Prev Sci (2013) 14:40–51
DOI 10.1007/s11121-012-0294-1

Setting-Level Influences on Implementation of the *Responsive Classroom* Approach

Shannon B. Wanless · Christine L. Patton · Sara E. Rimm-Kaufman · Nancy L. Deutsch

Published online: 14 October 2012

Abstract We used mixed methods to examine the association between setting-level factors and observed implementation of a social and emotional learning intervention (*Responsive Classroom*® approach; *RC*). In study 1 (N=33 3rd grade teachers after the first year of *RC* implementation), we identified relevant setting-level factors and uncovered the mechanisms through which they related to implementation. In study 2 (N=50 4th grade teachers after the second year of *RC* implementation), we validated our most salient Study 1 finding across multiple informants. Findings suggested that teachers perceived setting-level factors, particularly principal buy-in to the intervention and individualized coaching, as influential to their degree of implementation. Further, we found that intervention coaches' perspectives of principal buy-in were more related to implementation than principals' or teachers' perspectives. Findings extend the application of setting theory to the field of implementation science and suggest that interventionists may want to consider particular accounts of school setting factors before determining the likelihood of schools achieving high levels of implementation.

Keywords Implementation · Intervention · Social-emotional learning · Mixed methods

S. B. Wanless (✉)
Department of Psychology in Education, School of Education,
University of Pittsburgh,
5937 Wesley W. Posvar Hall,
Pittsburgh, PA 15260, USA
e-mail: swanless@pitt.edu

C. L. Patton
Harvard Family Research Project, Graduate School of Education,
Harvard University,
Cambridge, MA, USA

S. E. Rimm-Kaufman
Center for Advanced Study of Teaching and Learning,
Curry School of Education, University of Virginia,
Charlottesville, VA, USA

N. L. Deutsch
Curry School of Education, University of Virginia,
Charlottesville, VA, USA

Recent research in school-based prevention has extended beyond establishing the evidential basis for interventions and toward the study of how interventions can be implemented (Berkel et al. 2011; Greenberg 2010). One challenge faced by researchers, practitioners, and policy-makers is that implementation is typically uneven (Durlak 2010; Weisz et al. 2005). Because of this variability, fidelity of implementation has been viewed as a key factor for understanding the efficacy of school-based interventions. A recent meta-analysis of social-emotional learning (SEL) interventions, in particular, found that in the presence of implementation problems, interventions were no longer related to, or were more weakly related to, social-emotional and academic outcomes (Durlak et al. 2011).

Fidelity of implementation is multiply determined and features of school settings stand out as critical (Durlak and DuPre 2008). This reality demands study of the setting-level factors that contribute to implementation, an area referred to as Type II translational research (Dariotis et al. 2008). Critical setting-level features must be identified, but also, understood from the perspective of the personnel responsible for implementation. The purpose of the present research, therefore, is to determine how setting-level factors are defined by teachers, and lead to variation in the context of a SEL intervention, the *Responsive Classroom*® Approach.

Elements of the School Setting that May Influence Implementation

Fidelity of implementation is the extent to which teachers implement new intervention practices in the manner in which they were designed. Previous research has used different terms for this concept, such as treatment integrity, fidelity, and implementation quality (Dane and Schneider 1998; Durlak 1998; Greenberg et al. 2005). Extending Dane and Schneider's conceptual work (1998), aspects of implementation have recently been described and organized into different frameworks (Berkel et al. 2011; Century et al. 2010). The aspect examined in the present studies, centers on the actual use of intervention practices and is often termed "adherence," "fidelity," or "implementation."

Teachers' practices change throughout their careers (Richardson and Placier 2001). This development, particularly in terms of acquiring intervention practices, depends in part on social processes within schools (Tseng and Seidman 2007). In particular, development reflects teachers' interactions with: (1) schools/administration, (2) intervention coaches, (3) other teachers, and (4) students. Investigation of these social processes may advance understanding of how to increase initial implementation and build a strong foundation to support long-term sustainability.

Schools/Administration School administrators have been referred to as the gatekeepers of change and convey messages to teachers about the relative importance of interventions (Berends et al. 2002; Berman and McLaughlin 1976; Desimone et al. 2004). For example, evaluators of SEL interventions have found that implementation was directly related to principals' support of the intervention, such as involvement and belief in the intervention (J. C. Marshall and Caldwell 2007; Ringwalt et al. 2003), even when assessed as teachers' perceptions (Ransford et al. 2009). Definitions of principal support, however, have varied considerably, from identifying the intervention as a high priority, believing in the importance of the intervention, providing logistical support, to using intervention practices (Kam et al. 2003; Mancini et al. 2009; J. C. Marshall and Caldwell 2007). Another aspect of principal support has been described as transformational leadership, which is defined as leadership that builds staff capacity, including the efforts of people within and outside of the school, and acknowledging the interdependence of all contributors to the success of the school (Leithwood and Jantzi 2005). In one study of 12 schools, leaders described as transformational developed professional relationships relatively quickly, a process that has been shown to facilitate intervention efforts (Leithwood and Jantzi 1990). Identifying specific critical elements of principals' support may indicate a school's likelihood of successful implementation.

