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Students’ Perceptions of School Climate in the U.S. and China

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Although the construct of student climate has been studied extensively in the United States, we know little about how school climate is perceived in other countries. With large class sizes yet higher academic achievement and less disruptive and aggressive student behaviors, schools in China present a contrast to many schools in the United States. Differences in school climate between the two countries were examined in this study. The sample consisted of 10,400 American and 3,435 Chinese students across three grade levels (elementary, middle, and high school) in 85 American and 22 Chinese schools. Factor structure and measurement invariance across countries were first established for the Modified-Delaware School Climate Survey-Student. Differences in latent means were then tested. Across all three grade levels Chinese students scored significantly higher than American students on all four subscales (Teacher–Student Relations, Student–Student Relations, School Liking, and Fairness of School Rules). Effects sizes tended to be smallest in elementary schools and largest in middle schools. Significant differences between American and Chinese students exist in their perceptions of school climate. It is likely that those differences can be attributed to cultural differences in respect of authority, academic and social values, self-regulation and peer-regulation of behaviors, and teachers’ classroom management.

Keywords: school climate, cross-cultural, measurement invariance, classroom management, Delaware School Climate Survey

Over the past three decades, an increasing number of studies have examined school climate in American schools, with school climate generally referring to the “quality and character of school life” (Cohen, McCabe, Michelli, & Pickeral, 2009, p. 182). Although the conceptualization and measurement of school climate has varied widely across researchers (Anderson, 1982; Zullig, Koopman, Patton, & Ubbes, 2010), a number of studies have shown school climate to be associated with important student and school outcomes. For example, school climate has been linked to students’ academic achievement (Brand, Felner, Shim, Seitsinger, & Dumas, 2003) and motivation (Marsh, Martin, & Cheng, 2008) and to teacher’s instructional performance (Suldo et al., 2009). It has been found to impact students’ social–emotional adjustment and mental health, including self-esteem (Way, Reddy, & Rhodes, 2007), anxiety (Rigby, 2000), depression (Loukas, Suzuki, & Horton, 2006), sense of belonging to school (Waters, Cross, & Runions, 2009), and general behavior problems (Wang & Dishion,
2011). School climate also has been shown to be related to more specific student behavior problems, including school absenteeism (Corville-Smith, Ryan, Adams, & Dalicandro, 1998), school avoidance (Brand et al., 2003; Welsh, Stokes, & Greene, 2000), aggression (Wilson, 2004), victimization (Gottfredson, Gottfredson, Payne, & Gottfredson, 2005; Welsh et al., 2000), bullying (Bandyopadhyay, Cornell, & Konold, 2009), and student delinquency (Gottfredson et al., 2005). Given its relation to those outcomes, it is not surprising that school climate has recently been targeted for improvement in programs for promoting mental health and preventing behavior problems (Adelman & Taylor, 2010), as well as in programs that target more specific behaviors, such as bullying (e.g., Olweus & Limber, 2010).

Although school climate has been studied extensively in the United States, we know little about school climate in most other countries. This is particularly true in China. Despite large class sizes being the norm in China (Romanowski, 2006) and gross national income per capita less than 10% of that in the U.S. (The World Bank, 2012), researchers report less disruptive and aggressive behavior (Adelman & Taylor, 2010), as well as in programs that target more specific behaviors, such as bullying (e.g., Olweus & Limber, 2010).

Cultural Differences That Likely Influence School Climate

Consistent with the findings of Jia et al. (2009), we predicted that in all grades Chinese students would have more positive perceptions of school climate than American students. In addition to teacher-student and student-student relationships, we included two aspects of school climate not examined by Jia et al.: students’ perceived fairness of school rules and their liking of school. Our prediction of more positive perceptions among Chinese students was based not only on the findings of Jia et al. but also on additional research and theory on cultural differences between China and the U.S. related either directly or indirectly to school climate. For heuristic purposes we group those cultural differences into three areas: (a) Chinese students’ views of education and teachers, (b) social harmony and behavior regulation, and (c) classroom management and socialization. Cultural differences in each of those areas and how they are likely to influence school climate are highlighted below.

Chinese Students’ Views of Education and Teachers

A number of researchers have attributed fewer behavior problems and greater orderliness and on-task behavior in Chinese classrooms compared to American classrooms to cultural norms in China that more strongly support education and respect of the teacher (Jia et al., 2009; Teddlie & Liu, 2008). Those norms reflect Confucian values that emphasize self-perfection, honor to the family, and respect of parents (Hui, Sun, Chow, & Chu, 2011)—values that can largely be met through academic excellence. Beginning at an early age, Chinese parents stress the importance of academic achievement. They also emphasize the importance of compliance and obedience to help achieve self-perfection but also to help develop positive parent–child and adult–child relationships (Yau, Smetana, & Metzger, 2009). Upon entering school, an emphasis on compliance and obedience extends to the teacher–child relationship. Chinese students are expected to treat teachers as they do their parents, with obedience and respect, and teachers are expected to provide their students with the support and structure that foster learning and development (Jia et al., 2009).

A strong commitment to education and respect of teachers are two important aspects of school bonding. Among multiple variables examined in a study of school bonding in American schools, Jang (2002) found that those two
variables accounted the greatest for less deviant school behavior among Chinese American students (and other Asian American students) compared to non-Asian students. Whereas Asian American students were found to be no more attached to their parents than non-Asian students, they were much more attached to their schools.

In the Jia et al. (2009) study, the researchers attributed finding positive teacher-student relationships, or greater bonding, in Chinese than American schools to the high social status and respect of Chinese teachers. They also attributed this to students spending more time with their teachers. They noted that Chinese students often have the same teacher for more than one year, which likely enhances the bond between teachers and students. Given the higher social status and greater respect of teachers in China than in the U.S. and greater opportunities for social bonding, it is reasonable to expect that Chinese students would view school climate, and especially teacher-student relationships, more favorably than American students.

