

Testing the Invariance of a Motivation Model across Seven Cultural Groups¹

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Using confirmatory factor analysis this study examines the cross-cultural generalizability of the factor structure for the Inventory of School Motivation (ISM), an instrument based on Personal Investment theory. The instrument consists of eight different scales with 43 survey items (ranging from 3 to 7 items each) and each reflecting one of eight specific dimensions: task, effort, competition, social power, affiliation, social concern, praise, and token. The factor structure was invariant over large samples of responses by Anglo-Australian ($n=2,616$), Migrant Australian ($n=1,265$), Aboriginal Australian ($n=906$), Hong Kong Chinese ($n=697$), Navajo ($n=1,776$), Anglo-American ($n=884$) and African ($n=819$) cultural groups of high school students. The results of factorial invariance analysis indicated that the ISM has a stable and reliable factor structure among the 7 cultural groups. Findings also provide evidence that the ISM scales are applicable to students of different cultural backgrounds; meaningful cross-cultural comparisons should use the 43 items in educational settings.

1. Introduction

Educational research in cross-cultural settings consistently identifies shortcomings such as the lack of a theoretical basis for defining and interpreting the construct and the poor quality of instruments used to measure it. Many studies on achievement motivation, cognitive development, and learning styles failed to establish that the behaviors and responses being measured were functionally, conceptually or metrically equivalent to those from which norms for comparison were drawn, and that the constructs and tools used were culturally appropriate (McInerney, Yeung, & McInerney, 2001; Matsumoto, 2001). Earlier psychometric research was often so narrowly focused on measuring the status of non-Western groups against Western norms that the importance of investigating other culturally relevant aspects was neglected. As a consequence psychometric research (especially that carried out by outsiders of a particular culture) fell into disfavor and disrepute (McInerney, Roche, McInerney, & Marsh, 1997; McInerney et al., 2001). The present article applies a cross-cultural validation approach to examine the cross-cultural generalizability of the factor structure for the Inventory of School Motivation (ISM), an instrument based on Personal Investment (PI) theory across Anglo-Australian, Migrant Australian, Aboriginal Australian, Hong Kong Chinese, Navajo, Anglo-American and African cultural groups of high school students. The paper thus addresses the methodological issue of cross-cultural applicability of a psychometric instrument such as McInerney's (1994a, 1994b, 1995) Inventory of School Motivation (ISM). The ISM is an exploratory instrument through which a range of motivation salient constructs drawn from Maehr's Personal Investment theory (Maehr, 1984; Maehr & Braskamp, 1986) can be identified in educational settings across a diversity of groups.

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2. Personal Investment Theory

Personal Investment Theory PI (Maehr & Braskamp, 1986, see also Maehr & McInerney, 2004) is concerned with how persons choose to invest their energy, talent, and time in particular activities. PI theory is particularly relevant in investigations into how individuals of varying social and cultural backgrounds relate to differing achievement situations such as schooling. This is because the theory does not assume that people from a given culture or group will invest effort in the same achievement situations or, if they do, for the same reasons, as those from other cultures and groups. PI theory also emphasizes the role played by social and cultural contexts in determining motivational patterns in performing achievement tasks. Moreover, it is phenomenologically based, and emphasises the subjective meaning of situations in light of individuals' culturally determined belief systems such as beliefs about self, perceptions of appropriate goals, and perceived alternatives available for pursuing these goals.

PI theory is a social-cognitive theory, as it assumes that the primary antecedents of choice, persistence and variations in activity levels are thoughts, perceptions and beliefs that are embedded in cultural and social beliefs about self and situation. Specifically, PI theory designates three basic components of meaning as critical to determining personal investment in specific situations:

- beliefs about self, referring to the more or less organized collections of perceptions, beliefs, and feelings related to who one is.
- perceived goals of behaviour in given situations, referring to the motivational focus of activity, importantly what the person defines as 'success' and 'failure' in this situation. Among these goals are Task, Ego, Social Solidarity, and Extrinsic Rewards.
- perceived alternatives or facilitating conditions for pursuing these goals, referring to the behavioural alternatives that a person perceives to be available and appropriate (in terms of sociocultural norms and opportunities that exist for the individual) in a given situation.

