Increasing Meta-Cognitive Competence through Conflict Resolution
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What is This?
The purpose of this study was to determine the effects of conflict resolution and related social skill development on students’ meta-cognitive competencies. The investigation was conducted throughout a 5-year period in elementary schools in the Philadelphia School District and in a neighboring urban school district. Sample subjects were fourth- and fifth-grade students. Each of the student samples (10 treatment groups and 8 comparison groups) were assessed for significant pretest to posttest differences using a one-tailed t test with an alpha level of .05. One-tailed t tests with an alpha level of .05 established that treatment group students demonstrated significant improvement in meta-cognitive skills. The research hypothesis was accepted. Consequently, the veracity of integrating conflict resolution and social skills training into curricula was affirmed.

Keywords: conflict resolution; meta-cognition; school safety; academic achievement; social/ emotional learning

The creation of conflict resolution programs in American schools has been the primary attempt to curb violence and antisocial behavior in our classrooms. The majority of American schools have mandated conflict resolution or peer mediation programs (Nemecek, 1998). Numerous studies have been conducted on the efficacy of conflict resolution programs and the findings of these studies, although limited in breadth, are encouraging.

Conflict resolution program evaluations show that such programs not only reduce aggression and violence but also provide lifelong decision-making skills and enhance the self-esteem of students (U.S. Department of Justice, 1997). A study conducted by the Center for Law-Related Education (Bodine, 1996) found that most conflict resolution programs reduce time teachers spend on conflicts, improve school climate, enhance problem-solving skills, and increase self-control among students.

Conducted over a period of approximately two decades, the research on conflict resolution programs has documented several positive outcomes.
Most simple, stand-alone conflict resolution programs (rules/steps posted in a classroom without curriculum integration) produce little, if any, effect beyond reduced aggression and suspensions (Prothrow-Stith, 1991). However, comprehensive conflict resolution programs that infuse meta-communication strategies into the curriculum often produce dramatic changes in integrative, win-win (vs. distributive, lose-win) thinking styles (Johnson & Johnson, 1996). Comprehensive conflict resolution programs require students to engage in social communication strategies such as active listening, paraphrasing, brainstorming, questioning for clarity, and the development of affective vocabulary. In a comprehensive conflict resolution program, these strategies are embedded in the curriculum and practiced throughout the day.

Because of the intense national focus on academic standards, questions about the mental processing of students who have undergone conflict resolution training are paramount. Furthermore, a meta-analysis of educational research by Wang (1992) shows that meta-cognitive competency, or the ability to reflect and exhibit self-regulation over one’s thinking, is one of the most important differences between low-achieving, at-risk children and their more academically successful counterparts. Meta-cognitive competence or cognitive self-regulatory skills are particularly essential for underachieving, at-risk students (Loper & Murphy, 1985). Therefore, understanding how meta-cognitive competence may be affected by conflict resolution training is particularly relevant.

During pilot studies conducted by the researchers, students were asked how they had changed since being part of a comprehensive conflict resolution classroom. The most frequent response was, “Now I stop and think.” This response suggested a major change in students’ cognitive approaches to issues. Similar observations were made by two treatment class teachers who reported that students took significantly more wait time before answering questions after conflict resolution program implementation. The observations from pilot studies and teacher interviews indicate changes in meta-cognitive competencies of students in the comprehensive conflict resolution environment.

**CONFLICT RESOLUTION AND REASONING IN THE SOCIAL AND ACADEMIC DOMAINS**

Although positive behavioral changes are the primary goal of conflict resolution programs, improved academic performance often occurs when
conflict resolution skills are integrated into content areas (Zins, Weissberg, Wang, & Walberg, 2004). Conversely, there exists a “well-established relationship between academic underachievement and anti-social behavior” (Larson, 1994, p. 151). Although the direction of the relationship is not always clear or uniform, in most cases academic achievement is fostered in a conflict positive environment (Johnson & Johnson, 1996). Furthermore, we have strong evidence that conflict resolution programs, which provide students with opportunities for skill development in a cooperative context, are related to “significant increases on cognitive skills as indexed by the WISC-R (Wechsler Intelligence Scale for Children-Revised)” (Greenberg, 1996, p. 3). More specifically, statistically significant changes in the planning skills section of the WISC-R have been found after implementation of social skills/conflict resolution training (Zins et al., 2004).

