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## Cross-national measurement of school learning environments: Creating indicators for evaluating UNICEF's Child Friendly Schools Initiative

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### Abstract

The present study examines the psychometric properties of a student-reported measure of school quality, the CFS Conditions for Learning Survey, to examine its utility as a cross-national comparative measure to evaluate UNICEF's Child Friendly Schools initiative. Factor analyses conducted on data from fifth- and sixth- grade students in 68 schools across the Philippines, Nicaragua, and South Africa revealed a core set of items that loaded highly onto each of the three dimensions of the CFS Conditions for Learning survey across all three countries. Formal tests established measurement invariance for a subset of these items, indicating that they were free from methodological bias across countries. However, meaningful differences in the country-specific structure and substantive interpretation of school quality were also detected. The results suggest that items in the CFS Conditions for Learning survey can be used to create both reliable cross-national and country-specific indicators of school quality and provide a blueprint for future psychometric work in the field of comparative child and family policy.

### Keywords

Child Friendly Schools; comparative policy; international education policy; international policy evaluation; factor analysis; measurement; measurement invariance; school climate; school quality

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Although often overlooked in cross-national studies of child and family policy, schooling is an increasingly important aspect of national policy for comparative research on the development of the world's children. Schooling is one of the most common ways that societies prepare their children for the future and, as evidenced in international declarations and agreements such as UNESCO's Education for All and United Nation's Millennium Development Goals 2 and 3, it is widely recognized as a primary mechanism for the

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economic and social development of nations. Indeed, recent estimates indicate that more than a billion children worldwide are in primary or secondary school on any given day (UNICEF, 2009a). The vast majority of these children are in low- and middle-income countries, which spend an average of about 4% of their gross domestic product on public education each year.

In the past decade, countries have made significant progress towards fulfilling the objectives of Education for All and the Millennium Development Goals. While the world child population has stayed stable between 2002 and 2006, recent data estimates that the number of children not enrolled in school has dropped from 94 million to 75 million (UNICEF, 2009a). However, many children who are enrolled in school are unable to attend regularly and/or drop out of school. In 2002, an estimated 115 million primary school-age children were not attending school (UNESCO-UIS & UNICEF, 2005); this number dropped to around 101 million in 2006 (UNICEF, 2009g). In many low- and middle-income countries, poor educational quality combined with threats to active participation in learning such as child labor, HIV/AIDS, civil conflict, natural disasters and deepening poverty threaten gains in school enrollment, attendance and completion rates (UNICEF, 2009a). Because of these factors, current educational efforts must focus not only on getting children into school, but on improving students' attendance, learning and long-term outcomes once they are enrolled. A growing body of research suggests that improving the quality of the learning environment can improve attendance and learning, decrease the likelihood of dropping out of school, and reduce antisocial and unhealthy behaviors, fostering the development of the whole child and providing greater opportunities for life-long success (e.g., Battistich & Horn, 1997; Christenson & Thurlow, 2004; Greenberg, Skidmore & Rhodes, 2004; Hamre & Pianta, 2005; Osher, Dwyer & Jimerson, 2004; Osher et al, 2007; Osher & Kendziora, 2010; Osterman, 2000; Slap, Lot, Huang, Daniyam, Zink & Succop, 2003; Teddlie & Reynolds, 2000; UNICEF, 2009a; Wentzel & Wigfield, 1998). Thus, school quality is of central interest to policymakers and practitioners concerned with the educational and developmental outcomes of children in their nation.

Using data from a recent global evaluation of the Child Friendly Schools (CFS) framework, UNICEF's flagship school quality initiative, the current study evaluates the psychometric properties of multi-item scales of student perceptions of school quality across three low- and middle-income countries – the Philippines, Nicaragua and South Africa. The goals of the study are two-fold. First, we aim to inform future research and evaluation efforts of this important multi-national initiative by determining whether a common core structure of students' perceptions of school quality can be identified across countries or whether no common structure exists and country-specific structures are necessary (e.g., Hughes, Seidman & Williams, 1993; Gregorich, 2006; Marsh, 1993). Second, we seek to highlight the relevance of this type of psychometric work for improving the ability of comparative child and family policy analysis to identify better ways of meeting the needs of children and families throughout the world and provide a roadmap for scholars to undertake these endeavors in other studies of comparative child and family policy.

## **UNICEF's Child Friendly Schools (CFS) Framework**

In 1999, the education section of UNICEF's Programme Office launched the Child Friendly Schools (CFS) framework to respond to the global need for improvements in quality schooling. While efforts were originally concentrated in UNICEF's Asian and Pacific Island region, as of 2009, UNICEF promoted the CFS framework at all its global and regional levels, and currently supports the implementation of CFS in about 95 countries worldwide (UNICEF, 2009f).

The CFS framework is driven by a child-rights philosophy that views the role of schools as promoting the development of the whole child. The framework was grounded in a number of international human rights instruments and declarations, particularly the 1990 Convention on the Rights of the Child and the Declaration for Education for All. In addition, it was informed by the World Health Organizations' emphasis on connectedness, caring and access to support; UNICEF's interest in child-, family-, and community-centered approaches to school improvement; and research on school effectiveness emphasizing the important role school factors play in the development of children, particularly those from disadvantaged backgrounds (UNICEF, 2009f).

Based in these perspectives, three key inter-related principles form the core of the CFS framework: child-centeredness, democratic participation and inclusiveness (UNICEF, 2009f). The principle of *child-centeredness* means that safe-guarding the interest of the child should be central to all decision-making in education. It translates to school features such as a child-centered pedagogy in which children are active participants and a healthy, safe and protective learning environment provided through appropriate school architecture, services, policies and action. The principle of *democratic participation* maintains that as rights holders, children and those who facilitate their rights should have a say in the form and substance of their education. This principle is represented in schools with policies and services that support fairness, non-discrimination and participation, where there are strong links between home, school and community, and in which children, families and communities are active participants in schools and school decision-making. Finally, the principle of *inclusiveness* holds that all children have a right to education and that access to education is not a privilege that society grants to some children, but a duty it fulfills to all. Inclusive schools have policies that encourage attendance and retention, are girl-friendly, gender sensitive and open to children with disabilities and are child-seeking, inclusive and welcoming for students of all backgrounds. Thus, the CFS model embraces a multidimensional approach, intending to “move schools and education systems progressively towards quality standards by addressing all elements that influence the wellbeing and rights of the child as a learner and the main beneficiary of teaching” (pg 2, UNICEF, 2009a). These quality standards are expected to improve school access, retention and completion and provide an educational experience in which students can achieve their full potential.

Rather than supporting CFS on a local or ad-hoc basis, UNICEF seeks to promote change across the entire sector, advocating that countries adopt the framework as a comprehensive quality model in their national education plans and priorities (UNICEF, 2009a). An important hallmark of UNICEF's approach is that it envisions and promotes these principles as pragmatic “pathways towards quality in education” rather than a rigid blueprint or set of abstract concepts (UNICEF, 2009a). UNICEF recognizes that CFS models are grounded in local realities that limit the ability to design and implement ideal solutions and actively works with government and civil society to negotiate priorities and make trade-offs based on the specific needs, resources and capacities of each country.

## Global Evaluation of the CFS Framework

While a number of country- and region-specific evaluations of CFS have been conducted across a range of geographic areas, the first and only comparative global evaluation of the initiative was not launched until the late 2000s. In January of 2008, UNICEF contracted with the American Institutes for Research (AIR) to conduct a global evaluation of the CFS initiative consisting of site visits to child friendly schools in six countries, a Delphi survey of UNICEF staff in the 95 countries implementing CFS and a secondary review of the literature. The global evaluation was intended as a baseline evaluation to systematically

describe how the key principles of CFS are understood and implemented in multiple contexts, provide data on the extent to which UNICEF's objectives for schools are being realized within and across countries, create tools to monitor future progress, and identify challenges to implementation (UNICEF, 2009f).

