

The contribution of the Responsive Classroom Approach on children's academic achievement: Results from a three year longitudinal study[☆]

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Abstract

This paper reports the results of a quasi-experimental study on the contribution of the Responsive Classroom (RC) Approach to elementary school children's reading and math performance over one-, two-, and three-year periods. All children enrolled in six schools (3 intervention and 3 control schools in a single district) were the participants in the study. Children's test scores in math and reading were used as outcomes, and data on treatment fidelity were used to describe differences in use of RC practices between intervention and control schools. Findings showed that, after controlling for poverty and test scores from previous years, the RC Approach contributed to the gains in both reading and math, with math showing greater difference between the intervention and control schools. The contribution of the RC Approach appeared to be greater over a three-year period than over a one or two-year period. These findings provide early evidence for the positive contribution of the RC Approach to gains in academic achievement.

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The contribution of the Responsive Classroom Approach on children's academic achievement in elementary school classrooms

The primary goal of American schooling is to teach children to master academic subjects of reading, writing and math to ensure successful acculturation into adult society. Beyond this goal; parents, educators, school psychologists, and the general public voice support a more expansive set of objectives for American schools. Not only should children leave school with academic proficiencies, they must also demonstrate adequate social skills, make healthy decisions and choose ethical and responsible behavior in order to become engaged citizens (Greenberg et al., 2003). This broad goal is well-aligned with those of the school psychologists. Promoting positive youth development and preventing behavioral and mental health problems have become major objectives (Desrochers et al., 2005; Weisz, Sandler, Durlak, & Anton, 2005). Increasingly, school psychologists have viewed schools as the context in which to intervene to promote children's social and emotional health and well-being (Rones & Hoagwood, 2000). The degree to which these interventions help schools meet children's developmental and relational needs and ultimately lead to academic success is a question worthy of careful scrutiny.

The present study examines the contribution of the Responsive Classroom (RC)[®] Approach, an approach designed to integrate social and academic learning, on children's academic achievement. To date, several initial studies have been conducted describing the positive contribution of the RC Approach for promoting children's social skills and reducing behavior problems (Elliott, 1993, 1999; Rimm-Kaufman & Chiu, *in press*), as well as enhancing teachers' perceptions of their teaching efficacy and their attitude toward teaching (Rimm-Kaufman & Sawyer, 2004). However, there has been virtually no research on the RC Approach and children's academic outcome as measured by standardized tests. As such, the present study is situated in the earliest stage of the research continuum. This paper does not describe a large scale randomized evaluation of the RC Approach—the type enabling researchers, educators, and practitioners to make causal inferences. Rather, this work examines efficacy of the RC Approach and is part of a larger movement in educational and psychological research to identify practices being used in school settings and to study the ways in which these practices relate to children's academic performance.

Measuring the association between use of the RC Approach and children's achievement is an important issue. More than 60,000 teachers nation-wide have been trained to implement the RC Approach. Many schools have adopted the RC Approach as a school-wide intervention. In 2000, the RC Approach was endorsed by the Comprehensive School Reform (CSR) Program, a national program offering funds to schools for interventions designed to improve children's achievement. As such, school districts accessed federal and state monies (via the Obey–Porter Amendment to Title I, Drug Free School funds, and state-funded Character Education efforts) to adopt the RC Approach, despite the lack of evidence of its effectiveness.

In 2002, the CSR Program presented new criteria for interventions to be included as reform models (U.S. Department of Education, 2002). The CSR Program has 11 criteria for inclusion. Selected examples include a scientific basis for methods and strategies; an integrated and comprehensive design with aligned components; ongoing, high-quality professional development for teachers and staff; meaningful parent and community involvement in planning, implementing, and evaluating school improvement activities;

support for teachers, administrators, and staff; and high quality external technical support and assistance from an experienced external partner. Most germane to the present study, the new criteria demanded that interventions demonstrate strong evidence for their ability to increase children's achievement, consistent with one of the primary goals of the No Child Left Behind (2001) legislation. Thus, the *RC* Approach meets all but one of the 11 criteria for inclusion. Without research, it is simply unclear whether the *RC* Approach warrants inclusion into this and other comparable programs, representing just one example of a much larger, systemic problem in relation to educational interventions.

The present study employs a quasi-experimental design to examine the relation between use of the *RC* Approach and children's academic performance. Specifically, this study asks the question: how does *RC* Approach implementation at the school level relate to children's math and reading performance over the time spans of one-, two- and three-years? The contribution of the *RC* Approach is examined after controlling for children's family poverty level (operationalized as free/reduced lunch status), a factor that has been linked to a depressed academic performance (Denton & West, 2002; McLoyd, 1998). Schools often look to interventions like the *RC* Approach to help them manage classroom organization, reduce discipline problems, meet children's emotional and relational needs, and enhance children's social and academic competencies. The present paper is an initial step assessing the efficacy of this intervention for improving children's academic achievement.

The Responsive Classroom Approach

The *RC* Approach is designed to integrate social and academic learning, and to create classroom environments that are productive and focused on learning. The *RC* Approach has seven essential principles to guide teachers' thinking and action. These principles are: 1) equal emphasis on the social and academic curriculum; 2) focus on how children learn as much as what they learn; 3) the view that social interaction facilitates cognitive growth; 4) emphasis on cooperation, assertion, responsibility, empathy, and self-control as critical social skills for children to learn; 5) focus on knowing the children individually, culturally, and developmentally; 6) emphasis on knowing the families of children, and 7) viewing the working relationships among adults at the schools as critically important (Northeast Foundation for Children [NEFC], 2003). Specific *RC* practices emerge from these principles. Practices include: 1) Morning Meeting, a daily meeting to create a sense of classroom community with time for sharing, games, and playful intellectual activity; 2) Rules and Logical Consequences, where rules are established to prevent problems and consequences for problem behaviors follow logically from misdeeds, are developmentally and individually relevant to the child, and rely on a trusting and positive relationship between the teacher and the child for their effectiveness; and 3) a shift in teacher language, where teachers learn to comment descriptively on children's effort and learning processes, not only products, as well as use "encouragement" rather than "praise" (NEFC, 1997). These principles and practices are designed to create classroom environments conducive to learning. As such, the majority of the practices emphasize social, emotional, and self-regulatory skills as immediate goals and academic achievement as a culminating objective.