Within this recurring theme, it is easy to understand how increased academic achievement and “student self-responsibility” (Davis, 1994, p. 85) are among the frequently reported results of a conflict resolution program. Studies (Wittmer & Honig, 1994) report that when children study a comprehensive conflict resolution program, even “aggressive and shy children become more positively social within three months” (p. 152) and increased positive social functioning is associated with children’ ability to “think of more strategies” (Wittmer & Honig, 1994, p. 152) when problem solving.

Researchers tell us that students “work harder, achieve more, and attribute importance to school work in classes in which they feel liked, accepted and respected by the teacher and fellow students” (Lewis, Schaps, & Watson, 1996, p. 16). There is evidence that a sense of alienation negatively affects cognitive performance (Davidson & Worsham, 1992). Several studies (Johnson, Johnson, Dudley, Mitchell, & Fredrickson, 1997; Zins & Forman, 1991) report that conflict resolution’s integrative bargaining and perspective reversal skills leave students empowered to reason and form prosocial bonds. Testing thousands of students, researchers in New Jersey found that feeling like a “definite minority in a group” tends to blank out your intuitive ability in that group. (Ostrander, Schroeder, & Ostrander, 1979, p. 205). The increased sense of belonging or attachment in the cooperative conflict resolution classroom alone may facilitate cognitive gains. In some sense, all students may fall victim to the minority effect in a classroom characterized by alienation and competition. Students in a very competitive environment become more rigid, dichotomous thinkers as a result of working in a win-lose, black-and-white, academic environment (Kohn, 1986). Ironically, our competitive individualistic environment also creates “rank conformity and dampens creativity” (Kohn, 1986, p. 130). In contrast, in a cooperative conflict resolution classroom, students routinely examine other perspectives. This reduces the
my-side bias that flaws most thinking, regardless of high levels of intelligence (Perkins, 1995).

Wentzel, Weinberger, Ford, and Feldman (1990) conducted multivariate research to study the relationship between social and emotional factors and academic success. There is “an important developmental link between social and academic competence” (Wentzel et al., 1990, p. 179) and “there is evidence that affective and self-regulatory problems such as . . . low empathy, aggression and conduct disorders predict low levels of achievement” (Wentzel et al., 1990, p. 179).

Social competencies, including self-regulation and problem-solving style, are a “powerful predictor of academic achievement” (Wentzel, 1991, p. 1066). In fact, these “interpersonal forms of competence are often more powerful predictors of achievement than intellectual ability” (Wentzel, 1991, p. 1066). Wentzel’s (1991) study of the relationship between social competence and academic achievement found that “socially responsible behavior mediates almost entirely the relationship between students grades” (p. 1066) and two other aspects of social competence, including sociometric status. Self-regulated behavior appears to be determined by three components, including levels of interpersonal trust, interpersonal problem solving, and a sense of social responsibility (Wentzel, 1991, p. 1067). All three of these subcomponents of self-regulation have been linked “empirically to objective indices of social competence as well as to intellectual accomplishments” (Wentzel, 1991, p. 1067).

Wentzel (1991) found that each of the three characteristics of social responsibility (interpersonal problem solving, interpersonal trust, and emotional self-regulation) were significantly ($p < .001$) correlated with students’ grade point averages. Because many of the predictor variables were correlated significantly with each other, simultaneous regression models were used to determine any unique variance among the social competence predictor variables. School success is related to a student’s ability to resolve academic and social problems in an adaptive way. As Wentzel (1991) states, “Very simply, students who control negative affective reactions to failure and who persist in trying to solve problems achieve more than those who tend to become emotionally upset” (p. 1068). “Although the link between social and academic problem solving is not well understood” (Wentzel 1991, p. 1068), it appears that “the ability to control negative emotional reactions to failure may contribute to both socially and academically competent outcomes” (Wentzel, 1991, p. 1068). A socially responsible disposition explained a significant amount of the unique grade point variance when analyzed with simultaneous regression methods as well. Socially responsible goals, interpersonal trust, and constructive problem-solving styles were all significant
independent predictors of a general, socially responsible disposition. Personal background and status variables “did not explain an additional, significant amount of variance in social responsibility” (Wentzel, 1991, p. 1074).