Each of these components of PI theory may be influenced differentially by the structure of tasks and situations, personal experience and access to information and, importantly, the sociocultural context in which tasks, situations, and persons are embedded. As a model, PI alleviates many of the problems inherent in mono-cultural research models. In particular, it conceptualizes achievement motivation in terms that recognize the possibility of diverse modes of achievement behaviour across cultures and groups. PI theory also strikes a balance between the interaction of personality and situations, while incorporating dimensions (such as locus of control) that have been found useful in analysing levels of achievement motivation.

PI theory predated goal theory but incorporated within its framework three elements that were to become increasingly the major focus of motivational research in educational settings, namely, mastery (task) goals, ego (performance) goals, and social goals. However, while much goal theory research over the last twenty years has concentrated on comparing and contrasting the effects on behaviour of mastery and performance with a much more recent and somewhat belated attempt to broaden goals to include social goals, PI not only was a multiple goal oriented theory from its inception, but also included sense of self and facilitating conditions dimensions that made it, potentially, a far richer and more sensitive source of information on the motivational determinants of behaviour. Particularly this was the case in socioculturally diverse settings.

3. Multigroup Invariance Testing

3.1 Multigroup Testing

Elliot & Bempechat (2002) argue that the psychological basis of achievement motivation, when integrated with principles of cultural anthropology and cultural psychology, will move both theory and research forward. They argue that researchers should contextualize research questions,

develop authentic means of inquiry and acknowledge within group differences. Sue (1999) argued that psychological research has not taken sufficient advantage of cross-cultural comparisons that allow researchers to test the external validity of their interpretations and gain insights about the applicability of their theories and models. Watkins (2001) highlighted that much cross-cultural research compared results from only two countries or contrasted results from a single country with characteristic findings in another country. He argued that cross-cultural comparisons based on only two countries are intrinsically weak (Bond, 1994), when attempting to argue for a continuum of differences along some cultural dimension. Marsh and colleagues (Marsh, Marco, & Abcy, 2002) emphasized that to evaluate whether observed differences between countries represent a continuum rather than possibly irrelevant differences between any two countries, at least three countries are needed. Consequently, in this study we take a multigroup approach to compare the motivational profiles of seven cultural groups.

3.2 Measurement Validity

Vandevijver & Tanzer (1997) noted that in every cross-cultural study, there is always a question of whether scores in different cultural samples can be compared across cultures. Horn (1991) argued that when one compares different groups in terms of means, variances, and correlations for linear composite measures (factor scores), it is necessary to show the invariance of the factor pattern across groups to support the assumption that the common factors measure the same attributes across groups. With respect to measurement issues in comparative cross-cultural studies, Bond and Task-sking (1983) argued that many of the cross-cultural studies of psychological constructs have used instruments developed on American samples with individuals in non-Western cultures. Researchers have then compared American and non-Western individuals without considering the psychometric comparability of the instruments (Park, Huebner, Laughlin, Valois, & Gilman, 2004). The lack of equivalence in validity of the instruments may suggest differences in the meaning of student motivational goal constructs in different cultural groups when the differences really represent measurement problems.

McInerney and colleagues (McInerney, Yeung, & McInerney, 2001) noted that many earlier studies on achievement motivation failed to establish that the behaviours and responses being measured were functionally, conceptually or metrically equivalent to those from which norms for comparison were drawn, and that the constructs and tools used were culturally appropriate. Little (2000) noted about measurement equivalence that items on scale must be interpreted and responded to in the same way across groups. Little stated that when this condition has been met, then the cultural differences in levels, correlates, and consequences related to constructs could be examined in valid and meaningful ways. Meredith (1993) suggested that construct comparability (factor invariance) holds when the corresponding measurement parameters (factor loadings) of a construct are equivalent across groups of interest.

Inadequate attention has been paid to the issue of cross-cultural generalizability in the factor structure of motivational orientations in many of the instruments designed to measure achievement motivation, but which are nevertheless used in a range of cross-cultural settings (McInerney, Yeung, & McInerney, 2001). It should be noted that this concern is not about comparing mean differences of motivation constructs per se but rather, whether responses to the individual items within each of the scales in an instrument have the same meaning for different cultural groups.

