Canadian Journal of School Psychology
2014, Vol. 29(1) 54–67

DOI: 10.1177/0829573514521777
cjs.sagepub.com
SAGE

A Psychometric Evaluation of a Revised School Climate Teacher Survey

Ying Liu[1], Cody Ding[1,2], Marvin W. Berkowitz[1], and Melinda C. Bier[1]

Abstract

The concept of school climate has been an important topic for education and it has been studied extensively over the past several decades. One of the challenges in such a research effort is to develop instruments that effectively and efficiently measure the construct. Literature has documented a number of school climate instruments, most of which target students' perceptions. A review of recent literature on school climate suggests that it is imperative to assess teachers' perceptions of school climate. The purpose of this study was to examine the factor structure and reliability of a revised version of a teacher survey instrument designed to measure school climate. Based on the data from a comprehensive character education project implemented in an urban school district in 2007 (n = 380), 2008 (n = 305), and 2010 (n = 277), results of exploratory and confirmatory factor analysis revealed a seven-factor structure across 3 years, indicating a stable factor structure of the revised form. The scales in this abbreviated form demonstrated similar reliability to those of the original form.

Résumé

Le concept de climat scolaire, sujet important en éducation, a été étudié abondamment au cours des dernières décennies. Un défi que se doivent de relever les chercheurs est de bâtir des instruments qui puissent mesurer efficacement le construct. La littérature fait état d'un certain nombre d'instruments sur le climat scolaire, la plupart ciblant les perceptions des élèves. Une revue de la littérature récente à ce sujet nous donne à penser qu'il est impérieux d'inclure les perceptions des enseignants. L'objectif de la présente étude est de déterminer la structure factorielle et la fiabilité

[1]University of Missouri–St. Louis, USA
[2]Southwest University, Chongqing, People's Republic of China

Corresponding Author:
Cody Ding, Department of Educational Psychology, Research, and Evaluation, University of Missouri–St. Louis, 404 Marillac Hall, St. Louis, MO 63121, USA.
Email: dingc@umsl.edu

d'une version révisée d'un sondage auprès des enseignants sur le climat scolaire. Sur la base de données d'une étude approfondie en éducation comportementale, effectuée dans un district scolaire urbain en 2007 (n = 380), 2008 (n = 305) et 2010 (n = 277), les analyses factorielles exploratoire et confirmatoire révèlent l'existence de sept facteurs sur trois ans, indiquant ainsi la stabilité de la structure factorielle de la version révisée. De plus, les échelles de cette version abrégée présentent des taux de fiabilité comparables à ceux de la version originale.

Keywords
school climate questionnaire for teachers, factor structure, reliability, factor analysis

Introduction

School climate has been studied extensively over the past several decades, in large part because of the key role it plays in initiating and maintaining education improvement (Cohen, McCabe, Michelli, & Pickeral, 2009). A significant amount of research has evidenced the relationship between school climate and various academic and social outcomes. For example, a safe, caring, participatory, and responsive school climate has been found to provide the foundation for social, emotional, and academic learning (Blum, McNeely, & Rinehart, 2002); to protect against the development of risk behaviors in youth (Cohen, 2006; Cunningham, 2007; Kuperminc, Leadbeater, Emmons, & Blatt, 1997); to foster psychological health and well-being in school (Berkowitz & Bier, 2005; Catalano, Haggerty, Oesterle, Fleming, & Hawkins, 2004); and to lower dropout rates by students' senior year (Barile et al., 2012; Lan & Lanthier, 2003).

Existing literature has documented a number of school climate instruments, most of which target students' perceptions. Social-cognitive theory (Bandura, 2001) posits that, although students and their teachers share an objective experience, their differing roles within the school likely will lead to discrepant perceptions of the environment. What seems to be less important to students' views of school climate, such as principal accessibility and parental involvement, may have greater impact on how teachers perceive the quality of their school climate. For teachers, school climate means not only their working environment (Hoy, 1990) but also a product of the professional teacher–principal relationship (Halawah, 2005; Rafferty, 2003), and an indication of organizational health (Hoy & Hannum, 1997).