The meta-cognitive competence and sense of self-responsibility necessary to go from an egocentric cognitive perspective to a broader allocentric cognitive perspective are fostered in the dialogue of the classroom (Costa, 1984; Davidson & Worsham, 1992; Davis, 1994; Gilhooly, Keane, Logie, & Erdos, 1990; Karpov & Haywood, 1998). Students in the conflict resolution environment may develop a sense of “self-responsibility” (Davis, 1994, p. 85) that goes beyond increased reasoning for conflict resolution purposes. As students begin to consider the way their actions affect others (Johnson & Johnson, 1995) and “seek to find the value in each position or idea” (Berman, 1991, p. 15), they learn to engage in “synthesis thinking” (Berman, 1991, p. 15)—or integrative thinking (Johnson & Johnson, 1996). Rather than focusing on a superficial, polarized, right-or-wrong response, they broaden their perspectives and begin to synthesize new solutions.

The increased cooperation in the conflict positive classroom improves problem-solving performance and cognitive flexibility (Davidson & Worsham, 1992). There are several important reasoning strategies that are part of the conflict resolution process. The first skill students learn in conflict resolution training is active listening. Listening skills are as important as oral communication. Most of us spend 8.4% of our time writing, 13.3% reading, 23% speaking, and 55% listening (Davidson & Worsham, 1992). The active listening and paraphrasing aspects of conflict resolution training increase students’ comprehension (Heydenberk & Heydenberk, 2000). The paraphrasing, role reversal, and perspective taking required in the conflict resolution process has been researched extensively. Johnson and Johnson (1991) found that students’ “reasoning is enhanced [by] the combination of explaining one’s knowledge and summarizing and paraphrasing the other persons’ knowledge and perspective” (p. 299).

David Johnson’s (1971) original review and summary of the research on role reversal first affirms the seminal work of Morton Deutsch, indicating that in a competitive environment it is difficult to effectively resolve problems or conflict because “participants do not have a very complete or accurate understanding of their opponents position or frame of reference” (p. 322). In a problem-solving or conflict situation, role reversal is “the most direct procedure” (Johnson, 1971, p. 322) and the most effective procedure “for increasing understanding” (Johnson, 1971, p. 322). It is important to note that engaging in role reversal or paraphrasing increases understanding,
retention, and comprehension of all sides (Johnson & Johnson, 1979) but does not increase compromising behaviors (Johnson, 1971).

People who engage in role reversal are more disposed to negotiate a constructive resolution, but they remain as “committed . . . to their position” (Johnson, 1971, p. 324). Conflict resolution is therefore more often characterized by synthesizing a new solution than by compromising ideals or goals. In general, Johnson’s research indicates that role reversal or paraphrasing changes the students’ dispositions toward problem solving, not their ideals or principles. This “attitude change” (Johnson, 1971, p. 326) is essential to the synthesis of a constructive solution that honors both parties’ perspectives. The role reversal increases “bias scanning” (Johnson, 1971, p. 327) in participants, causing increases in reflection and comprehension.

Perkins’s (1995) research has identified negative dispositions that prevent clear thinking. Perkins (1995) describes “my-side bias as an unfortunate thinking disposition that works against intelligent behavior” (p. 278). When faced with a decision, “people focus overwhelmingly on evidence favoring their learning and neglect evidence on the other side of the case” (p. 278). This disposition is separate from intellectual ability, as evidenced by the fact that intelligent people can think effectively and deeply about the side of a case they favor but choose not to apply the same thinking skills to another’s perspective. When asked to apply the same skill level to the other side, “research shows that people are quite capable” (p. 278) of doing so. A biased disposition prevents students from applying their intellectual skills to all sides of a problem. Perkins (1995) and his colleagues have organized a taxonomy of essential thinking dispositions that includes broad thinking, clarifying, seeking understanding, evaluating reasoning, and meta-cognitive self-management.

Johnson and Johnson studied the effects of conflict and controversy in cooperative classrooms for two decades. Johnson and Johnson’s (1979) first major review of the academic use of conflict states that “by avoiding and suppressing certain types of conflicts, teachers lose valuable opportunities to increase student motivation, creative insight, cognitive development and learning” (p. 51). Johnson and Johnson (1979) affirm that conflict in the academic setting “leads to epistemic curiosity and to a more adequate cognitive perspective and reasoning process presumably through understanding more accurately the cognitive perspective and reasoning of one’s opponents” (p. 53). Eventually, “a more creative and higher quality conclusion is derived” (p. 53). When students are involved in a constructive conflict or controversy, they are forced to “predict subsequently what line of reasoning their opponent would use” (p. 54), reducing cognitive bias.
Costa (1984) suggests that “evaluating with multiple criteria” (p. 60) and “paraphrasing” (p. 61) are among the most important tools for developing meta-cognition. Perkins and Salomon (1988) suggest that considering another’s perspective requires and develops self-monitoring strategies. Because in virtually all contexts people tend not to give their attention to the other side of the case, these meta-cognitive dispositions regarding reflecting and self-monitoring are essential (Perkins & Salomon, 1988).

