible, we used omnibus multivariate analyses of covariance (MANCOVA), grouping conceptually related variables in order to decrease the number of analyses and chance of spurious results. Univariate analyses were undertaken only if multivariate results were significant at $p < .05$. Participant sex, grade, and baseline ratings of social competence or antisocial behavior were entered as covariates, yielding a 2 (group) analysis of covariance. Divergences from this design are noted, as when preliminary analyses indicated an interaction of a covariate with group.

3.1.2.2. Level of analysis.   We adopted three different analytic strategies based on our conceptualization of the variables. Children within classes were rated by the same individuals who observed children's behavior in the context of the classroom. Multivariate analyses were therefore followed by confirmatory multilevel modeling with individuals nested within classroom.

Observed behavior reflected the dyadic relationship and joint decision making, requiring analyses on the combined behavior of the pair. Preliminary partitioning of the variance components confirmed that dyad accounted for 22.7% to 78.7% of the variance in negotiation behaviors, with classroom accounting for virtually none.

Goals and satisfaction measured during the dyadic session reflected the individual's expectations, goals, and interpretation of the events as influenced by knowledge of the partner's identity and that partner's subsequent behavior. Partitioning showed significant variance at the individual and pair levels. Confirmatory multilevel modeling addressed subject nesting within pairs.

3.1.3. Teacher-reported social behavior

Because students changed teachers in the second year of program implementation, ratings were confounded with reporters across years. Previous research indicates that teachers complete scales in idiosyncratic ways (Coie et al., 1999), making it difficult to compare ratings across years/reporters. We therefore examined change within each implementation year, entering baseline ratings as covariates. An overall MANCOVA revealed significant group differences, $F(4, 731) = 11.31$, $p < .001$, in teacher-reported social behavior. The discovery of a significant group by covariate interaction, however, necessitated a separate analysis for antisocial behavior.

In order to look at meaningful differences, we divided baseline (Time 1) antisocial ratings at one standard deviation above the mean. We analyzed changes in antisocial behavior during the 2 years by means of a 2 (group) by 2 (antisocial baseline) MANCOVA, with sex and grade as covariates. As shown in Table 4, the significant multivariate findings for group, $F(2, 749) = 16.65$, $p < .001$, and the group by baseline interaction, $F(2, 749) = 6.17$, $p < .01$, were due to changes in the first year of program implementation. Among those with high baseline ratings, the intervention group showed greater declines in antisocial behavior than the control group ($p < .001$, $ES = .25$). Significant but smaller differences also favored the intervention group among students with low baseline scores ($p < .05$, $ES = .17$). Intervention students with low baseline scores showed no change in antisocial behavior, whereas control students increased. There were no group differences in antisocial behavior change in Year 2.

Table 4

F-values and adjusted mean yearly changes in antisocial behavior and social competence ratings

Sub-groups by year	Group		*F*
	Intervention	Control	
Group by baseline effects			
Year 1 antisocial			$F(1, 750) = 10.72$***
High baseline	-14.57_a	-2.26_a	
Low baseline	0.73_b	4.27_b	
Year 2 antisocial			$F < 1$
High baseline	3.87	3.30	
Low baseline	2.33	2.12	
Cell sizes			
High baseline	61	65	
Low baseline	277	354	
Group effects			
Year 1 competence	7.92	0.29	$F(1, 745) = 30.16$***
Year 2 competence	2.72	-0.26	$F(1, 745) = 7.71$**
Cell sizes	339	411	

Means with the same subscripts differ at $p < .001$, and $p < .01$, respectively.

** $p < .01$. *** $p < .001$.

A two-group MANCOVA of social competence with sex, grade, and baseline social competence as covariates indicated a significant group effect, $F(2, 746) = 19.04$, $p < .001$. Changes in the first intervention year showed significant intervention group gains in social competence relative to the control group. The intervention group also showed relative gains in the second year. As shown in Table 4, these were of smaller magnitude ($p < .01$, $ES = .10$), than the first-year gains ($p < .001$, $ES = .20$).

Using HLM to control for nesting in teacher reports, fall baseline ratings and sex were entered at the individual level and grade and group at the classroom level. To investigate the differential intervention effects by grade and baseline ratings, group was also entered on the baseline rating slope at the classroom level.

