

## Examining the Validity of Motivational Profiles across Indigenous and Non-Indigenous Students

Natasha R. Magson, Rhonda G. Craven, Genevieve F. Nelson, and Alexander Seeshing Yeung

*Centre for Educational Research, University of Western Sydney*

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### Abstract

In multicultural societies such as Australia, examining the potential similarities and differences of students' motivational profiles cross-culturally is an important topic for research. For the most part, goal theory research has been conducted using Caucasian samples and the potential differences between cultural groups have remained relatively unexplored until recently (Urdu & Giancarlo, 2000). The purpose of the current research was to explore cross-cultural similarities and differences in the motivational profiles of Indigenous Papua New Guinean (PNG) and Indigenous and non-Indigenous Australian students. A total of 1792 secondary students, across the three cultures, completed self-report motivational measures. Invariance testing demonstrated that the Inventory of School Motivation (ISM - McInerney, Yeung & McInerney, 2001) measure was invariant across cultural groups. The current findings highlight the strength of the ISM and the importance of assessing invariance testing over diverse cultural groups.

Student motivation, or drive to learn, has been shown to predict important educational outcomes including psychological well-being and academic achievement, making it an essential aspect of educational research (Barker, Dowson, & McInerney, 2006). The factors that influence and enhance students' drive to learn and achieve have long intrigued educational researchers and has formed the focal point for literally hundreds of studies. However, before devising effective means to promote student motivation, there is a desperate need to measure motivation reliably with valid instrumentation (cf. Byrne, 2003).

### *Achievement Goal Theory*

Achievement goal theory has emerged as one of the most prominent theories of student motivation (Meece, Anderman, & Anderman, 2006). The theory proposes that students' motivation and achievement behaviours can be best understood by considering the students' purposes for academic engagement based on their subjective learning experiences (Ali, 2006; Ames, 1992; Covington, 2000; Grant & Dwek, 2003; Middleton & Midgley, 1997; Wigfield, 1997). Goal theory distinguishes between two different types of motivation goal orientations:

(a) “mastery goal orientation”, where the focus is on *developing* one’s competence for personal satisfaction, and (b) “performance goal orientation”, where the emphasis is on *demonstrating* one’s competence in an effort to look good in front of others (Linnenbrink, 2005).

An abundance of evidence has consistently shown that the adoption of mastery goals relate positively to adaptive patterns of cognition, affect, and behaviour in educational settings, whereas performance goals are most commonly negatively associated with these learning strategies. For example, studies have shown that mastery goals are positively associated with: persistence on difficult tasks (Elliot & Dweck, 1988); higher levels of task involvement (Harackiewicz et al, 2000); higher levels of effort and persistence (Grant & Dweck, 2003); the use of learning strategies that enhance conceptual understanding and recall of information, and positive perceptions of academic ability and self-efficacy (Ames, 1992). These positive links have been demonstrated across grade and subject areas. In contrast, a study by Meece and colleagues (2006) investigated the effects of performance goals in the classroom and found that performance goals were positively correlated with self-reported cheating and disruptive classroom behaviours. In a similar study, Grant and Dweck, (2003), found that students who endorsed performance goals were more likely to feel helpless, had a larger loss of self-worth, and made more attributions of low ability after failure. Performance goals have also been positively associated with the use of superficial or short-term learning strategies such as rote learning and inefficient time management, which fail to promote recall of information and conceptual understanding of class materials (Ames & Archer, 1988; Covington, 2000; Nolan, 1988).

In addition to mastery and performance goals, there is a growing body of literature highlighting the importance of social goals in relation to student learning and achievement. For example, Weiner (1990) argues that “school motivation cannot be divorced from the social fabric in which it is embedded” (p. 621) therefore we must consider factors outside the self in order to gain a deeper understanding of what motivates students to strive for achievement. It is possible that social goals interact with both mastery and performance goals in school settings and subsequently influence educational outcomes. In support of this view, a study conducted by Anderman and Anderman (1999) demonstrated that social goals were related to adaptive patterns of learning such as personal improvement, personal effort and recognizing the importance of learning, however, other social goals were associated with gaining status within the peer group and acceptance. Both forms of social goals appear to reflect characteristics similar to those found in both mastery and performance goals respectively (Hinkley, 2001). Therefore, it is predicted that social and achievement goals will be strongly related.