In this article we address the issue of the generalizability of the scales across independent groups. In other words we address the question of whether responses to the items within each of the scales in our instrument have the same meanings for seven different cultural groups and whether ISM scales can be derived that have comparable construct validity for each of the separate cultural groups.

3.3 Invariance Testing

The use of measurement invariance testing refers to an assessment of a measure that has been used for more than one group in order to discover if the measurement is equivalent and invariant across groups (Byrne, 1994, 2003; Marsh, 1994; Mavondo & Farrell, 2000). When parallel data exists for more than one group, invariance tests using a CFA approach provide a way of assessing the equivalence of solutions across multiple groups (Marsh, 1994, 1993, Marsh & Hocevar, 1985). In invariance tests, the researcher constrains any one, any set, or all parameters to be invariant across multiple groups (Marsh, 1987; 1993; 1994; Marsh, Hau, Roche, Craven, Balla, & McInerney, 1994; Marsh, Richards, Johnson, Roche, & Tremayne, 1994). In this study, we were interested in evaluating the invariance of the factor structure across the seven cultural groups comprising the sample to see if these structures are invariant in terms of factor pattern matrix across the groups. If the factor structure is invariant across groups this provides evidence that the derived scales can be used with some confidence in a range of cultural groups in educational settings.

4. Method

4.1 Participants

The research reported here represents a macro level study of the psychometric features of the ISM on data compiled from a series of longitudinal studies (McInerney 1990, 1995, 2002; McInerney et al., 1997) across different cohorts. These collected data, representing a range of cultural groups over a long time frame, allowed for a rigorous testing of the psychometric validity and reliability of the ISM.

The sample of 8963 students comprised 2,616 Anglo-Australian, 1,265 Migrant Australian, 906 Aboriginal Australian, 697 Hong Kong Chinese, 1,776 Navajo, 884 Anglo-American and 819 African (207 White South African, 206 Black South African, 199 Malawi, 140 Zambian and 67 Nigerian) drawn from Years 7 to 12 from 41 high schools. Across the full sample there were 48.1% males and 51.9% females, and their average age was 14 years. Details on the specific samples may be found in the studies cited above. Only respondents who had intact data on the core ISM items were included in this study.

4.2 Instruments

The Inventory of School Motivation (McInerney & Sinclair, 1991, 1992; McInerney et al., 1997; McInerney, Yeung, & McInerney, 2001) was designed as an exploratory instrument through which a range of motivation salient constructs drawn from Maehr's Personal Investment (Maehr, 1984; Maehr & Braskamp, 1986) model could be identified in educational settings across a diversity of groups. These constructs included motivational goal orientations, sense of self components, and perceived opportunities or action possibilities. There is considerable empirical evidence drawn from both exploratory and confirmatory factor analytic studies for the validity and reliability of the various scales drawn from the ISM (see, for example, McInerney, 1992, 1995, 2002; McInerney et al., 1994a, 1994b; McInerney et al., 1997; McInerney & Swisher, 1995; McInerney et al., 2001; McInerney et al., 2003). In this study we are concerned with validating 43 items that refer to the goal orientation components of Personal Investment Theory. Goal orientation questions relate to four perceived goals of behaviour, each of which has two elements:

Task (Mastery): Task involvement (e.g., "I like to see that I am improving in my schoolwork") and Effort (e.g., "When I am improving in my schoolwork I try even harder").

Ego (Performance): Competition (e.g., “I like to compete with others at school”) and Social Power (e.g., “I work hard at school to be put in charge of a group”).

Social solidarity: Affiliation (e.g., “I prefer to work with other people at school rather than work alone”) and Social concern (e.g., “I like to help other students do well at school”).

Extrinsic: Praise (e.g., “I want to be praised for my good schoolwork”) and Token rewards (e.g., “I work best in class when I get some kind of rewards”).

The students responded to each item on a 5-point scale (1 = strongly disagree to 5 = strongly agree). The responses to the items were coded such that higher scores reflected higher levels of motivation. The reliability of each scale (coefficient alphas) is presented in the appendix.