Johnson and Johnson’s (1992) research found that reversing perspectives and then reconceptualizing was the best possible tool for synthesizing a new solution to problems. Neal Whitman’s (1988) work reveals that students who “learn materials for their own needs” (p. 5) use different, less effective cognitive processing than students who learn something with the expectation of teaching someone else. Paraphrasing may be an essential academic tool as well as a social tool.

Shifting to multiple perspectives creates cognitive flexibility or allocentrism as opposed to Piaget’s egocentrism. Berman’s (1991) review of interpersonal perspective taking found that using perspective-taking skills, “students could move from egocentric and impulsive interpersonal negotiation strategies to mutual and collaborative strategies” (p. 13). Finally, at the brainstorming stage of conflict resolution, students engage in a synthesis thinking mode “that seeks to find the value in each position or idea” (Berman, 1991, p. 15). This is the essence of integrative thinking.

Klaczynski, Gordon, and Faith (1997) identified meta-cognitive competencies as essential components to critical thinking. Klaczynski et al. (1997) studied the relationships among critical thinking, goals, general ability, and information-processing style. Three types of critical thinking were investigated as dependent variables. A students’ general ability effectively predicted two of the three critical thinking measures; however, biases in reasoning were predicted by the students’ information-processing styles. The authors state that “students must conquer the meta-cognitive challenge of evaluating evidence independently from their goals and beliefs” (p. 470). This led the authors to conclude that a true measure of intelligence must go beyond natural abilities to “consider meta-cognitive abilities and dispositions . . . as central to intelligence as specific cognitive capacities” (p. 472). In this extensive study, they state that the quality of “intelligence is indeed associated with meta-cognitive dispositions involved in monitoring the flow of one’s reasoning and maintaining consistency” (p. 472); a student’s natural cognitive ability does not determine the quality of problem solving if it is only applied to one side of the problem.

Klaczynski et al. (1997) state that “critical thinking results from a combination of two ingredients” (p. 481). The first ingredient is the competence to
use a given critical thinking skill. The second ingredient is a “meta-cognitive competence not captured by intelligence tests” (p. 481). The authors review a range of other studies that find “reasoning is a function of an array of personal dispositions distinct from intelligence” (Klaczynski et al., 1997, p. 481). The “meta-cognitively-oriented individuals” (Klaczynski et al., 1997, p. 482) have the essential advantage of applying their critical reasoning abilities when and where appropriate. Conflict resolution provides students with opportunities to practice the essential perspective-taking skills that correct “my side bias” (Perkins, 1995).

Karpov and Haywood (1998) suggest that Vygotsky’s concept of cognitive mediation has been shown to be the “main mechanism of learning and development” (p. 27). The authors analyze Vygotsky’s work to distinguish two major types of mediation—“meta-cognitive and cognitive” (p. 27). The “meta-cognitive mediation . . . has its roots in interpersonal communications” (p. 27). Cognitive mediation begins with the exploration of academic concepts in school-age children. To develop meta-cognitive skills in children, the authors recommend “cooperative, shared activity, under mutual control” (p. 29). Through self-regulation as well as attempts to help regulate or understand others, meta-cognition develops. The authors tell us that the effect of these activities on meta-cognition is “supported by experimental data” (p. 36) and the ideal “situation for the development of children’s self-regulation is one of collaborative problem solving” (p. 30).

Gilhooly et al. (1990) offer a similar perspective. To help children increase meta-cognitive skills, the authors suggest paired problem solving where students think aloud with a “listener critic” (p. 303) and then reverse roles. Although the authors recommend several types of activities for developing meta-cognitive skills, “all efforts rely on talk in the context of social interaction as a means for promoting thinking” (p. 307). Social interaction and social problem solving is a “recurrent theme” (p. 307) in all the meta-cognitive development strategies.

Social problem-solving curricula and conflict resolution programs emerged in our schools to address the incidents of disruptions and violence in our classrooms. The investigations of social problem-solving programs support their veracity: they are successful in reducing classroom disturbances and in the creation of favorable learning environments. However, knowledge is lacking about students’ thinking processes and dispositions toward meta-cognition, which are central to resilience, class climate, and academic achievement.