Recognizing that schools are situated in a broader regional and national context, the evaluation focused on six countries from four of UNICEF's global regions: the Philippines and Thailand (East Asia and the Pacific Region); Guyana and Nicaragua (Latin America and the Caribbean); South Africa (East and Southern Africa) and Nigeria (West and Central Africa). These countries were chosen to represent a variety of conditions under which CFS is typically implemented, including variation in local and national policies, levels of effort from regional and national UNICEF offices, support from government and civil society, as well as economic resources, demographic profiles and political situations. In addition, countries varied in their implementation and evaluation conditions. Of the six countries, the Philippines and Thailand have the most established, far-reaching and successful CFS programming, in part because they are located by a UNICEF Regional Office that has been very active in promoting and supporting the initiative. South Africa, on the other hand, has only recently begun receiving support for the CFS initiative and thus is very 'new' to the model (UNICEF, 2009f). In addition, at the request of UNICEF South Africa, the most disadvantaged and needy schools implementing CFS were targeted for evaluation.

Twenty to twenty-seven child friendly schools in two-four regions within each country were visited and evaluated using mixed-methods techniques including surveys, focus groups and interviews with students, parents, teachers and school heads as well as structured observations of schools and randomly selected classrooms. Hierarchical linear modeling (HLM) techniques were used to begin to unpack the relationship between CFS programming components. Teacher, parent and school head surveys and structured school and classroom observations were used as indicators of implementation of CFS principles and were hypothesized to relate to student perceptions (assessed via student surveys) of school quality – specifically (1) how much they feel listened to, cared about, and helped by teachers and other adults in the school, (2) how strongly they feel what they are learning is interesting and how much they perceive teachers and other adults in the school to support their academic success and active engagement in the learning process, and (3) how much they perceive the school to be inclusive and respectful as well as physically and emotionally safe. Results of these analyses indicated that family and community participation in schools and the use of child-centered pedagogy were consistently positively related to student perceptions of support and safety. For more information regarding the findings of the global evaluation, please see UNICEF (2009f).

## The current study

The global evaluation was quite successful in providing important information about how the key principles of CFS are understood and implemented in multiple contexts, which were two of its primary goals. However, a lack of financial and temporal resources prevented the evaluation from being as effective as it could have been in reaching its other two goals of providing data on the extent to which UNICEF's objectives are being realized within and across countries and creating tools to monitor future progress.

In particular, the evaluation relied heavily on multi-item scales from parent, teacher and student surveys to assess both the implementation of CFS principles and the degree to which those school features translated to student perceptions of school quality. While initial psychometric analyses were conducted to establish the internal reliability of these scales, advanced methodological techniques such as structural equation modeling allow for a more

precise evaluation of the underlying structure, face validity and internal reliability of these scales. These techniques have three distinct advantages when it comes to meeting the goals of the evaluation. First, they offer more comprehensive information regarding the psychometric properties of items, providing additional empirical support for the reliability and validity of hypothesized scales. Second, they provide detailed information about the relative importance of each item for measuring its underlying theoretical construct, allowing for a more nuanced interpretation of these dimensions within each country that takes into account its unique context of CFS implementation. Third, these analyses can be used to formally test whether items measure the same theoretical construct in the same way across countries. These formal tests of measurement invariance are particularly important when multi-item scales are used to compare outcomes across different population groups such as language groups, cultural groups, and countries (e.g., Hughes, Seidman & Williams, 1993; Gregorich, 2006; Marsh, 1993). They establish that cross-country differences in a scale's average level or relationships to other constructs are due to meaningful, substantive differences and not methodological artifacts such as differences in translation, interpretation and response style. These analyses are therefore an essential first step that allows us to compare the extent to which CFS objectives are being realized across countries and create cross-national tools to monitor future progress.

As the primary goal of the global evaluation was to assess CFS implementation within each of the six countries in the evaluation, the surveys used were not necessarily designed with cross-country comparisons in mind. The goal of the current study is to evaluate whether a common core structure of students' perceptions of school quality can be identified across three countries on three continents or whether country-specific structures are necessary to characterize these perceptions. We view this work as a next step in the process of formally validating the psychometric properties of scales measuring the extent to which CFS objectives have been realized within and across countries. We seek to contribute to future evaluation of the CFS framework in two specific ways. First, we employ factor analytic techniques to examine the reliability and validity of the three hypothesized dimensions of student perceptions of school quality within three countries – the Philippines, Nicaragua and South Africa. The results of these techniques are used to examine cross-country similarities and differences in the structure and substantive interpretation of each dimension. Second, we utilize multi-group comparisons to formally statistically compare the factor analytic structure of each dimension across countries and assess the extent to which student perceptions of school quality can be as used as cross-national indicators of CFS implementation. In so doing, we also hope to highlight the relevance of this type of psychometric work for improving the ability of comparative child and family policy analysis to identify better ways of meeting the needs of children and families throughout the world and provide a roadmap for scholars to undertake these endeavors in other studies of comparative child and family policy.

We center our analysis on student perceptions of school quality for three reasons. First, research suggests that students' experiences of connectedness, safety, respect and engagement in school are related to key academic outcomes of interest, including improved attendance, learning and achievement and reduced dropout (e.g., Fredericks, Blumenfeld & Paris, 2004; Goodenow, 1993; Osher & Kendziora, 2010; Osterman, 2000; Wentzel, 1998). Thus, student perceptions of these aspects of school quality represent important proximal predictors of longer term educational and developmental outcomes. Second, one of the hallmarks of the CFS model is the extent to which it envisions and promotes its core principles as pragmatic pathways towards quality in education rather than a rigid blueprint. While this allows for important flexibility in the interpretation and implementation of CFS principles across countries, it complicates cross-national comparisons of specific implementation indicators. Student perceptions of school quality, on the other hand, may

represent a common denominator across a variety of implementation contexts and might be used to monitor and evaluate the realization of child friendly schools across countries (UNICEF, 2009f). Finally, focusing on the student perceptions of school quality is consistent with UNICEF's child-centered approach and representative of the growing trend in cross-national indicators to focus on children's perceptions of their own experiences and wellbeing (Ben-Arieh, 2008). However, we acknowledge that by focusing on the perceptions of students enrolled in school we do not fully address the issue of school accessibility, which is an important goal of the initiative.

Finally, to reduce the analytic complexity of cross-country psychometric analyses, we begin this work by focusing on three of the six countries evaluated in the global report: the Philippines; Nicaragua; and South Africa. These countries were chosen because they are located in three of the four regions covered in the global evaluation (East Asia and the Pacific Rim, Latin America and the Caribbean, and East and Southern Africa, respectively) and represent a range of economic and socio-political contexts. In addition, they vary in the length of time they have implemented CFS, the degree to which CFS is integrated with national education priorities and other initiatives, and the emphasis they place on different aspects of the CFS framework. A detailed description of CFS programming in each country can be found on pages 11–15 of the Global Evaluation Final Report UNICEF (2009f) and in country-specific evaluation reports prepared for each of the six countries in the global evaluation (UNICEF, 2009b; UNICEF 2009c; UNICEF 2009d; UNICEF 2009e; UNICEF 2010a; UNICEF 2010b).

## Method

### Study Design

Site visits to child friendly schools in each country were conducted during two two-week periods in July of 2008. In each country, the evaluation team consisted of two evaluators from AIR's home office with experience conducting field work in developing countries and a local team of six to eight data collectors who were experienced field researchers knowledgeable about the national education system and the communities in which site visits were conducted. In each country, AIR led training and feedback sessions to ensure a common understanding of evaluation procedures and establish consistency across data collectors in the translation, interpretation and ratings of all instruments.

A total of 21–25 child friendly schools were visited in each country. School selection was based on a purposeful sampling strategy designed to ensure representation of child friendly schools within each country along key dimensions such as urbanicity, demographic and religious characteristics and years of CFS implementation. In order to balance the need for school diversity with logistical and cost concerns, schools were sampled from two to four geographic areas within each country. Although this strategy resulted in some geographic clustering, efforts were made to ensure that school selection within these regions would not result in a biased selection of CFS schools in each country (UNICEF, 2009f). In the Philippines, 21 schools were visited across four regions of the country: metro Manila, Camarines Norte, Guimaras and Negros Oriental. In Nicaragua, 25 schools were visited across three provinces of the northern region: in Esteli, Madriz and Nueva Segovia. Finally, in South Africa, 22 schools were visited in three areas in two provinces: Durban and Paulpietersburg in Kwazulu-Natal Province and Port Elizabeth in Eastern Cape Province. In the Philippines and Nicaragua, schools were concentrated in rural areas, reflecting the fact that the CFS framework has been predominantly implemented in those areas. In South Africa, a mix of schools in both urban and rural areas was visited and efforts were made to sample the most disadvantaged and needy schools implementing CFS. A summary of school characteristics by country is presented in Table 1.