4.3 Statistical Analysis

Confirmatory factor analyses (CFA) were conducted with LISREL 8.54 (Jöreskog & Sörbom, 2003) using maximum likelihood estimation. In a CFA study, the parameters typically consist of factor loadings, factor variances and covariances, and measured variable uniquenesses. In the present investigation, the 43 items were hypothesized to represent 8 a priori factors. In accordance with standard practice in the structural equation modeling literature, all multigroup analyses were performed using covariance matrices as input (Kline, 1998; Cudeck, 1989; Jöreskog & Sörbom, 1993). Hence, the data for the present investigation are 43 (items) x 43 covariance matrices for each of the 7 cultural groups.

Both absolute fit statistics; and incremental fit statistics were utilized to evaluate the model fit (see Hoyle & Painter, 1995; Tanaka, 1993). The absolute fit statistics included the χ^2 test of exact model fit, the root-mean-square error of approximation (RMSEA; Browne & Cudeck, 1993). The incremental fit statistics (Hoyle & Painter, 1995) included the Comparative Fit Index (CFI; Bentler, 1990), the Tucker-Lewis Index (TLI; Tucker & Lewis, 1973). A small and insignificant χ^2 suggests a good model fitting because the null hypothesis assumes that the model being tested does fit the data. However, the χ^2 test is not a good indicator of model fit when the sample size is large (Marsh, Balla, & McDonald, 1988). With large samples, very minor differences can yield a significant χ^2 , indicating the rejection of a good model (Keith & Witta, 1997). Therefore, considering the relatively large sample size of this study, the results of the chi-square test were not considered to be critical in evaluating model fit for this study. In general, for indices, the CFI and TLI vary along a 0-to-1 continuum in which values greater than 0.90 and 0.95 are typically taken to reflect acceptable and excellent fits to the data, respectively. According to Browne and Cudeck, RMSEA values in the vicinity of 0.05 indicate “close fit,” values near 0.08 indicate “fair fit,” and values above 0.10 indicate “poor fit.” The Satorra-Bentler scaled maximum likelihood procedure was applied to ameliorate reliance on multivariate normality (Fouladi, 2000; McDonald & Ho, 2002).

Prior to multigroup invariance analyses, we tested the ability of 43 items to form 8 a priori factors using the total sample of students (Model AG). Then we pursued invariance models in which the invariance of the parameters in our a priori factor model was tested across 7 cultural groups.

In tests of factorial invariance, the hierarchical analytic step, which tests models in an orderly sequence, is recommended in order to determine factor structure equivalence and to identify the source of any equivalence across groups (see Bollen, 1989; Byrne, 1998; Jöreskog and Sörbom, 1996; Keith et al., 1995). In this study, a series of nested models in which the end-points are the least restrictive model with no invariance constraints and the most restrictive model with all parameters are constrained to be the same across all groups. In each model, sets of particular parameters were constrained to be equal across the groups and then that was compared to a less restrictive model in which the parameters were freed. In this study, the following models were tested in steps:

- M1: All parameters (i.e., factor loadings, uniquenesses and error variances, factor correlations, factor variances) were allowed to vary across groups (i.e., number of factors are the same).
- M2: Only the factor loadings were specified to be equal across groups (uniquenesses and error variances, factor correlations, factor variances were allowed to vary across groups).
- M3: Factor loadings and factor variances/covariances were specified to be equal across groups. Only the uniquenesses were allowed to vary across groups.

5. Results and Discussion

5.1 Reliability

Initial consistency estimate Cronbach alphas were calculated for each of the scales for the full group and each of the cultural subgroups (see Table 1). Reliability estimates were acceptable and varied from .66 to .82 (Mean = .75) for the full group. This average reliability of each of the eight scales is obviously higher than the target reliability of at least .70; there appears to be a reasonable balance between the brevity of the scales and at least this aspect of psychometric strength. Regardless of the generally acceptable values of the reliability estimates, some scales had lower reliabilities than the other scales.

Table 1
Reliability Estimate on ISM Scales by Cultural Background.