Increased time on task does not appear to be the most significant factor in determining increases in cognitive performance in the conflict positive classroom. Increased motivation and a sense of self-efficacy, as well as increased
opportunities to practice authentic problem solving, are related to gains in reasoning (Johnson et al., 1997; Schunk, 1991; Wentzel et al., 1990). When students “seek to find the value in each position or idea” (Berman, 1991, p. 15) in a cooperative classroom environment, they learn to engage in “synthesis thinking” (Berman, 1991, p. 15) or integrative thinking (Johnson & Johnson, 1996). Rather than focusing on a superficial, polarized, right-or-wrong response, students broaden their perspectives and begin to synthesize new solutions, a skill that characterizes higher level thinking in both the social and academic domains. Accordingly, this study investigates the changes in students’ meta-cognition as a result of conflict resolution training.

PURPOSE OF THE STUDY

The purpose of this study was to investigate changes in students’ meta-cognitive competencies as a result of their conflict resolution skill development. The following hypothesis was investigated:

Hypothesis: Conflict resolution skill and related social skill development will positively affect use of meta-cognitive strategies.

Before addressing this hypothesis, two preliminary measures were taken. The first was a measure to determine implementation of the independent variable, conflict resolution training, using the Students’ Attitudes About Conflict (SAAC). The second preliminary measure was conducted to compare pretest scores of treatment and comparison students on both instruments: the SAAC and the Dispositions Toward Meta-Cognition (DTM).

DESIGN OF THE STUDY

This study employed a pretest-posttest comparison group design. Intact classrooms were used, reducing the threats of reactive arrangements. This design controls for “the main effects of history, maturation, testing and instrumentation” (Campbell & Stanley, 1963, p. 48). For each year, the researchers pretested groups early in the school year and posttested in May or early June. The SAAC and the Dispositions Toward Meta-Cognition (DTM) served as criterion measures. All items on the SAAC and the DTM were read aloud to students by the researcher to accommodate a range of reading and
oral vocabulary abilities within the classes. Questions regarding vocabulary were entertained by the examiner to ensure valid responses to items. All student responses were anonymous; therefore, group means were obtained for comparison purposes. The classroom teachers were in the room during the administration of the aforementioned instruments to provide student assistance when indicated.

SAMPLE

The sample was composed of fourth- and fifth-grade students from the Philadelphia School District and a neighboring urban school district. The latter school district under investigation ranked second from the highest in child abuse, rate of families living below the poverty level, and spouse abuse in the geographic region. The neighboring Philadelphia school district has approximately 520 elementary students in two schools. The majority of the students are from lower-middle-class families. The demographics for this district show the population to be 65% Caucasian, 30% African American, and 5% is designated as “other.” However, because a disproportionate percentage of Caucasian students attend the local parochial school, our public school sample is 50% African American and 50% Caucasian.

The Philadelphia school under investigation was in a north Philadelphia neighborhood with a high rate of violence and unemployment. The school serves approximately 500 kindergarten through fifth-grade students, 95% of whom are African American and 5% of whom are either Hispanic, Caucasian, or Asian. Every student in the Philadelphia school sample qualified for the free lunch program.

All the students in the treatment classrooms were fourth graders whose teachers had participated in the Peace Center’s training called Project Peace. The comparison group students in Philadelphia also were in fourth grade. The Philadelphia comparison group teacher was not available for training because she had been employed in a nearby school at the time of the training. The remaining comparison group teachers were selected because they were unavailable for Project Peace training due to medical leaves. The neighboring Philadelphia comparison group consisted of two fifth-grade classrooms.

There were no significant differences between any of the classrooms on any of the treatment measures, with the exception of a difference on the meta-cognition scale for the year-3 neighboring Philadelphia school groups. Despite support from administration and counselors for the Project Peace evaluation, and their efforts to keep treatment and comparison groups separated, there was significant contamination of this comparison group in year 3. Students in the
comparison group were exposed to peer mediation on the playground and attended assemblies about the mediation program. Consequently, several of the comparison group students knew the steps of mediation and were enthusiastic about the program. For this reason, the study was analyzed with the year-3 sample (Group I) and without the year-3 sample (Group II).

The seven teachers in the study had between 24 and 31 years of teaching experience. From questionnaires and observations, it was determined that the teachers generally employed similar teaching methods in all classrooms within both of the two schools.