Coaches Research suggests that coaching that includes demonstrations, feedback, and opportunities to practice new skills, produces changes in teacher practices (Grierson and Gallagher 2009; Joyce and Showers 2002; Wallace et al. 2008). Moreover, implementation varies systematically by differences in coaching (Downer et al. 2009). Although not sufficiently researched, the coach-teacher relationship and the quality of the coach's technical support may be important elements of successful coaching (Downer et al. 2009; Joyce and Showers 2002; McCormick and Brennan 2001). Greenberg et al. (2005) proposed that a positive relationship would be supportive, cooperative, and have open communication. The extent to which coaching provides this kind of social support cannot be overemphasized as implementation of a school-wide intervention is inherently a social process (Rogers 2003). Further, coaches are often tasked with providing individualized feedback to teachers (Kretlow and Bartholomew 2010) which is most successfully done in the context of a supportive relationship. In addition, the quality of technical support, which varies widely among programs (Fixsen et al. 2009), is a key component for success (Dole 2004; Elias et al. 2003). Providing feedback and technical support may be an essential component for sustainability since coaches can help teachers recognize changes in student outcomes that result from successful implementation of intervention activities (Han and Weiss 2005). What exactly needs to occur in coaching, however, is largely unknown. Our understanding of coaching draws mostly from proposals for best practice and has not been closely examined in research studies.

Other Teachers Evans (2001) describes the first year of implementing a new intervention as "survival" when teachers are learning new skills and coping with many changes. Time to interact with colleagues may be necessary to implement initially and sustain practices over time (Elmore and McLaughlin 1988). Being part of a professional community offers opportunities for teachers to learn from others' experiences and compare strategies for improved implementation. A large-scale study of elementary teachers underscored the importance of such teacher-teacher relationships, finding that when teachers trusted one another they felt more comfortable to implement new teaching practices (Bryk and Schneider 2002). Bryk and Schneider note that these relationships were characterized by relational trust which includes respect, personal regard, competence in role responsibilities, and personal integrity (Bryk and Schneider 2003), similar to the kind of social support that may be provided by coaches. Having a strong professional relationship with other teachers may also increase teacher self-efficacy (Yost 2002), which has been found to relate to increased program implementation (Han and Weiss 2005). Taken together, research on teachers suggests their access to each other for support may influence implementation.

Students Smaller class sizes, higher rates of students living in poverty, and more ethnic minority students relate to high levels of implementation (Berends et al. 2002; Zvoch 2009). Further, students' interest in the intervention topics relates to teacher implementation, suggesting that teachers are aware of students' interests and shape their classroom practices accordingly (Ringwalt et al. 2003). Teachers also assess the utility of an intervention in part by the severity of the problem in their classroom that the intervention aims to address. If teachers perceive that students are struggling with social-emotional skills, for example, teachers are more likely to deem the SEL intervention as worth their time and resources (Han and Weiss 2005). The relative dearth of research in this area suggests a need for further studies.

Prevention Using the *Responsive Classroom* Approach

We chose to study the influence of key players in the context of a SEL intervention, the *Responsive Classroom* (*RC*) approach. The *RC* approach was developed by the Northeast Foundation for Children (NEFC) and focuses on building the overall capacity of teachers and thus places a high demand on fundamental teacher change. Specifically, the *Responsive Classroom* approach aims to "foster safe, challenging, and joyful classrooms and schools…by bringing social and academic learning together" through the use of dynamic practices that teachers are asked to apply throughout the curriculum and with all children (Northeast Foundation for Children (NEFC) 2003, p.1). The *RC* approach asks teachers to align their beliefs, practices, and language about children to reflect a teaching philosophy based in developmental psychology.

This intervention was chosen because it is packaged to foster effective dissemination consistent with best practices and has been widely used. Most importantly, the *RC* approach shares features with other school-based interventions that use training and coaching to build teacher capacity and improve classroom social interactions (Greenberg 2010). Previous findings from a quasi-experimental study suggested that *RC* related to increased student math and reading skills after controlling for socioeconomic status and previous academic achievement (Rimm-Kaufman et al. 2007). Analyses from a randomized controlled trial of *RC* are still underway. Early findings, however, show that training in the *RC* approach improves teachers' mathematics teaching practices (such that they are more aligned with National Council of Teachers of Mathematics Standards) (Ottmar et al. 2012). Further, teachers' use of the *RC* approach contributes to improved quality of teacher-student interactions (Abry et al. 2012, The influence of implementation fidelity on teacher-student interactions, unpublished).