Individual Level

$$Y_{ij} = \beta_{0j} + \beta_{1j}(\text{SEX}) + \beta_{2j}(\text{BASELINE}) + r_{0j}$$

Classroom Level

$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{GRADE}) + \gamma_{02}(\text{GROUP}) + u_{0j}$$
$$\beta_{1j}(\text{SEX}) = \gamma_{10}$$
$$\beta_{2j}(\text{BASELINE}) = \gamma_{20} + \gamma_{21}(\text{GROUP})$$

HLM analyses confirmed the group difference and group by baseline ratings interaction for antisocial behavior (ps $< .001$) in Year 1. Separate HLM analyses showed group differences for both the high- and low-baseline antisocial groups (ps $< .05$). HLM also confirmed the group difference for social competence in year 1 ($p < .01$) but not for year 2.

Table 5
F-values and adjusted group means for goals and satisfaction in the prisoner's dilemma game and prize division

	Group		*F*
	Intervention	Control	
Prosocial goals	2.52	2.30	$F(1, 743) = 11.19**$
Expected satisfaction			
Self-interested	4.21	4.38	$F(1, 743) = 6.96**$
Cooperative	4.21	4.22	$F < 1$
Actual satisfaction			
Game outcome	4.12	3.95	$F(1, 784) = 3.92*$
Prize division	4.49	4.25	$F(1, 784) = 11.52***$
Egalitarian reasons	1.07	0.95	$F(1, 632) = 4.33*$

*$p < .05$. **$p < .01$. ***$p < .001$.

3.1.4. Prisoner's dilemma game

3.1.4.1. Children's understanding of contingencies.   All children chose either the equal-high or self-high outcome as their first choice. Further evidence that children understood the game contingencies comes from a 4 (outcome) repeated measures ANOVA of the expected satisfaction ratings. The mean ratings for equal-high and self-high outcomes were between "satisfied" and "very satisfied" (4.19 and 4.28, respectively), whereas those for equal-low and self-low outcomes fell between "dissatisfied" and "in between" (2.92 and 2.68, respectively). Since no hypotheses were formed for the self-low and equal-low outcomes, these were not examined further.

3.1.4.2. Prosocial goals and expected satisfaction.   There was a significant multivariate effect for group, $F(3, 741) = 5.00$, $p < .05$, $ES = .17$. As predicted, the univariate analyses summarized in Table 5 indicate that goals chosen by the intervention group were more prosocial than those chosen by the control group. As shown in Table 6, the mean differences appear due primarily to a smaller percentage of the intervention group choosing a dominating goal and a larger percentage choosing the egalitarian goal. Table 5 indicates that children in the control group expected greater satisfaction for the self-high outcome than those in the intervention group. Post hoc comparisons showed that control group children expected greater satisfaction from the self-high outcome than from the equal-high outcome ($p < .05$). The groups did not differ in the satisfaction expected following an equal-high outcome.

Table 6
Frequencies of goal choices by group

Goals	Intervention		Control	
	n	*P* (%)	*n*	*P* (%)
Dominating	55	14.0	96	23.4
Individualistic	127	32.4	130	31.6
Egalitarian	170	43.4	146	35.5
Altruistic	40	10.2	39	9.5
N	392		411	

Hierarchical linear modeling (HLM) of prosocial goals and expected satisfaction included baseline social competence scores (grand mean centered) and student sex at the individual level. In order to verify the multivariate analyses, we entered group at the pair level intercept. Analyses with this design confirmed all group differences obtained with MANCOVA ($ps < .05$).

Individual Level
$$Y_{ij} = \beta_{0j} + \beta_{1j}(\text{SEX}) + \beta_{2j}(\text{BASELINE}) + r_{0j}$$
Pair Level
$$\beta_{0j} = \gamma_{00} + \gamma_{01}(\text{GRADE}) + \gamma_{02}(\text{GROUP}) + u_{0j}$$
$$\beta_{1j}(\text{SEX}) = \gamma_{10}$$
$$\beta_{2j}(\text{BASELINE}) = \gamma_{20}$$

3.1.4.3. Joint decision making.   Because this was a measure of the dyad's cooperative choices on the prisoner's dilemma game, the sum of the pair's baseline ratings for social competence was entered as a covariate along with sex and grade. The proportion of cooperative choices made by each pair on the eight trials was subjected to univariate analysis of covariance. Contrary to predictions, the two groups did not vary in the proportion of cooperative choices, $F < 1$, $M = 37.1\%$.

