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Teachers' Perceptions of School Organizational Climate as Predictors of Dosage and Quality of Implementation of a Social-Emotional and Character Development Program

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Abstract Organizational climate has been proposed as a factor that might influence a school's readiness to successfully implement school-wide prevention programs. The aim of this study was to evaluate the influence of teachers' perceptions of three dimensions of school organizational climate on the dosage and quality of teacher implementation of *Positive Action*, a social-emotional and character development (SECD) program. The dimensions measured were teachers' perceptions of (a) the school's openness to innovation, (b) the extent to which schools utilize participatory decision-making practices, and (c) the existence of supportive relationships among teachers (teacher-teacher affiliation). Data from 46 teachers in seven schools enrolled in the treatment arm of a longitudinal, cluster-randomized, controlled trial were analyzed. Teacher perceptions of a school's tendency to be innovative was associated with a greater number of lessons taught and self-reported quality of delivery, and teacher-teacher affiliation was associated with a higher use of supplementary activities. The findings suggest that perceptions of a school's organizational climate impact teachers' implementation of SECD programs and have implications for school administrators and technical assistance providers as they work to implement and sustain prevention programs in schools.

Keywords School organizational climate · Organizational capacity · Program implementation · Social-emotional and character development

Over the past decade, a number of studies (Payne and Eckert 2010), literature reviews (Durlak and DuPre 2008; Greenhalgh et al. 2004), and conceptual frameworks (Aarons et al. 2011; Domitrovich et al. 2008; Wandersman et al. 2008) have emphasized the need to better understand individual, organizational, and community readiness associated with fidelity of implementation of human services programs. Consistent with theories that recognize the importance of contextual factors in all aspects of human behavior (Bronfenbrenner 2005; Flay et al. 2009), this emerging area of implementation science highlights the extent to which service providers are influenced by multiple interacting ecological factors as they implement programs to promote positive behaviors.

One focus of this research concerns the impact of organizational climate on school readiness to implement prevention programs for children and adolescents (Beets et al. 2008; Domitrovich et al. 2008; Gregory et al. 2007). Increased knowledge of the relationship between organizational climate—defined as staff perceptions of a school's psychosocial work environment (Rentoul and Fraser 1983)—and quality of teacher implementation, could assist educational administrators and technical assistance providers in identifying strategies that support more effective implementation. Although a number of previous studies have investigated a link between a school's organizational climate and implementation (e.g., Beets et al. 2008; Ennett et al. 2003; Gregory et al. 2007; Kallestad and Olweus 2003; Low et al. 2013; McCormick

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et al. 1995; Ringwalt et al. 2003), few have involved social-emotional and character development (SECD) programs.

The present study uses data from the treatment arm of a matched-pair, cluster-randomized trial of the SECD program *Positive Action* (*PA*). Because PA, as a comprehensive, whole-school program is expected to be most effective when the majority of teachers at a school engage in a high level of program implementation, we were interested in exploring whether general organizational factors at a school—specifically measures of climate—are related to fidelity of implementation by teachers. A previous study of PA conducted in ten Hawai'i elementary schools found that teachers' perceptions of the quality of school-based relationships had both direct and indirect effects on implementation (Beets et al. 2008). In the present study, our primary aim was to explore whether multiple aspects of organizational climate were associated with PA implementation in a low-income, urban setting.

Background

Organizational climate is a type of "general organizational capacity," a term that encompasses a variety of factors important to an organization's overall functioning but unrelated to a specific intervention (Flaspohler et al. 2008). Because organizations that function well are believed to be better positioned to implement a variety of types of interventions, high levels of general capacity may provide a foundation for organizational readiness (Wandersman et al. 2008; Weiner 2009).

School organizational climate can be understood from the perspective of Moos' (1974) conceptualization of social environments. Moos' theory, based on research regarding human behavior in an array of settings, posits that social environments, like people, have unique "personalities" characterized by a variety of measurable factors (Moos 1974, p. 1) that are classified into three categories (Moos 1994; Rentoul and Fraser 1983): (1) factors associated with *system maintenance and system change*—the extent to which an environment is orderly, provides clear expectations, and is responsive to change; (2) factors associated with the *quality of relationships* that occur within a particular setting , and (3) factors associated with *personal growth* and self-enhancement. Using a number of different measures—often in combination—to investigate pertinent factors, prior investigations have primarily focused on the first two of these three categories.

This idea for this paper was also influenced by elements of the Interactive Systems Framework (ISF) for Dissemination and Implementation, an ecological framework developed specifically for prevention efforts (Wandersman et al. 2008). The ISF strongly emphasizes the importance of alignment between the requirements of a specific intervention and the capacity of an entity (i.e., an individual, organization, or community) responsible for conducting the intervention to meet those requirements. Because a mismatch between program requirements and capacity can result in poor program implementation (Flaspohler et al. 2008), understanding capacity is "central to addressing the gap between research and practice" (Wandersman et al. 2008, p. 173). Once understood, steps can be taken to help build capacity. Although general capacity building is intended to enhance "the infrastructure, skills, and motivation of an organization" rather than the knowledge and skills required for a specific intervention (Wandersman et al. 2008), improved general capacity may influence readiness by contributing to improved organizational functioning (Flaspohler et al. 2008). Weiner (2009) theorizes that contextual factors such as organizational functioning and quality of working relationships promote or dampen implementation by influencing members' assessment of the organization's ability to carry out change-related activities ("change efficacy") and their attitude regarding the likely benefits of the change itself ("change valence").