Early studies suggested that, from teachers' perspectives, quality school climate includes and is not limited to characteristics such as shared norms and expectations (Brookover, Schweitzer, Schneider, Beady, Flood, & Wisenbaker, 1978), level of teachers' empowerment (Short & Rinehart, 1992), and the psychosocial context in which teachers work and teach (Fisher & Fraser, 1990). More recent research showed that several other factors also contribute to healthy school climate:

1. *Communication*: Shared values, goals, and beliefs produced from open communication between teachers and administrators can help promote positive school climate (Edgerson, Kristonis, & Herrington, 2006; Halawah, 2005).

2. *Principal*: As the most influential figure and primary role model in a school, the principal can contribute to improved climate perceptions by promoting quality and professional relationships with teachers (Hassenpflug, 1986), building trust and communication (Halawah, 2005), and demonstrating transformational leadership (Pepper & Thomas, 2002). Therefore, whether a principal has made reasonable efforts in these areas also can be benchmarks against which teachers evaluate their overall school experience.
3. *Teacher efficacy*: Yet another indicator of favorable school experience concerns teacher efficacy. Improved teacher efficacy has been associated with positive attitude and behaviors that influence the development of school (Nelson & Gould, 1988; Short & Rinehart, 1993).

The National School Climate Center's National School Climate Council has developed a school climate framework with four major dimensions: safety, relationships, teaching and learning, external environment, each of which has two or three subdimensions (e.g., safety is comprised of rules and norms, sense of physical security, and sense of social-emotional security; http://www.schoolclimate.org/programs/documents/dimensions_chart_pagebars.pdf). It reiterates the importance of assessing school climate from teachers' perspective.

In an effort to assess teachers' perceptions of a school's climate, the Developmental Studies Center (DSC; http://www.devstu.org) has developed the School Climate Teacher Survey (SCTS). It is part of a nation-wide six-district evaluation study of the Child Development Project, a multifaceted, school-wide elementary school improvement program (Battistich, Solomon, Watson, & Schaps, 1997; Solomon, Battistich, Watson, Schaps, & Lewis, 2000; Solomon, Battistich, Kim, & Watson, 1997). Although the teacher survey instrument has been used in many school districts, it is considered too long, making it time consuming and resource demanding to administer. In addition, some content of the survey is outdated. Therefore, it is necessary to refine and abbreviate the school climate teacher survey instrument, so that the instrument can be administered by teachers with ease and more importantly, reflects a reasonably up-to-date school climate structure (see more discussions below). This strategy parallels earlier efforts to create an abbreviated and validated measure of student perceptions of school climate (Ding, Liu, & Berkowitz, 2011).

The Original School Climate Teacher Survey

The original SCTS was designed to target teachers' sense of school as a caring community. It consisted of 90 items embedded in 14 sub-scales with a response scale of 1 to 5 (1 being *strongly disagree*, and 5 being *strongly agree*): shared educational goals and values; teachers' participatory decision making; principal supportiveness, accessibility, and competence; positive relations among students; school safety; positive student–teacher relations; colleagues as valuable resource; faculty collegiality; teacher efficacy; school norms and rules; prosocial development practices; enjoyment of teaching; and parent involvement. An additional scale that assesses specific character-related behaviors of students was derived from the work of Every Person Influences Children's Pathways to Character program. Previous research has reported good factor

structures and reliability estimate for the SCTS, with acceptable factor loadings for items on their respective factors (Solomon et al., 2000).

This instrument was used by a U.S. Department of Education–funded study of the Pathways to Character curriculum (http://www.epicforchildren.org) in the Buffalo (NY) Public Schools. The Every Person Influences Children, Inc. (EPIC)'s Pathways to Character is a school-based character education program that aims to help students develop core character traits through a meaningful and challenging academic curriculum. The Buffalo Public School District collaborated with the Center for Character and Citizenship (CCC) at the University of Missouri–St. Louis and EPIC to develop, implement, and evaluate a comprehensive character education program based on the EPIC's Pathways to Character program in response to the challenges to promote character and citizenship among youths. As a major outcome variable, the perceived school climate of teachers who participated in the Pathways to Character evaluation study was investigated using the SCTS.

Reasons for Revising the SCTS

An evaluation of Pathways to Character program in Buffalo using the original 90-item SCTS in the recent years (2007-2010) showed that the original 14-factor structure did not hold as expected. For example, several individual scales unexpectedly collapsed into one. Also, the reliability of some of the scales was low. In addition, teachers reported lack of motivation and commitment to complete such a lengthy survey. Both the psychometric problems and administration issues experienced over the course of the studies prompted the need to further study the psychometric properties of the survey to update, shorten, and improve its factor structure and scale reliability.