Social Harmony and Behavior Regulation

An emphasis on compliance, obedience, and positive adult–child relationships serves the long-term aim of developing students’ self-regulation, or self-discipline, as well as good moral character in general—qualities viewed as important in their own right but also as critical to social harmony throughout Chinese society (Chen, Huang, Chang, Wang, & Li, 2010). Thus, as is true with self-perfection and respect of adults, social harmony is highly valued in traditional and contemporary Chinese culture (Chen & French, 2008; Chen et al., 2010), including in schools (Chang & Holt, 1991). To promote social harmony, ample opportunities are provided in Chinese schools to enhance not only teacher-student bonding but also relationships among students. In finding more positive student-student relationships among Chinese students, Jia et al. (2009) noted that compared to students in the U.S., students in China spend more time studying together and have more opportunities for social interactions with peers and for classroom decision-making.

Just as individual qualities reflecting social harmony are to be promoted in Chinese culture, so too are behaviors inconsistent with them to be stifled. This includes aggressive and disruptive behaviors in the classroom, which peers perceive to be deviant and problematic (Chen et al., 2010). At both home and school, children in China are taught that aggressive, impulsive, and defiant behaviors are incompatible with self-perfection, respect of others, and social harmony. Thus, they are not to be tolerated. More so than American parents, Chinese parents teach this at an early age (Chang, 2004; Cheah & Rubin, 2004) and it continues to be taught and practiced throughout schooling (Chang, 2004). Indeed, research (Greenberger et al., 2000) shows that compared to students in other countries, including the U.S., Chinese students tend to be less tolerant and more disapproving of conduct problems. As such, Chinese students are expected to regularly evaluate and regulate not only their own behavior, but also that of their peers. Behavior that disrupts learning or harms others is likely to result in negative evaluations, including public humiliation from both teachers and peers (Chen & French, 2008; Chen et al., 2010). Thus, peer norms against aggression, which are widely viewed by researchers as critical to preventing bullying and aggression (Dishion, Piehler, & Myers, 2008), are common in Chinese schools (Chen, Kaspar, Zhang, Wang, & Zheng, 2004). This is likely to impact students’ perceptions of school climate given that research shows that students’ perceptions of school climate are more favorable in schools with fewer behavior problems (Koth, Bradshaw, & Leaf, 2008). Similarly, peer norms that support academic excellence, which are common in Chinese schools, also have been linked to more favorable students’ perceptions of school climate (Marsh et al., 2008; Battistich, Solomon, Kim, Watson, & Schaps, 1995).

With social norms promoting social harmony and academic excellence, and with greater opportunities for student-student bonding, it is likely that Chinese students view school climate, and especially student-student relationships, more favorably than American students. This is supported by research in American schools demonstrating that practices designed to promote prosocial values and cooperation are effective in increasing students’ perceptions of connectedness (Battistich et al., 1995).

Moreover, consistent with the valuing of harmonious relations and a sense of collectivism and social harmony, as well as the expectation
that Chinese students are to follow social norms and refrain from criticism of persons of authority (Yau et al., 2009), it seems reasonable that Chinese students would view school rules to be fairer. This is supported by a cross-cultural study of classroom discipline in Grades 7 to 12 conducted by Lewis, Romi, Katz, and Qui (2005). They found that compared to students in Australia and Israel, students in China held the strongest beliefs that their teachers’ disciplinary actions were justified. They also had the least negative feelings toward their teachers.

Classroom Management and Socialization

Social support, as seen in close teacher-student and student-student relationships, is a critical dimension of classroom management and school discipline, but so too is structure (Bear, 2010; Gregory et al., 2010). Structure includes high expectations, fair rules and consequences, consistent routines and procedures, and other teacher-centered practices that curtail misbehavior and promote academic engagement and prosocial behavior. Social support and structure are recognized as important dimensions not only of effective classroom management and school discipline but also of school climate (Bear, Gaskins, Blank, & Chen, 2011; Stockard & Mayberry, 1992).

In addition to providing greater social support, as discussed in the previous section, Chinese classrooms tend to be more structured than in the U.S. Instruction is more whole-group instead of small-group or individualized, and much more efficient (Lan et al., 2009; Teddlie & Meza, 1999). For example, in their observations of math classes in primary schools in China, Teddlie and Liu (2008) found Chinese students to be on-task 91% of the time, with interactive time on-task found 81% of the time. They compared this to 64% and 43%, respectively, found in a typical school in the U.S. (Lan et al., 2009; Teddlie & Meza, 1999). Researchers attributed their findings to greater efficiency (including greater whole group instruction) and greater use of proactive techniques than corrective techniques. Whereas Chinese and American teachers used a similar amount of reactive techniques (e.g., verbally reprimanding a student for daydreaming), Chinese teachers were twice as likely as American teachers to use verbal and nonverbal proactive techniques, such as verbally reminding students of class norms and behavioral expectations, and directing students verbally or nonverbally to pay attention or raise their hands). Lan et al. (2009) noted that the primary goal of those techniques was not only to foster on-task behavior, but to “socialize self-guidance.”

Combined with techniques of classroom management, and for purposes of socializing self-guidance and citizenship education, Chinese schools and teachers are to teach, both directly and indirectly, the “Eight Honors and Eight Shames” established in 2006 by the Chinese government (Camicia & Zhu, 2011). Those most related to social harmony and classroom behavior are “Serve the people; never betray them,” “Be united, help each other; make no gains at other’s expense,” and “Be disciplined and law-abiding; not chaotic and lawless.” Those values are transmitted throughout an explicit national curriculum of moral education that includes everyday lessons, citizenship courses, and school assemblies, as well as in the implicit, or hidden curriculum, such as in posters, bulletin boards, and school radio messages (Camicia & Zhu, 2011). Given greater emphases in Chinese schools on classroom management and moral education with the aim of promoting social harmony, behavior regulation, and respect of teachers, it is likely that Chinese students view school climate more favorably than American students.