Aims of the Present Study

The earlier study of the influence of organizational climate on teacher implementation of PA (Beets et al. 2008) used measures of teacher perceptions of the quality of relationships in a school. It found that a composite measure of two factors—perceived administrative support and school connectedness—was directly associated with school-wide PA material usage and indirectly associated with the amount of curriculum delivered (mediated by teacher beliefs about their responsibility to teach SECD programs and attitude toward PA). The first aim of the present study is to test whether teacher perceptions of the quality of work relationships was associated with implementation of PA in a different population and using a different measure, teacher-teacher affiliation. Prior studies have found positive correlations with similar relationship measures such as "openness in communication" (Kallestad and Olweus 2003), "community spirit," (Ennett et al. 2003), and "supportive climate" (Gregory et al. 2007).

The present study's second aim is to explore whether two measures of Moos' system maintenance and systems change category—innovation and participatory decision-making—were also associated with implementation. Innovation refers to a school's openness to change and new teaching approaches. Innovative organizations are believed to "cultivate an atmosphere conducive to trying new approaches" (Durlak and DuPre 2008). Participatory decision-making refers to the extent to which teachers have the opportunity to share in decision-making that impacts the school as a whole (Fisher and Fraser 1990).

Participatory decision-making is often cited as an important influence on the diffusion of innovations (Damanpour 1991; Domitrovich et al. 2008; Durlak and DuPre 2008).

McCormick et al. (1995) found that a composite measure consisting of teacher perceptions of five factors (job satisfaction, satisfaction with supervisors, involvement in decision-making, organizational risk-taking, conflict management, and work motivation) was positively correlated with implementation of tobacco prevention programs at the school district level. However, although including teachers in school decisions to adopt a specific program may be particularly important for gaining buy-in and support (Coffey and Horner 2012; Fixsen et al. 2013), whether a school's *general* climate of participatory decision-making influences quality of implementation is still an open question (Ennett et al. 2003; Ringwalt et al. 2003).

Our hypothesis was that teachers who perceive that their schools rate higher on these three psychosocial dimensions of school organizational climate would deliver a higher number of PA lessons and associated activities and implement the program with higher quality. Consistent with Weiner's theory (2009) that contextual organizational factors lead to readiness for change, in part, by influencing individual attitudes toward the change, we hypothesized that teachers' attitudes toward SECD programs would also be positively related to the same measures of implementation.

Methods

Study Design

The present study uses data from the treatment arm of a longitudinal, cluster-randomized, controlled trial (CRCT) of PA. The sample was from low-performing, high-poverty K–8 schools in Chicago, with a large minority of student populations. The trial was one of seven sites nationwide participating in a study funded by the US Department of Education's Institute of Education Sciences to evaluate the effects of school-based interventions to promote social-emotional and character development.

Sampling and recruitment of schools took place during spring 2004. Participating schools were drawn from the population of 483 K–6 and K–8 schools within the Chicago Public Schools (CPS) system. Exclusion criteria were as follows: (1) non-community schools (e.g., charter and magnet schools), (2) current use of PA or a similar SEL/SECD intervention, (3) enrollment below 50 or above 140 students per grade, (4) annual student mobility rates under 40 %, (5) greater than 50 % of students who met or exceeded grade-level standards on the Illinois State Achievement Test, and (6) fewer than 50 % of students who received free or reduced-price lunch. Sixty-eight schools were eligible to participate and 36 principals attended a recruitment meeting. Of these, 18 agreed to participate in the study. The following variables from the 2003–2004 CPS data were used for matching the 18 schools into nine pairs: percentage of White, African American, Hispanic, and Asian students; percentage of students who met or exceeded standards on the state achievement tests; attendance rate; truancy rate; percentage of students who received a free or reduced-price lunch; percentage of students who enrolled or left school during the school year (mobility); number of students per grade; percentage of parents who were involved with school activities; percentage of teachers employed by the school who met minimal teaching standards; and geographic location within the city. Because funding for the study allowed for only seven pairs, the seven best-matched pairs were recruited for participation. All agreed and were randomly assigned to either PA or the control condition. Data collection involved surveying students, parents, teachers, and administrators on a wide array of measures. The present study uses teacher data from the first year of the trial, 2004–2005.

Program Overview

PA (Flay and Allred 2010) is a comprehensive, school-wide, SECD program grounded in theories of self-concept, particularly Self-Esteem Enhancement Theory (SET) (DuBois et al. 2009), and consistent with social learning theories (Akers 1998; Bandura 1986) and other theories and approaches related to social development, health promotion, and prevention of unhealthy behaviors (Flay et al. 2009; Hawkins and Weis 1985; Peters and McMahon 1996). The program includes classroom curricula consisting of 140 lessons taught for 15 to 20 min 4 days/week for grades K through 6 and 70 lessons taught 2 to 3 days/week for grades 7 and 8 (lessons for grades 9 through 12 are also available, but were not tested in this trial). The core curricula consists of the following six units: (1) self-concept, (2) positive actions for body and mind, (3) social and emotional positive actions for managing oneself responsibly, (4) social and emotional positive actions for getting along with others, (5) social and emotional positive actions for being honest with one's self and others, and (6) social and emotional positive actions for self-improvement. Supplementary program materials (e.g., posters, music) and activities (awarding certificates of recognition) reinforce and expand upon the concepts taught during classroom lessons and are an integral part of the overall school-wide program. Previous quasi-experimental and experimental evaluations have found significant effects of PA on a variety of outcomes (Bavarian et al. 2013; Beets et al. 2009; Flay and Allred 2003, 2010; Flay et al. 2001; Lewis et al. 2013a, b; Li et al. 2011; Snyder et al. 2010, 2012).