Groups	Task	Efft	Comp	Socp	Affl	Scrn	Prse	Tken	Mean	SD
All Groups (N=8963)	0.66	0.82	0.75	0.80	0.68	0.71	0.80	0.79	0.75	0.06
Australian (N=2616)	0.64	0.81	0.76	0.78	0.70	0.71	0.82	0.77	0.75	0.06
Migrant (N=1265)	0.64	0.81	0.81	0.84	0.68	0.71	0.83	0.84	0.77	0.08
Aboriginal (N=906)	0.72	0.82	0.75	0.75	0.63	0.71	0.78	0.81	0.75	0.06
Navajo (N=1776)	0.71	0.79	0.68	0.79	0.66	0.70	0.79	0.78	0.74	0.06
American (N=884)	0.63	0.80	0.63	0.79	0.79	0.72	0.81	0.76	0.74	0.07
African (N=819)	0.69	0.80	0.74	0.77	0.67	0.65	0.72	0.74	0.72	0.05
Chinese (H) (N=697)	0.55	0.70	0.75	0.78	0.57	0.69	0.77	0.72	0.69	0.09
Mean	0.65	0.79	0.73	0.79	0.67	0.70	0.79	0.77	0.74	0.06
SD	0.06	0.04	0.06	0.03	0.07	0.02	0.04	0.04	0.04	

Note: Task = Task; Efft = Effort; Comp = Competition; Socp = Social Power; Affl = Affiliation; Scrn = Social Concern; Prse = Praise; Tken =Token, SD = Standard Deviation

There was more variability within the seven sub-groups; however, in most cases reliability was acceptable. The average reliabilities for each of the groups ranged from .69 to .77 with Hong Kong Chinese groups lower reliability (Mean = .69) while Migrant Australian group had higher reliability (Mean = .77). In evaluating possible explanations for the groups with lower reliabilities, we considered the Standard Deviations (SD) of eight scales for each of the groups.

The SD for Australian Migrant (.08) and Anglo-American (.07) were similar to the average SD across all seven groups (.06), suggesting that the low reliability estimates in these two groups were not specific to a particular scale. However, for the Hong Kong Chinese group, the SD is larger (.09) and scrutiny of the reliability estimates shows that the reliability estimates are low for task and affiliation scales. In summary, these results demonstrated adequate internal consistency in relation to reliability estimates, the ISM instrument seems to have achieved a good balance between brevity and reliability, except for the slightly lower level of reliability for the task and affiliation scales for the Hong Kong Chinese students.

5.2 Confirmatory Factor Analysis

We began with the Confirmatory Factor Analysis of all 8,963 students from the 7 cultural groups to test the ability of the eight factors to explain relations among 43 ISM items. We posited a highly restrictive a priori model with 8 a priori factors such that each item was allowed to load on one and only one factor (all other factor loadings were constrained to be zero) and uniqueness term associated with each item was not allowed to correlate with uniqueness terms for any other items. The factor structure is well defined in that the Non-Normed Fit Index (NNFI) = .95 and Root Mean Square Error of Approximation (RMSEA) = .045 (see Table 2); the solution is fully proper; and parameter estimates are consistent with a priori expectations. Now we turn to separate CFAs of results for each of the 7 cultural groups considered separately and a series of tests for comparison of the factor model to validate factorial invariance across the cultural groups.

Table 2
Goodness of Fit in Confirmatory Factor Analysis of the ISM in each of Cultural Groups.

Groups	Model	χ^2	df	RMSEA	NNFI	CFI	N
All Groups	TG1	16254	832	.045	.95	.96	8963
1. Australian	MG1	5297	832	.045	.94	.95	2616
2. Migrant	MG2	2712	832	.042	.95	.96	1265
3. Aboriginal	MG3	2242	832	.043	.94	.95	906
4. Navajo	MG4	4414	832	.049	.94	.95	1776
5. American	MG5	3227	832	.057	.90	.91	884
6. African	MG6	3325	832	.061	.91	.92	819
7. Chinese (H)	MG7	2350	832	.051	.90	.90	697
Mean		3367	832	0.050	0.93	0.93	1280
SD		1123	0.00	0.007	0.02	0.02	693

Note: DF = degrees of freedom, RMSEA = root mean square error approximation, NNFI = non-normed fit index, CFI = comparative fit index.