Purposes and Hypotheses

In sum, the primary purpose of this study was to compare students’ perceptions of school climate in China and the U.S. Our research was guided by a social–ecological perspective in which an individual’s perceptions of the social environment, and especially social transactions, rather than objective indicators of the social environment are viewed as most important in understanding human motivation, adjustment, and well-being (Bandura, 1986; Bronfenbrenner, 1979; Connell & Wellborn, 1991; Eccles et al., 1993). In light of the research and theory reviewed previously, we hypothesized that students’ perceptions of teacher-student and student-student relationships and of fairness of rules would be more positive in Chinese than in American schools. We also hypothesized that Chinese students would like their schools more
than American students. Because Chinese students are expected to have more favorable perceptions of teacher-student relationships, student-student relationships and fairness of rules, it seems reasonable that they also would like their schools more.

Finally, we predicted that more favorable perceptions of school climate among Chinese students would be found across elementary, middle, and high school levels and across genders. That is, we expected that the cultural differences discussed above would apply at all grade levels and for both boys and girls. In examining students’ perceptions of school climate, we focused on their perceptions toward the whole school rather than the classroom. Although perceptions at both the classroom and school levels are commonly measured in studies of elementary schools, school-level measures of school climate are more appropriate at the middle and high school levels, particularly in American schools (Brand et al., 2003), where students have more than one teacher and class.

A secondary purpose of the study was to establish the factor structure and measurement equivalence of the Modified-Delaware School Climate Survey-Student (M-DSCS-S) across American and Chinese students. This was necessary to achieve the primary purpose of the study, but it also served to provide school psychologists and educators in China and cross-cultural researchers in both the U.S. and China with evidence supporting the psychometric properties of the M-DSCS-S for use in both practice and cross-cultural research.

Method

Participants

The original American sample consisted of 12,262 students enrolled in 85 schools in Grades 3 to 12 in the state of Delaware. These were the same subjects in a study of the validity of the Delaware School Climate Survey-Student (DSCS-S; Bear et al., 2011). The original Chinese sample consisted of 4,542 students enrolled in 22 schools in Grades 3 to 12 in the city of Foshan, Guangdong Province. Foshan is a city with a population of 5.68 million. Schools volunteered to participate upon invitation from either the Delaware or Foshan departments of education, and were promised results of the survey for their participation. Although the ages of students were not obtained, students are of similar ages in both countries (e.g., in both countries children begin first grade at age six).

Among those students, 482 of the American students (3.93% of the sample) and 191 Chinese students (4.2% of the sample) were omitted because responses to one or more demographic items on the survey (i.e., gender and grade; also race in U.S. sample) were either missing or unreadable by the Scantron computerized scoring system used. We also omitted all students in Grades 6 and 9: 1,380 American students (11.25% of the American sample) and 916 Chinese students (21.05% of the sample). Whereas American schools included Grades 3 to 5, 6 to 8, and 9 to 12 for elementary, middle, and high schools, respectively, Chinese schools included Grades 3 to 6, 7 to 9, and 10 to 12, respectively. Thus, to maintain consistency in grades across grade level groupings, and remove a potential confound in the analyses, Grades 6 and 9 were omitted. Upon omitting those students, missing responses to individual items on the survey ranged from 0.9 to 2.2% for American students and 0.3% to 1.1% for Chinese students. The final sample included 10,400 American students and 3,435 Chinese students. Demographic information, including racial composition of the American sample, is presented in Table 1.1

Instrument

Students’ perceptions of school climate were assessed with the M-DSCS-S. The original DSCS-S (Bear et al., 2011) consisted of 23 items and five subscales: Teacher–Student Relations (8 items), Student–Student Relations (4 items), Liking of School (4 items), Fairness of Rules (4 items), and School Safety (3 items). Students responded to the items using a 4-item Likert scale, with 1 = Strongly Disagree, 2 = Disagree, 3 = Agree, and 4 = Strongly Agree. The Teacher–Student Relations subscale assessed students’ perceptions of the quality of adults’ interactions with students in the school,

1 Racial composition of the Chinese sample was not ascertained in the survey; however, Chinese researchers and school officials reported that over 99% of the Chinese students were of Chinese descent.
such as teachers caring about and listening to their students. The Student–Student Relations subscale tapped students’ perceptions of the quality of interactions among students, such as peers showing friendliness, caring, and respect. The Fairness of Rules subscale assessed student perceptions of the fairness of school rules and their consequences. The Liking of School subscale assessed how students generally feel about their school, and the School Safety scale assessed students’ perception of school safety (see Bear et al., 2011 for a review of research and theory supporting those subscales). Confirmatory factor analyses (CFA) of the DSCS-S were conducted on a sample of 11,780 students and 85 schools, including 7,889 students in 58 elementary schools, 2,522 in 17 middle schools, and 1,369 in 10 high schools. Results of the CFA supported both a five-factor model consisting of the five correlated factors listed above and a bifactor model consisting of those five specific factors and a general school climate factor (Bear et al., 2011). The latter model provided the strongest model fit and thus was the model adopted. Measurement invariance for that model was confirmed across elementary, middle, and high school grade levels, gender, and racial/ethnic groups. In support of the survey’s external validity, each of the factors correlated positively with academic achievement, and negatively with suspension/expulsion rates ($r = .59$ to $.81$).

To ensure comparability with the 23-item English version of the DSCS-S, in the current study all items on the Chinese version were first translated from English into Chinese and back again into English by a different translator. During the translation process, the three items of the School Safety factor were excluded because safety and school violence were of little concern in Chinese schools (Jessor et al., 2003). The item “The school’s Code of Conduct is fair” also was excluded because Chinese researchers questioned its equivalence in Chinese schools and whether its meaning would be the same in both countries. Thus, the scale was reduced to 19 items composing four subscales: Teacher–Student Relations (8 items), Student–Student Relations (4 items), Liking of School (4 items), and Fairness of School Rules (3 items).