A 4-h teacher and staff training workshop was provided to each PA school by the program developer at the beginning of the year. These were generally attended by all teachers and staff present at the school on the day of training. A PA implementation coordinator provided ongoing consultation to principals, teachers, and other staff.

Participants

This study required linking two separate data sources—unit implementation reports (UIRs) collected by the PA research team at the University of Illinois at Chicago (UIC) and baseline work climate and demographic data collected as part of a teacher work climate survey (TWCS) administered by a multisite contractor, Mathematic Policy Research, Inc. (MPR). Because the TWCS data were collected only from teachers in grades 3 to 5, our analysis was limited to those grades. Sixty-three third- through fifth-grade teachers in the PA schools were expected to teach the program. Of these, 52 completed UIRs for one or more units and 54 responded to the TWCS administered at the beginning of the school year. Forty-six teachers who completed both surveys and had complete data for the predictor variables were included in the present analysis. The majority (78.7 %) was female; 42.6 % self-identified as black, 44.7 % as white, and 12.8 % as Hispanic. Their mean years teaching experience was 14.7 (range, 1–34 years) and 46.8 % had a graduate degree. The demographics for the eight teachers who were part of the TWCS sample of 54 teachers, but were not included in the present study due to lack of UIR data (or, in the case of one teacher, incomplete data for the predictor variables), were not significantly different from the 46 teachers included in the study.

Measures

The predictor variables were collected at baseline in the fall of 2004 after the seven schools had received PA training but before they began implementing the program. The implementation outcome data were collected at six subsequent time points throughout the remainder of the school year. All data were collected via teacher self-report.

Predictor Variables The climate data were collected as part of the TWCS, using the School Level Environment Questionnaire (SLEQ). The SLEQ was adapted from Moos' Work Environment Scale and was designed specifically to measure teachers' perceptions of the school work environment (Fisher and Fraser 1991). When selecting predictors for the present study, we started with scales from a version of the SLEQ that had been revised based on psychometric testing (Johnson and Stevens 2001) and modified them for our sample using principal component factor analyses conducted using a larger sample of 102 teachers that included the 46 teachers in this study as well as teachers in the control-school arm of the trial. The responses for all items used a 5-point response scale (strongly disagree to strongly agree). The final measures (Table 1) were as follows: (1) "teacher-teacher affiliation" (Example item: *I feel that I could rely on my colleagues for assistance if I needed it*), (2) "innovation" (Example item: *New and different ideas are always being tried out in this school*), and (3) "participatory decision-making" (Example item: *teachers are frequently asked to participate in decisions concerning administrative policies and procedures*). "Attitudes toward SACD" was a single item that asked teachers to indicate which of the following best described their attitudes toward social and character development efforts at their school: enthusiastic, cooperative, or openly dislike. No teachers selected "openly dislike," so we dichotomized this variable (1=enthusiastic; 0=cooperative).

Program Implementation Variables Program implementation variables were collected via UIR surveys administered by the PA research team at UIC. Teachers were asked to complete these at the end of each of the six units. Two of the variables were dosage measures ("average number of lessons taught per week" and "use of supplementary materials and activities") and one was a quality measure ("quality of delivery"). Dosage refers to how much of the program was delivered and quality refers to how well the program components were carried out (Domitrovich et al. 2008; Durlak and DuPre 2008).

The response options for "average number of lessons taught per week" ranged from 1 (one lesson) to 5 (five or more lessons). Based on implementation report data averaged over units, an estimated 53 % of teachers met the program benchmark of teaching at least four lessons per week (Bickman et al. 2009).

"Use of supplementary materials and activities" was a composite variable indicating the average number of times teachers used one or more of nine activities that are part of the PA program but not part of the classroom curriculum. For each unit, teachers indicated how many times they did each of the following during an average week: (1) gave out "words of the week cards" (27 % met benchmark of distributing five cards per week); (2) gave out "PA stickers" (25 % met benchmark of distributing five stickers per week); (3) gave out "PA tokens" (no benchmark set; 14 % gave out at least five tokens); (4) read "PA notes" from the "ICU box" (49 % met benchmark of reading five notes); (5) wrote "Positive notes" (no benchmark set; 29 % gave out at least five notes per week; (6) used "PA music" (13 % met benchmark of playing music two days per week); (7) filled out "PA certificates of recognition" (no benchmark set; 37 % distributed two or more certificates per week); (8) talked to parents about the PA program (19 % met benchmark of speaking with two parents per week); and (9) infused PA ideas into curriculum areas (no benchmark set; 21 % infused five or more ideas per week). Fifty-three percent of teachers met the benchmark for at least one of the supplementary activities for which benchmarks were set. Possible responses ranged from 0 to 5 or more and were averaged across units to create a scale for analysis.