Training for teachers typically consists of two week-long sessions during consecutive summers and ongoing coaching. Coaches observe, give feedback, demonstrate, lead grade-level teacher meetings, meet administrators, and provide mini-workshops. The present analyses are part of the *Responsive Classroom* Efficacy Study (RCES), the first randomized controlled trial examining the *RC* approach. Previous work on *RC* found correlative evidence that school/administration and teacher processes related to implementation. Specifically, fewer school-related barriers to teacher collaboration (Sawyer and Rimm-Kaufman 2007) and greater self-efficacy, positive attitudes about teaching, and having teaching priorities similar to *RC,* were related to greater implementation (Rimm-Kaufman and Sawyer 2004).

Overview of Mixed Methods Design

Best practices for measurement have long emphasized triangulation; using multiple sources of data to increase certainty of a pattern of relations (Webb et al. 1966). We present a 2-year mixed methods study employing multiple data sources to provide evidence for the legitimacy of findings. We conducted a fully mixed, sequential, equal status mixed methods study (Leech and Onwuegbuzie 2009), meaning qualitative analyses from Study 1 were integrated into the Study 2 quantitative design (fully mixed). Study 1 qualitative analyses were complete before beginning the quantitative design in Study 2 (sequential); findings from both analyses were drawn upon equally in interpretation (equal status).

Study 1 focused on exploratory analyses of setting-level factors that teachers perceived as influential on implementation. We asked teachers to identify the most influential factors, and in focus groups, to describe the mechanisms through which these factors affected implementation. This targeted the perceptions of teachers that become reified over time and translate into practice. Next, building on Study 1, we created questionnaire items that reflected the most salient qualitative finding. This allowed us to seek evidence of the predictive validity of a Study 1 theme, quantitatively. In Study 2, ratings by teachers, principals, coaches for teachers (CTs), and a coach for principals (CP) were used to authenticate the most salient Study 1 theme and the extent to which it was associated with observed implementation.

Study 1

These questions guided Study 1. (1) What are the setting-level factors that support and create barriers to implementation? (2) What specific mechanisms do teachers perceive to

account for the relations between setting-level factors and teachers' implementation?

Methods

Participants and Measure

In this study, schools were randomly assigned to treatment and control conditions and within the treatment schools, all third and fourth grade teachers were trained in *RC*. For the first year of the study we collected data from third grade teachers and in the second year from fourth grade teachers. All of the third and fourth grade teachers in the school participated in training.

Participants for Study 1 were third grade teachers from elementary schools in a large district in the mid-Atlantic U.S. The schools had an average of one-fourth of the children who received free and reduced lunch (range 3.00%–47.00%), about 40.00% Caucasian children (range 13.00%–70.00%), with the next largest minority group being an average of about one-fourth of the children being Hispanic (range 5.00%–58.00%). Six of the schools received Title One funding. All teachers had completed *RC1* training and their first year of implementation during the year prior to the focus groups. The number of third grade teachers participating in *RC* training at each school ranged from 2 to 8 (M=3.96). Of 63 third grade teachers in 13 schools randomly assigned to be in the treatment (*RC*), 33 teachers volunteered to participate in the focus groups. *t*-tests indicated that focus groups participants were not significantly different from the other teachers assigned to the intervention group, in gender (31 female, 2 male), age (M=34.27, SD= 10.80), education level (17 had at least a master's degree), or teacher-reported use of *RC* practices in the year before the training or in the first year after training (ps>.05).

The Setting-level Factors Questionnaire consisted of two items and was given at the end of the focus group. The first asked teachers to identify the factor that was most helpful for implementation, and the second asked teachers to identify the factor that was most challenging to implementation. Options for each question included: schools/administration, coaches, teachers, and students. Definitions of these categories were discussed in focus groups (see below) prior to the questionnaire.

Focus Group Data Collection, Coding, and Analytic Strategy

After the first year of *RC* implementation, teachers attended a 1-week summer *Responsive Classroom II* training. Eight focus groups (40 min each) were conducted with teachers from 13 schools (about 4 participants in each group) on the fourth day of training, in unoccupied rooms at the training site. One participant arrived late to the focus group and was individually interviewed using the focus group protocol. Facilitators were one of five females (four doctoral students, one post-doctoral researcher) who presented prompts and asked clarifying questions. All participated in a half-day training on conducting focus groups.

A structured protocol was used; however moderators followed participants, pursuing leads and changing the order of questions in response to comments. Moving along an unstructured-to-structured continuum allowed for natural flow of discussion and collection of specific, detailed information. The facilitator asked teachers to reflect on their first year of implementation, focusing on supports and barriers related to: (a) schools/administration, (b) coaches, (c) teachers, (d) students, (e) other. Teachers wrote supports and barriers on sticky notes and placed the notes on posters labeled with each of the sources (schools/administration, coaches, teachers, students, and other). Moderators asked open-ended questions using examples from the notes. Focus groups were recorded and transcribed.