## Sample

In the global evaluation, a total of 100 students in grades 5 or higher were targeted to complete the student survey in each school. In schools with more than 100 students in these grades, students were randomly sampled from student and class lists obtained from the school head. Students who answered less than 50% of the survey items were removed from all analyses, resulting in the exclusion of 31 students across all six countries (0.3%). For the remainder of students, missing data on survey items (but not demographic characteristics) were imputed (see UNICEF, 2009f for more details).

Although survey data were collected from students above grade 6, the current study limited the sample to students in grades 5 and 6 for two reasons. First, students in these grades were the most consistently surveyed across countries and represent the majority of responses. Second, by focusing on a more narrow age range, we hold constant some of the variation in cognitive and academic skills that could influence students' responses to survey items. The sample consists of 3,099 students: 1431 from the Philippines; 843 from Nicaragua; and 825 from South Africa. The average number of students sampled per school was 67 in the Philippines, 38 in Nicaragua and 32 in South Africa. Basic demographic characteristics for the current sample are presented in Table 1.

## CFS Conditions for Learning Survey

A version of AIR's Conditions for Learning Survey was used to tap student perceptions of the quality of learning conditions in their school. The Conditions for Learning Survey has been utilized in a variety of studies including previous studies sponsored by UNICEF (e.g., Osher et al. 2008; Spier et al., 2007) and was adapted at a workshop with UNICEF's East Asia and Pacific Region Office and Ministry of Education staff in nine countries. AIR relied on UNICEF country offices for advice on whether instruments would need to be translated into local language(s). Locally-based translators translated student surveys into Spanish in Nicaragua and into Afrikaans, Xhosa and Zulu in South Africa. However, surveys were not translated in the Philippines because English is one of the two official national languages and believed to be easily understood by students. Prior to translation, UNICEF country offices reviewed the instruments to identify any potentially problematic questions or phrases and suggest appropriate adaptations. Few issues were flagged during this process and suggestions for adaptations were minor (UNICEF, 2009f).

The survey was designed to assess three dimensions of student perceptions of the quality of their learning conditions. The first dimension, called "emotionally-supportive climate", consists of 15 items capturing how much students feel listened to, cared about, and helped by teachers and other adults in the school. The second dimension, termed "challenging, student-centered learning environment" is made up of 14 items tapping how strongly students perceive that teachers and other adults in the school support the academic success of all students and encourage the active engagement of students in the learning process and how much students feel that what they are learning is interesting. Finally, the third dimension, "safe, inclusive and respectful climate" consists of 27 items measuring how physically and emotionally safe students feel in school and the extent to which they perceive the school to be inclusive and respectful of all types of students. Among these 27 items, the 18 items tapping perceptions of physical and emotional safety are considered a subscale measuring "physical and emotional safety". Responses to all items were captured on a forced choice four-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). Cronbach's alphas across all countries in the global evaluation were .74 for emotionally-supportive climate, .79 for challenging, student-centered learning environment and .83 for safe, inclusive and respectful climate, providing initial evidence of adequate internal reliability. Prior to analysis, items were reverse coded as needed so that high values

reflect positive levels of each dimension. The full list of items in each dimension is presented in Tables 2 through 4.

### Analytic Plan

A series of exploratory and confirmatory factor analyses was used to explore the factor structure of each dimension of school quality within and across countries. To reduce the possibility of capitalizing on chance, the student sample within each country was randomly split in half; exploratory analyses were performed on one half of the sample and confirmatory analyses were performed on the other half of the sample.

All analyses were conducted using Mplus version 5.2 (Muthen & Muthen, 1998–2007), which enabled us to address two methodological issues inherent in the current data. First, because responses to all items were measured on an ordinal 4-point scale, modeling the indicators as continuous rather than categorical could lead to biased results, particularly for group comparisons (e.g., Bernstein & Teng, 1989; Dolan, 1994; Heck & Thomas, 2009; Hoogland, 1999; Lubke & Muthen, 2004). Second, students were nested within schools, violating the assumption of independence of errors typically made in factor analytic techniques. Mplus enables us to address these issues through the use of the weighted least squares with robust standard errors, mean and variance adjusted (WLSMV) estimator (Muthen & Muthen, 1998–2007, Flora & Curran, 2004). The WLSMV estimator robustly and accurately estimates parameters from categorical indicators and adjusts model parameters to account for nested data.<sup>1</sup>

As recommended by Hu and Bentler (1999), models were evaluated using several indices of fit. A comparative fit index (CFI) and Tucker-Lewis index (TLI) greater than .9 and a root-mean-square-error of approximation (RMSEA) and weighted root mean residual (WRMR) lower than .05 to .10 are commonly used criteria to evaluate adequate model fit, particularly in models with categorical indicators (Kline, 2005; MacCallum & Austin, 2000; Martens, 2005). In addition, the chi-square difference statistic ( $\chi^2$  change) was used to compare nested, or hierarchical, models.<sup>2</sup> Finally, we prioritize the RMSEA, which has received the greatest amount of support from methodological scholars (Hu & Bentler, 1999; MacCallum & Austin, 2000; Martens, 2005) and de-emphasize the WRMR which has received far less support.

## Results

### Measurement Models within Countries

To examine cross-country similarities and differences in the structure and substantive interpretation of each dimension, the first stage of analyses was to determine the best-fitting measurement model for each dimension of the CFS Conditions for Learning survey (emotionally-supportive climate; challenging, student-centered learning environment; and safe, inclusive and respectful climate) in the Philippines, Nicaragua and South Africa. First, we used one half of the randomly-split sample to conduct three exploratory factor analyses within each country examining the structure of items hypothesized to measure each dimension (results available from primary author). Second, we confirmed the factor structure of each dimension within each country using the other random half of the sample.

<sup>1</sup>Mplus also affords the ability to estimate a two-level factor analysis that provides information about the factor structure at both levels of the data (e.g., at the school-level and the student-level). However, due to the computational complexity of these models and the relatively small number of schools in each country, we were unable to reliably estimate these results. Thus, the analyses presented here account for the fact that students are nested within schools, but do not provide a factor structure at the school level.

<sup>2</sup>Because the WLSMV estimator was used to account for nested data and categorical indicators, the chi-square difference test was calculated using the *diff*test command in Mplus (for further details see Muthen & Muthen, 1998–2007)

In these analyses, we used the best performing item from the exploratory analyses to scale each factor in the confirmatory analyses. Using a combination of theory, face validity, factor loadings and model fit statistics, we then systematically removed items from each dimension until the best fitting measurement model for each country was obtained. Factor loadings and fit statistics for the final within-country measurement models for each dimension are presented in Tables 2 through 4.

**Emotionally-supportive climate**—Fifteen items on the CFS Conditions for Learning survey were hypothesized to measure how much students feel listened to, cared about, and helped by teachers and other adults in their school. Across all three countries, the model fit statistics indicated that a one factor measurement model was a good fit for the data. While the solutions revealed core similarities, there were also some differences in the structure of the model across countries. Five items (17, 48, 54, 57 and 62), which focus on students' perceptions of their school work and the amount of support they receive from teachers in their learning, loaded highly onto the factor in each country. An additional four items (11, 22, 58, 60) tapping emotional support, family involvement, opportunities to improve school work and presence of learning materials loaded consistently but less highly onto the factor in each country. Finally, one item (69) did not contribute meaningfully to the factor in any country. In addition, there were a number of items (37, 50, 47, 61, 66) that contributed meaningfully to the measurement model in some countries but not others.

**Challenging, student-centered learning environment**—Fourteen items were hypothesized to capture students' interest in what they learn in school and how strongly they feel teachers and other adults in the school encourage their active engagement in the learning process and the academic success of all students. Model fit statistics indicated that a one factor measurement model was the best fit for the data in all three countries. However, while the best measurement models found in the Philippines and Nicaragua were an adequate fit to the data, the best measurement model in South Africa was a less adequate fit, particularly based on the CFI. Removing additional items from the measurement model in South Africa did not result in any meaningful improvement to fit, and there was no evidence of the need for an additional factor. This suggests that these items may not measure the underlying dimension of challenging, student-centered learning environment as well in South Africa as in the other two countries, at least for students in grades 5 and 6.