5.3 Independent CFA for Each Group

In this stage of the analyses, we tested the ability of the a priori model to fit the data separately for each of the 7 cultural groups with no invariance constraints (see Table 2). Each of the 7 groups solutions provided an acceptable fit to the data. All the parameter estimates were reasonable in that all factor loadings were large and statistically significant, and the patterns of correlations were logical and all the goodness of fit indices were good in relation to typical standards of acceptable fits to the data; but the factor loading of one of the items of Token scale

for African group and one of the items of Social Power scale for Hong Kong Chinese group was low .27 and .28 respectively. The CFIs varied from .90 to .96 (M CFI = .93) values are higher than the typical guideline of an acceptable fit to the data (.90). Similarly, RMSEAs vary from .042 to .061 (M RMSEA = .050).

5.4 Measurement invariance across groups

The results of the series of tests for the comparison of factor models are summarized in Table 3. We first established a baseline model (M1) that fitted to the seven cultural groups but without any constraints imposed. In this, as in subsequent analyses, the factor loadings, factor variance-covariance matrices and the unique variances are allowed to be freely estimated across seven groups. As expected, the results vary logically for the different indices of fit. Change in chi-square is statistically significant for each step in the hierarchy, indicating that there is some statistically significant lack of invariance due in part to the large sample size, this is hardly surprising.

Table 3

Summary of Models and Goodness of Fit Statistics across 7 Cultural Groups.

Model	χ^2	df	RMSEA	NNFI	CFI	Model Description
AG	16254	832	0.045	0.95	0.96	Total group, no multiple group comparison
M1	34473	5824	0.062	0.93	0.94	INV = none; Free = FL, FV, FCV, Uniq
M2	40408	6034	0.067	0.93	0.93	INV = FL; Free = FV, FCV, Uniq
M3	53787	6250	0.077	0.92	0.92	INV =FL, FV, FCV; Free = Uniq

Note: df = degrees of freedom, RMSEA = root mean square error approximation, NNFI = non-normed fit index, CFI = comparative fit index, INV = invariant (parameters constrained to be invariant over the 7 cultural groups). FL = factor loadings, FV = factor variances, FCV = Factor covariances, Uniq = item uniquenesses, AG = All groups.

Model 2 which, specified that all factor loadings were equal across the seven groups, produced acceptable fit statistics, although the fit was slightly decreased when compared to that of Model 1, which freed all parameters. However, the NNFI, the CFI, and RMSEA all support the invariance of factor loadings, factor correlations, and factor variances. Specifically, CFI dropped only 0.01, NNFI did not change, while RMSEA increased by .005 when all the factor loadings were constrained to be equivalent across the seven groups (M2 versus M1).

Model 3, factor loadings, factor variance and factor covariances were specified to be equal across groups. Nevertheless, even the difference between M3 and M1 CFI dropped only 0.02, NNFI dropped 0.01, while RMSEA increased by .015 when all the factor loadings, factor variances, factor covariances were constrained to be equivalent across the seven groups.

In the final set of models, all parameters were specified to be equivalent across groups. When the uniquenesses invariance constraint was imposed across all seven groups, the fit was poor. It is likely that imposing full invariance across the seven groups caused problems with model fit owing to the poorer reliability of some items within scales across the cultural groups. However, the third model (M3) in which all parameters, except uniquenesses were freed invariant provides support for the use of the eight scales across diverse cultural groups.

6. Summary and Implications

The present study addressed the methodological issue of whether responses to the items within each of the goal orientation scales in the ISM have the same measurement meaning for seven different cultural groups and, therefore, has comparable construct validity for each of the separate cultural groups.

The present study found that the items in most of the goal orientation scales of the ISM are mostly invariant across groups such that they are probably applicable to both Western and non-Western cultures. A few items such as in the Social Power and Token scales tended to vary so that vigilance needs to be taken when they are used for among group comparisons. Any comparison based on these items should be interpreted with caution because the Hong Kong Chinese and African students do not appear to interpret some items within the scales in an identical way.