First, transcripts were independently read, re-read, and coded for supports and barriers in relation to (a) schools/administration, (b) coaches, (c) teachers, (d) students, and (e) other. It was decided, however, that "support" and "barrier" were restrictive and did not fully capture experiences. Also, the "students" category did not emerge, and was folded into "other." We then independently re-read the transcripts and organized quotes into clusters based on content (Miles and Huberman 1994). Twelve codes were identified and labeled with emic codes, such as buy-in, capturing participants' language (C. Marshall and Rossman 1999). Four less used codes were discarded and the remaining eight were clustered into three categories: (a) principal buy-in, (b) individualized coaching, and (c) psychologically-safe context. Each transcript was coded independently and discrepancies were discussed and removed if agreement could not be reached.

Results

In the Setting-level Factors Questionnaire, teachers chose schools/administration (69.23 %, n=18) as the largest barrier, over coaches (0.00 %, n=0), teachers (15.38 %, n=4), and students (15.38 %, n=4). They chose coaches (70.37 %, n=19) as the largest support, over schools/administration (11.11 %, n=3), teachers (14.81 %, n=4), and students (3.70 %, n=1).

Based on focus group themes, we identified the following teacher-perceived mechanisms through which schools/administration and coaches influenced implementation.

Principal Buy-In

Principals' judgments about the relevance of the intervention was instrumental to teachers' implementation.

Although the literature describes this as "participant responsiveness" (Dane and Schneider 1998; O'Donnell, 2008), our participants overwhelmingly referred to it as "buy-in." Many teachers highlighted positive principal practices and attitudes, noting that lack of buy-in posed challenges to implementation. Buy-in emerged as a dominant theme in all sessions because teachers felt that "…it takes an administration to kind of set that tone…" for implementation. In speaking of her administrators, one teacher told us, "You can tell when they are behind something." Specifically, they could "tell" by principals' (a) *motivation*, (b) *consistency* in use of practices, and (c) the *accommodations* provided to teachers.

Motivation

Teachers told us that principals' participation in the intervention was based on, "…money and fame, you know. And it is sad to say, but it is more things to say 'check' on a resume, rather than, 'You know what? This sounds like an awesome thing'." Teachers felt recognition-seeking reduced intervention enthusiasm. In contrast, some teachers reported having principals, or a desire to have principals that were motivated by their belief in the intervention's principles and interest in improving child outcomes. For example, one teacher said, "the county is pushing us to do either this or some other [intervention]…and they said we are going to have to pick one eventually so we might as well do this study…it wasn't like because it was a good thing for students…" In sum, teachers felt positive about implementation when principals showed buy-in rooted in motivation to improve child outcomes.

Consistency

For teachers, consistency meant students' steady exposure to intervention-like behaviors from all staff (including the principal); school-wide use of practices, or at least practices that did not conflict with the intervention; and all-school adherence to all practices instead of a "well I like this [part of it], so I am going to do this, but I don't like this [other part of it]" approach. Teachers viewed principals as the vehicle through which consistency could be achieved. One teacher said, "…throughout the year [the administration] would sort of bring up these other programs …and encourage people to do those …It really clouded the waters." Many of these programs "conflict[ed] a lot" with and were "extremely different" from *RC*. Conflicting programs made it difficult and confusing for teachers and students.

Accommodation

Teachers also needed principals to accommodate implementation by providing them with related materials (e.g., chimes, easel paper, and resource books) and dedicated time in the master schedule to conduct *RC* practices, such as 20 min for the Morning Meeting (a time for greeting, sharing, and learning). As one teacher told us, "There needs to be a school-wide vision on this that it needs to be a sacred time."

Individualized Coaching

Coaches, from the Northeast Foundation for Children, provided teachers with consulting, workshops, three visits during the school year, and email exchanges. Teachers viewed support as coming from these coaches' (a) ability to show *real-world applications* and (b) provision of *on-demand resources*.

Real-World Applications

Teachers described coaches as skilled implementers. Specifically, teachers received feedback from their coaches about their routines, what worked or did not, and how to re-engage students after school breaks. One teacher said "…it wasn't even just what [the coach] taught, but it was just watching [the coach's] way of interacting with the kids." Another said, "…anytime you do these types of courses or you read these things in books…my instinct has been to say, 'Yeah, that might work in your school, but that will never work with my class or with these kids." However, coach demonstrations provided evidence and concrete examples of practices that could be implemented with *these kids*.

On-Demand Resources

Teachers looked for their coaches to provide them with on-demand resources and be on-demand resources. Intervention books were noted as particularly useful because of their detailed descriptions of practices. Teachers spoke of their frequent use, "Last year I kept all of my *RC* books …on my filing cabinet where I could grab them at all times. …I'm not sure how you could go without all those different books." Teachers also noted how often they emailed coaches and the coaches' responsiveness. Overall, teachers felt that coaches' real-time assistance was critical to implementation.

Psychologically-Safe Context

Teachers also spoke about how administrators and coaches conveyed encouragement that helped them feel safe to take risks and attempt new ways of interacting with students. Teachers discussed the importance of a psychologically-safe context; one that provided (a) *validation*, (b) time to work at their own *pace* and (c) *social support*.