The revision of the SCTS involved elimination of outdated or less relevant items. Although the multidimensional nature of school climate suggests the importance of measuring a broad range of factors, practical limitations (e.g., funding and time constraints) require a more economic way of measuring school climate. Abbreviated instrument has the advantage of being less demanding on teachers, which in turn improves response rates as well as the quality of responses. In addition, an abbreviated form of school climate measure is more likely to be used along with other research tools (e.g., observation and interviews) in more in-depth studies of schools. Previous research indicated that an abbreviated form of a long questionnaire may work equally well or better than the original one (Ding et al., 2011; Johnson & McClure, 2004; Netemeyer et al., 2002). An abbreviated version of the SCTS also should preserve and improve the psychometric properties of the original measure. A detailed revision process and results of the psychometric study are reported in the following sections.

Method

Sample

Data for the current study were drawn from the Pathways to Character evaluation study implemented in 24 elementary schools in a large, ethnically diverse urban school district located in Buffalo, NY. Completed surveys were obtained from 380 teachers in

2007 (n = 380), 305 in 2008 (n = 305), and 277 in 2010 (n = 277) from the 24 elementary schools (most of them participated two to three times across different times of measurement). Most teachers identified themselves as White or Caucasian (72.7%), whereas 14.4% were Black or African American, 5.8% Hispanic, 4.3% Native American, 0.7% Asian American, and 2.2% Other.

Revision of the 90-Item SCTS

Content and statistical properties were the two primary criteria used to evaluate the revision of the SCTS. In the content-focused part, an expert panel consisting of four researchers with expertise in the areas of educational psychology and character education revised the instrument, minimizing item redundancy, removing less relevant items, and ensuring that remaining items reflect the intent of the original measure. Using a scale of 0 (*no*) or 1 (*yes*), the expert panel evaluated and rated each of the survey items with respect to item specificity, content clarity, recency, and relevancy. Items with a score lower than 4 points were dropped. After this procedure, 25 items were dropped, leaving 65 items in the preliminary study.

Statistical Analysis

In the statistics-focused part, we performed exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Using EFA, we explored the factor structure of the 65-item questionnaire, with principal axis factoring method followed by promax rotation (Gorsuch, 1983). The number of factors was determined by the parallel analysis and Velicer's Minimal Average Partial (MAP) test (Horn, 1965). EFA was conducted separately on each of the three yearly samples using the same factoring method.

In addition, given that the same instrument was used in all 3 years, the factor structure was expected to be invariant. Therefore, CFA was performed to test factor invariance of the scale over three yearly samples of teachers to assess temporal stability of the scores for the measure based on the factor structure as revealed in EFA.

For CFA, the fit of the model was verified using the normed chi-square statistic (values below 2 suggesting a good fit and below 3 an acceptable fit), the comparative fit index (CFI; values in the range between 0.95 and 1.00 suggesting a good model fit and between 0.90 to 0.95 an acceptable fit), root mean square error of approximation (RMSEA; values less than 0.05 indicating a good fit and less than 0.08 an acceptable fit), and standardized root mean residuals (SRMRs, values below 0.10 indicating a good fit), as suggested by Schweizer (2010). All the analyses were performed using SAS software (SAS Institute, 2011).

Results

Exploratory Factor Analysis

The Kaiser–Meyer–Olkin (KMO) measure, an indicator that the data were appropriate for factor analysis, showed a reasonably good sample adequacy, with the value being

.86, .89, and .87 for 2007, 2008, and 2010, respectively. The number of factors to retain was determined by the following criteria: (a) parallel analysis and Velicer's MAP test, (b) no double loading of items across factors (i.e., no secondary factor loading of 0.30 or higher), and (c) no item divergence in content (i.e., wording of items needs to be scale specific).

Results of the MAP test and parallel analysis suggested seven interpretable factors. Based on the criteria mentioned above, 23 items were excluded from the revised 65-item questionnaire, leaving 42 items in the latest revised version. As seen in Table 1, the seven-factor structure can be replicated over 3 years (2007, 2008, and 2010) with factor loadings of all items being .40 or above. One exception was for the item "By trying a different teaching method, I can significantly affect a student's achievement," whose factor loading was 0.31 for 2010. However, the expert panel considered this item to be conceptually important in assessing teacher efficacy, and the factor loadings for 2007 and 2008 samples were above 0.40. Thus, the item was kept in the revised version.