The *RC* Approach is unique among social and emotional interventions in three ways. First, most interventions targeted toward enhancement of social and emotional skills are

skill based and specific. As a result, teachers and school psychologists are faced with balancing several fragmented programs in order to meet children's social, emotional and developmental needs (Zins, Bloodworth, Weissberg, & Walberg, 2004). The *RC* Approach, in contrast, focuses on integrating social and academic learning throughout the school day. Second, in relation to many social and emotional interventions, decision-makers ask the question: Will we depress children's academic achievement if we place increased emphasis (and allocate more time toward) children's social and emotional learning? This question is worth asking. Abundant research suggests that classrooms that prioritize nurturance at the expense of academic learning do not create the academic press necessary to produce children's achievement outcome (Lee & Smith, 1999; Shouse, 1996). The *RC* Approach is designed to emphasize social and academic learning equally. Third, many interventions exist simply as a set of paper resources and require principals and teachers to carry the burden of interpretation and implementation. In contrast, the *RC* Approach has been thoroughly developed over a period of twenty years, and as such, there are scores of materials (e.g., books, a monthly newsletter) elaborating recommended principles and practices. The intervention is taught to teachers through a series of one-week training programs, with opportunities for in-school coaching sessions with a certified *RC* trainer. Further, the intervention has structures in place to support sustainability.

In theory, *RC* Approach has many of the hallmark characteristics of an effective intervention. This explains both why it has become increasingly popular among elementary school teachers and why it has become necessary to investigate its association with children's academic achievement.

Theoretical basis

The principles and practice described by the *RC* Approach are grounded in theory and research in educational and developmental science. Zins & colleagues (2004) offer a theoretical framework describing the contribution of Social and Emotional Learning Interventions. We have expanded upon this framework to place more emphasis on the teachers' central role in producing high quality classroom environments and children's academic success, consistent with the objectives and design of the *RC* Approach.

Fig. 1 illustrates our theory of why the teachers' use of *RC* practices may contribute to academic gains. There are four key elements: 1) Teachers who use *RC* practices create academically-rich learning environments that are motivating to children; 2) Teachers using *RC* practices create well-managed, caring learning environments; 3) These learning environments produce greater school engagement and motivation and teach children social and self-regulatory skills (e.g., self-control, responsibility, cooperation); 4) Greater engagement and motivation as well as social and self-regulatory competencies lead to improved academic performance.

A concrete example is helpful for explanation. According to this hypothetical model, a teacher who uses *RC* Morning Meetings, Rules and Logical Consequences, and Academic Choice establishes strong relationships with his/her students and among the students, reduces classroom discipline and management problems, and provides children guided choice and autonomy in their learning. From this, children develop prosocial skills and self-control and become more engaged and motivated to learn. These social and

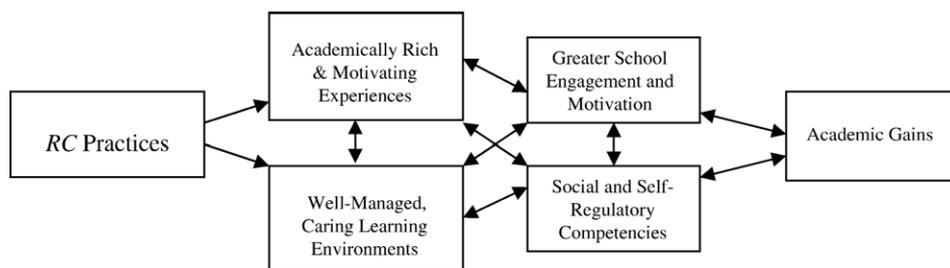


Fig. 1. Theoretical model describing the contribution of the RC approach.

self-regulatory competencies and heightened levels of engagement in learning lead to academic gains.

The effects in this model are bi-directional. For example, a well-managed, caring learning environment fosters children's development of social and emotional competencies and, in turn, children with improved social and emotional competencies create a better learning environment for other children in their classroom (Zins et al., 2004). Children who experience more academically-rich and motivating experiences become more engaged in school, and likewise, children who are more engaged in school will create for themselves more academically-rich and motivating experiences (Gutman & Sulzby, 2000; Pintrich, 2000). The transactional nature of these processes is important for understanding the way in which meeting children's social and developmental needs establishes a positive pattern of engagement and potentially contributes to their academic success over time (Pianta, 1999).

Research on comparable social and emotional learning interventions

It is useful to place the present study in the context of existing research on other comparable school-based interventions. The Seattle Social Development Project (SSDP) and the Child Development Project (CDP) are two such well-research examples that share a common theoretical basis as well as common principles and practices (Battistich, Solomon, Kim, Watson, & Schaps, 1995; Hawkins, Guo, Hill, Battin-Person, & Abbott, 2001). The emphasis on the development of a well-managed, caring learning community developed through proactive approaches to behavioral management and the provision of academically-rich, motivating experiences resemble the RC Approach.

Studies examining the effectiveness of SSDP show that students perceived school as more positive and rewarding and were more attached to school, a finding that persisted over time (Hawkins, Catalano, et al., 1992, Hawkins, Gou et al., 2001). Even two years of this intervention (in grades five and six) was linked to increased school success, with children receiving the intervention showing better overall performance in math, reading, and language than a comparison group (Abbott et al., 1998). Comparable work examining the effectiveness of the CDP shows links between these intervention and improved student attitudes and classroom behavior, changed teachers' practices and perceptions, and, most germane to the present study, improved children's achievement outcomes, especially in schools implementing the intervention with high level of fidelity (Battistich, Solomon, Watson, & Schaps, 1997). Further, CDP appears to have lasting effects: elementary school

children experiencing high levels of implementation of this program showed higher achievement test scores and grade point averages compared to a comparison group (Battistich, Schaps, & Wilson, 2004).

Findings from SSDP and CDP studies offer some indications about what to expect in relation to the contribution of the *RC* Approach: we can expect that children will show greater academic improvement under the *RC* Approach and these academic gains will be more pronounced for children receiving higher levels of the intervention over a longer period of time (Abbott et al., 1998; Battistich et al., 2004).

Treatment fidelity

The *RC* Approach, like many interventions used in schools, depends on appropriate implementation, or treatment fidelity, in order to produce its intended effects. The intervention is conducted by teachers and administrators and its contribution is only measurable if, indeed, the teachers are implementing the practices effectively. Assessing treatment fidelity is critically important for both strengthening the conclusions about the effectiveness of interventions and increasing the likelihood that the original results can be replicated (Battistich et al., 1997; Domitrovich & Greenberg, 2000). In the present study, we validate the differences between *RC* Approach and control schools and measure treatment fidelity based on teachers' reported and observed use of *RC* practices.

Research question

The present study examines the degree to which the Responsive Classroom Approach is associated with children's academic performance over one-, two-, and three-year periods. Our hypothesis is that children attending schools implementing the *RC* Approach will show greater improvement in reading and math performance than children attending control schools. We expect that these effects will be greater for children with longer exposure to *RC* practices. Such findings are important for understanding the ways in which the *RC* Approach contributes to children's school performance. Each year, approximately 5000 teachers nationally are trained in the use of this approach. Understanding the implications of the use of the *RC* Approach is an important first step in establishing (or questioning) its efficacy.