### *Group Validity in Student Motivation*

*Culture.* Examining the potential similarities and differences of students’ motivational profiles cross-culturally is an important topic for research. For the most part, goal theory research has been conducted using Caucasian samples and the potential differences between cultural groups have remained relatively unexplored until recently (Urdu & Giancarlo, 2000). In Australia (and other Western societies), it is acknowledged that society is multicultural, however, most of the research in educational psychology fails to address the significance of race, ethnicity, and class, and how these variables impact on our understanding of students’ motivational states (Pintrich, 1994). In terms of achievement goal theory, McInerney (1992) argues that the literature on students’ achievement goals needs to be expanded to include a larger variety of cultural groups.

Existing research on cultural variations in regard to students’ goals has resulted in mixed findings. Some researchers posit that achievement goals, particularly performance

goals, have different meanings and effects for different cultures (Berry, 1984; 2000; Triandis, 2004; Urdan & Mestas, 2006), while others argue that there are minimal group differences (McInerney, Roche, McInerney, & Marsh, 1997). Most often these researchers tend to make contrasts between individualistic and collectivist groups. Triandis (2004) argues that collective groups emphasize values consistent with social goals such as security, obedience, duty, and in-group harmony, whilst individualistic societies tend endorse values consistent with performance and mastery goals such as individual pleasure, winning, freedom, autonomy, and achievement. It is believed that through socialisation, these values translate into the goals that direct an individual's behaviour (Ali, 2006). However, very little is known about the salience of different goals held by students from different cultural backgrounds that are schooled in Western countries.

The proposed investigation aims to validate a motivational measure of student goals beyond Western cultures to include both an Australian and Papua New Guinean (PNG) Indigenous sample, thereby extending the literature on cross-cultural motivation, learning and achievement.

### The Present Investigation

Given the somewhat limited and inconsistent findings on the relation between goals and group differences, the current study incorporates cultural differences into its design using state of the art statistical methods to determine the cross-cultural validity of a model of student motivation. The importance of this approach is highlighted by Barker (2006) who posited that the best way to address issues of group difference is to first ensure that instruments used to measure motivation are well validated, reliable, and tested for invariance before judgments of group differences are made. In agreement with this suggestion, the present investigation will conduct invariance testing across all groups in order to accurately assess any group variation of meaning for the measurement constructs. The overarching aim of the proposed investigation is to extend the literature on cross-cultural motivation, learning and achievement, beyond Western and minority Indigenous samples, by including a majority Indigenous sample from the developing country of Papua New Guinea (PNG). The study will determine whether or not the patterns of relations between motivational concepts are consistent across both Western and non-Western cultures.

### *Method*

*Participants.* Participants ( $N = 1792$ ) consisted of PNG, Indigenous Australian, and non-Indigenous Australian students. The non-Indigenous Australian sample consisted of 520 students, drawn from Years 7-11 from Australian rural and urban secondary schools in New South Wales and the Northern Territory. There were a similar number of male ( $n = 278$ ) and female ( $n = 242$ ) students with ages ranging from 11 to 16 years ( $M = 13.53$ ,  $SD = 1.10$ ).

The Indigenous sample comprised students in Years 7 to 12 ( $n = 398$ ) drawn from a combination of rural and urban secondary schools within the Northern Territory of Australia. This sample included 171 males and 227 females aged from 11 to 21 years ( $M = 13.83$ ,  $SD = 1.72$ ).