As was the case with emotionally-supportive climate, the measurement models for this dimension revealed both similarities and differences in the factor structure across countries. Six items (20, 23, 51, 53, 59 and 67) loaded highly onto the factor in all three countries. These items represent the core aspects of this dimension, tapping into students' interest and effort in their school work, teachers' and adults' encouragement of their active participation in learning, emphasis on the importance of school and confidence in the ability of all students to succeed academically. An additional three items (49, 52, 68) assessing challenging school work, cheating and sharing ideas and opinions in class loaded consistently but less highly onto the factor in each country. Finally, one item (12) tapping feelings of giving up on school did not contribute meaningfully to the factor in any country and there were a number of items (44, 56, 64, 15) that contributed meaningfully to the measurement model in some countries but not others.

**Safe, inclusive and respectful climate**—A total of 27 items on the CFS Conditions for Learning survey were hypothesized to measure the extent to which students perceive the school to be safe, respectful and inclusive of all types of students; a subset of 18 of these items were hypothesized to assess student perceptions of the physical and emotional safety of the school. To explore this hypothesized structure, all 27 items were submitted first to exploratory factor analyses and then to confirmatory factor analyses. Across all three

countries, model fit statistics indicated that a two factor measurement model in which items were specified to load onto only one of the two factors and the factors were allowed to be correlated was an adequate fit for the data (the correlation between the factors was .51 in the Philippines, .44 in Nicaragua, and .89 in South Africa). In addition, in each country, the two factor solution was a significantly better fit than a solution in which all items were specified to load onto only one factor ( $\chi^2_{\text{change}}(1) = 90.77, p < .0001$  in the Philippines,  $\chi^2_{\text{change}}(1) = 87.51, p < .0001$  in Nicaragua, and  $\chi^2_{\text{change}}(1) = 50.20, p < .0001$  in South Africa). In all countries, the interpretation of two factor solution diverged from what was originally hypothesized in the CFS Conditions for Learning survey. The first factor represented perceptions of the school environment as respectful, inclusive and generally safe. The second factor seemed to measure perceptions of harsh treatment from students and teachers in the school.

Again, the results of the measurement model suggest some commonalities and some differences across countries, with more divergence of results for the second factor. A total of 14 items were specified to load onto the first factor of the measurement. Five of these (items 24, 31, 38, 21 and 65) loaded highly onto the first factor across countries; three of these focused on how much schools respect students and families, the fourth tapped how welcoming the school is for families and the fifth assessed feeling safe in school. In addition, two items (55 and 19) tapping fair and nice treatment of students from teachers and other students, loaded moderately well on this factor in each country. Finally, there were two items (33, 43) that loaded highly in some countries but loaded only moderately or not at all in others. In addition, two items (9, 13) measuring the extent to which students help and respect each other loaded at least moderately well onto this factor in the Philippines and Nicaragua, but loaded highly onto the other factor in South Africa.

Thirteen items were specified to load onto the second factor in the measurement model. Only three items (36, 39, and 41) loaded consistently onto the second factor across the three countries. Together, they represent perceptions of harsh treatment from teachers and other students in the school. Only three items (26, 42, and 36) had low loadings or were excluded from measurement models across all countries. The remaining seven items loaded highly onto the second factor in one or more countries, but loaded only moderately or were excluded from the model in the others. Finally, the two factors comprising this dimension were moderately correlated in the Philippines and Nicaragua, but highly correlated in South Africa. This suggests that while a two factor solution was empirically supported in each country, the uniqueness of these factors varies across countries: the two factors share only 19 to 26% of their variance in the Philippines and Nicaragua, but 80% of the variance in South Africa.

### Measurement Invariance across Countries

The second stage of analysis builds on the within-country analyses by formally testing the measurement invariance of items contributing to each dimension of school quality across countries. Establishing the measurement invariance of instruments is especially important in comparative research, as it helps ensure that any differences found across groups can be attributed to substantive factors rather than measurement factors such as translation, cultural appropriateness and response biases (e.g., Hughes, Seidman & Williams, 1993; Gregorich, 2006; Marsh, 1993).

There are five commonly assessed types of measurement invariance; together they form a nested hierarchy representing increasing levels of invariance (e.g., Gregorich, 2006; Meredith & Teresi, 2006; Teresi, 2006; Vandenberg & Lance, 2000). The first two levels, dimensional and configural invariance, establish that the same number of factors and general pattern of item loadings is the same across groups. The third level metric (or pattern)

invariance establishes that the value of each item's loading on the factor is the same across groups. The fourth level of invariance, scalar (or strong factorial) invariance, establishes that the value of the intercept or threshold for each item is equivalent across groups. Finally, the fifth and highest level, strict factorial invariance, establishes that each item's residual variance is the same across groups. Any of these "full" forms of invariance can be relaxed to obtain "partial" invariance by relaxing the invariance constraints for one or more of the items.<sup>3</sup> For continuous indicators, each type of invariance can be evaluated separately. For categorical indicators, however, metric and scalar invariance must be assessed in tandem because the item probability curve is influenced by both parameters and strict factorial invariance cannot be assessed (Muthen & Muthen, 1998–2007; Temme 2006).

Tests of measurement invariance proceeded as follows. First, three multi-group models, one for each dimension of school quality, were estimated to assess the dimensional and configural invariance across countries. Indicators of each dimension included only those items that were found to contribute to that dimension in all three countries in the within-country measurement models and factor loadings and thresholds for each item were allowed to vary across groups.<sup>4</sup> Next, metric and scalar invariance was tested by constraining the factor loadings and thresholds for all items to be equal across countries.<sup>5</sup> Since this constrained model is nested within the unconstrained model testing configural and dimensional invariance, the chi-square difference statistic can be used to compare change in model fit. A significant chi-square difference statistic indicates that metric/scalar invariance cannot be established. If metric/scalar invariance was not found for all items (full invariance), we consulted factor loadings, thresholds and modification indices to determine if invariance could be established by relaxing the equality constraints for some of the items (partial invariance). Fit statistics for these models are presented in Table 5 and factor loadings for the final cross-country measurement model for each dimension are presented in Table 6.

**Emotionally-supportive climate**—Ten common items were found to contribute to the dimension of emotionally-supportive climate in the Philippines, Nicaragua and South Africa. A multi-group model specifying each item as an indicator of one underlying factor but allowing factor loadings and thresholds to vary across groups was a good fit for the data. In addition, all items loaded significantly onto the factor. These results provide initial empirical support that the same construct is being measured in each group (Bollen, 1989; Marsh 1993). However, constraining the factor loadings and thresholds to be equal across groups significantly changed model fit, indicating that metric/scalar invariance for all 10 items could not be established. When the factor loadings and thresholds for four items (11, 48, 60, 62) were allowed to vary across countries, there was no significant change in model fit. Thus, evidence for partial invariance was found. This suggests that, for at least six items (17, 22, 37, 54, 57, 58), the scaling of the factor indicators to the latent factor for this dimension is the same across countries. This finding supports the use of these items in cross-country comparisons of student perceptions of the amount of emotional and instructional support they receive from teachers and other adults at their school.

<sup>3</sup>While further research is needed to more fully understand the properties of partial measurement invariance, most scholars agree that substantive groups comparisons can still be made if at least partial measurement invariance is established (e.g., Byrne, Shavelson & Muthen, 1989; Gregorich, 2006; Steenkamp & Baumgartner, 1998; Teresi, 2006)

<sup>4</sup>Following Muthen and Muthen (1998–2007), models were estimated using delta parameterization and identified by fixing the scale factors to one in each country, the factor means to zero in each country and using the best-performing item across countries to scale the factor in each group.

<sup>5</sup>To identify each model, the highest-loading item across countries was used to scale the factor, scale factors were fixed at one and the factor mean was set to zero in one arbitrarily chosen country (South Africa) (Muthen & Muthen 1998–2007)

**Challenging, student-centered learning environment**—Nine items were found to contribute to the dimension of challenging, student-centered learning environment in all three countries. Fit statistics for a multi-group model specifying each item as an indicator of one underlying factor but allowing factor loadings and thresholds to vary across groups suggested the model was an adequate fit to the data. In addition, all items loaded significantly onto the factor in each country. When the factor loadings and thresholds were constrained to be equal across countries, however, there was a significant change in model fit. Thus, the metric/scalar invariance of all nine items could not be established. We were able to find support for partial invariance when the factor loadings and thresholds for two items (52 and 59) were allowed to vary across countries. This suggests that the remaining seven items (20, 23, 29, 51, 53, 67, 68) measure the underlying factor in the same way and are not biased by cross-country measurement differences in these three countries, supporting their use in substantive cross-country comparisons of student perceptions of their school work and learning environment.