Methods

Participants

Three cohorts of children from six study schools (3 intervention, 3 control) within a single district were included as participants. Each cohort ranged in size from 381 to 514 students, with approximately equal number of students from intervention and control schools. The demographic characteristics of the children in each cohort are more fully described in Table 1. Cohorts were in different grade level during the pre-test year and were followed for a different span of time (equivalent to the amount of time at one of the study schools before leaving for middle school). The second grade cohort was followed for three

Table 1
Description of the child cohorts for reading and Math

Cohort	Years spanned	School type		Grade level at the pre-test year			Gender		Ethnicity			
		Cont.	Interv.	2	3	4	Male	Female	White	Black	Hispanic	Asian
<i>Reading</i>												
Grade 2 at baseline	3 years	170	211	381			192	189	213	85	62	21
Grade 3 at baseline	2 years	220	282		502		244	258	254	106	119	23
Grade 4 at baseline	1 year	240	266			506	253	253	263	113	109	21
<i>Math</i>												
Grade 2 at baseline	3 years	174	214	388			195	193	217	87	63	21
Grade 3 at baseline	2 years	223	291		514		251	263	258	113	120	23
Grade 4 at baseline	1 year	235	264			499	246	253	260	113	106	20

years, from May of their second grade year to April/May of their fifth grade year. The third grade cohort was followed for two years, from May of their third grade year to April/May of their fifth grade year. The fourth grade cohort was followed for one year, from May of the fourth grade year to April/May of the fifth grade year. Thus, cohorts were named for their pre-test years.

Students were included in the study if they had test score data available at pre-test and post-test time periods. Between 11 and 101 children were excluded from each cohort based on incomplete data. Chi-squared tests were conducted to test whether selected participants were different from unselected participants based on free/reduced lunch status, gender, or ethnicity. In no cases were there statistically significant differences. The sample sizes were slightly different for reading and math due to missing data.

For purposes of measuring treatment fidelity, teachers were recruited to complete questionnaires and participate in classroom observations. For questionnaire data, 122 teachers in grades kindergarten through four participated, representing a 69% enrollment rate (58% control, 79% RC). Recruited teachers had an average of 11.35 years of experience (SD=9.82); 16 held only bachelor degrees and 105 held bachelor and masters degrees; 24 taught kindergarten, 26 taught first, 25 taught second, 22 taught third, and 25 taught fourth grade. There were no differences in years of experience, education, or grade taught between intervention and control schools. For classroom observations, 90 teachers (43 RC, 47 control) in grades first through fifth participated. One hundred twenty (representing a 77% response rate) indicated a willingness to be observed; 90 teachers were selected randomly from this group. Observed teachers had an average of 10.15 years of teaching experience (SD=9.64); 14 held bachelor degrees only and 76 held bachelor and masters degrees; 19 taught first, 19 taught second, 15 taught third, 18 taught fourth, and 19

taught fifth grade. Again, there were no differences in years of experience, education, or grade taught between intervention and control schools.

The student and teacher participants were enrolled at or taught in one of six public schools in an urban district in the Northeast. The control and intervention schools were roughly the same with regard to ethnicity and socioeconomic status. In half the cases, there were no statistical differences in average test scores between the *RC* and comparison schools. The student populations of these school, on average, were comprised of 53.63% of students who were ethnic minorities (*RC*: 50.56%, Control: 56.70%) and 35.32% who were eligible for free or reduced-price lunch (*RC*: 34.46%, Control: 36.17%).

All six schools were subject to the same district-level guidelines for teaching reading and mathematics. The reading and math curricula were custom-designed and developed locally to align with standards exemplified by the state tests. Both the reading and curricula were based upon materials developed by Houghton–Mifflin, but extended beyond these materials as well. Teachers in all six schools selected from this body of materials to teach. All six schools were required by the district to spend 90 min on literacy and 45 min on mathematics per day, a mandate that appeared to be implemented fairly consistently across the six schools in the present study based on conversations with principals and teachers.

Design and procedure

Data for this study were collected as part of the Social and Academic Learning Study, a three-year longitudinal, quasi-experimental study of the efficacy of the Responsive Classroom Approach conducted by outside evaluators. Six schools (3 control and 3 intervention) were recruited into the study based on applications from the principals. Three intervention schools initiated the process of full school-wide implementation of the *RC* Approach in 2001.

Academic achievement data were garnered from the cooperating school district over the three-year period of interest, starting in the spring of the year prior to *RC* implementation and ending in the spring of the third year of *RC* implementation. All kindergarten through fourth grade teachers at these six schools were invited (by mail and in person) to participate in the questionnaire portion of the study during the fall of the second year of *RC* Approach implementation, corresponding approximately to the midpoint of the test data collection. Adoption of the *RC* Approach was still in the early stages—the second year of an at least three-year process—thus, teachers' report of *RC* practices at this point offered a conservative estimate of implementation. To recruit teachers for observations, all first through fifth grade teachers attending a fall staff meeting were invited in person to participate. Postcard responses indicating interest were received from 120 teachers and a subset of 90 (43 *RC* and 47 control) were selected randomly for observation. This recruitment occurred during the third year of *RC* implementation, corresponding to the last year of test score data collection.

Intervention

Approximately one-third of the teachers at *RC* schools were trained per year. By the third year of the study, all teachers had been trained in *RC* Approach at the intervention schools and only three teachers at control schools had received the basic training in the *RC* Approach during the comparable period. All training was conducted by certified *RC*

consulting teachers. The basic *RC* training (*RC* 1 training) occurred during a week during the summer months and included an introduction to the philosophy and basic practices of the *RC* Approach (see NEFC, 1997, 2003, for a full description of the *RC* philosophy and practices). Teachers observed, practiced, and/or discussed key components of the *RC* Approach (i.e., Morning Meeting, Rules and Logical Consequences, Academic Choice, Guided Discovery, Understanding Children's Development, Communicating with Families). This learning was reinforced with consultation opportunities where trainers visited teachers' classrooms two to four times per year for observation and consultation.

The advanced *RC* training (*RC* 2 training) occurred on 5 individual days across the school year. The *RC* 2 training built upon the *RC* 1 training and provided more depth about the philosophy and practices of the *RC* Approach. *RC* 2 focused on advanced strategies such as procedures for problem-solving class meetings, a shift in teacher language from praise to encouragement (e.g., instead of saying, "good job," saying "I noticed you were working hard on your math work"), and a greater range of strategies for working with and believing in the potential of children showing behavior problems (e.g., a move toward school-wide discipline strategies so that expectations are clear across classrooms and from year to year; use of a buddy system of teachers across classrooms to assist in the management of behavior problems).

Measures

Data were gathered from three sources: 1) achievement data were garnered from school records, 2) teacher questionnaires were gathered to assess use of *RC* practices among teachers in grades K-4, and 3) observations were conducted to quantify use of *RC* practices in selected classrooms in grades one through five.

Achievement tests

All students enrolled in grades two through five in these schools, except those with extreme disabilities (e.g., mental retardation, Down's syndrome), took standardized assessment tests in the spring of the school year. These tests were administered to the whole class in the children's home classrooms, resulting in math and reading test scores.