The resulting SCTS consisted of 42 items in seven scales. Factor 1 was Principal Supportiveness, Accessibility, and Competence (PRIN) with 8 items. Factor 2 was Colleague Collegiality (COLL) with 4 items. Factor 3 was Prosocial Development Practices (PDEV) with 5 items. Factor 4 was Student Behavior (SBEH) with 14 items. Factor 5 was Teacher Efficacy (TEFF) with 3 items. Factor 6 was Enjoyment of Teaching (ENJT) with 5 items. Factor 7 was Parent Involvement (PRNT) with 3 items.

Table 2 presents the parallels and differences between the 90-item SCTS's factor structure and that of the revised version. First, for the revised instrument, the original factor labels were retained if the majority of the items were from the original 90-item measure. Second, while the revised instrument revealed a similar overall factor structure, items from some scales in the original measure merged together with items from a different scale. For example, the item "The principal consults with staff members before she or he makes decisions that affect us" from the original Participatory Decision Making scale was moved into the Principal Supportiveness, Accessibility, and Competence scale in the revised measure, given the fact that this item conceptually concerns more of the quality of principals. Similarly, the items from the original scale of Colleagues as Valuable Resource and Faculty Collegiality became one factor in the abbreviated version, which was named Colleague Collegiality. Third, since the items from the original scales of Shared Educational Goals & Values, Positive Relations Among Students, School Safety, Positive Student–Teacher Relations, and School Norms & Rules spread across other factors, they were eliminated in the revised instrument. Although the number of items for a given scale was dramatically reduced, the reliability of the scales in the revised instrument actually remained similar in comparison with those in the original version across the data from 2007, 2008, and 2010 (see Tables 2 and 3). Table 4 shows means and standard deviations of each scale across years and Table 5 shows the correlations among scales. As expected, these scales were moderately correlated.

Table 1. Factor Loadings for 42 Items of the Revised School Climate Teacher Survey by Year.

Factors	2007	2008	2010
Factor 1: Principal Supportiveness, Accessibility, and Competence			
The principal usually consults with staff members before he or she makes decisions that affect us	0.67	0.72	0.72
Goals and priorities for the school are clear	0.61	0.61	0.69
The principal is accessible to teachers	0.80	0.83	0.71
The principal is capable and well-organized	0.92	0.89	0.71
Staff members are never recognized for a job well done. [R]	0.51	0.46	0.42
The principal deals effectively with pressures from outside the school that might interfere with my teaching	0.66	0.77	0.76
The principal takes an active role in most school activities	0.84	0.84	0.64
The principal does a poor job of getting resources for this school. [R]	0.61	0.67	0.59
Factor 2: Colleague Collegiality			
I can get good advice from other teachers in this school when I have a teaching problem	0.65	0.67	0.81
Teachers frequently consult with and help one another	0.59	0.68	0.68
Teachers are supportive of one another	0.77	0.78	0.76
Teachers demonstrate respect for each other	0.69	0.77	0.87
Factor 3: Prosocial Development Practices			
If I try really hard, I can get through to even the most difficult or unmotivated student	0.60	0.77	0.56
If teachers have patience and goodwill, they can help any student to learn	0.53	0.62	0.47
By trying a different teaching method, I can significantly affect a student's achievement	0.75	0.61	0.72
Helping students to understand and appreciate people who are different from themselves is an important part of my teaching	0.60	0.68	0.60
In my class, I talk with students about emotions and why they are important	0.66	0.50	0.59
Factor 4: Student Behavior			
Students are not mean, cruel, or insensitive to others' feelings	0.78	0.68	0.61
Students clean up their own mess, rather than expecting others to do it	0.64	0.64	0.65
Students adhere to rules of fair play	0.83	0.76	0.79
Students take responsibility for their mistakes	0.88	0.91	0.81
Students are accepting of people who are different from them	0.78	0.76	0.56
Students follow rules and instructions given by staff members	0.77	0.74	0.70
Students give their best effort	0.68	0.70	0.60
Students treat others the way they want to be treated	0.80	0.89	0.88
Students keep commitments made to others	0.71	0.69	0.71
Students do not deceive, mislead, or act deviously	0.73	0.68	0.70
Students are kind and supportive of one another	0.82	0.87	0.78