Table 1 Descriptive statistics for model variables (N=46)

Variables	No. of items	Mean (SD) or %	Range	α
Innovation	4	3.47 (0.60)	1.75–5.00	0.68
Participatory decision-making	4	2.91 (0.61)	1.75–4.25	0.69
Teacher-teacher affiliation	7	4.09 (0.65)	2.43–5.00	0.89
Enthusiastic toward SACD		76.09 %	0.00–1.00	
Average number of lessons taught per week		3.59 (1.07)	1.00–5.00	
Use of supplementary activities and materials		15.44 (10.33)	0.00–36.0	
Quality of delivery		2.90 (0.67)	2.00–4.00	

"Quality of delivery" was measured by asking teachers, "How well do you think you delivered the *Positive Action* program during this unit?" (Response options: 1, poorly; 2, about average; 3, quite well; 4, very well). The program benchmark of reporting that the program was delivered very well or quite well was met by an estimated 69 % of teachers. Again, responses were averaged across the units.

Teachers responded to an average of 3.36 of the 6 UIRs. The fact that most teachers responded to several of the program units allowed for a composite across-unit measure of the outcomes with no missing data. To assess the validity of this approach, we compared UIR data for the number of lessons per week with similar data collected during an end-of-year survey completed by the third-grade teachers in the sample (data were not available for fourth- and fifth-grade teachers). With the exception of one missing data point, the18 teachers who completed the end-of-year survey reported that they taught all of the lessons in all six units. This suggests that the missing data in the UIR reports were due to failure to complete the reports rather than to teachers not delivering the lessons. However, for the entire sample, the number of missing UIRs was negatively correlated with the dosage variable "average number of lessons taught per week" (r=−0.4), raising the possibility that teachers who completed fewer reports implemented fewer lessons. The number of missing UIRs was positively correlated with a measure of work pressure, suggesting that teachers who felt more work pressure completed fewer reports (r=0.25).

Although this study relied on teacher self-report for both the predictor and outcome variables, the reports from a subset of the participants (18 teachers who taught the Grade 3 student cohort) demonstrated modest positive correlations between average student ratings of engagement with the PA program and teacher reports of number of lessons taught, use of supplementary materials and activities, and quality of implementation (r= 0.24, 0.46, and 0.31, respectively). This provides support for the validity of teacher-reported implementation as students could not be engaged in something that was not happening or lacked sufficient quality.

Analytic Strategy

Stata 12.1 was used for all analyses including: descriptive statistics for demographic characteristics and model variables, bivariate correlations, missing data reports, scale analysis of the three school organizational climate scales, and model estimation. Model estimation was conducted using ordinary least squares regression with Stata's vce (cluster *variable*) command. This command is ideal for studying teachers in schools because it provides robust estimates of standard errors in the presence of non-independent observations. The small number of clusters (7) for the present sample is considered too low for multi-level analysis (Hox 2010).

Results

Descriptive statistics for the predictor and outcome variables are shown in Table 1 and bivariate correlations in Table 2. Bivariate correlations indicated that quality of delivery was positively correlated with both average number of lessons taught per week (r=0.28) and use of supplementary materials and activities (r=0.45). All three outcome variables were also positively correlated with "attitudes toward SACD" programs, although not all were statistically significant. Among the climate variables, innovation was positively correlated with participatory decision-making and teacher-teacher affiliation. Intraclass correlations (teachers within schools) for the three outcome variables were as follows: average number of lessons per week, 0.30; use of supplementary materials and activities, 0.04; and quality of delivery, 0.11.

Findings for the regression analyses are provided in Table 3. As can be seen, teacher perceptions of their school's innovativeness were a significant and positive predictor of the average number of lessons taught per week as well as of self-rated quality of program delivery. Ratings of teacher-teacher affiliation were a significant predictor of a greater reported use of supplementary program activities and materials. Finally, teachers' perceptions of their schools' participatory decision-making climates were a significant predictor of lower self-rated quality of program delivery.

Table 2 Bivariate correlations of model variables (N=46)

Measure	1	2	3	4	5	6
1. Average number of lessons taught per week						
2. Use of supplementary materials and activities	.39**					
3. Quality of delivery	.28†	.45**				
4. Innovation	.28†	.18	.19			
5. Participatory decision-making	.00	−.10	−.24	.49***		
6. Teacher-teacher affiliation	.25†	.31*	.16	.33*	.20	
7. Attitude toward SACD	.37*	.25†	.24	.04	−.04	.10

† p<.10; *p<.05; **p<.01; ***p<.001

Discussion

Despite its small sample size, this study had several significant and interesting results that extend the findings of the previous study of the influence of school organizational climate on the implementation of PA (Beets et al. 2008). Teachers' perceptions of their school's tendency to be innovative were predictive of their reports of delivering a greater number of PA lessons and a higher quality of delivery. This is an expected finding given that prior research and theory suggests that employees of organizations that have a climate of being open to experimentation and new ideas are more likely to assimilate new practices (Cook et al. 2012; Greenhalgh et al. 2004). In the case of the current analysis, it is reasonable to assume that when teachers viewed their school's organizational culture as innovative, they were more likely to embrace and use PA.