Validation

As new implementers, teachers emphasized that it was important that administrators and others understood the relevance of the practices happening in classrooms. "Sometimes you come into a noisy classroom and think, 'Well, this classroom is out of control' …but, it might be something that's really relevant to *RC* and they're going to understand that and say, 'Oh, I see what she's doing; we've been taught this.'" Teachers also desired confirmation from others that they were "doing a good job."

Pace

The teachers viewed implementation as "a process" that required time "to dig deep and sit and think." As such, they needed to implement at their own pace. Many teachers talked about "taking it slowly." Teachers repeatedly talked about receiving this pace-related support from coaches, who universally said "…Pick one thing to work on" at a time.

Social support

Teachers reported regularly asking each other and coaches questions such as, "Am I doing it right?" and "What did you do?" Teachers were grateful to be in the presence of other implementers, because, "[it's] really nice, knowing that there are other people who are going through [this]…" Others said, "we could help each other with strategies, you know our experiences were the same…" Teachers "… shared good ideas," and "problem-solve[d]".

Discussion

Findings from Study 1 showed that coaches were perceived as the greatest support to implementation and principals as the greatest barrier. Setting level factors were influential through: (1) *principal buy-in*, (2) *individualized coaching* and (3) a *psychologically-safe context*. Previous research supports these factors, but few studies have looked at the mechanisms through which they influence implementation. Two recent studies on coaching, however, have begun exploratory analyses to identify the core components (Dusenbury et al. 2010; Kretlow and Bartholomew 2010). This work suggests that providing multiple demonstrations (individualized coaching) and frequent feedback (psychologically-safe context) are essential to effective coaching. Participants in the present study also pointed to these themes but suggested that there are additional aspects of these factors that were relevant to implementation of *RC*.

Among the three themes that emerged, principal buy-in was most prevalent. The fact that almost 70 % of the teachers reported principals as their primary challenge to implementation together with teachers' comments in the focus groups, suggests that *lack* of principal buy-in specifically posed major challenges to implementation. Other research has demonstrated that aspects of principal buy-in influence implementation and the relation of interventions to child outcomes (Kam et al. 2003; Ransford et al. 2009). Study 1 extends existing work by providing specificity about the most relevant aspects of principal buy-in to implementation. Specifically, teachers believed principals being *motivated* to implement to improve child outcomes, being committed to *consistently* embodying the intervention philosophy across school programs, and *accommodating* implementation by providing books, materials, and time to fit practices into the school day would be most helpful. Prevention programs may benefit from strategies to help principals, and other types of program leaders, address these issues. Furthermore, given the teachers' belief in the importance of principal buy-in for this and other SEL interventions (Kam et al. 2003; Ransford et al. 2009), it is necessary to develop a tool that can be used to quantitatively assess principal buy-in so programs can identify schools where interventions are likely to be successfully implemented and those which may need additional support. Given that principal buy-in was the strongest of the three emergent themes and that it was emphasized in every focus group, we chose to further examine this construct in Study 2. Specifically, the principals in the present study had agreed to participate in the randomized trial of *Responsive Classroom*, as is common for many intervention studies, and the view that they were a major barrier to implementation necessitated further investigation and validation.

Study 2

Research shows that different raters have different perceptions of the same construct that may be systematically related to individual characteristics, differences in raters' experiences with the construct, or raters' different internal reference groups against which they are judging the construct (Heine et al. 2002; Mashburn et al. 2006). Thus, when considering how to assess principal buy-in, it is important to consider whose perceptions will best relate to implementation and the efficiency of measures in terms of resources (e.g., less expensive to assess one principal than many teachers). We investigated whether principal buy-in was quantitatively associated with implementation, and, whether different perceptions of buy-in converged, to determine the most efficient reporter. Consequently, we created four measures of principal buy-in, each reflecting the indicators that may be most relevant for each type of respondent. There were four raters in Study 2: principals, teachers, intervention CTs, and a CP.

Principals tend to rate their schools more favorably than teachers (Bingham et al. 1993; Desimone 2006). Principals' positivity may reflect a responsibility to portray their school well to officials, parents, and community members. In terms of coaches, previous research has found outside observers may have greater predictive utility than self-reports. For example, outside observers and program providers were asked to rate implementation of a life skills program. Although these ratings were significantly correlated, only the outside observer ratings were significantly related to child outcomes (Lillehoj et al. 2004).

The following research questions were investigated: (1) Are reports of principal buy-in significantly related to teachers' observed implementation? Based on Study 1 findings, we hypothesized that teacher perceptions of principal buy-in would relate positively to implementation. (2) To what extent do reports of principal buy-in across raters show convergent validity? Due to a shared context, we hypothesized that scores from teachers and principals would relate to each other more closely and that the CTs and CP would relate more closely.