(continued)

Table 1. (continued)

Factors	2007	2008	2010
Students follow the strength of their convictions in spite of what their peers are doing	0.67	0.73	0.59
Students do not cheat in games or on tests	0.76	0.72	0.59
Students respect others' right to work and learn without disrupting	0.80	0.78	0.72
Factor 5: Teacher Efficacy			
If I try really hard, I can get through to even the most difficult or unmotivated student	0.66	0.62	0.72
If teachers have patience and goodwill, they can help any student to learn	0.76	0.53	0.71
By trying a different teaching method, I can significantly affect a student's achievement	0.47	0.44	0.31
Factor 6: Enjoyment of Teaching			
I think that teaching at this school isn't really worth the stresses and disappointments it involves [R]	0.57	0.58	0.48
I really love teaching	0.61	0.64	0.75
I usually look forward to each working day at this school	0.74	0.75	0.73
In general, I really enjoy my students	0.55	0.63	0.69
I don't seem to have as much enthusiasm now as I did when I began teaching. [R]	0.72	0.68	0.58
Factor 7: Parent Involvement			
Teachers and parents think of each other as partners in educating children	0.62	0.75	0.73
Parents are actively involved in school activities (as volunteers, participants in class and school programs, etc.)	0.65	0.61	0.59
Parents are supportive of the school and the teachers	0.83	0.74	0.75

Factor Invariance

CFA was conducted to test invariance of factor structure across three yearly samples. In this analysis, we first ran a non-restricted model in which none of the model's parameters were restricted to equal across three yearly samples. Results of this null model indicated a CFI of .98, RMSEA of .019, and SRMR of .023, which were deemed as good. Second, we examined a restricted model in which the factor loadings and factor variance and covariance were constrained to be equal across samples. However, our analysis did not constrain error variance to be equal across samples because it was too restrictive (Byrne, Shavelson, & Muthén, 1989). The results indicated that the hypothesized model of measurement invariance was good, with normed $\chi^2_{(\chi 2 = 3149.36,\ df = 2592)} = 1.22$, CFI = .95, RMSEA = .026, and SRMR = .076. Moreover, the chi-square difference between this invariant model and the model in which parameters were set to be freely estimated across samples was not significant, $\Delta\chi^2 = 217.83$, $df = 210$, $p >$

Table 2. Factor Label and Number of Items in the Original SCTS and the Revised Version Based on the 2007 Data Set.

Revised version		Original version	
Factor label	No. of items[a]	Factor label	No. of items[a]
Principal Supportiveness, Accessibility, and Competence	8 (.90)	Principal Supportiveness, Accessibility, and Competence	8 (.90)
Colleague Collegiality	4 (.77)	Colleagues as Valuable Source [b]	2 (.61)
		Faculty Collegiality[b]	7 (.81)
Prosocial Development Practices	5 (.79)	Prosocial Development Practices	6 (.81)
Student Behavior	14 (.95)	Student Behavior	23 (.95)
Teacher Efficacy	3 (.71)	Teacher Efficacy	5 (.74)
Enjoyment of Teaching	5 (.82)	Enjoyment of Teaching	7 (.75)
Parent Involvement	3 (.81)	Parent Involvement	5 (.81)
		Shared Educational Goals and Values[c]	2 (.55)
		Teacher Participatory Decision Making[b]	4 (.81)
		Positive Relations Among Students[c]	6 (.50)
		Positive Student–Teacher Relations[c]	3 (.46)
		School Norms and Rules	3 (.34)
		School Safety[c]	4 (.62)
Total SCTS	42 (.94)		90 (.89)

Note. SCTS = School Climate Teacher Survey.
[a]Numbers in the parentheses are Cronbach's alpha estimates.
[b]Items from the scale became a part of another scale in the revised version.
[c]This scale was dropped since the items were eliminated for either conceptual ground or statistical ground.

.05. These results suggested that the measurement model for the school climate measure was invariant across samples.