### Survey Procedures

Teachers were given procedures to administer the survey, which included assuring students of confidentiality (neither names nor identification numbers were used). Likewise, to protect teachers from identification, no method was used in the American Sample to identify classrooms or teachers. In the Chinese sample, classroom numbers were recorded on the survey, but classroom-level data were never analyzed or reported to schools, as was promised by the

<table>
<thead>
<tr>
<th>Grade level</th>
<th>American Sample</th>
<th>Chinese Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(n = 61)</td>
<td>(n = 10)</td>
</tr>
<tr>
<td>Full Sample</td>
<td>7,632 (73.38%)</td>
<td>1,308 (38.08%)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td>3,875 (50.77%)</td>
<td>715 (54.66%)</td>
</tr>
<tr>
<td>Girls</td>
<td>3,757 (49.23%)</td>
<td>593 (45.34%)</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian</td>
<td>3,860 (50.58%)</td>
<td>530 (57.80%)</td>
</tr>
<tr>
<td>African American</td>
<td>2,249 (29.47%)</td>
<td>222 (24.21%)</td>
</tr>
<tr>
<td>Hispanic</td>
<td>796 (10.43%)</td>
<td>62 (6.76%)</td>
</tr>
<tr>
<td>Asian</td>
<td>191 (2.50%)</td>
<td>52 (5.67%)</td>
</tr>
<tr>
<td>Other</td>
<td>536 (7.02%)</td>
<td>51 (5.56%)</td>
</tr>
</tbody>
</table>

Note. For the full sample, percentages represent the percent of students within the American or Chinese sample. For gender and race/ethnicity groups, percentages represent the percent of students within the corresponding grade level.

*a Number of schools at each grade level. There were 85 American schools in total; one had both elementary and middle school levels. There were 22 Chinese schools in total; two had both middle and high school levels.
American (factor structure of the M-DSCS-S across the procedure. First, CFA was conducted to test the factor model, a one-factor model, and a second-four specific factors. Model fit of the hypothesized bifactor model was tested and then compared with three alternative models: a four-factor model, a one-factor model, and a second-order model. The models tested are shown in Figure 1.

Given that chi-square fit statistics ($\chi^2$) are sensitive to sample size and violation of normality assumption, three other commonly used fit indices were used in determining model fit: the comparative fit index (CFI), the root mean square error of approximation (RMSEA), and the standardized root-mean-square residual (SRMR; Hu & Bentler, 1998). CFI was considered acceptable if $\geq .90$ and adequate if $\geq .95$; RMSEA was considered good if $< .06$, and the SRMR was good if $< .08$ (Hu & Bentler, 1998; Kline, 2005). The Satorra–Bentler scaled chi-square difference test statistic ($\Delta \chi^2$) was used to compare nested models (Asparouhov & Muthén, 2010) and the Akaike Information Criterion (AIC) values were used to compare nonnested models.

When the factor structure of the 19-item M-DSCS-S was first tested, the model fit was not achieved across groups. Thus, step-by-step modifications were made to the scale’s factor structure and item structure guided by our theoretical model of school climate and indications of absolute model fit, the factor loadings of the items, and the modification indices. After the factor structure of the M-DSCS-S was confirmed, its reliability was examined by computing internal consistency coefficients among the four subscale scores for the full samples and three grade levels.

In the second step of our three-step procedure, measurement invariance across American and Chinese students was tested in a hierarchical fashion by testing configural invariance, metric invariance, and scalar invariance in the full samples and within each grade level and gender group. Configural invariance examined if the same items were indicators of the same latent factor. In testing for configural invariance, the same parameters in the final four-factor model were estimated. Configural invariance was supported if the fit indices for American and Chinese students were adequate. The fit of configural invariance models also provided the baseline value against which all subsequently specified invariance models were compared (Byrne, 2006). After configural invariance was achieved, metric invariance was tested next, in which equality constraints were placed on factor loadings (Chen, Sousa, & West, 2005). Following the recommendation of Chen (2007), a change in CFI of $< -.010$ supplemented by a change in RMSEA of $< .015$ or a change in SRMR of $< .030$ between metric invariance models and configural invariance models indicated metric invariance.

After metric invariance was found, scalar invariance was tested by constraining the intercepts of the measured variables to be equal across American and Chinese students. When scalar invariance was achieved it indicated that the point of origin for the scale was equal across Chinese and American students, as recommended for making mean comparisons. A change in CFI of $< -.010$ supplemented by a change in RMSEA of $< .015$ or a change in SRMR of $< .010$ between scalar invariance models and metric invariance models indicated scalar invariance (Chen, 2007). When scalar invariance was not found, partial scalar invariance was tested following procedures recommended by Byrne, Shavelson, and Muthen (1989). As noted by those researchers, means can still be compared if partial scalar invariance is found in at least half the items per construct or factor.

In the third step of our procedure, we tested differences in latent means between American and Chinese students in the full sample and across grade level and gender groups. When testing latent mean differences, latent mean values were set to zero in the American groups and researchers. The survey was administered between late February and late April.

**Analysis Procedures**

The statistical analyses followed a three-step procedure. First, CFA was conducted to test the factor structure of the M-DSCS-S across the American ($N = 10,400$) and Chinese ($N = 3,435$) samples and across grade level (i.e., elementary, middle and high school) and gender groups. The full information maximum likelihood (FIML) estimator procedure in Mplus 6.11 (Muthén & Muthén, 1998–2011) was used for estimating parameters with incomplete data. Consistent with an earlier study of the DSCS-S (Bear et al., 2011), we hypothesized that the M-DSCS-S was best represented by a bifactor model with a general school climate factor and three specific factors. Model fit of the hypothesized bifactor model was tested and then compared with three alternative models: a four-factor model, a one-factor model, and a second-order model. The models tested are shown in Figure 1.