The Degrees of Reading Power test is a nationally-normed, criterion-referenced test of reading comprehension developed by Touchstone Applied Science Associates, (TASA, 2002). This test is comprised of test paragraphs, consisting of two to three sentences, or test passages comprised of eight to ten sentences, depending on the child's grade level. Specific words are deleted from the text and students are expected to select the correct word from four or five possible options to place in each sentence. Thus, the activity requires decoding as well as comprehension across sequential sentences. The score on this test indicates the level of text difficulty students are able to read and understand, and possible scores range from 15 to 99.

The CMT-Math test is a standardized assessment used across the state of Connecticut to assess children's math abilities. Children took the CMT-Math Assessment once a year (in the spring) in second, third, and fifth grades, and twice a year (in the fall and spring) in

fourth grade. The test has different number of items for each grade. In second grade, the test was comprised of 40 items, in third grade 83 items, in fourth grade 94 items, and in fifth grade, 105 items.

The CMT-Math test consists of a mix of multiple-choice and open-ended questions. Each multiple-choice question was worth one point whereas the open-ended questions ranged in value from one to three points. Questions were explicitly mapped to curriculum objectives; between two and four items were used to test each objective.

For the purposes of accountability and school evaluation, the local district adopted math proficiency standards for the fifth grade that were well-aligned with state standards used in grades four, six and eight. These proficiency standards correspond to the different math test score cut-off values. Student performance is at one of three levels: remedial, proficient, and goal. For fifth grade, the criteria were 95 for goal, 68 for proficiency, and less than 68 for remedial. These cutoff values were regarded by our collaborating district as meaningful criteria defining success in math and these values were aligned with those existing in state and federal policies. As such, we adopted them for use in our multinomial logistic regression analyses.

Teacher-reported use of RC practices

The Classroom Practices Measure assessed teachers' implementation of the RC Approach, and thus, treatment fidelity. This 41-item measure was custom designed (see Rimm-Kaufman & Sawyer, 2004, for more information). Each of the first 34 items provided teachers with two statements, with one being not at all characteristic of RC practices, and the other being very characteristic of RC practices. To avoid biasing teachers' responses, classroom practices were not described in RC terminology. Teachers rated the degree to which they used each RC practice. The items asked teachers about their use and characteristics of: (1) hand signals; (2) classroom opening exercises; (3) classroom rules and consequences, (4) classroom organization; (5) introduction of materials; (6) student choice; (7) student reflection; (8) assessment and parent communication; (9) time-out; and (10) problem-solving class meetings. For example, one item assessing opening exercises ranged from, "The teacher greets classmates during opening exercises, but classmates usually do not greet each other," to "The teacher greets classmates during opening exercises, and classmates usually greet each other." An item assessing use of rules and logical consequences ranged from, "Teachers use praise and reward to reinforce the rules" to "The teacher reminds, reinforces, and redirects children in their practice of the rules." Reliability estimate was computed for the 34 classroom practices items, resulting in a Cronbach's alpha of 0.91.

The remaining seven items of this 41-item instrument were open-response questions and queried teachers about their classroom management and discipline strategies. These items were coded on a five-point scale, where zero equaled inconsistency, three equaled partial consistency, and five equaled consistency with RC practices. Two raters agreed at a level of 85% or above for the total of these items. Mean scores were computed across all 41 items as an indicator of reported use of RC classroom practices.

Observed use of RC practices

The data of the observed use of RC practices were collected during a two-and-half hour observation in the classroom using a sixteen item rating scale. This rating scale assessed the

set-up of the classroom, the teachers' approach to behavior management, and the teachers' use of practices to create a sense of classroom community. Questions reflected whether the teacher allowed time for sharing, posted classroom rules, and informed children about logical consequences (or consequences that were linked in very specific ways to the child's behavior). All questions were worded as to avoid *RC* terminology and jargon. Initial efforts were made to create a 1 to 5 rating scale (corresponding to the teacher-report measure), however, for parsimony, the final version of the scale was designed as a three point scale ranging from zero to two. A score of 0 indicated no observed evidence of the *RC* practice, 1 indicated minimal observed evidence of the *RC* practice, and 2 indicated more than minimal observed evidence of the *RC* practice. Inter-rater reliability checks were conducted prior to the initiation of data collection and at two points during the school year in actual classrooms, resulting in an average of 95% agreement between two coders (the actual classroom observer and the master coder). The classroom observer had little knowledge about the *RC* Approach and was blind to the status of the school and teacher (i.e., intervention or control schools). See Rimm-Kaufman, et al., (under review) for further details.

Analytic approach

Analysis of covariance (ANCOVA) was used to test the differences between schools implementing the *RC* Approach and those in a comparison condition. Separate analyses were conducted for reading and math. School type (intervention versus control) was the between-subjects independent variable and the outcome variable was the post-test score. In these analyses, pre-test scores and free/reduced lunch status were treated as the covariates given the importance of both of these variables in predicting achievement. Multinomial logistic regression using these same predictors (school type, pre-test scores, and free/reduced lunch status) were conducted to predict children's level of proficiency in math. In order to assess the contribution of the intervention accurately, only pre-test scores obtained prior to the implementation of the *RC* Approach were used.

The ANCOVA approach was used instead of hierarchical linear modeling (HLM) for several reasons. First, the predominant focus was children's academic performance as a function of their exposure to the *RC* Approach. Because children moved between classrooms within a single grade, it was untenable to link children's achievement in a subject with the actual teacher of that subject. Second, this paper has a longitudinal focus. Children were nested within schools across time, but not nested within classrooms across grade levels. As a result, we could not link a student's performance to an individual teacher or classroom.

Results

Achievement tests

The Degrees of Reading Power test

Table 2 presents essential information for the DRP test, including the descriptive statistics for the pre-test and the post-test scores, *t*-test for testing the pre-test means of the intervention (*RC* schools) and the control schools, the adjusted means of the post-test for the

Table 2
Descriptive statistics and ANCOVA results for reading as measured by the DRP test

Cohorts	N	Pre-test X̄(SD)	t statistic for testing pre- test means	Post-test X̄(SD)	Adjusted means ^a	ANCOVA F-test (df1, df2) for adjusted means	Effect size for adjusted means (Cohen's d)
<i>Grade 2 at baseline three-year interval</i>							
Intervention	211	41.05 (13.53)	.29	68.17 (12.60)	68.04	10.75 (1, 374) *	.16
Control	170	40.64 (14.12)		64.74 (14.73)	65.00		
<i>Grade 3 at baseline two-year interval</i>							
Intervention	282	49.84 (12.43)	.72	66.88 (14.67)	66.39	12.22 (1, 498) **	.21
Control	220	49.04 (12.17)		63.47 (13.93)	64.10		
<i>Grade 4 at baseline one-year interval</i>							
Intervention	266	57.69 (11.76)	3.63 **	65.44 (13.44)	63.67	2.74 (1, 502)	.07
Control	240	53.70 (13.36)		60.69 (13.91)	62.65		

Note. Adjusted means are based on ANCOVA analysis, and adjusted for both pre-test scores and free/reduced lunch status.