Discussion

This study focuses on psychometric evaluation of the revised SCTS, a measure specifically designed to investigate teachers' perceptions of school climate. The original 14-factor structure did not hold when we examined the 90-item SCTS using data from 2007, 2008, and 2010. Several individual scales unexpectedly collapsed into one. Also, the reliability of some of the scales was low. After item review and factor analyses, the revised SCTS consisted of 42 items and revealed a 7-factor structure that could be replicated across 3 years. In addition, invariance of factor structure across 3 years

Table 3. Reliability for Seven Subscales and the Total Scale of the Revised Version of School Climate Teacher Survey by Year.

Scales	No. of items	Cronbach's α		
		2007	2008	2010
Principal Supportiveness, Accessibility, and Competence	8	.90	.88	.85
Colleague Collegiality	4	.77	.85	.85
Prosocial Development Practices	5	.79	.76	.76
Student Behavior	14	.95	.96	.93
Teacher Efficacy	3	.71	.73	.74
Enjoyment of Teaching	5	.82	.79	.83
Parent Involvement	3	.81	.77	.80

Table 4. Mean and Standard Deviation of the Revised Version of SCTS by Year.

	Range	2007	2008	2010
		M (*SD*)	*M* (*SD*)	*M* (*SD*)
Principal Supportiveness, Accessibility, and Competence	1-5	3.59 (0.87)	3.59 (0.85)	3.61 (0.75)
Colleague Collegiality	1-5	3.99 (0.61)	4.05 (0.64)	3.95 (0.72)
Prosocial Development Practices	1-5	4.18 (0.50)	4.20 (0.48)	4.12 (0.49)
Student Behavior	1-5	2.76 (0.81)	2.71 (0.83)	2.93 (0.67)
Teacher Efficacy	1-5	3.78 (0.73)	3.84 (0.66)	3.84 (0.72)
Enjoyment of Teaching	1-5	3.92 (0.72)	3.86 (0.77)	3.95 (0.70)
Parent Involvement	1-5	2.65 (0.92)	2.66 (0.89)	2.72 (0.86)
Total SCTS	1-5	3.41 (0.52)	3.40 (0.52)	3.48 (0.48)

Note. SCTS = School Climate Teacher Survey. Standard deviations are given in parentheses.

was supported in the CFA, which provided additional assurance about the stability of the factor structure. The reliabilities of the scales were in the same range as those in the original version, indicating that the abbreviated form could reflect the intent of the original scale and measure the construct of school climate as effectively. The current study demonstrated that the abbreviated instrument has a stable 7-factor structure and good reliability, suggesting that it can measure the construct of school climate as effectively as the original version. When used in conjunction with the revised student perception of school climate instrument (Ding et al., 2011), this combined set now offers a free, psychometrically validated pair of instruments to assess both student and staff perceptions of school climate. This strategy to collect different stakeholder perspectives on school climate has been favored widely in the character education literature (e.g., Corrigan, Grove, & Vincent, 2011).

Table 5. Correlation Among Seven Subscales by Year.

	1	2	3	4	5	6	7
2007							
1. PRIN	—						
2. CC	.31**	—					
3. PDEV	.16**	.20**	—				
4. SBEH	.33**	.18**	.26**	—			
5. TEFF	.21**	.15**	.38**	.33**	—		
6. ENJT	.48**	.26**	.35**	.41**	.43**	—	
7. PRNT	.48**	.22**	.14**	.53**	.26**	.39**	—
2008							
1. PRIN	—						
2. CC	.25**	—					
3. PDEV	.14*	.18**	—				
4. SBEH	.28**	.20**	.20**	—			
5. TEFF	.19**	.02	.42**	.32**	—		
6. ENJT	.39**	.31**	.30**	.48**	.48**	—	
7. PRNT	.31**	.21**	.10	.52**	.23**	.33**	—
2010							
1. PRIN	—						
2. CC	.32**	—					
3. PDEV	.27**	.18**	—				
4. SBEH	.36**	.26**	.25**	—			
5. TEFF	.33**	.19**	.37**	.33**	—		
6. ENJT	.53**	.32**	.36**	.47**	.48**	—	
7. PRNT	.24**	.21**	.10	.43**	.28**	.24**	—

Note. PRIN = Principal Supportiveness, Accessibility, and Competence; CC = Colleague Collegiality; PDEV = Prosocial Development Practices; SBEH = Student Behavior; TEFF = Teacher Efficacy; ENJT = Enjoyment of Teaching; PRNT = Parent Involvement.
*$p < .05$. **$p < .01$.