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Figure 1. Hypothesized bifactor model and alternative models of school climate.
were freely estimated in the Chinese groups. For groups with full scalar invariance achieved, differences were tested in scalar invariance models. For groups in which only partial scalar invariance was achieved, differences were tested in partial scalar invariance models with equality constraints relaxed on identified noninvariant items. Statistical significance associated with latent mean differences was determined using the z-statistic. Effect sizes and confidence intervals associated with the latent mean differences were estimated according to the guidelines of Hancock (2001).

Because students were nested within schools, the size of the design effect (DEEF) was calculated using HLM 7 prior to conducting the CFA to examine if clustering in the data needed to be taken into account. The size of the DEEF is a function of the intraclass correlation and the average cluster size, with a DEEF greater than 2.0 indicating that clustering needs to be taken into account (Muthén & Satorra, 1995). The DEEF size did not exceed 2.0 for the majority of factors across American and Chinese grade level and gender groups. Exceptions were for American elementary students (i.e., DEEF ranged from 3.61 to 9.30 across the four factors, with a mean of 6.75) and for Chinese high school students on the Lik-ing of School factor (DEEF = 2.33).

After testing the factor structure and model fit of the final model, the analyses were repeated using student data centered to the means of school climate scores in their specific schools. This was done to further explore whether the variations of school climate scores at the student-only level and student-school-combined level were presented by a similar factor structure. The results showed no appreciable differences in factor structures, factor loadings, and model fit statistics. Factor loadings ranged from .00 to .08 for the American sample and -.03 to .11 for the Chinese sample. Thus, based on the above considerations and the small number of Chinese schools, middle schools, and high schools, the multilevel structure of the data was not modeled.

Results

Factor Structure and Reliability of the M-DSCS-S

Factor structure. When CFA was conducted to test the hypothesized bifactor model based on the 19-item M-DSCS-S, the model failed to converge. Thus, the proposed three alternative models (a four-factor model, a second-order model, and a one-factor model) were tested in full American and Chinese samples and across groups. The absolute model fit statistics indicated that the model fit for the four-factor and second-order models were acceptable or adequate for all groups, except for Chinese students in elementary schools. However, the model fit for the one-factor model was consistently poor. Based on each model’s absolute fit statistics, item factor loadings, and model fit indices, modifications were made to the hypothesized bifactor model and the alternative three models simultaneously. The modifications included deleting two items from the model (i.e., “Rules are too harsh” and “Teachers treat students with respect”) and moving one item (i.e., “Teachers are fair when correcting misbehavior”) from Teacher-Student Relations to Fairness of School Rules. When CFA was conducted on the modified 17-item M-DSCS-S, acceptable to adequate model fit was achieved in the four-factor model across all American and Chinese groups.

Upon making the above modifications and conducting CFA on the 17-item scale, the hypothesized bifactor model still failed to converge. Thus, the proposed alternative models were tested in the full American and Chinese samples and across groups. The comparison between the four-factor model and the nested one-factor model indicated that the four-factor model provided a better fit for both the American sample: $\Delta S-B_{\chi}^2 = 14,539.00$ ($\Delta df = 2$), $p < .001$, and the Chinese sample: $\Delta S-B_{\chi}^2 = 910.22$ ($\Delta df = 2$), $p < .001$. The comparison between the four-factor model and the nested second-order model indicated that the four-factor model provided a better fit for the American sample, $\Delta S-B_{\chi}^2 = 181.20$ ($\Delta df = 2$), $p < .001$, and that the model fit was not significantly different for the Chinese sample, $\Delta S-B_{\chi}^2 = 3.53$ ($\Delta df = 2$), $p > .05$. Similar results were obtained when the four-factor and the nested second-order models were compared using randomly split-half samples. Considering the appropriate model fit of the four-factor model across all groups and its better fit than other
alternative models, it was selected as the final model. As shown in Table 2, the 17 items had similar factor loadings on the four factors across American and Chinese samples.

**Reliability**

Internal consistency coefficients ranged from .66 (Fairness of School Rules) to .85 (Teacher–Student Relations) in the full American sample and from .68 (Fairness of School Rules) to .81 (Teacher–Student Relations) in the full Chinese sample. Among 24 reliability analyses computed for separate groups (2 countries × 3 grade levels × 4 subscales), the mean alpha coefficient was .73, with coefficients ranging from .55 (Liking of School for Chinese elementary school students) to .83 (Teacher–Student Relations for Chinese middle school students).

**Measurement Equivalence**

Configural invariance was achieved between the American and Chinese full samples, $\chi^2 = 2,175.35$ ($df = 226$), $p < .001$, CFI = .969, SRMR = .029, and RMSEA = .035. For metric invariance, differences of measurement invariance test statistics between the metric invariance and configural invariance models supported metric invariance across the American and Chinese full samples, $\Delta S - B \chi^2 = 949.71$ ($\Delta df = 13$), $p < .001$, $\Delta$CFI = -.012, $\Delta$SRMR = .004, and $\Delta$RMSEA = .004. When equality constraints were relaxed on item 1.3, differences of measurement invariance test statistics between the partial scalar invariance and metric invariance model indicated that partial scalar invariance was not achieved across the American and Chinese full samples, $\Delta S - B \chi^2 = 405.21$ ($\Delta df = 12$), $p < .001$, $\Delta$CFI = -.005, $\Delta$SRMR = .003, and $\Delta$RMSEA = .002.

Similar measurement invariance tests between American and Chinese students were conducted within each grade level and gender.