**Safe, inclusive and respectful climate**—A total of 11 items were found to contribute to the measurement of this dimension in each of the three countries, but these were found to assess two distinct aspects of this dimension. Eight items measured general feelings of safety, respect and inclusiveness at school and three items tapped into perceptions of harsh treatment from teachers and students. A two factor multi-group model was estimated in which each item was specified to load onto only one factor and compared to a multi-group model specifying all items to load onto the same factor. The two factor model allowing factor loadings and thresholds to vary across countries was a good fit for the data and a significant improvement over the fit of the one factor model ( $\chi^2_{\text{change}}(3) = 111.34, p < .0001$ ). In addition, all items in the two factor model loaded significantly onto their specified factor. However, constraining the factor loadings and thresholds to be equal across groups resulted in a significant change to model fit, indicating that metric/scalar invariance for the full set of 11 items cannot be established. When the factor loadings and thresholds for three items (38 on the first factor and 36 and 39 on the second factor) were allowed to vary across countries there was no significant change in model fit, providing support for the partial measurement invariance of this dimension across countries. Since two of the three items measuring the second factor are not invariant across countries, these results suggest that only the seven invariant items on the first factor measuring general feelings of safety, respect and inclusiveness (19, 24, 31, 45, 21, 55, 65) are free from response bias across these three countries and can be used for comparative purposes.

## Discussion

Schooling is widely recognized as a primary mechanism for the economic and social development of nations and recent estimates suggest that more than a billion children worldwide are in primary or secondary school on any given day (UNICEF, 2009a). Unfortunately, in many low- and middle-income countries, poor educational quality reduces the effectiveness of schooling, limiting school enrollment, attendance and completion rates and compromising the long term economic and psychosocial wellbeing of children (UNICEF, 2009a). Thus, school quality is of central interest to policymakers and practitioners concerned with the educational and developmental outcomes of children and represents an important, but often overlooked, area of research for scholars interested in comparative child and family policy.

It is within this context that UNICEF launched its CFS initiative to improve school quality worldwide. As the CFS framework was designed to be implemented and adapted across countries with a variety of economic, sociopolitical and cultural circumstances, a primary goal is to create indicators that describe and evaluate how the key principles of CFS are

understood and implemented in multiple contexts, provide data on the extent to which UNICEF's objectives for schools are being realized within and across countries and create tools to monitor future progress (UNICEF, 2009a). In this paper, we build off the global baseline evaluation conducted by AIR to evaluate the UNICEF's CFS initiative (UNICEF, 2009f). Focusing on student perceptions of school quality in the Philippines, Nicaragua, and South Africa, we contribute to current and future evaluations of the CFS initiative and to scholarship in comparative child and family policy by examining whether cross-national indicators of school quality can be created for use as tools to benchmark and compare school quality across nations, or whether school quality is best represented by country-specific measures.

The results from this study suggest that each of the three hypothesized dimensions of student perceptions of school quality - emotionally supportive climate, challenging, student-centered learning environment and safe, inclusive and respectful climate - consist of a core structure of common items that can be used to create reliable cross-national indicators of school quality across the Philippines, Nicaragua and South Africa. For emotionally-supportive climate, measurement models within each country indicated a common set of ten items (11, 17, 22, 37, 48, 54, 57, 58, 60, 62) that loaded moderately to highly onto a single factor representing this dimension in each country. In addition, we were able to establish measurement invariance for six of these items (17, 22, 37, 54, 57, 58), indicating that they are free from differential response bias due to linguistic, cultural or other methodological factors. For challenging, student-centered learning environment, a core set of nine items (20, 23, 49, 51, 52, 53, 59, 67, and 68) were found to load moderately to highly onto a single factor representing this dimension in each country and measurement invariance was found for seven of these items (20, 23, 49, 51, 53, 67, 68). Finally, for safe, inclusive and respectful climate, within-country measurement models revealed a core set of eleven items which loaded moderately to highly onto two correlated factors representing this dimension (Factor 1 - 19, 21, 24, 31, 38, 45, 55, 65; Factor 2 - 36, 39, 41). Seven of the items on the first factor (19, 21, 24, 31, 45, 55, 65) and one item on the second factor exhibited measurement invariance across the three countries.

These results make a number of contributions to future evaluation and monitoring efforts of the CFS initiative and the field of comparative child and policy more generally. First, they provide initial empirical support that a subset of items can be used to create valid and reliable cross-national indicators of student perceptions of school quality. Items that measured each dimension well within countries and exhibited measurement invariance across countries can be used to create scales representing student perceptions of their school's emotionally-supportive climate, challenging, student-centered learning environment and safe, inclusive and respectful climate. These scales advance future comparative research and evaluation efforts in the Philippines, Nicaragua and South Africa by providing indicators of student-reported school quality that are free from differential response bias across countries, allowing for cross-country differences to be attributed to substantive rather than methodological factors. While these findings currently only hold across these three countries, it is noteworthy that a common structure can be found across three politically, regionally and developmentally diverse countries with differing contexts of CFS implementation and evaluation. Therefore, these results suggest the potential for these items to be used to create tools to assess school quality across a wider variety of nations and contexts. Our next step is to extend this analysis to the full set of six countries assessed in the global evaluation and the United States. The completion of this work will both strengthen our conclusions about the factor structure of the CFS Conditions for Learning survey measure as well as increase our confidence in the utility of this measure as a cross-national comparative tool.

Second, these results provide additional insight into the substantive interpretation of the core features of each dimension of student-reported school quality across countries. While the common set of seven items that measured challenging, student-centered learning environment equivalently across countries closely reflects all aspects this dimension was intended to measure, the core set of items for emotionally-supportive climate and safe, inclusive and respectful climate differ in their substantive interpretation from what each dimension was hypothesized to assess. The set of items that measured emotionally-supportive climate equivalently across countries assess the extent to which children perceive that academic and emotional support is available to them from adults in the school and the degree to which adults are aware of and responsive to their academic and other needs. Thus, while it measures how much students feel "...cared about, and helped by teachers and other adults in the school", it does not explicitly assess how much students feel "listened to," which the evaluation conceptualized as part of this construct. Similarly, for safe, inclusive and respectful climate we did not find empirical support for the expected sub-dimension of items measuring physical and emotional safety. Instead, the first factor captured the degree to which students feel safe at school and perceive that adults and other students at their school create an environment of respect, equality/fairness, and inclusion; and the second factor appeared to tap into students' perceptions of harsh treatment from teachers and students, particularly not wanting to attend school because of treatment from teachers.

Thus, current research and evaluation using these cross-national tools should limit their interpretation of emotionally-supportive climate and challenging, student-centered learning environment to these aspects. Nonetheless, the interpretation of these dimensions is in line with other work suggesting that experiences of support, inclusion, and acceptance with teachers and peers, organized and challenging classrooms with a high level of student involvement, and safe schools in which students perceive a sense of belonging and inclusiveness are important ingredients in high quality school and after-school environments (Battistich et al., 1995; Brand, Felner, Shim, Seitsinger, & Dumas, 2003; Durlak, Weissberg & Pachan, 2010; Osterman, 2000; Pianta, 2001; Pierce, Bolt & Vandell, 2010; Solomon et al., 1996). To more fully capture these dimensions, future evaluations could include additional items that explicitly measure students' perceptions of being listened to in school, their feelings of physical and emotional safety in school and their fear of harsh treatment in school.

While the survey was not designed to make international comparisons with any precision, our analyses suggest that it may be possible to do so. However, our findings also highlight the challenges inherent in developing a common measure of school quality across diverse contexts. While we were able to identify core similarities in the items measuring emotionally-supportive climate, challenging, student-centered learning environment and safe, inclusive and respectful climate across the Philippines, Nicaragua and South Africa, we also noted important differences in the structure and substantive interpretation of each dimension within these countries. Our review of the country-specific evaluation reports for each country in the global evaluation (UNIICEF, 2009d; UNICEF 2010a; UNICEF 2010b) suggested that many of these differences reflected each country's specific cultural, sociopolitical, and CFS implementation/evaluation contexts. For example, future orientation and community involvement in the school may be seen as less important in CFS-implementing schools in Nicaragua than in the other two countries. This may help to explain why items 50 and 66 on emotionally-supportive climate and items 15 and 44 on challenging, student-centered learning environment behave differently in Nicaragua than in the other countries. In addition, variation in loadings across countries may be partially attributable to differences in the political and cultural context of these countries. For example, items 33 and 43, which are related to inclusiveness and equality, load highly onto the safe, inclusive and respectful climate scale in the Philippines and in Nicaragua, but lower in South Africa. This

difference could be due to the fact that equality and human rights are very strongly emphasized both politically and culturally in South Africa and therefore may be less dependent on qualities of the school than in other countries. Finally, variation in the degree to which bullying and school violence are pervasive social problems might help to explain why items assessing these features (27, 28, 34, 35, and 42) behaved differently across the Philippines, Nicaragua, and South Africa. The fact that the CFS evaluation in South Africa targeted the country's worst performing child friendly schools may have heightened these differences and might explain why the correlation between the two factors representing safe, inclusive and respectful climate was higher in South Africa than in the other two countries.