Method

Participants, Measures, and Analytic Approach

Study 2 participants included teachers, principals, CTs and a CP. Teachers were from the same schools as described in Study 1, but taught fourth grade and attended both weeklong *RC* trainings over two summers. These teachers were in their second year of *RC* implementation. The number of fourth grade teachers participating in training at each school ranged from two to eight (M=3.85). All 48 fourth grade teachers in 13 schools participated. The majority of teachers were female (n=39, 82.00%), had at least a master's degree (n=32, 66.67 %), and an average of 10.35 years of teaching experience (SD=7.55, range=2–34 years). For principals, all 13 participated in the present study. All but one of the principals in Study 2 was the same as in Study 1. Ten were female (76.92 %) and they had an average of 7.42 years of experience as principals (range=2–20 years). Six CTs, employed by NEFC worked with the teachers over Study 1 and 2. On average, the CTs had 8.33 years of experience as NEFC coaches (range=6–12 years), 4 were female, and 5 (83.33 %) had a master's degree. One principal coach from NEFC worked with principals throughout the study. This coach had extensive experience with *RC* implementing schools, and was a former principal of an *RC* school.

The Classroom Practices Observational Measure (C-POM; Abry et al. 2007, Classroom practices observational measure. University of Virginia, unpublished) is a 16-item, live-coded observational measure on a 3 point scale, designed with NEFC. Observations were for 60 minutes three times across the year during mathematics instruction and an average was taken. Scores had strong internal (α=.89) and inter-rater reliability (ICCs≥.74). Previously, the C-POM detected significantly higher *RC* implementation in the treatment than control group (N=179, p<.01).

Teachers, principals, CTs, and a CP retrospectively rated principal buy-in in the summer after the second year of implementation. Four different measures were constructed based on focus group themes, conversations with coaches, and literature. The items in each measure were designed to reflect the aspects of buy-in that each rater could report on. For example, teachers could rate why they thought their principal wanted them to get trained, and coaches could rate how often principals initiated contact with them (See Appendix). Correlations between each type of rater and implementation indicated the predictive validity of that type of rater.

Results

There was little missing data but missingness was significantly more likely for teachers without a master's degree, so we included this auxiliary variable in our models and used the maximum likelihood robust estimator. Multilevel models (teachers nested in schools) were used to obtain unbiased standard errors (Muthén and Muthén 2010). Teacher and principal ratings were not significantly related to implementation (See Table 1). See Table 2 for means, standard deviations, and coefficients of variation (the standard deviation divided by the mean, allowing comparison of variability across measures). Based on bivariate correlations, teacher and principal ratings had the weakest relation and coach ratings had the strongest relation to each other.

Overall Discussion

Sequential analyses built on the strengths of both qualitative and quantitative research methods to identify teachers' perceptions of the greatest support and barrier to implementation, to quantitatively validate this perceived relation, and to determine how to assess principal buy-in to relate to implementation. Study 1 identified factors that teachers perceived to contribute to implementation. Teachers viewed schools/administrators and coaches as the most important sources of influence. These findings underlined the known importance of principals and highlighted a newer source of support: coaches. When following up on principal buy-in, the most salient Study 1 finding, coaches' ratings of principal buy-in in Study 2 related to teacher implementation more strongly than either teacher or principal ratings.

Table 1 Study 2: Multilevel model of relations between raters of principal buy-in and teachers' observed fidelity of implementation

Rater of principal buy-in:	Standardized coefficients	Unstandardized coefficients	Standard errors
MODEL 1			
Teacher	.05	.02	.10
MODEL 2			
Principal	.67	.19	.20
MODEL 3			
CT	1.00	.19**	.07
MODEL 4			
CP	.37	.09*	.04

* = p<.05, ** = p< .01

CT coaches for teachers; *CP* the coach for principals; analyses also controlled for whether or not teachers had a master's degree, as an auxiliary variable

Setting-level Factors

Teachers in Study 1 largely perceived schools/administrators to adversely influence implementation and many cited a lack of principal buy-in. Of all three themes that emerged in our analyses, teachers were the most vocal about principal buy-in. Further, their perceptions were consistent with quantitative findings from Study 2, when principal buy-in was assessed by coaches. Our Study 1 findings replicate and extend previous research by describing specific aspects of buy-in that influence implementation. For example, consistent with previous research, when principals were motivated to adopt the intervention by issues relating to funding or prestige, teachers were skeptical of the intervention (Mancini et al. 2009). Also, teachers viewed the consistency between intervention practices and other programs in the school as an indicator of principal buy-in, consistent with existing work (Beets et al. 2008; Greenberg et al. 2005). Finally, teachers recognized buy-in through the accommodations principals made including changing the schedule to ensure time for Morning Meeting (as prescribed by *RC*).

Coaches were noted as important for implementation by Study 1 teachers. Although we did not have data to test this quantitatively, individualizing coaching interactions has been found previously to support implementation (Landry et al. 2009; Powell et al. 2012), and we extend this work by describing ways coaches individualize. Teachers in Study 1 repeatedly referred to their coaches' ability to translate practices into demonstrations and "real world" examples. Specifically, teachers reported that seeing coaches implement practices with the teachers' own students made it possible to believe practices would work. Previous studies note that demonstrations are effective for learning new practices when coupled with coaching and training (Grierson and Gallagher 2009). Teachers also reported finding it useful to use *RC* books often and email coaches with questions. Previous research also identified having someone available to address daily problems as key to school-based implementation (Elias et al. 2003).