Table 2

<table>
<thead>
<tr>
<th>Items</th>
<th>American (N = 10,400)</th>
<th>Chinese (N = 3,435)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Loading</td>
<td>SE</td>
</tr>
<tr>
<td>Factor 1: Teacher–Student Relations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.1 “Teachers care about their students”</td>
<td>.75</td>
<td>.01</td>
</tr>
<tr>
<td>1.2 “I like my teachers”</td>
<td>.69</td>
<td>.01</td>
</tr>
<tr>
<td>1.3 “Adults who work in this school care about the students”</td>
<td>.74</td>
<td>.01</td>
</tr>
<tr>
<td>1.4 “Teachers listen to you when you have a problem”</td>
<td>.73</td>
<td>.01</td>
</tr>
<tr>
<td>1.5 “Teachers let you know when you are doing a good job”</td>
<td>.56</td>
<td>.01</td>
</tr>
<tr>
<td>1.6 “Adults in this school treat students fairly”</td>
<td>.74</td>
<td>.01</td>
</tr>
<tr>
<td>Factor 2: Student–Student Relations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.1 “Students get along with one another”</td>
<td>.67</td>
<td>.01</td>
</tr>
<tr>
<td>2.2 “Students are friendly toward most other students”</td>
<td>.67</td>
<td>.01</td>
</tr>
<tr>
<td>2.3 “Students really care about each other”</td>
<td>.77</td>
<td>.01</td>
</tr>
<tr>
<td>2.4 “Students treat each other with respect”</td>
<td>.77</td>
<td>.01</td>
</tr>
<tr>
<td>Factor 3: Liking of School</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.1 “I wish I went to another school”</td>
<td>.69</td>
<td>.01</td>
</tr>
<tr>
<td>3.2 “I like this school”</td>
<td>.85</td>
<td>.01</td>
</tr>
<tr>
<td>3.3 “I am proud of my school”</td>
<td>.82</td>
<td>.01</td>
</tr>
<tr>
<td>3.4 “School feels like a prison”</td>
<td>.60</td>
<td>.01</td>
</tr>
<tr>
<td>Factor 4: Fairness of School Rules</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.1 “The school rules are fair”</td>
<td>.70</td>
<td>.01</td>
</tr>
<tr>
<td>4.2 “Consequences for breaking school rules are fair”</td>
<td>.47</td>
<td>.01</td>
</tr>
<tr>
<td>4.3 “Teachers are fair when correcting misbehavior”</td>
<td>.70</td>
<td>.01</td>
</tr>
</tbody>
</table>

**Note.** Loading = standardized factor loading; SE = standard error; $z$ = robust $z$ score.
Configural and metric invariance were achieved in each of those groups. Scalar invariance was achieved for boys and for high school students, but not for elementary and middle school students and not for girls. However, partial scalar invariance was achieved for elementary school students (with equality constraints relaxed on item 1.3), middle school students (with equality constraints relaxed on two items 1.3 and 3.3) and girls (with equality constraints relaxed on item 1.3). In all groups with equality constraints relaxed, partial scalar invariance was found in more than half of the items per factor. This justified comparing latent means across countries at the elementary and middle school levels and among girls despite the lack of scalar invariance.

Mean Differences

Results of observed means and latent mean differences for the full samples and across grade levels, including the associated effect sizes and confidence intervals, are presented in Table 3. For the full sample, the latent mean differences on all four factor scores were statistically significant, with Chinese students scoring higher. Effect sizes ranged from .12 for Teacher–Student Relations to .98 for Student–Student Relations. Across grade levels, effect sizes ranged from .30 (Teacher–Student Relations among elementary school students) to 1.81 (Fairness of School Rules among middle school students). Effect sizes tended to be smallest in elementary school and largest in middle school.

Differences in latent means also were tested across gender groups, comparing scores for boys and girls in the U.S. with those in China. Effect sizes were of similar magnitude across genders: For Teacher–Students Relations, Student–Student Relations, Liking of School, and Fairness of School Rules, effect sizes were .08, .92, .35, .77.

Table 3

<table>
<thead>
<tr>
<th>Latent means and differences</th>
<th>Observed means</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>American</td>
</tr>
<tr>
<td>Estimates</td>
<td>$M_{\text{Chinese}} - M_{\text{American}}$</td>
</tr>
<tr>
<td>Elementary School</td>
<td></td>
</tr>
<tr>
<td>Teacher–Student Relations</td>
<td>0.13</td>
</tr>
<tr>
<td>Student–Student Relations</td>
<td>0.59</td>
</tr>
<tr>
<td>Liking of School</td>
<td>0.40</td>
</tr>
<tr>
<td>Fairness of School Rules</td>
<td>0.37</td>
</tr>
<tr>
<td>Middle School</td>
<td></td>
</tr>
<tr>
<td>Teacher–Student Relations</td>
<td>0.63</td>
</tr>
<tr>
<td>Student–Student Relations</td>
<td>0.91</td>
</tr>
<tr>
<td>Liking of School</td>
<td>0.70</td>
</tr>
<tr>
<td>Fairness of School Rules</td>
<td>0.80</td>
</tr>
<tr>
<td>High School</td>
<td></td>
</tr>
<tr>
<td>Teacher–Student Relations</td>
<td>0.35</td>
</tr>
<tr>
<td>Student–Student Relations</td>
<td>0.62</td>
</tr>
<tr>
<td>Liking of School</td>
<td>0.27</td>
</tr>
<tr>
<td>Fairness of School Rules</td>
<td>0.55</td>
</tr>
<tr>
<td>Full Sample</td>
<td></td>
</tr>
<tr>
<td>Teacher–Student Relations</td>
<td>0.07</td>
</tr>
<tr>
<td>Student–Student Relations</td>
<td>0.56</td>
</tr>
<tr>
<td>Liking of School</td>
<td>0.19</td>
</tr>
<tr>
<td>Fairness of School Rules</td>
<td>0.30</td>
</tr>
</tbody>
</table>

Note. $d$ = effect size associated with the latent mean difference; positive $d$ values indicated that Chinese students had higher scores.

*p < .001.
and .63, respectively for boys, and .07, 1.04, .23, and .49, respectively, for girls.²

**Discussion**

The primary purpose of this study was to compare students’ perceptions of school climate in China and the U.S. A secondary purpose was to provide evidence of the factor structure and measurement equivalence of the M-DSCS-S in support of its use among schools psychologists, educators, and researchers in assessing school climate in China and conducting cross-cultural studies between China and the U.S. Results of the study are discussed in the context of those two purposes, followed by limitations of the study and suggested future directions for researchers.