As many of these differences can be attributed at least in part to the cultural, sociopolitical, and CFS implementation/evaluation contexts of each country, our results also highlight the potential value of country-specific measures that capture aspects of school quality that are uniquely important to each country. Thus, these analyses provide a guide for future evaluations of the CFS initiative to tailor their measurement of school quality to multiple goals. By combining a core set of items for cross-national comparison with additional country-specific items, evaluations can create two sets of monitoring tools, one appropriate for cross-country comparisons and one sensitive to the unique aspects of CFS implementation within countries. Focus groups could be used to better understand the unique aspects of CFS within countries and aid in the development of country-specific items for future evaluations.

It is important to note that the psychometric analyses conducted in the current study focus on the face validity, internal reliability and factor structure of items measuring each dimension of the CFS Conditions for Learning survey. Thus, while we contribute to scholarship by examining the cross-national measurement structure and face interpretation of these dimensions, further work is needed to explore other aspects of their reliability and validity within and across countries. For example, preliminary work has begun to explore how these dimensions of student-reported school quality are related to school quality as measured through teacher, parent and school head reports and classroom and school observations (UNICEF, 2009f). However, more research is needed to establish the concurrent validity of the cross-national and country-specific versions of the CFS Conditions for Learning survey. In addition, future studies should explore the test/re-test reliability of these dimensions as well as their sensitivity to interventions designed to improve the child friendliness of schools. Efforts to explore these two facets of validity and reliability will be undertaken with studies currently being fielded in South Africa ("Sibhekelelaizingane zethu" or "We look out for our children"; NICHD grant #1R01HD055137; PI: Aber) and the Democratic Republic of Congo ("Impact Evaluation of the OPEQ Intervention in the Democratic Republic of Congo"; USIAD project #123268; PI: Annan). Finally, we reiterate that the current study focuses on perceptions of school quality among students enrolled in school and does not directly address issues of school accessibility. As recommended by UNICEF (2009f), further work is needed to create tools to monitor and evaluate this important goal of the CFS initiative.

Some additional limitations of this study should be mentioned. First, while we were able to establish a common core structure and measurement invariance for a subset of items measuring each dimension of the CFS Conditions for Learning survey across the Philippines, Nicaragua and South Africa, the equivalence of these items across the remaining three countries in the global evaluation and the other 89 countries currently implementing the CFS framework is not known. Follow-up work examining measurement invariance in all six countries comprising the global evaluation will increase our confidence in using these items to create cross-national indicators of each dimension. However, the equivalence of items should be evaluated for cross-national comparative work involving

countries that were not a part of the global evaluation. Where possible, we recommend that future efforts to develop cross-national monitoring tools do so among stratified random sample of countries; this would increase the ability to generalize results to policy relevant geographic regions. Second, our analysis is limited to the 20–25 child friendly schools that were chosen to represent each country in the global evaluation. While efforts were made to ensure a representative sample of child friendly schools within each country, financial, logistical and geographical constraints likely limited their representativeness of all schools implementing the CFS initiative. Third, the relatively small number of schools sampled in each country posed some analytical limitations. While we were able to account for the hierarchical structure of the data (i.e., students nested in schools), we could not reliably estimate multilevel factor models which would provide additional information about the structure and interpretation of items at the school level. However, it is important to note that the CFS theory of change hypothesizes that it is students' individual perceptions of school quality that are related to desired program outcomes, not their shared perceptions. Therefore, individual level analyses are arguably the most relevant for program developers, implementers and evaluators. Fourth, we based our analyses on student perceptions of school quality rather than on the perceptions of teachers, parents or school heads. We focused on student perceptions because they are child-centered, comparable across diverse implementation contexts, and associated with important academic outcomes (e.g., Fredricks et al., 2004; Goodenow, 1993; Osher & Kendziora, in press; Osterman, 2000; Wentzel, 1998). Nonetheless, future work should explore the psychometric properties of the teacher, parent and school head reported measures of school quality within and across countries. Finally, we limited our study of school quality to the reports of students in the 5<sup>th</sup> and 6<sup>th</sup> grades. It is possible that developmental differences in cognitive and academic skills may influence students' responses to items, limiting the generalizability of these results. While we do not expect this to pose a problem for students in higher grades, more work should be done to confirm the reliability and validity of these dimension for students in lower grades.

Despite these limitations, this work has important implications both for efforts to evaluate and monitor the CFS initiative and for the field of comparative child and family policy more broadly. Using psychometric techniques we were able to identify a core structure and set of items that can reliably measure three important dimensions of school quality across countries and detect meaningful differences in the structure and substantive interpretation of each dimension that represent unique aspects of school quality within each country. The results of this analysis suggest that it is both possible and fruitful to use multi-item scales to create cross-national and country-specific indicators. Thus, this process holds considerable promise for creating reliable and meaningful monitoring tools for international policies and programs with varying conditions for implementation and evaluation. We hope that this paper represents a first step in fostering a new, more stringent concern with psychometric properties among scholars of comparative child and family policy, as well as a blueprint for creating future measurement tools for monitoring and evaluation of other cross-national policy initiatives.

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**Table 1**

Sample Characteristics by Country

	Full Sample		Philippines		Nicaragua		South Africa	
	Percentage Mean (SD)	N	Percentage Mean (SD)	N	Percentage Mean (SD)	N	Percentage Mean (SD)	N
Students		3099	1431	843				825
Grade 5	45%		39%		51%		49%	
Female	53%		53%		53%		51%	
Same language at school/home	73%		55%		98%		78%	
In Religious Minority at School	36%		38%		32%		36%	
Schools		68		21		25		22
Rural	71%		76%		80%		55%	
Years implementing CFS	4.13 (2.66)		5.81 (2.70)		4.82 (1.82)		1.73 (1.54)	

*Note.* Percentages are rounded to the nearest 1%.

**Table 2**  
Within-Country Measurement Models for Emotionally-Supportive Climate

Items	Philippines			Nicaragua			South Africa		
	Loading	S.E.	$\beta$	Loading	S.E.	$\beta$	Loading	S.E.	$\beta$
17 Teachers at this school really care about students like me.	0.92	0.07	0.64	0.84	0.09	0.58	0.95	0.06	0.73
48 My teachers give me feedback on my assignments that help me to improve my work.	0.95	0.07	0.66	0.71	0.08	0.49	0.90	0.09	0.69
54 Adults in this school are usually willing to give students extra help.	0.94	0.06	0.65	1.00	0.00	0.69	0.98	0.04	0.75
57 Teachers notice if I am having difficulty with my lessons.	0.71	0.05	0.50	0.97	0.07	0.66	0.99	0.05	0.76
62 I can talk to teachers or other adults at school if I am having problems in class.	0.84	0.08	0.59	0.92	0.07	0.63	0.97	0.08	0.75
11 I can talk with at least one adult at school about things that are bothering me.	0.68	0.09	0.48	0.45	0.11	0.31	0.69	0.09	0.53
22 My family knows what goes on inside this school.	0.59	0.08	0.41	0.54	0.11	0.37	0.56	0.11	0.43
58 Teachers give students opportunities to improve their work if they do poorly on an assignment.	0.83	0.09	0.58	0.84	0.09	0.58	1.00	0.00	0.77
60 Students at this school have the materials they need to support their learning.	0.70	0.10	0.49	0.56	0.10	0.39	0.78	0.07	0.60
69 It is difficult for students like me to get extra help from teachers. (r)	0.35	0.09	0.24	---	---	---	---	---	---
37 This school does a good job teaching students what they really need to know in life.	1.00	0.00	0.70	0.41	0.09	0.28	0.98	0.07	0.75
50 This school does a good job in preparing students to continue on for more education after they graduate.	0.95	0.07	0.67	---	---	---	0.96	0.03	0.74
47 This school does not try to help students who are behind in their work to catch up. (r)	0.56	0.09	0.39	0.91	0.06	0.62	---	---	---
61 Sometimes I am too hungry to pay attention in school. (r)	---	---	---	0.92	0.05	0.63	0.31	0.11	0.23
66 Families like mine are involved in making decisions that affect this school.	0.53	0.07	0.37	---	---	---	0.80	0.06	0.61
<b>Fit Statistics</b>									
CFI	0.94			0.98			0.98		
TLI	0.95			0.98			0.99		
RMSEA	0.04			0.03			0.04		
WRMR	0.83			0.64			0.57		

Note. All loadings significant at  $p < .01$ .  $\beta$  denotes standardized loading; dashed lines indicate items that were dropped from the measurement model.