The Project Peace treatment curriculum is a comprehensive, integrated, conflict resolution program that focuses on teacher training. The treatment group teachers received approximately 12 hours of conflict resolution—peer mediation training subsequent to the aforementioned pretesting. The training included a review of relevant curricula and theoretical background, establishment of conflict resolution centers in classrooms, steps of conflict resolution, class meeting strategies, role plays, active listening and paraphrasing techniques, development of affective vocabulary, I-statement strategies, and group discussion strategies. Following the initial training, weekly or biweekly support meetings with the conflict resolution trainers were provided to the teachers throughout the school year by the Peace Center personnel.

INSTRUMENTS

Two instruments were used in the study. The first was a modified form of the SAAC by Jenkins and Smith (1992). This test was used to verify implementation of conflict resolution strategies in the classroom (the independent variable in the study). Developed by the New Mexico Center for Dispute Resolution to measure the effects of a statewide conflict resolution education initiative, the SAAC is composed of 32 items that were selected after determining their reliability. This study involved 1,200 4th- through 12th-grade students in New Mexico public schools during the 1986-1987 school year. The item-total correlations were examined and items with values less than .20 were discarded, resulting in the final version of 32 items. Factor-analytic procedures were used to assess the construct validity of the SAAC. As a result of the factor-analytic procedures, four underlying factors corresponding to four clusters of items were identified. These underlying factors were labeled as the subscales of this instrument. The subscales that were identified by the test developers are School Attachment, Self-Concept and Peer Relations, Social Skills, and Conflict Resolution Skills.
A yes-no response format was substituted for the 4-point Likert scale because the scale was considered by the researcher to be too difficult for some members of the sample of elementary students used in this study. The decision to adopt the yes-no format was predicated on the difficulty of administering the 4-point Likert SAAC to classes of students who share similar attributes to the sample employed in this study.

The second instrument used was the DTM. The DTM was developed by the researchers for the purpose of use in this study by revising the Center for Research on Evaluation, Standards, and Student Testing (CRESST) Meta-Cognition Self-Assessment Questionnaire. Because, “unfortunately [there are] few standardized measures of meta-cognitive skills” (O’Neil & Abedi, 1996, p. 234), researchers at CRESST have developed a Meta-Cognition Self-Assessment Questionnaire. The questionnaire is composed of 20 items, 5 items in each of four subscales. The subscales are Awareness, Cognitive Strategy, Planning, and Self-Checking. O’Neil and Abedi, the authors, found these meta-cognitive subscales fairly reliable (alpha > .70) and one-dimensional (one factor per subscale). As well, the authors found the construct validity “acceptable” (O’Neil & Abedi, 1996, p. 236). Items were written to be consistent with the authors’ constructs of planning, self-checking, cognitive strategy use, and awareness. The items were then presented to “multiple groups of students in successive studies to examine its psychometric characteristic” (p. 237). Means and standard deviations were obtained for each item and for each subscale. Factor analysis was used to determine whether each item was one-dimensional or multidimensional, fitting more than one subscale. All items that were not reliable or had a low item remainder correlation were removed. Twenty of the original 39 items were retained. Final subscale reliabilities ranged from .82 for the Awareness subscale to .87 for the Self-Checking subscale. Construct validity was determined by comparing the meta-cognition items and subscales to achievement test results. High performance on various achievement measures was correlated with high scores on the meta-cognition instrument.

Because the CRESST Meta-Cognition Self-Assessment inventory was developed for high school students, and was less reliable with younger students, and because the inventory was designed for use with a specific academic test, the instrument could not be used intact for this conflict resolution effect study. The researcher revised each of the five questions in each subscale for general use with elementary school students.

The revised instrument, the DTM, was designed and pilot-tested by the researcher on approximately 300 students in an urban Philadelphia
elementary school. The items were modified to ensure understanding by the elementary school sample. The 20-item instrument includes 20 questions pertaining to self-checking, strategy choice, and awareness.