**More Favorable Perceptions of School Climate Among Chinese Students**

As predicted, more favorable perceptions of school climate were found among Chinese than American students. Latent mean differences were statistically significant for all subscale scores across grade levels and gender. Thus, results replicate the findings of Jia et al. (2009) and extend them beyond the seventh grade population they studied. Results also extend Jia et al.’s findings beyond teacher-student and student-student relations to two additional aspects of school climate—liking of school and fairness of rules. Compared to American students, Chinese students liked their schools more and perceived classroom and school rules to be fairer. We found no appreciable differences across countries as a function of gender. That is, across all subscales both boys and girls in China scored significantly higher than boys and girls in the U.S., with effect sizes being of similar magnitude for both genders.

In general, effect sizes were smallest in elementary school and much larger thereafter. For example, in elementary school the effect sizes for differences in latent means were .30, .99, .60, and .77 for Teacher–Student Relationships, Student–Student Relationships, Liking of School, and Fairness of Rules, respectively. For middle school, the effect sizes for those same factors, respectively, were 1.16, 1.79, 1.20, and 1.81, and for high school they were .77, 1.56, .47, and 1.17, respectively. Thus, all effect sizes were nearly twice as large, or greater, in middle school compared to elementary school.

As presented previously in the introduction, three general cultural factors are likely to account for more favorable perceptions of school climate among Chinese than American students: (a) Chinese students’ views of education and teachers; (b) social harmony and behavior regulation; and (c) classroom management and socialization. Our findings suggest that whereas those factors may explain more favorable perceptions of school climate among Chinese students, their effects may be greatest after elementary school.

Declines in students’ perceptions of school climate in middle school are commonly cited in the American literature (e.g., Roeser, Eccles, & Sameroff, 2000; Way et al., 2007). In a recent longitudinal study of American students in Grades 6 to 8, Wang and Dishion (2011) found that students’ perceptions of teacher support, peer support, and behavior management declined through the middle school years, and those declines were associated with increases in students’ behavior problems. A decline in students’ perceptions of school climate in middle school is consistent with theory and research on a similar decline in student motivation, which is commonly attributed to a systemic change in school environments from elementary to middle school (Eccles et al., 1993). Those changes include less task structure, increased social control and social comparisons, greater academic standards and expectations, and teacher-student and student-student relations of less quality (Eccles et al., 1993). It is likely that the greater emphases in Chinese culture on the commitment to academic excellence, respect of teachers, social harmony, self- and peer-regulation of behavior, and differences in teachers’ classroom management practices lessen the decline from elementary to middle school in students’ perceptions of school climate in China. Any one of those factors, and most likely a combination thereof, may account for the substantial differences in effect sizes between countries in middle school. That is, although those factors influence students of all ages in China, they may be more salient and influential after elementary school, particularly relative to the presence or absence of similar factors in the U.S.

Likewise, it is likely that differences in structure and support, in general, between elementary
and middle schools in China are not as great as those in the U.S. For example, one might speculate that whereas teacher-student relations and respect for teachers are similar across countries in elementary school, after elementary school the quality of teacher-student relations and the degree of respect for teachers decrease more greatly in the U.S. than in China. An additional and related factor, which we observed qualitatively while visiting Chinese schools, also may contribute to differences in students’ perceptions of school climate. That is, instead of changing classes throughout the day, as is common in American schools, students in Chinese middle and high schools remained together in the same class, with subject-area teachers rotating from class to class. And, as observed Jia et al. (2009), many Chinese students had the same teachers more than one year. With students remaining together in Chinese middle schools, as found in elementary schools in both countries, there are greater opportunities for teacher-student and student-student bonding, and perhaps stronger norms and peer pressure promoting social harmony. It should be noted, however, that whereas such norms help promote social harmony and academic achievement and prevent behavior problems, a downside to such emphases is the potential suffering (e.g., peer rejection, shame, depression) experienced by those who fail to conform and who exhibit behavior inconsistent with such norms (Chen et al., 2010; Chen & French, 2008).

Factor Structure and Measurement
Equivalence of the M-DSCS-S

Consistent with the secondary purposes of this study, results support a four-factor structure for the M-DSCS-S. In a previous study of the survey (Bear et al., 2011), using the same American sample included in the current study (with the exception of the deletion of 6th and 9th graders), both a five-factor model and a bifactor model consisting of a general factor and five specific factors were found to have adequate model fit indices. Those fit indices were better, however, for the adopted bifactor model. In the current study, the hypothesized bifactor model was not supported and the four-factor model was adopted over the alternative second-order model and one-factor model. Although we recognize that a higher-order model is more consistent with the school climate theory we proposed, our choice of the final model was based on the methodological consideration that the higher-order model is more sophisticated than the four-factor model in terms of its factor structure. As such, in a higher-order model it is difficult to achieve measurement invariance across cultures. This is because in the higher-order model the general factor, which is the building block for the underlying specific factors, requires that all items on the scale have measurement invariance. The four-factor model does not have this requirement. Thus, the fact that we chose the four-four model as the final model representing the factor structure of M-DSCS-S does not mean that a higher-order factor of general school climate does not exist, but that it simply did not fit for the current study.

For the adopted four-factor model, testing of measurement invariance supported full scalar invariance for high school students and for boys and supported partial invariance for the full sample, elementary and middle school students, and girls. Finding partial rather than full invariance is a recognized limitation of the study that somewhat compromises our findings. Nevertheless, results of the current study, particularly in combination with previous findings of the scale’s external validity (Bear et al., 2011), support the use of the DSCS-S as modified in this study. However, further research is needed to establish the instrument’s construct validity and to ensure that the same construct is measured across different groups. As noted by Chen (2007), measurement equivalence is necessary but not sufficient for that purpose. Studies are needed of its concurrent validity (e.g., examining its correlation with other psychometrically sound measures of school climate) and of its convergent and discriminant validity (e.g., studies using a multimethod–multitrait approach to measuring school climate and theoretically related variables).