3.1.5. Observed negotiation strategies during prize division

3.1.5.1. Negotiation context.   The average number of utterances made during the negotiation task was 20.34. Judging from the high level of student interest in the prizes, the negotiation task was well-suited for testing children's ability to resolve conflicts amicably. Positive or interested comments about the prizes were common among pairs of students and did not vary by group ($M = 1.38$).[2]

3.1.5.2. Need for adult intervention.   Coders identified 6 out of 427 sessions in which the experimenter failed to follow protocol and intervened prematurely to assist in resolving the conflict (1.4%). The remaining 421 sessions were coded as requiring adult intervention or resolving negotiation successfully. A 2 (group) by 2 (adult intervention) Chi-square analysis showed the predicted group difference in need for adult intervention, $\chi^2(1) = 6.66$, $p < .05$, with pairs of students in the intervention group less likely to require adult intervention ($n = 16$, 7.6% of 210) than those in the control group ($n = 28$, 12.9% of 217).

3.1.5.3. Observed negotiating strategies.   The behavior observed during the prize negotiation provides insight into the differential rates of conflict resolution found between the intervention and control group dyads. As predicted, significant group effects were found among the most and least competent strategies (cooperative and coercive). Pairs of children in the intervention and control groups were equally likely to try to convince their partners to change position.

Coercive strategies were analyzed with the sum of the pairs' baseline antisocial ratings, sex, and grade entered as covariates. Multivariate analyses showed that group assignment predicted coercive behavior, $F(2, 397) = 4.14$, $p < .05$, $ES = .14$, during negotiations. As shown in Table 7, the intervention group was less likely than the control group to behave aggressively while negotiating for prizes. The groups did not differ in demanding, whiney behavior.

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[2] Negative comments about the toys occurred so infrequently that coders were not able to code them reliably.

Preliminary analyses of cooperative strategies indicated the need to include sex as a factor with group, yielding a 2 (group) by 2 (sex) MANOVA with grade and baseline social competence as covariates. Multivariate results showed a significant group by sex interaction, $F(3, 396) = 2.62$, $p < .05$. Inspection of the significant univariate findings showed that pairs of girls in the intervention group were more likely to check preferences of their partners than girls in the control group ($p < .05$, $ES = .17$). A marginally significant group by sex interaction ($p < .10$, $ES = .14$) suggested that boys in the intervention group were more likely than their cohorts in the control group to ask for their partner's agreement.

3.1.6. Outcome satisfaction

There were no group differences in the outcome of the prisoner's dilemma game. However, univariate tests following the finding of a significant multivariate group effect, $F(2, 783) = 7.17$, $p < .001$, $ES = .14$, showed, as predicted, that intervention students were more satisfied with the outcomes of the prisoner's dilemma game and prize division than control students (see Table 5).

The reasons children gave for their level of satisfaction had a high proportion of missing data. In order to preserve sample numbers for evaluating outcome satisfaction, the reasons were analyzed separately with 2 (group) ANCOVAs with sex, grade, and baseline as covariates. Students in the intervention group gave more egalitarian reasons for their satisfaction or dissatisfaction than students in the control group, $F(1, 632) = 4.33$, $p < .05$, $ES = .10$.

Table 7
F-values and means for coercive and cooperative negotiating strategies

Strategy	Group		F
	Intervention	Control	
Group effects			
Aggression	0.88$_a$	1.52$_a$	$F(1, 398) = 6.44^*$
Demand, whine	2.36	2.07	$F < 1$
Group by gender effects			
Check preference			$F(1, 398) = 4.57^*$
Girl pairs	0.78$_b$	0.49$_b$	
Boy pairs	0.34	0.39	
Check agreement			$F(1, 398) = 3.40^\dagger$
Girl pairs	0.89	1.25	
Boy pairs	0.92$_c$	0.69$_c$	
Prompt partner			$F < 1$
Girl pairs	0.86	0.89	
Boy pairs	0.60	0.66	
Cell sizes			
Girl pairs	87	110	
Boy pairs	98	108	

Means with the same subscripts differ at $p < .05$.
† $p < .10$. * $p < .05$.

Using the previous two-level (individual and pair) design, individual HLM analyses confirmed the significant findings for satisfaction with the prize division and egalitarian reasoning for satisfaction or dissatisfaction with the outcome of the prisoner's dilemma game ($ps < .05$), but not satisfaction with the game outcome.

3.1.7. Survey of hostile attributions and intentions

In preliminary analyses, behavioral intentions showed nearly identical patterns of responses to the ambiguous and non-ambiguous provocations. Aggressive intentions were uniformly higher for non-ambiguous provocations, but there were no interactions of provocation-type with group, student sex, or grade. Responses for each type of behavior were therefore combined across the six vignettes. Cronbach's alphas were .84, .82, and .63, respectively, for physically aggressive intentions, verbally aggressive intentions, and socially competent intentions. The alpha value for the measure of hostile attributions was .61.