* $p < .05$.

** $p < .01$.

intervention and control groups based on ANCOVA analysis, the ANCOVA test for testing the adjusted post-test means, and the computed effect sizes between the intervention and the control schools based on the adjusted post-test means.

T-tests conducted for the comparing the intervention and control schools on the pre-test means showed that, out of three comparisons, one comparison (fourth grade at baseline, one-year interval) was statistically different ($t = -3.63$, $p < .01$). This indicates that the intervention school students of one cohort had higher scores on DRP test at the beginning. This confirms the necessity of adjusting for the initial difference while comparing the post-test scores between the two conditions.

ANCOVAs were performed to assess the contribution of the RC Approach to students' reading performance, while controlling for both the potential initial difference in reading (pre-test) and the free/reduced lunch status (a proxy of socioeconomic status [SES]). As summarized in Table 2, after controlling for pre-test DRP score and free/reduced lunch status, ANCOVA analyses showed significant mean differences of DRP post-test scores between the intervention and control schools in two out the three cohorts. Specifically, there were significant intervention effect for the second grade cohort with the three-year interval [$F(1374) = 10.75$; $p < .05$], and for the third grade cohort with the two-year interval [$F(1498) = 12.22$; $p < .01$]. For the two statistically different comparisons, Cohen's d values were .16 and .21 respectively, suggesting the presence of small effects. There is some indication that longer exposure to the RC Approach resulted in more pronounced gains in reading achievement.

The CMT-Math test

Table 3 presents similar information as shown in Table 2, but for the CMT-Math test, including both descriptive information for the pre- and post-test scores of the two conditions, tests for the pre-test scores, and tests for the adjusted means of the post-test scores.

Table 3
Descriptive statistics and ANCOVA results for the Math achievement as measured by the CMT-Math test

Cohorts	N	Pre-test $\bar{X}(SD)$	<i>t</i> statistic for testing pre-test means	Post-test ^a $\bar{X}(SD)$	Adjusted means ^b	ANCOVA <i>F</i> -test _(df1, df2) for adjusted means	Effect size for adjusted means (Cohen's <i>d</i>)
<i>Grade 2 at baseline three-year interval</i>							
Intervention	214	33.05 (5.75)	.13	108.04 (21.76)	107.71	43.41 _(1, 381) ***	.39
Control	174	32.97 (6.46)		95.88 (28.89)	96.34		
<i>Grade 3 at baseline two-year interval</i>							
Intervention	291	97.29 (22.78)	2.68 *	94.20 (17.55)	92.41	14.95 _(1, 510) **	.16
Control	223	91.62 (24.55)		86.47 (21.99)	88.81		
<i>Grade 4 at baseline one-year interval</i>							
Intervention	264	85.95 (18.51)	5.87 *	94.00 (17.21)	89.42	2.43 _(1, 495)	.06
Control	235	74.69 (23.69)		83.00 (23.70)	88.11		

^aThe Math pre-test and post-test do not have the same number of items, thus the scores are not directly comparable.

^bAdjusted means are based on ANCOVA analysis, and adjusted for both pre-test scores and free/reduced lunch status.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Two out of three tests for the pre-test means showed that the intervention schools tended to have higher initial performance on the math test, indicating the necessity to take the initial difference into account while testing for the post-test score difference between the intervention and the control schools. ANCOVA techniques were employed to adjust for these initial performance differences and to control SES as represented by the free/reduced lunch status.

As can be seen in Table 3, after controlling for free/reduced lunch status and adjusting for the initial difference in pre-test scores, the students in the intervention schools showed higher post-test scores than the students in the control schools for two of the three cohorts. The intervention (RC Approach) effect was statistically significant for the second grade cohort with the three-year interval [$F(1381)=43.41, p < .001$], and the third grade cohort with the two-year interval [$F(1510)=14.95, p < .01$]. Again, Cohen's *d* values were computed as effect size measure. For the two statistically significant tests for the adjusted post-test means, Cohen's *d* values are .39 and .16, respectively, and these may be characterized as medium and small effect sizes. Similar to the observation for the reading test data, the contribution of the RC Approach seemed to be more pronounced for children who had longer exposure to the RC Approach.

Math proficiency levels at 5th grade

Multinomial logistic regressions were used for the analysis involving the CMT-Math proficiency levels (three levels: Remedial, Proficient, and Goal). These analyses considered the degree to which experience with the RC Approach predicted attainment of state goals in math achievement during the last year of elementary school, the fifth grade. Only students

Table 4
Multinomial logistic regression predicting the Math proficiency level at 5th grade

Cohorts	Predicted proficiency level	Predictors	Odds ratio	95% Confidence intervals	
Grade 4 at baseline One-year Interval	Proficient vs. remedial	Pre-test	1.13 ***	(1.10, 1.17)	
		Free lunch (1=yes 0=no)	.305 **	(.13, .70)	
		School type (1=RC 0=Control)	2.50 *	(1.07, 5.84)	
	Goal vs. remedial	Pre-test	1.33 ***	(1.27, 1.40)	
		Free lunch (1=yes 0=no)	.18 **	(.06, .49)	
		School type (1=RC 0=Control)	2.23	(.81, 6.12)	
	Grade 3 at baseline two-year interval	Proficient vs. remedial	Pre-test	1.09 ***	(1.06, 1.11)
			Free lunch (1=yes 0=no)	.69	(.31, 1.51)
			School type (1=RC 0=Control)	2.75 *	(1.26, 6.02)
		Goal vs. remedial	Pre-test	1.24 ***	(1.20, 1.28)
Free lunch (1=yes 0=no)			.36 *	(.14, .93)	
School type (1=RC 0=Control)			3.24 *	(1.31, 8.02)	
Grade 2 at baseline three-year interval	Proficient vs. remedial	Pre-test	1.28 ***	(1.19, 1.38)	
		Free lunch (1=yes 0=no)	.61	(.29, 1.27)	
		School type (1=RC 0=Control)	2.20 *	(1.03, 4.69)	
	Goal vs. remedial	Pre-test	1.69 ***	(1.53, 1.87)	
		Free lunch status (1=yes 0=no)	.44	(.19, 1.02)	
		School type (1=RC 0=Control)	6.37 ***	(2.71, 15.00)	

* $p < .05$.

** $p < .01$.

*** $p < .001$.

who were at fifth grade during the post-test period were used for this analysis, and thus, all three math cohorts were involved. Table 4 presents the summary of the results. In the multinomial logistic regression analysis, the outcome variable is the predicted attainment of math proficiency levels (Goal, Proficient, Remedial), and the independent variables in the model are students' pre-test math score at the beginning of the experiment (baseline math score), the free lunch status (yes or no), and the type of schools students were in (RC schools or not). This logistic regression analysis allows us to assess the influence of the RC Approach on students' attainment of math proficiency levels, while controlling for their previous math achievement and SES (lunch status as its proxy).