Use of the M-DSCS-S should not be limited to cross-cultural research. It also should include use by school psychologists and educators in China interested in assessing not only school climate per se but also the impact of programs, such as bullying prevention programs, which target school climate. To be sure, multiple cultural factors beyond those tapped by the M-DSCS-S influence school climate. Nevertheless, the findings provide some guidance to school
psychologists and educators as to what should be the primary focus of those interventions and included on a measure of school climate. That is, consistent with a wealth of research in the areas of school climate and school discipline, as reviewed earlier, demonstrating the importance of positive teacher-student and student-student relationships, especially when combined with clear expectations and fair rules (see Bear et al., 2011), the findings suggest that such emphases, as found in Chinese schools, are likely to help deter behavior problems and promote academic achievement.

Limitations and Future Directions

Our findings should be viewed in the context of the study’s limitations. As discussed below, some limitations and suggested future directions are specific to the M-DSCS-S and cross-cultural measurement whereas others are more general.

Limitations of the M-DSCS-S. The M-DSCS-S is a self-report measure, and limitations inherent to self-report measures apply, such as informant bias. It is unknown if social desirability influenced the results, contributing to more favorable responses among Chinese students who may have been more inclined to report a collective and positive view of their school. Research using direct observational measures is needed to address this limitation. A second limitation of the M-DSCS-S is the limited numbers of items, which restricts reliability and the extent to which each aspect of school climate is measured adequately. Although coefficients of internal consistency were generally adequate, coefficients were poor for several subscales in subgroups. Related to its brevity, the survey does not measure, nor was it intended to measure, all dimensions of school climate recognized by researchers, such as physical environment, academic engagement, and student autonomy.

Another limitation of the survey is that the subscales and its items were originally developed and standardized on American students and based on American research and theory on school climate. Thus, it is likely that the M-DSCS-S fails to capture aspects of school climate that may be more specific to Chinese culture. Our decision not to include the Safety subscale of the DSCS-S clearly reflected cultural differences that were discarded. It also is unknown to what extent, if any, the removal of two additional items due to inadequate loadings and model fit (“Teachers treat students with respect.” and “Rules are too harsh.”) resulted in discarding important cultural differences. Although the use of a scale developed in the U.S. is a recognized limitation of the study, this limitation is not unique to the M-DSCS-S. The use of American instruments or those based on American theories of school climate is common in studies of school climate in China, whether conducted by researchers in the U.S. and China (e.g., Jia et al., 2009) or researchers in China (e.g., Ge & Yu, 2006; Liu & Lu, 2011). We found only one study, which was published in Chinese, in which the measure of school climate was not an adaptation of an American scale. That scale, the Secondary School Ethos Survey (Fan & Huang, 2005) includes 13 subscales. Most of the subscales are similar to those found on many American measures of school climate (e.g., including teacher-student relationships, rules/expectations, academic learning, and autonomy), but several are not (e.g., collective life, service climate, and self-confidence and self). The scale also differs from most American scales in what it does not measure, including school safety and physical environment. The extent to which the inclusion and exclusion of those subscales reflect cultural differences is unclear. Nevertheless, the differences between the Chinese scale and most American scales suggest that the construct of school climate may not be completely the same in both countries.

Additional limitations of the study. Given that the schools were located in one state in the U.S. and in one city in South China, generalization of the findings to other schools is limited. Also, the small number of Chinese schools and the inability to code classrooms in the American sample precluded systematic testing of multilevel factor structures of the M-DSCS-S. Although our testing of models with group mean centering did not reveal major differences in factor structures, factor loadings, and model fit indices, more systematic multilevel analyses would have been preferable. Likewise, multilevel analyses of differences in school climate scores would have allowed us to have examined the variance accounted for at the
classroom and school levels, instead of only the individual level. Research shows that whereas the greatest amount of variance in school climate scores is explained at the individual student level, the construct of school climate also occurs at the classroom and schools levels (Griffith, 1999; Koth et al., 2008). Using multilevel analyses, future studies should examine if the magnitude of individual, classroom, and school level effects not only differ between China and the U.S. but also whether they are moderated by grade level (e.g., whether classroom level effects are greater and school-level effects are smaller in China).

Another limitation of the study, related to the sample, was the imbalance in sample size, with a much larger number of American than Chinese students. An imbalance in sample size lowers the power for detecting measurement invariance (Chen, 2007). With a larger and more balanced sample, the bifactor model might have emerged.

Perhaps another limitation of the study was that we did not examine differences in perceptions of school climate between groups within countries, including grade level and gender differences. Research in the U.S. has consistently found grade level differences (e.g., Vieno, Perkins, Smith, & Santinello, 2005), although gender differences have not always been found. Some studies of American students have reported girls to hold more favorable perceptions than boys (Ding, Li, Li, & Kulm, 2010; Furlong et al., 2005; Koth et al., 2008; Wang & Dishion, 2011; Way et al., 2007), whereas other studies have not (e.g., Brand et al., 2003; Kuperminc, Leadbeater, & Blatt, 2001). When differences have been found, they tended to be slight. Among Chinese students, Jia et al. (2009) found no gender differences in school climate, and Wei and Chen (2010) did not find gender differences in students’ attachment to school. Although of potential research value, within-country differences in grade level and gender were not a focus of the current study. Examining those differences would have required establishing measurement equivalence within each of the subgroups compared (e.g., Chinese boys in elementary school, Chinese girls in high school, etc.), which was beyond the scope of the study.

Conclusion

Results show that students in China view school climate more favorably than students in the U.S. Perhaps more importantly, those differences tended to be greatest after elementary school. Various cultural factors, as discussed in this article, are likely to account for the differences in students’ perceptions. Future studies, especially longitudinal studies, are needed to examine if students’ perceptions of school climate decline less with age and grade level in China than the U.S., if differences in declines are associated with similar changes in student behavior in both countries, and what cultural differences over time might influence relationships between school climate and various aspects of student behavior and wellbeing.

References


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