Perceptions of teacher-teacher affiliation as a dimension of school climate were predictive of a greater reported use of supplementary program activities and materials. As noted earlier, "teacher relationships" has been the subject of a number of prior studies, although the measures used, as well as the findings, have varied. Several have found a significant positive association with some aspect of implementation (Beets et al. 2008; Ennett et al. 2003; Gregory et al. 2007), while others showed no significant relationship (Kallestad and Olweus 2003; Low et al. 2013). Our study found no association between teacher-teacher affiliation and curriculum implementation. Teacher-teacher affiliation was, however, significantly associated with the use of supplementary activities and materials, many of which are school-wide in nature, rather than limited to the classroom. Stronger affiliation among teachers likely led to more opportunities to share ideas about PA materials and observe other teachers as they carried out PA activities outside of the classroom. This may have influenced teachers' use of these supplementary program components, with higher levels of use by teachers who had perceptions of high engagement and support among teachers in their schools.

One unexpected finding was a negative association between perceptions of the extent to which a school uses participatory decision-making practices and implementation. Participatory decision-making practices are often cited as an important influence on program implementation efforts (Domitrovich et al. 2008; Durlak and DuPre 2008). As noted under "Aims of the Present Study" above, prior research indicates that obtaining teacher buy-in for specific programs is likely to influence implementation (Coffey and Horner 2012; Fixsen et al. 2013). Our findings suggest, however, that a *general* climate of participatory decision-making in a school may not necessarily be conducive to greater program implementation. This is consistent with a study of school-based substance use prevention programs that found no association

Table 3 Summary of ordinary least squares regression analysis (N=46)

	Average number of lessons taught per week		Quality of delivery		Use of supplementary activities and materials	
Predictor variable	B (SE)	β (SE)	B (SE)	β (SE)	B (SE)	β (SE)
Participatory decision-making	−0.28 (0.18)	−0.16 (0.10)	−0.46 (0.14)*	−0.42 (0.13)*	−4.10 (3.10)	−0.24 (0.18)
Innovation	0.53 (0.16)*	0.30 (.09)*	0.40 (0.06)***	0.36 (0.05)***	3.52 (4.12)	0.20 (0.24)
Teacher-teacher affiliation	0.26 (0.18)	0.16 (.11)	0.12 (0.11)	0.11 (0.10)	4.26 (1.05)**	0.27 (0.07)**
Attitudes toward SACD	0.83 (0.41)†	0.33 (0.16)†	0.30 (0.22)	0.19 (0.14)	4.93 (1.77)*	0.21 (0.07)*
R^2	0.25		0.23		0.20	

Note: Standard errors were adjusted for the seven school clusters

† p<.10; *p<.05; **p<.01; ***p<.001

between teacher perceptions of a school's shared decision-making climate and curriculum guide usage (Ringwalt et al. 2003). The finding of a negative association between implementation and a climate of participatory decision-making is hard to explain, however. Perhaps when teachers perceive their school environments as supportive of their involvement in decision-making, they are more comfortable making their own determinations of whether and how much to implement a program that is being introduced into the school, thus potentially lowering levels of implementation. It is also possible that this finding occurred due to chance and would not be replicated in future studies.

Finally, we found a significant association between "attitudes toward SACD" and the use of supplementary activities and materials. Weiner (2009) has theorized that organizational contextual factors may influence organizational change, in part, because, if positive, they inspire organizational members' to have favorable attitudes toward the impending change. This, in turn, contributes to organizational readiness to implement an intervention effectively.

Limitations

There are a number of limitations that must be kept in mind when interpreting the results of this study. First, because of the small sample size, the study had limited statistical power to detect significant associations. Second, collecting detailed implementation data from busy teachers was challenging and there was a significant amount of missing data for the program implementation variables. Our findings are based on the assumption that a teacher's average value for each implementation variable reflects their true value for the school year regardless of the number of units they reported on.

Both the predictor and outcome data were collected via teacher self-report. Measures from the same source tend to be more highly correlated than measures from different sources, which may result in finding an association that is due to the method of measurement rather than a true relationship. This may be offset, however, by the fact that the data were collected at different times (climate data at the beginning of the school year and implementation data following each unit). In addition, implementation data for a subset of the sample was correlated with student-reported levels of engagement with the program, which supports the validity of these data.

Another common criticism of self-report data is that it overestimates treatment integrity as compared with observational measures (Lane et al. 2004). Some studies, however, have shown a correspondence between teacher self-report data and independent observations of program use (Abry et al. 2013; Biggs et al. 2008; Ransford et al. 2009), suggesting that that teacher self-report is a reliable measure of implementation. Furthermore, due to the expense of observing teachers in classrooms, observational data are usually limited to short, intermittent blocks of time and may not capture teachers' true performance when they are not being observed or videotaped.

Finally, because of the small sample size and small number of schools, it was not feasible to aggregate the measures of teachers' perceptions of organizational climate. In future studies, it would be useful to test aggregated perceptions, as well as unaggregated perceptions, as climate is often understood as the shared perceptions of a setting (Tseng and Seidman 2007).

Implications and Suggestions for Future Research

A key strength of this study was that it measured baseline indicators of school organizational climate and analyzed their association with later implementation outcomes. It also used measures of school organizational climate that have a strong theoretical foundation and could be easily used by schools to assess organizational climate perceptions of teachers and other personnel. Finally, the sample of low-income, low-performing, largely minority population schools provided a setting in which program implementation may be particularly challenging.