To date, psychological safety has not been widely studied as a predictor of implementation. However, among the school-level factors that foster implementation, Greenberg et al. (2005) describe psychologically-relevant characteristics that undergird intervention implementation, including the presence of supportive relationships that allow staff to take risks and support one another, as well as opportunities for school staff to learn from mistakes and grow professionally. We extend this work by reporting Study 1 teachers' need for social support, validation, and time to learn at their own pace (Evans, 2001; Metz 2007; Schein 2004). Study 1 teachers talked about social support, knowing that they were "not in this alone," as a

Table 2 Study 2: Descriptive statistics (*M, SD*) and correlations among raters of principal buy-in and with observed implementation

	M (*SD*)	Coefficient of Variation	1	2	3	4	5
1. Teacher Rating of Principal Buy-In (*N*=48)	2.96 (.58)	19.59	—				
2. Principal Rating of Principal Buy-In (*N*=13)	3.73 (.38)	10.19	.10	—			
3. CT Rating of Principal Buy-In (*N*=13)	2.58 (.82)	31.78	.30*	.54***	—		
4. CP Rating of Principal Buy-In (*N*=13)	1.97 (1.17)	59.39	.19	.65***	.84***	—	
5. Observed Teacher Implementation during Mathematics Instruction (*N* = 42)	1.72 (.30)	17.44	.06	.23	.45**	.36*	—

*** = p <.001, ** = p< .01, * = p<.05

CT coaches for teachers; *CP* the coach for principals

way part of a psychologically-safe context. Previous research suggests that time to work with colleagues increases implementation (Fine 2010). Further, researchers have pointed to the need for positive coach-teacher relationships, which may increase comfort with new practices and ideas (Joyce and Showers 2002). Study 1 teachers also emphasized the need for others (specialists and principals) to attend *RC* trainings as validation for the new practices study teachers were trying. When teachers saw others using practices or received positive feedback, they could maintain their identity as a "good teacher" and were inclined to continue. It is plausible that positive feedback increased teachers' self-efficacy, which, in turn, supported implementation (Bandura 1993; Rimm-Kaufman and Sawyer 2004). Finally, Study 1 teachers referred to coaches allowing them to "work on one thing at a time." This individualized pacing made teachers feel they were not being judged, yet emphasized moving forward.

Different Raters Have Different Perspectives

Findings from Study 2 highlight that different raters offer different perspectives on principals' buy-in to the intervention. In fact, the principals showed very little variability in ratings of their own buy-in, using 3 s and 4 s on a 4-point scale. In contrast, coaches' position as external sources may have led to greater variability in ratings, and, to their predictive utility. This finding is consistent with existing work (Borkenau and Liebler 1993). It may be useful for interventionists to seek input regarding principal buy-in from someone who is familiar with the principal but has experiences with other schools to maintain objectivity.

Alternative explanations are also possible to explain higher associations between coach views of buy-in and fidelity than principal views. Each rater responded to unique questions and the questions reflected differences in principal buy-in. Specifically, coach questionnaires included more items about concrete behaviors such as returning coach phone calls or attending *RC* meetings than the teacher or principal questionnaires. In other words, although coach ratings were the most related to implementation, this may suggest that that the coach items tapped an aspect of principal buy-in that was most relevant to implementation. As seen in the Appendix, coach items were less well-aligned with the Study 1 focus group definition of principal buy-in. Instead, the coach items reflected aspects of principal buy-in that coaches felt they could rate accurately and would also indicate buy-in to *RC*. These items tended to be more logistical in nature and reflected the principal's timeliness returning coach emails, attendance at coach on-site visits to school, and their overall active engagement in *RC*. Future studies are necessary to clarify the effect of rater and item content in associating principal buy-in with implementation.

Care also needs to be taken in generalizing these findings. Greenberg et al. (2005) describe various phases of intervention implementation (i.e. pre-adoption, delivery, post-delivery), a process that unfolds over time. Looking ahead to future work, we expect most studies of principal buy-in ask principals about their view of the intervention prior to training, whereas the present study asked principals about their view of the intervention after a full year of implementation. The actual process of engagement in intervention training may influence principals' perception of their buy-in to the intervention, a question worthy of empirical inquiry.

Limitations

First, the intervention was implemented at the grade-level not school-level. Principals' roles may look different in school-wide implementation. In the present sample, however, the district encouraged the *RC* schools to move toward school-wide implementation and some schools did move in that direction. In future studies, comparing grade-level and school-level implementation may offer a better understanding of the unique influences in each setting. Second, focus groups were beneficial because they allowed teachers to present their perceptions without being hindered by questions designed by researchers. This method, however, meant that teachers could not spend extensive time reflecting. With more time they may have spoken more about their own roles in implementation success. In-depth interviews or case studies may provide more of this type of data. Third, ratings of principal buy-in were collected at the end of the year, when implementation observations were complete. Raters retrospectively rated principal buy-in, remembering their experiences over the previous year. As such, we cannot claim directionality. Coach-rated principal buy-in may have been a product of teachers' implementation. Teachers in the focus groups, however, claimed that principal buy-in supported their implementation, and thus, we present directionality consistent with teachers' reports.