A 2 (group) by 3 (assessment time) by 3 (response type) multivariate repeated measures test with sex and grade as covariates was used to analyze hostile attributions and behavioral intentions. Contrary to predictions, there were no significant differences between- or within-groups. The data suggest a possible floor effect. The percentages of subjects at baseline who scored higher than the midpoints for hostile attributions, verbal aggression, and physical aggression were only 19.0%, 10.0%, and 11.8%, respectively.

3.1.8. Random subset analyses for program effects

In order to further explore internal validity, we performed post hoc analyses of our significant findings with just the randomly assigned sample. Post hoc 2-group ANCOVAs were computed with the students assigned to the intervention ($n = 440$) and control ($n = 165$) groups, using sex, grade, and baseline teacher ratings as covariates. Year 1 teacher ratings again showed positive effects for social competence, $F(1, 600) = 30.18$, $p < .0001$, and antisocial behavior, $F(1, 599) = 16.78$, $p < .001$. A significant group by baseline rating interaction, $F(1, 599) = 8.14$, $p < .01$, indicated the most potent effects occurred among children with initially high antisocial behavior. Intervention effects on Year 2 ratings of social competence did not reach significance, $F(1, 600) = 3.48$, $p < .07$.

The observed dyadic behavior showed positive intervention effects on aggressive negotiating strategies, $F(1, 263) = 4.19$, $p < .05$, and joint effects of group and sex on checking partner preferences, $F(1, 263) = 3.96$, $p < .05$.

Social-cognitive measures showed the predicted effects for prosocial goals, $F(1, 504) = 6.36$, $p < .05$, and expected satisfaction with a self-interested outcome $F(1, 504) = 4.01$, $p < .05$. Unlike the results from the larger sample, satisfaction ratings did not reach significance in the random sample [game outcome $F(1, 530) = 2.02$, $p < .16$], showing only a marginal effect for the prize division, $F(1, 530) = 2.99$, $p < .09$. Children in the intervention group were again found to offer egalitarian reasons for their level of satisfaction, $F(1, 436) = 3.90$, $p < .05$, more frequently than those in the control group.

3.2. Cognition–behavior-satisfaction linkages

In order to analyze cognitive–behavioral relationships within individuals and within dyads, we grouped children based on their goals and attributions. Children who identified the equal-high outcome as most preferred (altruistic or egalitarian goal) constituted the cooperative goal group. Children who preferred the self-high outcome (self-interested or dominating goal) constituted the self-interested goal group.

There were a limited number of possible scores for the mean of the attribution responses. Unable to split scores at the median, we reasoned that behaviorally significant differences were more likely to occur between more extreme high scores and lower scores. We therefore split the scores between the lower 65% (up to and including .5) and the upper 35% (.75 and above). This yielded 2 (goals) × 2 (attribution) ANOVAs for analyzing the contribution of social cognitions to individual satisfaction, teacher-reported behavior, and behavior intentions.

3.2.1. Satisfaction

As predicted, analyses of the satisfaction variables showed a significant effect for goal preferences, $F(3, 581) = 4.65$, $p < .05$. Satisfaction with the prize division was higher if students preferred cooperative goals $F(1, 583) = 5.23$, $p < .05$, than if they preferred self-interested goals ($M = 4.51$ and $M = 4.34$, respectively). Cooperative goals were also associated with a tendency to provide prosocial reasons for one's satisfaction or dissatisfaction with the results of the prisoner's dilemma game $F(1, 583) = 9.08$, $p < .01$ ($M = 2.10$ v. $M = 1.93$ for those with self-interested goals). Contrary to predictions, goal preferences were not related to actual satisfaction with the game outcome. Attributions were not predictive of satisfaction.

3.2.2. Teacher-reported social behavior

Analyses of teacher-reported social competence and antisocial behavior showed significant effects for goals, $F(2, 745) = 8.07$, $p < .001$, and attributions, $F(2, 745) = 7.00$, $p < .001$. The goal by attribution interaction approached significance, $F(2, 745) = 2.90$, $p < .06$, necessitating an evaluation of the main effects (shown in Table 8). Children with cooperative goal preferences were rated more socially competent, $F(1, 746) = 16.93$, $p < .001$, and less antisocial than those with self-interested goal preferences, $F(1, 746) = 12.40$, $p < .001$. Non-hostile attributions were also associated with greater social competence, $F(1, 746) = 13.87$, $p < .001$ and less antisocial behavior, $F(1, 746) = 9.05$, $p < .01$. Examination of the goal by attribution interactions for both social competence $F(1, 746) = 3.95$, $p < .05$, and antisocial behavior $F(1, 746) = 5.69$, $p < .05$, showed that hostile attributions predicted the behavior ratings of children with self-interested, but not cooperative goal preferences, $p s < .001$ (See Table 8).