Although there has been extensive research conducted related to the development of a variety of social-emotional learning and other prevention programs, studies indicate that they are often not well-implemented (Durlak et al. 2011; Ennett et al. 2011) and research and theory designed to better explain and address the complex processes involved in moving evidence-based interventions from research to practice is rapidly expanding (Spoth et al. 2013). Because implementation is a "social process that is intertwined with the context in which it takes place" (Damschroder et al. 2009), current research efforts to address the problem of fidelity of implementation involve studies to better understand the variety of contextual influences on implementation behavior (Fixsen et al. 2005; Weiner 2009). It is to this area of implementation research that the present study contributes.

Awareness of the potential positive influence on implementation of two of the climate measures explored in this study—innovation and teacher-teacher affiliation—may be useful to school administrators and technical assistance providers who are interested in building general capacity to successfully implement SECD and related programs. Of note in this regard, the range of observation values for each of the implementation outcome measures described above spanned the specified benchmarks set by the program developers (detailed in "Measures"). Thus, there is reason to believe that the predictive relationships found here have practical importance.

At the same time, studies are needed that include a broader array of variables that influence implementation so that the relative importance of organizational climate on readiness and ongoing program delivery can be assessed. Future research, both quantitative and qualitative, will likely benefit from examining organizational climate in the context of other

possible influences on implementation. It is generally conceded that schools that function well are more likely to implement programs with fidelity and that very disorganized or poorly functioning schools have difficulty implementing new programs (Gottfredson et al. 2002), but it is not known to what extent organizational climate, as one influence on a school's overall functioning, is an influential factor. Organizational climate is just one aspect of this overall complexity.

Knowing the current strengths and needs of an organization prior to selecting and attempting to implement an innovation is essential (Fixsen et al. 2005, p. 8). If the results of the present and other studies with positive findings are replicated, and causal mechanisms identified, this could provide a useful foundation for utilizing knowledge of organizational climate to support the use of evidence-based prevention programs in schools.

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References

Aarons, G. A., Hurlburt, M., & Horwitz, S. M. (2011). Advancing a conceptual model of evidence-based practice implementation in public service sectors. *Administration and Policy in Mental Health, 38*, 4–23. doi:10.1007/s10488-010-0327-7.

Abry, T., Rimm-Kaufman, S. E., Larsen, R. A., & Brewer, A. J. (2013). The influence of fidelity of implementation on teacher-student interaction quality in the context of a randomized controlled trial of the Responsive Classroom approach. *Journal of School Psychology, 51*, 437–453. doi:10.1016/j.jsp.2013.03.001.

Akers, R. L. (1998). *Social learning and social structure: A general theory of crime and deviance*. Boston, MA: Northeastern University Press.

Bandura, A. (1986). *Social foundations of thought and action: A cognitive theory*. Englewood Cliffs, NJ: Prentice Hall.

Bavarian, N., Lewis, K. M., DuBois, D. L., Acock, A., Vuchinich, S., Silverthorn, N., & Flay, B. R. (2013). Using social-emotional and character development to improve academic outcomes: A matched-pair, cluster-randomized controlled trial in low-income, urban schools. *Journal of School Health, 83*, 771–779. doi:10.1111/josh.12093.

Beets, M. W., Flay, B. R., Vuchinich, S., Acock, A. C., Li, K., & Allred, C. (2008). School climate and teachers' beliefs and attitudes associated with implementation of the positive action program: A diffusion of innovations model. *Prevention Science, 9*, 264–275. doi:10.1007/s11121-008-0100-2.

Beets, M. W., Flay, B. R., Vuchinich, S., Snyder, F. J., Acock, A., Li, K., Burns, K., & Durlak, J. (2009). Use of a social and character development program to prevent substance use, violent behaviors, and sexual activity among elementary-school students in Hawaii. *American Journal of Public Health, 99*, 1438–1445. doi:10.2105/AJPH.2008.142919.

Bickman, L., Brown, J. L., Flay, B. R., Li, K., Pelham, W., Massetti, G., & Dupre, D. (2009). Approaches to measuring implementation fidelity in school-based program evaluations. *Journal of Research in Character Education, 7*, 75–101.

Biggs, B. K., Vernberg, E. M., Twemlow, S. W., Fonagy, P., & Dill, E. J. (2008). Teacher adherence and its relation to teacher attitudes and student outcomes in an elementary school-based violence prevention program. *School Psychology Review, 37*, 533–549.

Bronfenbrenner, U. (2005). *Making human beings human: Bioecological perspectives on human development*. Thousand Oaks, CA: Sage Publications.

Coffey, J. H., & Horner, R. H. (2012). The sustainability of schoolwide positive behavior interventions and supports. *Exceptional Children, 78*, 407–422.

Cook, J. M., O'Donnell, C., Dinnen, S., Coyne, J. C., Ruzek, J. I., & Schnurr, P. P. (2012). Measurement of model of implementation for health care: Toward a testable theory. Implementation Science, 7. doi:10.1186/1748-5908-7-59.

Damanpour, F. (1991). Organizational innovation: A meta-analysis of effects of determinants and moderators. *Academy of Management Journal, 34*, 555–590.