TREATMENT OF THE DATA

Anonymity was required by both school districts participating in this study. Therefore, the student scores were combined to obtain a mean pretest and posttest score on each of the instruments used in this study: SAAC and DTM. Group means were obtained for two fourth-grade treatment classrooms and one fourth-grade comparison classroom in the Philadelphia School District throughout a period of 2 years. Group means were obtained for two fourth-grade treatment classrooms and two fifth-grade comparison classrooms in the two neighboring Philadelphia schools throughout a period of 3 years. A single-tailed $t$ test was used to determine significant differences between group pretest means and group posttest means on the dependent variable under consideration: meta-cognition. The SAAC was used to confirm Project Peace program implementation. The .05 confidence level was adopted for all measures under consideration. Because the pretest means of the year-3 sample were significantly different from the other pretest means, all data were analyzed with (Group I) and without (Group II) the year-3 sample.

FINDINGS

Full implementation of the independent variable, conflict resolution training, was confirmed in treatment classrooms by using the SAAC as a pretest at the beginning of the school year and posttest at the end of the school year. Significant differences on the SAAC were found using a single-tailed $t$ test with an alpha level of .05 in the treatment classrooms. The comparison classrooms, which had no conflict resolution training, showed no significant differences in SAAC scores, as affirmed by a single-tailed $t$ test between the pretest and the posttest, as seen in Table 1 and Figures 1 and 2.

The pretest scores of both treatment and comparison groups on both measures (the SAAC and the Meta-Cognition subscale) were compared. Significant differences were found between pretest scores of comparison and treatment groups during year 3 of the neighboring Philadelphia group.

There were no significant differences found between the treatment group pretest scores and comparison group pretest scores for any of the other 4
years of the study. However, because significant pretest differences were found in the neighboring Philadelphia year-3 sample on the Meta-Cognition subscale, all measures were analyzed with and without this sample. The analysis that included the neighboring Philadelphia year-3 sample was reported as Group I. The analysis that did not include the year-3 sample was reported as Group II.

**TABLE 1**

<table>
<thead>
<tr>
<th></th>
<th>Pretest</th>
<th>SD</th>
<th>Posttest</th>
<th>SD</th>
<th>t Score</th>
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<tr>
<td>Treatment group</td>
<td>19.460</td>
<td>1.633</td>
<td>24.568</td>
<td>2.819</td>
<td>9.988*</td>
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<tr>
<td>N</td>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comparison group</td>
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<td>2.288</td>
<td>19.805</td>
<td>0.968</td>
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</tr>
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*p < .05.

![Figure 1: Ten Treatment Groups’ Mean Pretest and Posttest Students’ Attitudes About Conflict (SAAC) Scores](image)
The hypothesis that conflict resolution and related social skill development will increase students’ use of meta-cognition strategies was pretested and posttested with the Meta-Cognition subscale in treatment and comparison groups. A single-tailed t test with an alpha level of .05 was used to determine pretest to posttest changes in each group. As Tables 2 and 3 and Figures 3, 4, 5, and 6 show, treatment groups show significant gains on the Meta-Cognition subscale pretest to posttest. Comparison groups show no significant change.

All treatment classrooms showed significant gains from pretest to posttest on the Meta-Cognition subscale. The comparison classrooms showed no significant gains from pretest to posttest. Therefore, the hypothesis was accepted.
Numerous conflict resolution curricula have been implemented in our classrooms throughout the past decades in response to the incidence and magnitude of school violence in our schools and in our communities. Although a host of research affirms the veracity of conflict resolution in promoting prosocial student behavior, critical areas have gone unexplored.

### TABLE 2
Meta-Cognition Scale Scores, Group I

<table>
<thead>
<tr>
<th></th>
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<th>Posttest</th>
<th>SD</th>
<th>t Score</th>
</tr>
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<tr>
<td>Treatment group</td>
<td>12.248</td>
<td>2.303</td>
<td>15.719</td>
<td>1.567</td>
<td>3.989*</td>
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<td>N</td>
<td>10</td>
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<td></td>
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<tr>
<td>Comparison group</td>
<td>13.755</td>
<td>1.577</td>
<td>12.643</td>
<td>1.390</td>
<td>0.250</td>
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</table>

*p < .05.

![Figure 3: Ten Treatment Groups’ Mean Pretest and Posttest Meta-Cognition scale Scores (Group 1)](image)

**IMPLICATIONS AND CONCLUSIONS**

Numerous conflict resolution curricula have been implemented in our classrooms throughout the past decades in response to the incidence and magnitude of school violence in our schools and in our communities. Although a host of research affirms the veracity of conflict resolution in promoting prosocial student behavior, critical areas have gone unexplored.
Specifically, how meta-cognition is affected by conflict resolution curricula is a question that has not been addressed. This question was inspired during 2 years of pilot testing through examination of students’ profiles on the SAAC and by listening to student and teacher comments about conflict.