For interpretation of the logistic regression results, we focus on the odds ratio (OR) of the independent variables, especially on the contrast of the RC Approach schools vs. the control schools, and the confidence intervals associated with these odds ratios. These odds

Table 5
 Measure of treatment fidelity: Differences in RC implementation between intervention and control schools

	Control group \bar{X} (SD)	Intervention group \bar{X} (SD)	<i>t</i> statistic	Effect size (Cohen's <i>d</i>)
Teacher-reported RC implementation	3.62 (.58)	4.13 (.47)	5.22 ***	.88
Observed RC implementation	.71 (.46)	1.52 (.33)	9.75 ***	1.76

*** $p < .001$.

ratios are conceptually and practically more meaningful to interpret than the coefficients of multinomial logistic regression models. Odds ratio of 1 (OR=1) represents neutral or no effect of a predictor on the attainment of the higher math proficiency level, and $OR > 1$ and $OR < 1$ represent positive and negative effects of the predictor on the attainment of the higher math proficiency level, respectively.

For the 4th grade cohort with one-year exposure to RC intervention, the first analysis is the predicted attainment of Proficient math proficiency level (in contrast to Remedial level). After controlling for prior math achievement and free lunch status, the contribution of the RC Approach is statistically significant ($p < .05$), and students receiving the RC intervention were more likely (OR=2.5) to reach the *Proficient* level instead of at the Remedial level. To translate this OR into probability terms,¹ if the control school students had 50% chance (i.e., probability of 0.5) to reach the Proficiency level instead of at the Remedial level, the RC school students' chance of reaching the Proficiency level would be approximately 71%. The second analysis is the predicted attainment of Goal vs. Remedial math level. After controlling for prior math achievement and free lunch status, the effect is not statistically significant ($p > .05$), even though it appears positive (OR=2.23). This non-significance is also clearly shown by the 95% confidence interval with 1 (no effect) being contained within the interval.

For the third grade cohort with two-year exposure to RC intervention, both analyses (for predicting the attainment of Proficient and Goal math levels respectively) showed that, after controlling for prior math achievement and free lunch status, the RC intervention has statistically significant positive effect, with OR being 2.75 and 3.24, respectively. If we translate these into probability terms, assuming that control school students had 50% chance (i.e., probability of 0.5) of attaining Proficient or Goal math levels, the students receiving the RC intervention would have 73% and 76% chance of attaining the comparable levels of math proficiency, respectively.

For the second grade cohort with the three-year exposure to RC intervention, similar findings were obtained about the effect of RC intervention. After controlling for pre-test score and free/reduced lunch status, the effect of RC intervention is statistically significant for both analyses (attainment of the Proficient and Goal levels in contrast to the Remedial level). The odds ratios are 2.20 and 6.37, respectively. To translate these odds ratios into probability terms, assuming that control school students had 50% chance (i.e., probability of 0.5) of attaining *Proficient* or *Goal* math levels, the students receiving the RC

¹ This involves algebraic operations which are not shown here. For the relationship between OR and probability, interested readers may refer to any introduction to logistic regression (e.g., Pedhazur, 1997).

intervention would have 69% and 86% chance of attaining the comparable levels of math proficiency, respectively.

The findings from the multinomial logistic regression analyses for the attainment of higher math proficiency levels suggest that longer exposure to the *RC* intervention resulted more pronounced effect on students' math proficiency, similar to the findings presented previously in Tables 2 and 3. The implications of this will be discussed in a more detail later.

As a proxy for SES, free/reduced lunch status was negatively associated with the attainment of higher math proficiency levels ($OR < 1$ in all analyses). But it might be surprising that it was only statistically significant in three out of the six comparisons. This, however, was primarily because of the inclusion of previous math achievement in the model: the effect of SES has largely been reflected by the previous achievement.

RC treatment fidelity

Independent sample t-tests were conducted to examine differences in teachers' *RC* practices in the control and the intervention schools. Table 5 displays the results. Findings show that, as expected, teachers at the intervention schools showed high to very high level of *RC* practices, compared to low level of *RC* practices at the control schools, both from teacher-reported data or observation data. Effect sizes corresponding to these differences were large.

Discussion

Three distinct findings emerged from these analyses. First, children at *RC* schools appeared to show greater increase in reading and math performance. Second, the association between exposure to the *RC* Approach and achievement appeared to show statistical and practical significance for children receiving the *RC* intervention for two or three years but not for children receiving the intervention for a single year. Third, the contribution of the *RC* Approach appeared to be greater in the area of math than reading performance. These results were evident in analyses that controlled for earlier levels of achievement and socio-economic status, factors that have often been linked to children's school achievement. Further, these findings existed in cohorts where there were no differences in baseline test scores. Finally, these findings were supported by evidence of treatment fidelity. Specifically, teachers at *RC* schools implemented more *RC* practices than teachers at control schools, based on both teacher-report and classroom observations (conducted by an observer blind to the condition of the school).

Such findings have practical relevance, given schools' goals for improving achievement. Although design constraints restrict the ability to make causal inferences, the present findings show an association between exposure to the *RC* Approach and improved academic performance in reading and math. These findings were evident in a district that was highly diverse in relation to socioeconomic status and ethnicity and in schools that were comparable in their approach to reading and mathematics instruction (aside from their use of the *RC* Approach). No Child Left Behind (2001) places greatest priority on helping children achieve levels of proficiency according to standardized tests, and the present results show that children in the *RC* schools were more likely to reach the proficiency level in math achievement compared to children at the control schools.

Increase in reading and Math performance

Findings show a positive association between the *RC* Approach and achievement in reading and math achievement during elementary school. Reported effects are consistently positive, small to moderate in magnitude, and comparable to or larger than those described in meta-analytic work. For example, a meta-analysis of more than 400 Positive Youth Development Interventions showed that a typical student enrolled in a social and emotional learning program showed fewer school behavior problems and more prosocial behaviors. Approximately 40 of these studies examined academic outcomes and showed small to moderate gains as a function of exposure to these interventions (Weissberg & Durlak, 2005). A meta-analysis of 29 Comprehensive School Reform Models (including 1017 independent samples) showed very small gains ($d = .15$ for math and $d = .13$ for reading) as a function of adoption of school reform models (Borman, Hewes, Overman, & Brown, 2003). Thus, findings on the *RC* Approach are in line with what would be expected for a school-based prevention effort (Elias, Bruene-Butler, Blum, & Schuyler, 2000).