Damschroder, L. J., Aron, D. C., Keith, R. E., Kirsh, S. R., Alexander, J. A., & Lowery, J. C. (2009). Fostering implementation of health services research findings into practice: A consolidated framework for advancing implementation science. Implementation Science, 4. doi:10.1186/1748-5908-4-50.

Domitrovich, C. E., Bradshaw, C. P., Poduska, J. M., Hoagwood, K., Buckley, J. A., Olin, S., & Ialongo, N. S. (2008). Maximizing the implementation quality of evidence-based preventive interventions in schools: A conceptual framework. *Advances in School Mental Health Promotion, 1*, 6–28. doi:10.1080/1754730X.2008.9715730.

DuBois, D. L., Flay, B. R., & Fagen, M. C. (2009). Self-esteem enhancement theory: An emerging framework for promoting health across the life-span. In R. J. DiClemente, M. C. Kegler, & R. A. Crosby (Eds.), *Emerging theories in health promotion practice and research* (2nd ed., pp. 97–130). San Francisco, CA: Jossey-Bass.

Durlak, J. A., & DuPre, E. P. (2008). Implementation matters: A review of research on the influence of implementation on program outcomes and the factors affecting implementation. *American Journal of*

Community Psychology, 41, 327–350. doi:10.1007/s10464-008-9165-0.

Durlak, J. A., Weissberg, R. P., Dymnicki, A. B., Taylor, R. D., & Schellinger, K. B. (2011). The impact of enhancing students' social and emotional learning: A meta-analysis of school-based universal interventions. *Child Development, 82*, 405–432. doi:10.1111/j.1467-8624.2010.01564.x.

Ennett, S. T., Ringwalt, C. L., Thorne, J., Rohrbach, L. A., Vincus, A., Simons-Rudolph, A., & Jones, S. (2003). A comparison of current practice in school-based substance use prevention programs with meta-analysis findings. *Prevention Science, 4*, 1–14.

Ennett, S. T., Haws, S., Ringwalt, C. L., Vincus, A. A., Hanley, S., Bowling, J. M., & Rohrback, L. A. (2011). Evidence-based practice in school substance use prevention: Fidelity of implementation under real-world conditions. *Health Education Research, 26*, 361–371.

Fisher, D. L., & Fraser, B. J. (1990, April). Validity and use of the school-level environment questionnaire. Paper presented at the Annual Meeting of the American Educational Research Association, Boston, MA. Retrieved from ERIC database. (ED318757).

Fisher, D. L., & Fraser, B. J. (1991). Validity and use of school environment instruments. *Journal of Classroom Interaction, 26*, 13–18.

Fixsen, D. L., Naoom, S. F., Blase, K. A., Friedman, R. M., & Wallace, F. (2005). *Implementation Research: A synthesis of the literature*. Tampa, FL: University of South Florida.

Fixsen, D., Blase, K., Metz, A., & Van Dyke, M. (2013). Statewide implementation of evidence-based programs. *Exceptional Children, 79*, 213–230.

Flaspohler, P., Duffy, J., Wandersman, A., Stillman, L., & Maras, M. A. (2008). Unpacking prevention capacity: An intersection of research-to-practice models and community-centered models. *American Journal of Community Psychology, 41*, 182–196. doi:10.1007/s10464-008-9162-3.

Flay, B. R., & Allred, C. G. (2003). Long-term effects of the *Positive Action* program. *American Journal of Health Behavior, 27*, S6–S21.

Flay, B. R., & Allred, C. G. (2010). The Positive Action program: Improving academics, behavior, and character by teaching comprehensive skills for successful learning and living. In T. Lovat, R. Toomey, & N. Clement (Eds.), *International research handbook on values education and student wellbeing* (pp. 471–501). Dordrecht: Springer Netherlands.

Flay, B. R., Allred, C. G., & Ordway, N. (2001). Effects of the Positive Action program on achievement and discipline: Two matched-control comparisons. *Prevention Science, 2*, 71–89.

Flay, B. R., Snyder, F., & Petraitis, J. (2009). The theory of triadic influence. In R. J. DiClemente, M. C. Kegler, & R. A. Crosby (Eds.), *Emerging theories in health promotion practice and research* (2nd ed., pp. 451–510). New York, NY: Jossey-Bass.

Gottfredson, G. D., Jones, E. M., & Gore, T. W. (2002). Implementation and evaluation of a cognitive–behavioral intervention to prevent problem behavior in a disorganized school. *Prevention Science, 3*, 43–56.

Greenhalgh, T., Robert, G., Macfarlane, F., Bate, P., & Kyriakidou, O. (2004). Diffusion of innovations in service organizations: Systematic review and recommendations. *Milbank Quarterly, 82*, 581–629. doi:10.1111/j.0887-378X.2004.00325.x.

Gregory, A., Henry, D. B., & Schoeny, M. E. (2007). School climate and implementation of a preventive intervention. *American Journal of Community Psychology, 40*, 250–260. doi:10.1007/s10464-007-9142-z.

Hawkins, J. D., & Weis, J. G. (1985). The social development model: An integrated approach to delinquency prevention. *Journal of Primary Prevention, 6*, 73–97.