**Table 3**  
Within-Country Measurement Models for Challenging, Student-Centered Learning Environment

Items	Philippines			Nicaragua			South Africa		
	Loading	S.E.	$\beta$	Loading	S.E.	$\beta$	Loading	S.E.	$\beta$
20 Adults in the community encourage me to take school seriously.	0.92	0.07	0.64	0.84	0.09	0.58	0.95	0.06	0.73
23 Teachers and school staff believe that all students can learn.	0.95	0.07	0.66	0.71	0.08	0.49	0.90	0.09	0.69
51 The subjects we are studying at this school are interesting.	0.94	0.06	0.65	1.00	0.00	0.69	0.98	0.04	0.75
53 Students at this school try to do a good job on their lessons, even if they are difficult or not interesting.	0.71	0.05	0.50	0.97	0.07	0.66	0.99	0.05	0.76
59 Teachers at this school will listen if you want explain your answers in class or on assignments.	0.84	0.08	0.59	0.92	0.07	0.63	0.97	0.08	0.75
67 Students are encouraged to work together in class.	0.68	0.09	0.48	0.45	0.11	0.31	0.69	0.09	0.53
49 When students master their lessons, they are given more challenging work.	0.59	0.08	0.41	0.54	0.11	0.37	0.56	0.11	0.43
52 Students at this school think that it is okay to cheat. (r)	0.83	0.09	0.58	0.84	0.09	0.58	1.00	0.00	0.77
68 Students are encouraged to share their ideas and opinions in class.	0.70	0.10	0.49	0.56	0.10	0.39	0.78	0.07	0.60
12 I have given up on school. (r)	0.35	0.09	0.24	---	---	---	---	---	---
44 Teachers at this school expect students like me to succeed in life.	1.00	0.00	0.70	0.41	0.09	0.28	0.98	0.07	0.75
56 Every student is encouraged to participate in class discussions.	0.95	0.07	0.67	---	---	---	0.96	0.03	0.74
64 Lessons at this school are boring. (r)	0.56	0.09	0.39	0.91	0.06	0.62	---	---	---
15 I want to complete secondary school.	---	---	---	0.92	0.05	0.63	0.31	0.11	0.23
<b>Fit Statistics</b>									
CFI	0.94			0.94			0.86		
TLI	0.96			0.95			0.94		
RMSEA	0.05			0.05			0.07		
WRMR	0.77			0.81			0.80		

Note. All loadings significant at  $p < .01$ .  $\beta$  denotes standardized loading; dashed lines indicate items that were dropped from the measurement model.

**Table 4**  
Within-Country Measurement Models for Safe, Inclusive and Respectful Climate

Items	Philippines						Nicaragua						South Africa						
	Factor 1		Factor 2		Factor 1		Factor 2		Factor 1		Factor 2		Factor 1		Factor 2				
	Loading	S.E.	$\beta$	Loading	S.E.	$\beta$	Loading	S.E.	$\beta$	Loading	S.E.	$\beta$	Loading	S.E.	$\beta$	Loading	S.E.	$\beta$	
24 I feel safe at my school.	0.88	0.08	0.66	0.96	0.06	0.71	0.91	0.06	0.76	0.91	0.06	0.76	0.91	0.06	0.76	0.91	0.06	0.76	0.91
31 My teachers treat me with respect.	1.00	0.00	0.75	0.91	0.09	0.67	1.00	0.09	0.84	1.00	0.00	0.84	1.00	0.00	0.84	1.00	0.00	0.84	1.00
38 This school places a high value on understanding and respecting children's rights.	0.94	0.09	0.70	1.00	0	0.73	0.79	0.09	0.66	0.79	0.09	0.66	0.79	0.09	0.66	0.79	0.09	0.66	0.79
21 I think this school respects families like mine.	0.91	0.09	0.68	0.83	0.08	0.61	0.83	0.08	0.69	0.83	0.08	0.69	0.83	0.08	0.69	0.83	0.08	0.69	0.83
65 The school is a welcoming and inviting place for families like mine.	0.76	0.07	0.57	0.90	0.07	0.66	0.86	0.07	0.72	0.86	0.07	0.72	0.86	0.07	0.72	0.86	0.07	0.72	0.86
45 Teachers at this school are interested in what students like me have to say.	0.66	0.08	0.49	0.59	0.09	0.44	0.92	0.04	0.76	0.92	0.04	0.76	0.92	0.04	0.76	0.92	0.04	0.76	0.92
19 If students see another student being picked on, they try to stop it.	0.67	0.09	0.50	0.46	0.09	0.34	0.76	0.07	0.63	0.76	0.07	0.63	0.76	0.07	0.63	0.76	0.07	0.63	0.76
55 Adults at this school apply the same rules to all students equally.	0.75	0.07	0.56	0.56	0.56	0.41	0.82	0.07	0.69	0.82	0.07	0.69	0.82	0.07	0.69	0.82	0.07	0.69	0.82
33 Both boys and girls have equal opportunities to succeed at this school.	0.90	0.08	0.68	0.81	0.07	0.59	0.81	0.07	0.59	0.81	0.07	0.59	0.81	0.07	0.59	0.81	0.07	0.59	0.81
43 This school is a welcoming place for all types of students.	0.95	0.09	0.71	0.84	0.07	0.61	0.84	0.07	0.61	0.84	0.07	0.61	0.84	0.07	0.61	0.84	0.07	0.61	0.84
9 Students at this school help each other, even if they're not friends.	0.68	0.11	0.51	0.68	0.05	0.50	0.68	0.05	0.50	0.68	0.05	0.50	0.68	0.05	0.50	0.68	0.05	0.50	0.68
13 Students at this school treat each other with respect.	0.83	0.06	0.62	0.71	0.06	0.52	0.71	0.06	0.52	0.71	0.06	0.52	0.71	0.06	0.52	0.71	0.06	0.52	0.71
25 I feel safe walking both to and from school.	0.73	0.07	0.55	0.75	0.06	0.55	0.75	0.06	0.55	0.75	0.06	0.55	0.75	0.06	0.55	0.75	0.06	0.55	0.75
29 I look forward to coming to school.	---	---	---	0.82	0.06	0.60	0.82	0.06	0.60	0.82	0.06	0.60	0.82	0.06	0.60	0.82	0.06	0.60	0.82
36 Students at this school think it is okay to fight someone who insults them. (r)	0.67	0.09	0.49	0.75	0.07	0.52	0.75	0.07	0.52	0.75	0.07	0.52	0.75	0.07	0.52	0.75	0.07	0.52	0.75