Admittedly, there are some potential limitations to this study. First, since teacher respondents were from the same school district, the observed factor structure may be unique to this particular population. Similarly, the structure and measurement properties may not apply equivalently for middle or high school teachers. A future study that employs different teacher populations from different school levels and places may provide definitive evidence to the observed factor structure. Second, the study was based on urban data, which may make the findings of limited value. Studies based on different samples may be helpful in verifying the factor structure found in the current study. Third, additional studies that examine the convergent and discriminant validity are needed. Future efforts should be made to correlate the revised SCTS with other similar teacher surveys (e.g., Organizational Health Inventory for Elementary Schools [OHI-E] [Hoy, Tarter, & Kottkamp, 1991], and Organizational Climate Index [OCI]

[Hoy, Smith, & Sweetland, 2002]) to examine its concurrent and construct validity. While the current study achieved its purpose to demonstrate the factorial validity and reliability of the revised SCTS, evidence is still needed to show the sensitivity of the revised instrument to student achievement and student perception of school climate. Additional school climate research that involves this instrument will provide opportunities to examine its sensitivity and the relationship between school climate and other critical factors.

Declaration of Conflicting Interests

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

References

Bandura, A. (2001). Social cognitive theory: An agentic perspective. *Annual Review of Psychology*, *52*, 1-26.

Barile, J. P., Donohue, D. K., Anthony, E. R., Baker, A. M., Weaver, S. R., & Henrich, C. C. (2012). Teacher-student relationship climate and school outcomes: Implications for educational policy initiatives. *Journal of Youth and Adolescence*, *41*, 256-267.

Battistich, V., Solomon, D., Watson, M. S., & Schaps, E. (1997). Caring school communities. *Educational Psychologist*, *32*, 137-151.

Berkowitz, M. W., & Bier, M. C. (2005). *What works in character education: A report for policy makers and opinion leaders*. Washington, DC: Character Education Partnership.

Blum, R. W., McNeely, C. A., & Rinehart, P. M. (2002). *Improving the odds: The untapped power of schools to improve the health of teens*. Minneapolis: Center for Adolescent Health and Development, University of Minnesota. Retrieved from http://www.casciac.org/pdfs/ImprovingtheOdds.pdf

Brookover, W. B., Schweitzer, J. H., Schneider, J. M., Beady, C. H., Flood, P. K., & Wisenbaker, J. P. (1978). Elementary school social climate and school achievement. *American Educational Research Journal*, *2*, 301-318.

Byrne, B. M., Shavelson, R. J., & Muthén, B. (1989). Testing for the equivalence of factor covariance and mean structures: The issue of partial measurement invariance. *Psychological Bulletin*, *105*, 456-466.

Catalano, R. F., Haggerty, K. P., Oesterle, S., Fleming, C. B., & Hawkins, J. D. (2004). The importance of bonding to school for healthy development: Findings from the Social Development Research Group. *Journal of School Health*, *74*, 252-261.

Cohen, J., McCabe, E. M., Michelli, N. M., & Pickeral, T. (2009). School climate: Research, policy, teacher education and practice. *Teacher College Record*, *111*, 180-213.

Corrigan, M. W., Grove, D., & Wincent, P. F. (2011). *Multi-dimensional education: A common sense approach to data-driven thinking*. Thousand Oaks, CA: Corwin Press.

Cunningham, N. J. (2007). Level of bonding to school and perception of the school environment by bullies, victims, and bully victims. *Journal of Early Adolescence*, *27*, 457-478.

Ding, C., Liu, Y., & Berkowitz, M. (2011). The study of factor structure and reliability of an abbreviated school climate survey. *Canadian Journal of School Psychology*, *26*, 241-256.

Edgerson, D., Kritsonis, W., & Herrington, D. (2006). The critical role of the teacher-principal relationship in the improvement of student achievement in the public schools of the United States. *Lamar University Electronic Journal of Student Research*, *3*, 1-6.

Fisher, D. L., & Fraser, B. J. (1990). *School climate: Assessing and improving school environments* (Set: Research Information for Teachers No. 2, Item 4). Melbourne: Australian Council for Educational Research.

Gorsuch, R. L. (1983). *Factor analysis* (2nd ed.). Hillsdale, NJ: Erlbaum.

Halawah, I. (2005). The relationship between effective communication of high school principals and school climate. *Education*, *126*, 334-345.