Table 8
Teacher- and self-reported behavior as a function of goal preferences and attributions

Behavior	Non-hostile attributions		Hostile attributions	
	Cooperative goals	Self-interested goals	Cooperative goals	Self-interested goals
Teacher ratings				
Social competence	130.70a	127.80b	127.15c	117.55abc
Antisocial behavior	51.49d	53.30e	52.48f	61.87def
N	220	260	129	142
Intended behavior				
Verbal aggression	1.57g	1.60h	2.10gh	2.47gh
Physical aggression	1.39i	1.44j	1.99ij	2.38ij
Socially competent	3.89	3.84	3.88	3.71
N	230	270	130	139

Means with the same subscripts differ at $p < .001$.

Those children with self-interested goals and hostile attributions were significantly less socially competent and more antisocial than other children.

3.2.3. Intended behavior

Analysis of intended behavioral responses to the hypothetical conflict scenarios showed the expected close relationship to attributions, $F(3, 763) = 40.64$, $p < .0001$. They were also related to the goals children preferred in the prisoner's dilemma game, $F(3, 763) = 3.82$, $p < .05$, and to the goal by attribution interaction, $F(3, 763) = 2.79$, $p < .05$. Both verbally aggressive, $F(1, 765) = 7.39$, $p < .01$, and physically aggressive intentions, $F(1, 765) = 9.64$, $p < .001$, were lower among children who espoused cooperative goals than those who espoused self-interested goals. Hostile attributions were linked to higher levels of verbally aggressive, $F(1, 765) = 95.46$, $p < .0001$, and physically aggressive intentions, $F(1, 765) = 113.04$, $p < .0001$. As shown in Table 8, there were significant goal by attribution interactions for both verbal, $F(1, 765) = 5.82$, $p < .05$, and physical aggression, $F(1, 763) = 8.37$, $p < .01$. These reflected larger attribution group differences found in the self-interested goal group, $p < .0001$, than in the cooperative goal group, $p < .001$.

3.2.4. Cognitions and dyadic interaction

Within dyads, there were three patterns of goal concordance: (a) both children preferred the cooperative goal (altruistic or egalitarian pattern); (b) both children preferred the exclusively self-interested goal (self-interested or dominating pattern); or (c) children preferred different goals. There were also three groups corresponding to pair attributions: (a) both children espoused non-hostile attributions; (b) both espoused hostile attributions; and (c) one espoused non-hostile and the other espoused hostile attributions. These yielded 3 (pair goals) by 3 (pair attributions) MANOVAs for analyzing the contribution of social cognitions to dyadic behavior.

3.2.4.1. Joint decision making.

Joint decision making on the prisoner's dilemma task showed that cooperative choices varied as a function of pair goals, $F(2, 298) = 5.71$, $p < .001$. As shown in Table 9, pairs in which both children shared cooperative goals made significantly more cooperative choices than

Table 9
Dyadic behavior as a function of within-pair goal concordance

Pair behaviors	Pair goals		
	Shared		Unshared
	Cooperate	Self-interest	
Game choices			
Cooperative	0.42_a	0.37_a	0.33_a
Prize negotiation			
Aggression	1.00	1.56	1.03
Demand, whine	1.14_{bc}	2.28_b	2.24_c
Check preference	0.62_d	0.55_e	0.30_{de}
Prompt	0.85	0.80	0.56
Ask agreement	0.79	1.02	0.87
N of pairs	91	104	112

Means with the same subscripts differ at $p < .05$ (subscripts b, c, and e) or $p < .01$ (subscripts a and d).

pairs in which children shared self-interested goals, $p < .01$, or disagreed in their preference, $p < .001$. Pairs of children who disagreed made the fewest cooperative choices, significantly lower than children who shared a preference for the self-interested goal, $p < .01$.

3.2.4.2. Negotiating strategies.   Coercive negotiating strategies were also related to pair goals, $F(4, 668) = 2.58$, $p < .05$. Examination of the significant results for demanding, whining behavior, $F(2, 333) = 3.48$, $p < .05$, showed that pairs who shared cooperative goals were less demanding and whiney than pairs who shared self-interested goals or pairs who did not agree (both $ps < .05$).