Items	Philippines						Nicaragua						South Africa					
	Factor 1		Factor 2		Factor 1		Factor 2		Factor 1		Factor 2		Factor 1		Factor 2			
	Loading	S.E.	$\beta$	Loading	S.E.	$\beta$	Loading	S.E.	$\beta$	Loading	S.E.	$\beta$	Loading	S.E.	$\beta$	Loading	S.E.	$\beta$
39 Teachers at my school say unkind things to students. (r)	0.92	0.07	0.66	0.92	0.07	0.66	0.79	0.10	0.55	1.00	0.00	0.65	1.00	0.00	0.65	1.00	0.00	0.65
41 Sometimes I do not want to come to school because of how the teachers treat me. (r)	1.00	0.00	0.72	1.00	0.00	0.72	0.99	0.11	0.69	0.92	0.12	0.60	0.92	0.12	0.60	0.92	0.12	0.60
26 I sometimes stay home from school because I am worried about my safety. (r)	---	---	---	---	---	---	0.45	0.10	0.32	---	---	---	---	---	---	---	---	---
42 Students at this school know how to disagree without starting a fight or an argument.	0.66	0.08	0.49	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
46 When students break rules, they are treated fairly.	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
32 Some types of students at this school are treated better than others by teachers and school staff. (r)	---	---	---	---	---	---	1.00	0.00	0.70	---	---	---	---	---	---	---	---	---
35 There are some students at this school who everybody teases.(r)	0.66	0.10	0.48	0.66	0.10	0.48	0.90	0.09	0.62	---	---	---	---	---	---	---	---	---
63 I wish I went to a different school. (r)	---	---	---	---	---	---	0.69	0.11	0.48	1.00	0.10	0.64	1.00	0.10	0.64	1.00	0.10	0.64
27 Students at this school like to put each other down. (r)	0.84	0.11	0.61	0.84	0.11	0.61	0.81	0.11	0.56	---	---	---	---	---	---	---	---	---
28 This school is being ruined by bullies. (r)	0.83	0.05	0.60	0.83	0.05	0.60	0.86	0.10	0.6	---	---	---	---	---	---	---	---	---
30 This school is badly affected by crime and violence in the community. (r)	0.81	0.10	0.59	0.81	0.10	0.59	---	---	---	---	---	---	---	---	---	0.72	0.15	0.46
34 There are some students in this school who nobody talks to. (r)	0.67	0.11	0.49	0.67	0.11	0.49	---	---	---	---	---	---	---	---	---	0.86	0.09	0.55
<b>Fit Statistics</b>																		
CFI	0.94			0.94			0.92			0.96			0.92			0.96		
TLI	0.96			0.96			0.93			0.97			0.93			0.97		
RMSEA	0.03			0.03			0.05			0.05			0.05			0.05		
WRMR	0.83			0.83			1.02			0.71			1.02			0.71		

Note. All loadings significant at  $p < .01$ .  $\beta$  denotes standardized loading; dashed lines indicate items that were dropped from the measurement model.

**Table 5**

Fit Indices for Measurement Invariance Analyses

	Dimensional/configural invariance	Full metric and scalar invariance	Partial metric and scalar invariance
Emotionally-supportive climate			
CFI	0.94	0.92	0.95
TLI	0.97	0.95	0.97
RMSEA	0.04	0.05	0.04
WRMR	1.15	1.645	1.32
$\chi^2$ change (df)		43.90 (15) ***	18.25 (11)
Challenging, student-centered learning environment			
CFI	0.90	0.90	0.91
TLI	0.95	0.96	0.96
RMSEA	0.06	0.05	0.05
WRMR	1.28	1.49	1.38
$\chi^2$ change (df)		30.13 (14) **	16.02 (12)
Safe, inclusive, and respectful climate			
CFI	0.98	0.97	0.98
TLI	0.99	0.98	0.99
RMSEA	0.03	0.03	0.03
WRMR	1.03	1.30	1.16
$\chi^2$ change (df)		32.98 (17) *	19.03 (14)

\* *Note.* p < .05;

\*\* p < .01;

\*\*\* p < .001.

Table 6

Factor Loadings for Partial Metric and Scalar Invariance Models

	Philippines			Nicaragua			South Africa		
	Loading	S.E.	$\beta$	Loading	S.E.	$\beta$	Loading	S.E.	$\beta$
<b>Emotionally-supportive climate</b>									
17 Teachers at this school really care about students like me.	1.02	0.05	0.64	1.02	0.05	0.66	1.02	0.05	0.74
22 My family knows what goes on inside this school.	0.62	0.09	0.39	0.62	0.09	0.31	0.62	0.09	0.45
37 This school does a good job teaching students what they really need to know in life.	1.01	0.05	0.64	1.01	0.05	0.56	1.01	0.05	0.73
54 Adults in this school are usually willing to give students extra help.	1.00	0.00	0.63	1.00	0.00	0.63	1.00	0.00	0.72
57 Teachers notice if I am having difficulty with my lessons.	1.08	0.05	0.54	1.08	0.05	0.52	1.08	0.05	0.77
58 Teachers give students opportunities to improve their work if they do poorly on an assignment.	1.09	0.05	0.58	1.09	0.05	0.61	1.09	0.05	0.78
11 <i>I can talk with at least one adult at school about things that are bothering me.</i>	0.94	0.16	0.48	0.90	0.17	0.35	0.74	0.08	0.53
48 <i>My teachers give me feedback on my assignments that help me to improve my work.</i>	1.28	0.19	0.65	1.78	0.26	0.70	0.97	0.08	0.69
60 <i>Students at this school have the materials they need to support their learning.</i>	1.01	0.18	0.51	0.57	0.21	0.22	0.84	0.06	0.61
62 <i>I can talk to teachers or other adults at school if I am having problems in class.</i>	1.23	0.22	0.63	1.45	0.20	0.57	1.02	0.06	0.73
<b>Challenging, student-centered learning environment</b>									
20 Adults in the community encourage me to take school seriously.	0.75	0.06	0.60	1.02	0.18	0.55	0.75	0.06	0.59
23 Teachers and school staff believe that all students can learn.	0.86	0.04	0.59	0.86	0.14	0.60	0.86	0.04	0.69
49 When students master their lessons, they are given more challenging work.	0.70	0.05	0.39	0.96	0.17	0.51	0.70	0.05	0.56
51 The subjects we are studying at this school are interesting.	1.00	0.00	0.78	1.00	0.00	0.69	1.00	0.00	0.80
53 Students at this school try to do a good job on their lessons, even if they are difficult or not interesting.	0.86	0.05	0.64	0.97	0.13	0.62	0.86	0.05	0.69
67 Students are encouraged to work together in class.	0.85	0.04	0.70	0.75	0.13	0.64	0.85	0.04	0.67
68 Students are encouraged to share their ideas and opinions in class.	0.78	0.08	0.55	0.69	0.13	0.60	0.78	0.08	0.62
52 <i>Students at this school think that it is okay to cheat. (r)</i>	0.80	0.14	0.52	0.33	0.12	0.16	0.70	0.10	0.56
59 <i>Teachers at this school will listen if you want explain your answers in class or on assignments.</i>	1.02	0.13	0.67	1.27	0.22	0.62	0.92	0.05	0.73
<b>Safe, inclusive, and respectful climate</b>									
<b>Factor 1</b>									
19 If students see another student being picked on, they try to stop it.	0.78	0.07	0.48	0.78	0.07	0.36	0.78	0.07	0.63
24 I feel safe at my school.	0.91	0.07	0.65	0.91	0.07	0.66	0.91	0.07	0.73
31 My teachers treat me with respect.	1.00	0.00	0.72	1.00	0.00	0.67	1.00	0.00	0.80

	Philippines			Nicaragua			South Africa		
	Loading	S.E.	$\beta$	Loading	S.E.	$\beta$	Loading	S.E.	$\beta$
<b>Emotionally-supportive climate</b>									
45 Teachers at this school are interested in what students like me have to say.	0.96	0.04	0.52	0.96	0.04	0.47	0.96	0.04	0.77
21 I think this school respects families like mine.	0.89	0.07	0.65	0.89	0.07	0.61	0.89	0.07	0.71
55 Adults at this school apply the same rules to all students equally.	0.84	0.07	0.53	0.84	0.07	0.44	0.84	0.07	0.68
65 This school is a welcoming and inviting place for families like mine.	0.93	0.06	0.58	0.93	0.06	0.66	0.93	0.06	0.75
38 <i>This school places a high value on understanding and respecting children's rights.</i>	1.39	0.22	0.70	1.78	0.26	0.74	0.83	0.09	0.67
<b>Factor 2</b>									
41 Sometimes I do not want to come to school because of how the teachers treat me. ( <i>r</i> )	1.00	0.00	0.74	1.00	0.00	0.85	1.00	0.00	0.59
36 <i>Students at this school think it is okay to fight someone who insults them.</i> ( <i>r</i> )	0.60	0.17	0.51	0.67	0.25	0.45	0.79	0.13	0.46
39 <i>Teachers at this school say unkind things to students.</i> ( <i>r</i> )	0.81	0.19	0.68	0.85	0.29	0.57	1.01	0.20	0.59

Note. All loadings significant at at least  $p < .01$ .  $\beta$  denotes standardized loading; loadings and thresholds for items in italics were allowed to vary across countries.