This study found fourth- and fifth-grade student increases in use of meta-cognitive strategies as a result of placement in conflict positive classrooms that fostered reflective thinking. The finding of this study supports the

<table>
<thead>
<tr>
<th></th>
<th>Pretest</th>
<th>SD</th>
<th>Posttest</th>
<th>SD</th>
<th>t Score</th>
</tr>
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<tr>
<td>Treatment group</td>
<td>12.342</td>
<td>2.394</td>
<td>15.381</td>
<td>1.354</td>
<td>3.889*</td>
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<td>N</td>
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<td>Comparison group</td>
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<td>1.283</td>
<td>13.462</td>
<td>1.108</td>
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</tr>
</tbody>
</table>

*p < .05.

Figure 4: Eight Comparison Groups’ Mean Pretest and Posttest Meta-Cognition scale Scores

Specifically, how meta-cognition is affected by conflict resolution curricula is a question that has not been addressed. This question was inspired during 2 years of pilot testing through examination of students’ profiles on the SAAC and by listening to student and teacher comments about conflict.

This study found fourth- and fifth-grade student increases in use of meta-cognitive strategies as a result of placement in conflict positive classrooms that fostered reflective thinking. The finding of this study supports the
Research in closely related areas in which students exercise metacognitive strategies. For instance, numerous researchers (Johnson & Johnson, 1996; Zins et al., 2004) demonstrated improved academic achievement after conflict resolution training. Similar positive results in problem-solving strategies and in thinking strategies such as perspective taking and improved listening have been brought about as a result of conflict resolution training.

Researchers (Davidson & Worsham, 1992) found that increasing social co-cognition improves metacognitive awareness. Improving affect regulation has been found to improve academic performance as well (Masten & Coatsworth, 1998). Furthermore, a related body of research suggests that social relationships and social interaction are fundamental to developing the skills of cognitive mediation and cognitive regulation (Davidson & Worsham, 1992). The research of Klaczynski et al. (1997) indicates that evaluation of multiple perspectives increases meta-cognitive development by creating an awareness of one’s own biases.

Although not directly defined as meta-cognition or meta-cognitive strategies, the strategies taught within this conflict resolution curriculum are
similar to, or in some cases identical to, recognized strategies used to enhance critical thinking and meta-cognition. Unlike the studies that investigated the impact of direct instruction in meta-cognition, the conflict resolution curriculum under investigation has critical thinking and meta-cognitive demands embedded within it, and in this construct, students demonstrated gains in meta-cognition. Students in this study internalized conflict resolution strategies and improved thinking styles while using them consistently over the duration of the study. From questions on the Meta-Cognition subscale that ask students to describe their thinking strategies in both social and academic domains, it may be inferred that increases in meta-cognitive reflection applied in the social domain transfer to the academic domain. Because this study established the effectiveness of conflict resolution training in improving meta-cognition, and because these findings corroborated other research findings on meta-cognition, it is concluded that conflict resolution training will enhance students’ thinking abilities in both the social and academic domains.
With intense pressures on our schools to raise academic achievement levels, along with the attendant focus on cognitive processes of students, the positive contributions of conflict resolution training to the thinking processes is edifying. In this case, thinking strategies were taught expressly to create safe schools. This curriculum-embedding strategy provided a time-effective context in which to teach thinking and behavioral skills concurrently. Therefore, the results of this investigation indicate that the implementation of conflict resolution training in schools is a worthwhile endeavor for increasing meta-cognitive skills as well as for developing conflict resolution skills.

REFERENCES


Warren R. Heydenberk is a faculty member at Lehigh University where he teaches language arts and conflict resolution courses. Roberta Anna Heydenberk is an adjunct faculty member at Lehigh University, having taught multicultural education and conflict resolution education courses. The Heydenberks have more than a decade of service in conflict resolution program research and curriculum design. They are recipients of numerous peace awards and they have served on national and international peace education boards. The Heydenberks have consulted with international mediation scholars and conducted research on conflict resolution, interpersonal communication, and social/emotional learning. Their research has culminated in a related textbook titled A Powerful Peace: The Integrative Thinking Classroom (2000) and a children’s book titled When I Get Angry (2001), as well as scholarly articles. In addition, Roberta is the recipient of several poetry awards. Additional information pertaining to their scholarly work and research can be found at Heydenberk.com.