Cooperative negotiating strategies were related to pair goals, $F(6, 666) = 2.33$, $p < .05$, and pair attributions, $F(6, 666) = 2.28$, $p < .05$. Goals predicted the frequency of checking preferences with one's partner, $F(2, 333) = 5.22$, $p < .01$. Pairs of children who shared cooperative goals checked partner preferences more than pairs who disagreed on goals, $p < .01$. Pairs who shared self-interested goals also checked partner preferences more than pairs who disagreed on goals, $p < .05$. (See Table 9). Pair attributions predicted the frequency of asking for partner's agreement, $F(2, 333) = 4.88$, $p < .01$. Pairs in which both children made non-hostile attributions asked for agreement more frequently than pairs who made hostile attributions, $p < .05$, or disagreed, $p < .01$ (means = 1.25, .86, and .67, respectively).

4. Discussion

This study extends prevention research and research on social development in three ways: first by demonstrating that a universal intervention can influence goals and observed behavior in conflict situations; second, by linking goals and attributions to observed behavior; and third, by examining the links between dyadic behavior and shared or unshared social cognitions. The discussion first addresses program-related changes and then the linkages between social cognitions and behavior that provide a conceptual basis for the *Second Step* program.

4.1. Group differences

Participation in the *Second Step* program was associated with significant benefits in student behavior, goals, and social reasoning for the sample as whole, and for the smaller, randomly-assigned sub-sample. The specific effects of the intervention varied according to the type of measurement and analysis. Consistent differences across analyses and sample were found in aggression and the need for adult intervention during prize division, and in motivational constructs such as goals, expected satisfaction, and reasoning about satisfaction. Group differences in teacher-reported behavior were robust for the first, but not second, year of intervention. Program effects on higher-level negotiation strategies were limited to intervention girls, and group differences in post-task satisfaction varied by analysis. No group differences were found for the survey measures, attributions and behavioral intentions, or for joint cooperative choices in the prisoner's dilemma game.

4.1.1. Developmental and contextual factors in conflict behavior

Consistent with naturalistic observations (Grossman et al., 1997), children in the intervention group displayed less aggression than those in the control group. Children in the two groups, however, made an equal number of demands when negotiating the division of their "thank-you" prizes. Meta-analyses of

other observational studies indicate that typically developing children use predominately coercive negotiating strategies (Laursen, Finkelstein, & Townsend Betts, 2001). The *Second Step* program appears to have reduced coercive strategies that fall into the aggressive, antisocial end of the continuum, but not the more developmentally typical "power plays."

Children who use higher-level negotiation strategies have better school adjustment than their peers (Yeates, Schultz, & Selman, 1991). In this study, girls in the intervention group were most likely to use such a strategy. Asking for a partner's preferences is particularly useful, as well as prosocial, because elementary students typically fail to state what they want in conflict situations (Johnson, Johnson, Dudley, & Acikgoz, 1994). The intervention did not result in the same findings for boys, although intervention boys were marginally more likely to check for agreement than their control group counterparts. Girls, who generally display higher levels of prosocial behavior than boys (Eisenberg & Fabes, 1998) may have found it relatively easy to adopt a collaborative strategy, whereas boys responded with marginal increases in cooperative, but not explicitly prosocial, behavior.

Previous research using a toy division paradigm shows that failure to reach agreement is associated with destructive negotiating strategies and negative relationships between participants (Ram & Ross, 2001). The present study extends this line of research to classmates, who often have emotionally-charged disputes over access to resources. (Johnson et al., 1994). These can last several days, interfering with opportunities to learn and teach. During toy negotiations, program participants required adult intervention 41% fewer times than those in the control group. Although the overall level of intervention was low, even small differences in student self-sufficiency can be critical to teachers. Reduced aggression and need for adult intervention potentially can free up teacher time, as well as reduce the potential for learning disruption.

In contrast to effects on negotiating strategies and success, the intervention had no impact on joint cooperative choices in the prisoner's dilemma game. Other research using both a game format and resource negotiation task found only the negotiation to be predictive of peer relationships (Fonzi, Schneider, Tani, & Tomada, 1997). It is possible that the game-like conditions of the current procedure elicited too much competitive spirit to be sensitive to group differences. The greater variability in goals and behavior that are elicited by negotiations may also transfer better to open-field situations, such as the playground, than to a highly structured game context, where, typically, the goal is to "win."