We speculate that improved classroom social processes are the mechanisms most likely to be responsible for improved performance in reading and math consistent with the proposed theoretical model. First, teachers who use the *RC* Approach may be better at creating a well-managed, caring, and efficient classroom environment. In terms of specific practices, *RC* teachers engage in daily meetings to reinforce social skills, use modeling to prepare children for daily tasks, and give explicit instructions in behavioral expectations. Existing research gives credence to these types of practices. For example, an observationally-based study on classroom practices described that teachers who spent more time in the fall orienting/organizing and giving explicit instructions about activities and expectations—practices that closely resemble those recommended by the *RC* Approach—spent less time later in the year in transitions (e.g., lining up for activities or waiting for a lesson to begin)—activities often viewed as unproductive time in the school day (Cameron, Connor & Morrison, 2005).

Second, we speculate that teachers who use the *RC* Approach may use more academically-rich and motivating classroom practices to teach academic skills. Specific Morning Meeting activities are geared toward improved achievement. Academic choice offers children an opportunity to select the way in which they conduct their independent learning within the classroom, providing an opportunity to support autonomy. The *RC* Approach to language is designed to offer children specific feedback and encouragement that is likely to enhance learning. Interesting learning formats, choice of activities, and specific feedback are all classroom social processes that have been linked to greater school engagement and children's social and self-regulatory abilities, ultimately leading to children's academic success (Brophy, 1999; Hamre, submitted for publication; Hamre & Pianta, 2005; Meyer, Wardrop, Linn & Hastings, 1993). The degree to which these mechanisms are responsible for improved performance with respect to the *RC* Approach requires further investigation.

Cumulative contribution of the RC Approach

The contribution of the *RC* Approach showed statistical and practical significance for children receiving the *RC* intervention for three rather than two years, and two rather than

one year. Other research comports and points to the importance of sustained experience with an intervention. As one example, an evaluation of the Seattle Social Development Project showed that receiving this intervention in elementary school can have lasting effects, contributing to increased feelings of bonding toward school into adolescence (at ages 13 and 18), even after controlling for the contribution of family poverty. These effects were more evident for children receiving the intervention over a five versus two-year period (Hawkins et al., 2001). Other studies that synthesize the literature suggest that multi-year programs have been shown to yield more enduring results than shorter, single-year programs (Greenberg, Domitrovich, & Bumbager, 2001).

Greater gains in math

The present findings point to moderate gains in math and small gains in reading in association with exposure to the *RC* Approach. This is a somewhat surprising finding given that the *RC* Approach is geared equally to all subjects and that some components of the model (e.g., Morning Meeting, Academic Choice) are more frequently and easily adapted for reading content than math.

Existing work offers some clarity in relation to this issue. Most research on comparable interventions (e.g., Seattle Social Development Project, Child Development Project) aggregates math and reading achievement, making it impossible to consider the differential contribution of such programming between the two subjects. In one exception, a comparison between a single school implementing the CDP and a control school revealed trends similar to those presented here, with more consistent and larger effects in math than in reading, (Solomon, Battstich, Watson, Schaps, & Lewis, 2000). In a quasi-experimental study of the Unique Minds School Program, an intervention designed to promote cognitive–social–emotional skills, children receiving the intervention in fourth and fifth grade showed gains in math but not reading grades in relation to this intervention (Linares et al., 2005). The most plausible explanation is that math achievement is more sensitive to time and quality of instruction in school whereas reading achievement is more multi-determined, reflecting home experiences with literacy and frequent out-of-school opportunities to practice newly learned skills, as well as schooling experiences (Bryk & Raudenbush, 1988; Harris, Kelly, & Valentine, 2000).

Limitations

Two limitations require mention. First, the quasi-experimental design of this study limits the degree to which readers can infer causality about the contribution of the *RC* Approach. In this case, the intervention and control schools were carefully matched in terms of minority composition and percentage of children receiving free and reduced lunch, however, in some cases, our intervention and control schools showed differences at the pre-test period. Although we analytically controlled for these differences by including relevant covariates in the analyses, such analytical control can never be a substitute for experimental control through randomization. The present study, although consistent with the objectives of an early efficacy trial, does not eliminate the possibility that school and teacher characteristics resulting in the commitment to implement the *RC* Approach were also responsible for improved test scores.

Second, this study was conducted during the first three years of implementation of the RC Approach, a process that typically takes three to five years to adopt. As a result of the training schedule, some teachers were not fully implementing the intervention during the early years of this period. As a result, the magnitude of effects should be interpreted cautiously. Partially ameliorating this concern, if anything, the effect sizes reported here may offer conservative estimates of the contribution of the RC Approach.

Closing comments

The present study suggests to the contribution of the Responsive Classroom Approach for improving children's academic achievement. It is useful to understand how the present study fits within the larger context of research in school psychology and the goals of American schools. The RC Approach is designed to target an entire school population with the goal of developing strengths in order to reduce the likelihood of later, high risk behaviors (Weisz et al., 2005). The RC Approach is meant to embed social resources into instruction across disciplines; offer a holistic approach to children's social and academic development; and emphasize high quality relationships and community-building as a starting point for classroom organization and instruction. The present findings offer correlative findings—when schools and teachers make a movement toward implementation of this approach, children appear to benefit academically. Future research that employs a randomized design, examines the mechanisms underlying its contributions, and considers the age at which children are most likely to benefit from the RC Approach constitute a critical next step in this line of research.

References

- Abbott, R. D., O'Donnell, J., Hawkins, D., Hill, K., Kosterman, R., & Catalano, R. (1998). Changing teaching practices to promote achievement and bonding to school. *American Journal of Orthopsychiatry*, 68(4), 542–552.
- Battistich, V., Schaps, E., & Wilson, N. (2004). Effects of an elementary school intervention on students' "connectedness" to school and social adjustment during middle school. *Journal of Primary Prevention*, 24(3), 243–262.
- Battistich, V., Solomon, D., Kim, D., Watson, M., & Schaps, E. (1995). Schools as communities, poverty levels of student populations, and students' attitudes, motives, and performance: A multi-level analysis. *American Educational Research Journal*, 32(3), 627–658.
- Battistich, V., Solomon, D., Watson, M., & Schaps, E. (1997). Caring school communities. *Educational Psychologist*, 32(3), 627–658.
- Borman, G. D., Hewes, G. M., Overman, L. T., & Brown, S. (2003). Comprehensive school reform and achievement: A meta-analysis. *Review of Educational Research*, 72(2), 125–230.
- Brophy, J. (1999). *Teaching*. Educational Practices Series-1. International Academy of Education and International Bureau of Education. Retrieved August 1, 2004, from <http://www.ibe.unesco.org/International/Publications/EducationalPractices/EducationalPracticesSeriesPdf/prac01e.pdf>
- Bryk, A. S., & Raudenbush, S. W. (1988). Toward a more appropriate conceptualization of research on school effects: A three-level hierarchical model. *American Journal of Education*, 97, 65–108.
- Cameron, C., Connor, C., & Morrison, F. (2005). Effects of variation in teacher organization on classroom functioning. *Journal of School Psychology*, 43(1), 61–86.
- Denton, K., & West, J. (2002). *Children's reading and mathematics achievement in kindergarten and first grade. NCES 2002-125*. Washington, DC: National Center for Education Statistics.