Hox, J. (2010). *Multilevel analysis: Techniques and applications*. Mahwah, NJ: Lawrence Erlbaum.

Johnson, B., & Stevens, J. J. (2001). Exploratory and confirmatory factor analysis of the school level environment questionnaire (SLEQ). *Learning Environments Research, 4*, 325–344.

Kallestad, J. H., & Olweus, D. (2003). Predicting teachers' and schools' implementation of the Olweus Bullying Prevention Program: A multilevel study. Prevention and Treatment, 6. doi:10.1037/1522-3736.6.1.621a.

Lane, K. L., Bocian, K. M., MacMillan, D. L., & Gresham, F. M. (2004). Treatment integrity: An essential—but often forgotten—component of school-based interventions. Preventing School Failure, 48.

Lewis, K. M., DuBois, D. L., Bavarian, N., Acock, A., Silverthorn, N., Day, J., & Flay, B. R. (2013a). Effects of Positive Action on the emotional health of urban youth: A cluster-randomized trial. *Journal of Adolescent Health*. doi:10.1016/j.jadohealth.2013.06.012.

Lewis, K. M., Schure, M., Bavarian, N., DuBois, D. L., Day, J., Ji, P., & Flay, B. R. (2013b). Problem behavior and urban, low-income youth: A randomized controlled trial of Positive Action in Chicago. *American Journal of Preventive Medicine, 44*, 622–630. doi:10.1016/j.amepre.2013.01.030.

Li, K., Washburn, I., DuBois, D. L., Vuchinich, S., Ji, P., Brechling, V., & Flay, B. R. (2011). Effects of the Positive Action programme on problem behaviors in elementary school students: A matched-pair, randomized control trial in Chicago. *Psychology and Health, 26*, 187–204. doi:10.1080/08870446.2011.531574.

Low, S., Van Ryzin, M. J., Brown, E. C., Smith, B. H., & Haggerty, K. P. (2013). Engagement matters: Lessons from assessing classroom implementation of steps to respect: A bullying prevention program over a one-year period. *Prevention Science*. doi:10.1007/s11121-012-0359-1.

McCormick, L. K., Steckler, A. B., & McLeroy, K. R. (1995). Diffusion of innovations in schools: A study of adoption and implementation of school-based tobacco prevention curricula. *American Journal of Health Promotion, 9*, 210–219.

Moos, R. H. (1974). *The Social Climate Scales*. Palo Alto, CA: Consulting Psychologists Press.

Moos, R. H. (1994). *The social climate scales: A user's guide* (3rd ed.). Redwood City, CA: Mind Garden, Inc.

Payne, A. A., & Eckert, R. (2010). The relative importance of provider, program, school, and community predictors of the implementation quality of school-based prevention programs. *Prevention Science, 11*, 126–141. doi:10.1007/s11121-009-0157-6.

Peters, R. D., & McMahon, R. J. (1996). *Preventing childhood disorders, substance abuse, and delinquency*. Thousand Oaks, CA: Sage Publications, Inc.

Ransford, C. R., Greenberg, M. T., Domitrovich, C. E., Small, M., & Jacobson, L. (2009). The role of teachers' psychological experiences and perceptions of curriculum supports on the implementation of a social and emotional learning curriculum. *School Psychology Review, 38*, 510–532.

Rentoul, A. J., & Fraser, B. J. (1983). Development of a school-level environment questionnaire. *Journal of Educational Administration, 11*, 21–38.

Ringwalt, C. L., Ennett, S., Johnson, R., Rohrbach, L. A., Simons-Rudolph, A., & Vincus, A. (2003). *Health Education & Behavior, 30*, 375–391. doi:10.1177/1090198103253627.

Snyder, F., Flay, B., Vuchinich, S., Acock, A., Washburn, I., Beets, M. W., & Li, K. (2010). Impact of a social-emotional and character development program on school-level indicators of academic achievement, absenteeism, and disciplinary outcomes: A matched-pair, cluster-randomized, controlled trial. *Journal of Research on Educational Effectiveness, 3*, 26–55. doi:10.1080/19345740903353436.

Snyder, F. J., Vuchinich, S., Acock, A., Washburn, I. J., & Flay, B. R. (2012). Improving elementary school quality through the use of a social-emotional and character development program: A matched pair, cluster-randomized, controlled trial in Hawai'i. *Journal of School Health, 82*, 11–20.

Spoth, R., Rohrback, L. A., Greenberg, M., Leaf, P., Brown, C. H., Fagan, A., & Hawkins, J. D. (2013). Addressing core challenges for the next generation of type 2 translation research and systems: The translation science to population impact (TSci Impact) framework. *Prevention Science, 14*, 319–351. doi:10.1007/s11121-012-0362-6.

Tseng, V., & Seidman, E. (2007). A systems framework for understanding social settings. *American Journal of Community Psychology, 39*, 217–228.

Wandersman, A., Duffy, J., Flaspohler, P., Noonan, R., Lubell, K., Stillman, L., & Saul, J. (2008). Bridging the gap between prevention research and practice: The interactive systems framework for dissemination and implementation. *American Journal of Community Psychology, 41*, 171–181. doi:10.1007/s10464-008-9174.

Weiner, B. J. (2009). A theory of organizational readiness for change. Implementation Science, 4. doi:10.1186/1748-5908-4-67