4.1.2. Teachers' perceptions of changes in student social behavior

The findings showed some convergence between teacher-reported and directly observed behavior. Teachers in the first year of student program participation reported clear increases in social competence and decreases in antisocial behavior relative to the control group. Decreases in antisocial behavior were largest among intervention children initially rated as highly antisocial, but also significant for those rated low in antisocial behavior. Reports of intervention group improvement in the second year were, at best, equivocal for social competence and absent for antisocial behavior. This pattern is similar to results of a two-year study of the "*I Can Problem Solve*" program (Shure & Spivak, 1982). The current study does not allow us to discern whether acceleration of social development occurred only in the first year, or whether teachers failed to notice continued improvement.

4.1.3. Motivational factors in conflict situations

Program participants were explicitly taught norms related to fairness, cooperation, and compassion for others. Perhaps these norms helped direct children's attention (Metcalfe & Mischel, 1999) to the prosocial aspects of the conflict situations. In support of this interpretation, intervention students were

more likely to espouse prosocial goals and state that mutual, rather than unilateral, good fortune in the prisoner's dilemma game contributed to their satisfaction with the outcome. This perspective may allow more opportunities for enjoyment than an exclusively self-interested one, and elicit prosocial behavior from others. Adolescents with prosocial goals experience more satisfaction with social relationships than those with dominance goals (Jarvinen & Nicholls, 1996). Consistent with those findings, cooperative goals, but not attributions, were associated with greater satisfaction with the prize division and more references to others' well-being when explaining satisfaction. Further research may indicate that social satisfaction is an important aspect of intervention success. Reinforcement provided by mutual goodwill may help maintain positive behavior change and commitment to prosocial goals (Erdley & Asher, 1999).

4.1.4. Attributions and intended responses to hypothetical situations

In contrast to positive effects of the intervention on motivation variables during the structured conflict situations, we found no program benefits with regard to attributions and intentions. Our method of assessment may have suffered from a floor effect. Unlike goals and reasoning, which were measured in the context of a real interaction, hostile beliefs and intentions relied on multiple-choice answers to hypothetical situations, a format less likely to uncover individual differences (Orobio de Castro et al., 2002). Alternatively, this may indicate a need to strengthen the part of the program that teaches children to question hostile beliefs.

4.2. Linking goals and beliefs with aggressive and prosocial behavior

Previous research indicates that social cognitions predict behavior in competitive situations (Lochman & Dodge, 1998). In the current study, converging evidence from observer-, teacher-, and self-reports show linkages between social cognitions and behavior. Cooperative negotiating strategies and social competence were positively related to cooperative goals; antisocial behavior and aggressive intentions were negatively related. Attributing hostile goals to hypothetical others predicted more aggressive intentions, lower social competence, and greater antisocial behavior, as rated by teachers.

Examination of the goal by attribution interactions for teacher ratings and aggressive intentions suggests that having cooperative goals may partially buffer children from the influence of hostile biases in attribution. Having self-interested goals may "prime" children to adopt a "win–lose" perspective on social interaction and increase their reliance on subjective and indirect means of understanding others' behavior. Conversely, children who did not evince hostile biases were less likely to display negative behavior, even if their goals were exclusively self-interested.

Previous research indicates that aggressive beliefs formed in the primary grades predict later aggressive behavior and account for considerable stability in aggression (Burks, Dodge, Price, & Laird, 1999; Huesmann & Guerra, 1997). The current findings suggest that a combination of self-interested goals and hostile biases may erect significant barriers to positive social development as well. The links found between goals and a wide spectrum of maladaptive and competent behaviors support arguments for increased focus on promoting positive social goals (Erdley & Asher, 1999).

4.3. Predicting interactive behavior from dyadic goals and beliefs

As predicted, children who shared cooperative goals and non-hostile attributions were more cooperative and less coercive during the prisoner's dilemma and prize negotiation tasks. Thus, the

cooperative negotiating strategy of asking for partner agreement occurred at low levels if even one of the partners had attributed hostile goals to others. Similarly, demanding, whiney strategies increased if one or both partners had self-interested goals.

The behaviors associated with less prosocial goals and beliefs cannot be entirely explained as due to one person's "bad influence," however. While shared cooperative goals were associated with cooperative choices in the prisoner's dilemma game and inquiring as to partner's toy preference during prize division, unshared goals were associated with the least cooperative behavior. Even pairs of children who shared self-interested goals behaved with greater cooperation than those with unshared goals, suggesting that dyadic conflict may have heightened the salience of self-interested behavior. These results await replication. Future research that compares the individual and dyadic behaviors of children differing in social cognitions could begin to identify when dyadic or group mechanisms contradict or extend those identified in individual analyses.