Closing Comments

The emergent field of implementation science considers factors and processes that differentiate implementers. This work contributes to this line of translational research by acknowledging the social processes that relate to implementation (Tseng and Seidman 2007) and by positioning high implementation as an outcome unto itself (Greenberg 2010). We contribute new knowledge about teachers' perceptions of school setting processes and the identification of effective approaches for assessing implementation, both topics that have been identified as critical areas of need (Durlak 2010). Future work may

involve assessing implementers prior to training to individualize and differentiate the intervention training process. Further, additional studies are needed to examine Study 1 themes that were not included in Study 2: individualized coaching and psychologically-safe context. If these two themes are validated, they could be included as indicators of a school's readiness to implement a social-emotional intervention. The past decade of research on school-based interventions in prevention and education science has produced a sizeable body of research on evidence-based practices. Being able to identify schools that are more likely to implement evidence-based social-emotional interventions would increase the likelihood that funding for such interventions is allocated efficiently and student outcomes are optimally affected. The benefits of this work, however, will only be fully realized when scientific evidence provides guidance for how interventions can be implemented effectively.

Acknowledgments The research reported here was supported by the Institute of Education Sciences, U.S. Department of Education, through Grant R305A070063 to the University of Virginia. The opinions expressed are those of the authors and do not represent views of the U.S. Department of Education.

Appendix

Item	Rating			
Items (6) for teacher rating of principal buy-in (α=.72)				
My principal wanted us to get *RC* training because it supports child outcomes.	Not true	Somewhat true	Mostly true	True
To what extent do you think your principal has "bought into" *RC*?	Not at all	Somewhat	Mostly	Completely
How often during the past school year have you felt other programs (including rewards/behavior programs) were inconsistent with *RC* practices?	Almost never	Sometimes	Often	Almost everyday
How often during the past school year have you felt that your administrators' behaviors were inconsistent with *RC* practices?	Almost never	Sometimes	Often	Almost everyday
How helpful has your principal been in terms of providing materials that help you implement *RC*? (including chart paper, chimes, an easel, *RC* books.)	Not helpful at all	Somewhat helpful	Very helpful	Extremely helpful
How helpful has your principal been in changing the school schedule to help you implement *RC*? (Ex.: setting aside time to conduct Morning Meetings without interruptions, setting aside time to meet and share ideas about *RC*).	Not helpful at all	Somewhat helpful	Very helpful	Extremely helpful
Items (2) for the self-rating of principal buy-in (α=.70)				
To what extent have you "bought into" the *RC* approach?	Not at all	Somewhat	Mostly	Completely
At this point, how likely do you think you are to continue actively using *RC* practices in your school after the study ends?	Not at all likely	Somewhat likely	Most likely	Certain
Items (7) for coach for teachers' (CT) ratings of principal buy-in (α=.89)				
Which administrator is the main person leading the *RC* effort?	No one	Assistant Principal (AP)	Principal (P)	The P and AP
How quickly does an administrator respond to your calls/emails?	Slowly after reminder	Slowly without reminder	Quickly after reminder	Quickly without reminder
The administrator usually joins you for how much of your on-site visits?	None	A small part	About half	All
How often has this administrator initiated contact with you?	Never	Rarely	Occasionally	Often
How often does this school offer *RC* support (book groups or team meetings)?	Never	Rarely	Occasionally	Often
To what extent do you see/hear about an administrator doing *RC*?	Never	Rarely	Occasionally	Often
Where do you think that *RC* falls on this administration's priority list?	Not at all	Low	Mid-way	High
Items (11) for coach for principals (CP) rating of principal buy-in (α=.95)				
Which administrator(s) at this school organize/lead the *RC* effort?	No one	AP	Principal	P and AP
When you do on-site visits, who usually meets with you?	No one	AP	Principal	P and AP
Are these administrators "on the same page" in terms of implementation?	No	Not really	Mostly	Yes

How often has an administrator at this school initiated contact with you?	Never	Rarely	Sometimes	Often
How often do administrators attend district *RC* meetings?	Never	Rarely	Sometimes	Often
How often do administrators participate in follow-up phone calls?	Never	Rarely	Sometimes	Often
Where do you think *RC* falls on this administration's priority list?	Not at all	Low	Mid-way	High
To what extent would you say that this administration is planning for long-term *RC* implementation (5+ years from now)?	Not considered	Little	Some concrete plans	An extensive plan in place
How much effort has administration made to include *RC* in the cafeteria?	None	Very little	Some	A lot
How much effort has been made to include *RC* in the school discipline plan?	None	Very little	Some	A lot
How much effort has this administration made to do an all-school Morning Meeting?	None	Very little	Some	None

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