Hassenpflug, A. (1986). Teacher-administration cooperation: A necessity for the effective school. *NAASP Bulletin*, *70*, 38-41.

Horn, J. L. (1965). A rationale and test for the number of factors in factor analysis. *Psychometrica*, *32*, 179-185.

Hoy, W. K. (1990). Organizational climate and culture: A conceptual analysis of the school workplace. *Journal of Educational Psychology Consultation*, *1*, 149-168.

Hoy, W. K., & Hannum, J. W. (1997). Middle school climate: An empirical assessment of organizational health and student achievement. *Educational Administration Quarterly*, *33*, 290-311.

Hoy, W. K., Smith, P. A., & Sweetland, S. R. (2002). The development of the organizational climate index for high schools: Its measure and relationship to faculty trust. *High School Journal*, *86*, 38-49.

Hoy, W. K., Tarter, C. J., & Kottkamp, R. B. (1991). *Open schools/healthy schools: Measuring organizational climate*. Beverly Hills, CA: Sage.

Johnson, B., & McClure, R. (2004). Validity and reliability of a shortened, revised version of the Constructivist Learning Environment Survey (CLES). *Learning Environments Research*, *7*, 65-80.

Kuperminc, G. P., Leadbeater, B. J., Emmons, C., & Blatt, S. J. (1997). Perceived school climate and difficulties in the social adjustment of middle school students. *Applied Developmental Science*, *1*, 76-88.

Lan, W., & Lanthier, R. (2003). Changes in students' academic performance and perceptions of school and self before dropping out of schools. *Journal of Education for Students Placed at Risk*, *8*, 309-332.

Nelson, F. H., & Gould, J. C. (1988). Teachers' unions and excellence in education: Comment. *Journal of Labor Research*, *9*, 379-387.

Pepper, K., & Thomas, L. (2002). Making a change: The effects of the leadership role on school climate. *Learning Environments Research*, *5*, 155-166.

Rafferty, T. J. (2003). School climate and teachers attitudes toward upward communication in secondary schools. *American Secondary Education*, *31*(2), 49-70.

SAS Institute Inc. (2011). *SAS/STAT ® 9.3 User's Guide*. Cary, NC: SAS Institute Inc.

Schweizer, K. (2010). Some guidelines concerning the modeling of traits and abilities in test construction. *European Journal of Psychological Assessment*, *26*, 1-2.

Short, P. M., & Rinehart, J. S. (1992). School Participant Empowerment Scale: Assessment of level of empowerment within school environment. *Educational and Psychological Measurement*, *52*, 951-960.

Short, P. M., & Rinehart, J. S. (1993). Teacher empowerment and school climate. *Education*, *113*, 592-597.

Solomon, D., Battistich, V., Kim, D., & Watson, M. (1997). Teacher practices associated with students' sense of the classroom as a community. *Social Psychology of Education*, *1*, 235-267.

Solomon, D., Battistich, V., Watson, M., Schaps, E., & Lewis, C. (2000). A six-district study of educational change: Direct and mediated effects of the child development project. *Social Psychology of Education*, *4*, 3-51.

Author Biographies

Ying Liu, PhD, is Program Support Coordinator (Assessment) in Academic Affairs at School of Osteopathic Medicine of Rowan University. She received her BA degree from Central China Normal University and PhD degree from the Department of Educational Psychology, Research, and Evaluation, University of Missouri–St. Louis. Her research interests include program evaluation, school climate, moral self-enhancement, and cross-cultural studies.

Cody Ding, PhD, is a Professor of measurement psychology in Department of Educational Psychology, Research, and Evaluation at University of Missouri–St. Louis. His research interests include multidimensional scaling models and their applications for change and preference analysis in intervention, measurement, and psychosocial adjustment and development.

Marvin W. Berkowitz, PhD, is the S. N. McDonnell Professor of Education and co-director of the Center for Character and Citizenship at University of Missouri–St. Louis, and UM President's Thomas Jefferson Professor. A developmental and educational psychologist, he is an expert in character development and education.

Melinda C. Bier, PhD, is currently the Associate Director for the Center for Character and Citizenship (CCC), University of Missouri–St. Louis. She is the principal investigator for a series of cross-disciplinary projects that involve implementing and/or assessing the impact of school-based interventions on student outcomes—health, character, and academic achievement.