In summary, CFA results demonstrated that the factor structure of the ISM was very similar across Anglo-Australian, Migrant Australian, Aboriginal Australian, Hong Kong Chinese, Navajo American, Anglo-American and African cultural groups of high school students. The results of factorial invariance analysis indicated that the ISM has a stable and reliable factor structure among the 7 cultural groups. These results indicate that the ISM factors are statistically sound with acceptable reliabilities that are consistent across all groups.

The present study has demonstrated that the use of confirmatory factor analysis and invariance analysis within structural equation modeling is a powerful and flexible data analysis method that can be used in multi-group comparison studies. The successful use of factorial invariance analysis in this study also has implications for future research with ethnic minority groups and culturally diverse groups in educational settings. The validated scales may be used across a wide range of cultural groups to profile their motivational characteristics in order to investigate those comparative characteristics most related to achievement outcomes. This provides the researcher and practitioner with valuable information to develop intervention strategies to enhance student motivation and consequently achievement across a range of cultural groups.

Finally the cross-cultural validation approach is important for any measuring instrument that has the potential of being used in cross-cultural studies. Consequently, the cross-cultural investigations on the factor structure equivalency of the ISM needs to be carried out with various samples from different cultural backgrounds in order to further validate current research findings.

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Appendix

Items, Alpha, Mean and Standard Deviations for Inventory of School Motivation (ISM)

Task	Alpha = .66	Mean = 4.27	SD = .60
1. A4ta	I like being given the chance to do something again to make it better		
2. A9ta	I try harder with interesting work		
3. A33ta	I like to see that I am improving in my schoolwork		
4. A34ta	I need to know that I am getting somewhere with my schoolwork		

Effort	Alpha = .81	Mean = 3.94	SD = .69
1. A10ef	I don't mind working a long time at schoolwork that I find interesting		
2. A12ef	I try hard to make sure that I am good at my schoolwork		
3. A56ef	When I am improving in my schoolwork I try even harder		
4. A68ef	The harder the problem the harder I try		
5. A79ef	I try hard at school because I am interested in my work		
6. A100ef	I work hard to try to understand new things at school		
7. A103ef	I am always trying to do better my schoolwork		

Competition	Alpha = .75	Mean = 3.15	SD = .83
1. A6co	Winning is important to me		
2. A43co	Coming first is very important to me		
3. A53co	I like to compete with others at school		
4. A76co	I work harder if I'm trying to be better than others		
5. A89co	I want to do well at school to be better than my classmates		
6. A91co	I am only happy when I am one of the best in class		

Social Power	Alpha = .80	Mean = 2.70	SD = .85
1. A51po	I work hard at school that I will be put in charge of a group		
2. A65po	I want to feel important in front of my school friends		
3. A71po	At school I like being in charge of a group		
4. A82po	It is very important for me to be a group leader		
5. A88po	I work hard at school to because I want the class to notice me		
6. A113po	I often try to be the leader of a group		

Affiliation	Alpha = .68	Mean = 3.67	SD = .88
1. A36af	I do my best work at school when I am working with others		
2. A39af	I try to work with friends as much as possible at school		
3. A97af	I prefer to work with other people at school rather than alone		

Social Concern	Alpha = .70	Mean = 3.72	SD = .71
1. A8soc	It is very important for students to help each other at school		
2. A21soc	I like to help other students do well at school		
3. A29soc	I care about other people at school		
4. A46soc	I enjoy helping others with their schoolwork even if I don't do so well myself		
5. A85soc	It makes me unhappy if my friends aren't doing well at school		

Praise	Alpha = .80	Mean = 3.42	SD = .87
1. A17pr	Praise from my teachers for my good schoolwork is important to me		

2. A23pr Praise from my friends for good schoolwork is important to me
3. A41pr At school I work best when I am praised
4. A73pr I want to be praised for my good schoolwork
5. A114pr Praise from my parents for good schoolwork is important to me

Token **Alpha = .79** **Mean = 2.98** **SD = .86**

1. A2to I work best in class when I can get some kind of reward
2. A7to I work hard in class for rewards from the teacher
3. A14to I work hard at school for presents from my parents
4. A20to Getting a reward for my good schoolwork is important to me
5. A24to Getting merit certificates helps me work harder at school
6. A107to Praise for good work is not enough I like a reward
7. A112to If I got rewards at school I would work harder