- Desrochers, J., Charvat, J., Cummings, J., Doll, B., Garcia, C., & Laidig, P. (2005). A pound of prevention is worth a ton of cure. *Communique*, 34 (Retrieved on September 1, 2006 from: http://www.nasponline.org/publications/cq344conv_prevention.htmlNASP).
- Domitrovich, C. E., & Greenberg, M. T. (2000). The study of implementation: Current findings from effective programs that prevent mental disorders in school-aged children. *Journal of Educational and Psychological Consultation*, 11(2), 193–221.
- Elias, M. J., Bruene-Butler, L., Blum, L., & Schuyler, T. (2000). Voices from the field: Identifying and overcoming roadblocks to carrying out programs in social and emotional learning/emotional intelligence. *Journal of Educational and Psychological Consultation*, 11(2), 253–272.
- Elliott, S. (1993). *Caring to Learn: A report on the positive impact of a social curriculum*. Greenfield, MA: Northeast Foundation for Children (Retrieved January 3, 2005 from: http://www.responsiveclassroom.org/PDF_files/Caring%20to%20Learn.pdf).
- Elliott, S. (1999). *A multi-year evaluation of the Responsive Classroom Approach: Its effectiveness and acceptability in promoting social and academic competence*. Greenfield, MA: Northeast Foundation for Children.
- Greenberg, M. T., Domitrovich, C., & Bumbarger, B. (2001). The prevention of mental disorders in school-aged children: Current state of the field. *Prevention and Treatment*, 4(1), 1–62.
- Greenberg, M. T., Weissberg, R. P., O'Brien, M. U., Zins, J., Fredericks, L., Resnik, H., et al. (2003). Enhancing school-based prevention and youth development through coordinated social, emotional, and academic learning. *American Psychologist*, 58, 466–474.
- Gutman, L. M., & Sulzby, E. (2000). The role of autonomy-support versus control in the emergent writing behaviors of African-American kindergarten children. *Reading Research and Instruction*, 39(2), 170–183.
- Hamre, B.K., (submitted for publication). Learning opportunities in preschool and early elementary school classrooms. In R.C. Pianta, M.J. Cox, & K. Snow (Eds.), *The New American Elementary School*. Baltimore: Paul H. Brookes.
- Hamre, B., & Pianta, R. C. (2005). Can instructional and emotional support in the first grade classroom make a difference for children at risk of school failure? *Child Development*, 76(5), 949–967.
- Harris, C., Kelly, C., & Valentine, J. C. (2000). *Making the most of summer school: A meta-analytic and narrative review*. *Monographs of the Society for Research in Child Development*, Vol. 65(1).
- Hawkins, J. D., Catalano, R. F., Morrison, D. M., O'Donnell, J., Abbott, R. D., & Day, L. E. (1992). *The Seattle Social Development Project: Effects of the first four years on protective factors and problem behaviors. Preventing Antisocial Behavior*. New York: Guilford Press.
- Hawkins, J. D., Guo, J., Hill, K. G., Battin-Person, S., & Abbott, R. D. (2001). Long-term effects of the Seattle social development intervention on school bonding trajectories. *Applied Developmental Science*, 5(4), 225–236.
- Lee, V., & Smith, J. B. (1999). Social support and achievement for young adolescents in Chicago: The role of school academic press. *American Educational Research Journal*, 36(4), 907–945.
- Linares, L. O., Rosbruch, N., Stern, M. B., Edwards, M. E., Walker, G., Abikoff, H. B., et al. (2005). Developing cognitive-social-emotional competencies to enhance academic learning. *Psychology in the Schools*, 42(4), 405–417.
- McLoyd, V. (1998). Socioeconomic disadvantage and child development. *American Psychologist*, 53(2), 185–204.
- Meyer, L. A., Wardrop, J. L., Hastings, C. N., & Linn, R. L. (1993). Effects of ability and settings on kindergarteners' reading performance. *Journal of Educational Research*, 86(3), 142–160.
- Northeast Foundation for Children (1997). *Guidelines for the Responsive Classroom*. Greenfield, MA: Northeast Foundation for Children.
- Northeast Foundation for Children (2003). *The Responsive Classroom level 1 workbook*. Greenfield, MA: Northeast Foundation for Children.
- Pedhazur, E. J. (1997). *Multiple regression in behavioral research: Explanation and prediction* (3rd Ed.) London, UK: Wadsworth.
- Pianta, R. C. (1999). *Enhancing relationships between children and teachers*. Washington, DC: American Psychological Association.
- Pintrich, P. R. (2000). The role of goal orientation in self-regulated learning. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 451–502). San Diego: Academic Press.

- Rimm-Kaufman, S.E., & Chiu, Y.I. (in press). Promoting social and academic competence in the classroom: An intervention study examining the contribution of the *Responsive Classroom* approach. *Psychology in the Schools*.
- Rimm-Kaufman, S. E., & Sawyer, B. E. (2004). Primary-grade teachers' self-efficacy beliefs, attitudes toward teaching, and discipline and teaching practice priorities in relation to the Responsive Classroom Approach. *Elementary School Journal*, 104(4), 321–341.
- Rones, M., & Hoagwood, K. (2000). School-based mental health services: A research review. *Clinical Child and Family Psychology Review*, 3(4), 223–241.
- Shouse, R. C. (1996). Academic press and sense of community: Conflict, congruence, and implications for student achievement. *Social Psychology of Education*, 1(1), 47–68.
- Solomon, D., Battstich, V., Watson, M., Schaps, E., & Lewis, C. (2000). A six district study of educational change: direct and mediated effects of the child development project. *Social Psychology of Education*, 4, 3–51.
- Touchstone Applied Science Associates (TASA) (2002). *Degrees of Reading Power program*. Brewster, NY: TASA.
- U.S. Department of Education (2002). Comprehensive School Reform program. Retrieved November 20, 2005, from <http://www.ed.gov/programs/compreform/2pager.html>
- Weissberg, R. P., & Durlak, J. A. (2005). Social and emotional learning for school and life success. Retrieved December 20, 2005, from <http://www.casel.org/downloads/apa08.20.05.ppt>
- Weisz, J., Sandler, I. N., Durlak, J. A., & Anton, B. S. (2005). Promoting and protecting youth mental health through evidence-based prevention and treatment. *American Psychologist*, 60(6), 628–648.
- Zins, J. E., Bloodworth, M. R., Weissberg, R. P., & Walberg, H. J. (2004). The scientific base linking social and emotional learning to school success. In J. E. Zins, R. P. Weissberg, M. C. Wang, & H. J. Walberg (Eds.), *Building academic success on social and emotional learning* (pp. 3–22). Columbia University, New York: Teachers College.