4.4. Implications for practice

For a school of 600 students, class materials, professional staff training, and training materials are estimated to be less than $9.00 per student, with no additional costs in subsequent years. This is the second field trial of the *Second Step* program to show beneficial effects on unbiased observations of aggressive and positive social behavior (Grossman et al., 1997). The effects on observed and teacher-reported behavior were modest, particularly for children that did not exhibit high levels of antisocial behavior. We cannot determine whether program contamination in control schools or the lack of the recommended whole-school implementation may have reduced group differences. As Rosenberg, Powell, and Hammond (1997) have nonetheless demonstrated, small changes in the behavior of individual students have an important impact on a classroom environment when those changes are reflected in the behavior of 25 individuals.

The current results also show group differences in positive goals, offering more hope for program-related change than Lochman and colleagues (1993) derived from their study of aggressive adolescent boys. A key difference in the two studies is age of intervention. Huesmann and Guerra (1997) found that social cognitions are unstable and particularly open to influence in elementary school. Their developmental learning model of how beliefs are formed corresponds in several ways to practices found in the *Second Step* program. First there is direct tuition in values and goals. A second source of learning is positive modeling by teachers, a more potent influence than exhortation alone (Grusec, Saas-Kortsaak, & Simutis, 1978). A third strategy is reinforcement and instruction "in the moment" when real world conflicts occur. Such events help shape later social beliefs and goals (Huesmann & Guerra, 1997). Students' behavior, and the reinforcement and attributions they receive for that behavior, appear to be highly influential (Grusec, Kuczynski, Rushton, & Simutis, 1978) as children construct beliefs about themselves and others.

Another influence on positive goal change may stem from improvements in cognitive, affective, and behavioral skills fostered by social–emotional learning programs. Tesser's (1986) model of self-enhancement maintenance and Eccles' expectancy-value theory (Eccles et al., 1983) suggest that social skill deficits will lead to a devaluing of prosocial behavior and goals while perceived expertise in aggression will increase the perceived value of hostile goals. In this model, self-perceived competence in prosocial domains would mediate the link between skills and goals (Ruble & Frey, 1991; Wigfield & Eccles, 1992), with both dimensions necessary to support socially responsible behavior.

4.5. Caveats

We obtained the agreement of all fifteen schools to assign randomly, but were only able to do so with the eleven schools recruited in the first year. The random and non-randomly assigned control schools appear functionally equivalent in comparisons. More importantly, the duplication of results in the random-only subset for observed negotiation behavior, teacher-reported behavior, goals, reasoning, and expected satisfaction strongly support a causal interpretation of findings in the larger sample.

The longitudinal design of this study allowed us to look for effects after two years of participation in a universal program. The period covered did not allow us to assess long-term transfer of training, nor to investigate fully the possible effects of development on the likelihood that students would retain or expand their prosocial goals and strategies. Further research with follow-up assessments that reach into early adolescence is needed to explore these possibilities. Having both pre- and posttest measures of students' goals, beliefs, and strategies in actual conflict situations would also facilitate a transactional analysis of behavior and attitudinal change.

5. Conclusions

The current study used multi-informant outcome measures to examine observable and phenomeno-logical aspects of prosocial and antisocial behavior. Positive goals and beliefs, in combination with skills (e.g., perspective-taking, emotion regulation) may be viewed as protective characteristics. In order to act in socially responsible ways, children must possess both the relevant skills and the motivation to use those skills. The concordance found between behavior, satisfaction, and cognitions is consistent with social-cognitive models of aggression and social competence (e.g., Crick & Dodge, 1994; Huesman, 1988) that provide much of the conceptual foundation of the *Second Step* program. Goals and hostile attributions were independently predictive of a wide range of outcome variables, including the use of prosocial behaviors during conflict. Interventions that foster positive motivation and multiple social-cognitive, emotional, and behavior skills are likely to be more successful than single component approaches.

For a relatively low cost, universal programs such as the *Second Step* program may strengthen the resilience of "at-risk" children without stigmatizing individuals (Greenberg et al., 2001). Although a universal program that attempts change only in school is unlikely to change strongly maladaptive behavior patterns, it can provide a stable social base for more intensive interventions by providing consistent school expectations, a shared vocabulary, and complementary behavioral repertoires. Equally important, universal programs can provide benefits to children not identified as "at risk" (Durlak, 1995) by reducing classroom disruption and building skills that help children meet life's challenges.

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