The PNG sample consisted of secondary students ( $n = 874$ ) from rural, urban, and village schools. The sample comprised a comparable number of males ( $n = 468$ ) and females ( $n = 406$ ) aged from 11 to 28 years with a mean age of 17.05 years ( $SD = 2.49$ ). It is important to note the large age range of this sample, particularly due to the large number of adult learners in the PNG group. As schools in PNG are fee paying, many students are not in a financial position to access education at the "age appropriate" time. As a result, many

postpone their education until they become more financially secure, usually in young adulthood (Nelson, 2007).

*Measure.* The Inventory of School Motivation (ISM) has been used cross-culturally by a number of researchers (Ali, 2006; McInerney et al., 2001) and has consistently demonstrated acceptable reliability and validity across diverse cultural groups. The ISM consists of 34 positively worded items randomly assigned throughout the questionnaire. All items were measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). Thus, higher scores reflect a stronger endorsement of the particular goal orientation being examined. The ISM delineates eight first-order factor scales and three higher-order factors labelled Mastery, Performance, and Social goal orientations. The Mastery factor is defined by two first-order factors: Task and Effort. The Performance factor is represented by four first-order factors: Competition, Social Power, Token, and Praise; and the Social factor is measured by the two first-order factors: Affiliation and Social Concern.

*Statistical analysis.* Confirmatory Factor Analysis techniques were employed in the present analyses (see Magson, 2007). To ensure the consistency of the ISM across cultural groups, tests of factorial invariance were conducted for all cultural groups. A total of five nested models were tested and assessed according to the goodness-of-fit criteria described by Byrne (2001). The first model was completely free and all parameters were allowed to vary across groups. To meet the necessary requirements for invariance, factor loadings (first and higher-order) were constrained to be equivalent across groups in the second model, thus meeting the minimum requirements of invariance (Byrne, 1998). The third model held factor variances and covariances equal, whilst the fourth model placed restraints on the factor loadings and item uniquenesses. In the final model, all parameters estimates (i.e., factor loadings, variances/covariances, and uniquenesses) were constrained to be equivalent across the groups.

In specifically judging whether invariance has been reached or not, emphasis is placed on the goodness-of-fit indices as to whether the invariance testing supplies a satisfactory result for any one measure. Unlike traditional CFA analyses, instead of examining the overall goodness-of-fit indices, emphasis is placed upon the change in the CFI only across each of the five models being tested. That is, the baseline model (the completely free model) is compared with the other four models within increasingly restrictive parameter settings. According to Cheung and Rensvold (2002), a change of no more than .01 in the CFI fit index is representative of factorial invariance across the groups. As a result, this investigation will take the position that for the minimal requirement of factorial invariance to be met (factor loadings only set to be invariant) the differences in CFI index between the completely free model and the second model of factor loadings held invariant, must not exceed .01.

## Results

*Reliability Analysis.* Cronbach's alpha estimates for the total sample were deemed acceptable and ranged from .62 to .90 (see Table 1). Cronbach's alpha estimates for cultural sub-groups showed more variability; however, in most cases, reliabilities were acceptable with the lowest Cronbach's alphas found in the Indigenous group for Task (.47) and Affiliation (.54). This may be due to the remote nature of the sample and the relatively small sample size. Furthermore, lower reliabilities of the Task and Affiliation subscales may reflect the small number of items within each scale, consisting of 4 and 3 items respectively. There was substantial improvement when Task and Affiliation scales were combined into their higher-order factors, resulting in reliability estimates of .75 for Mastery and .68 for Social; however, results involving these first-order subscales should be regarded with caution.

Table 1  
*Reliability Estimates for First-Order and Higher-Order General ISM Scales*

Higher-Order Factor	First-Order Factors	Cronbach's Coefficient Alpha ( $\alpha$ )			
		Total (N=1792)	non_Indig (n=520)	PNG (n=874)	Indig (n=398)
Mastery		.83	.80	.78	.75
	Task	.62	.60	.56	.47
	Effort	.80	.76	.73	.71
Performance		.89	.87	.86	.90
	Comp	.79	.73	.63	.75
	Social Power	.82	.81	.81	.79
	Praise	.79	.82	.78	.72
Social	Token	.76	.78	.68	.78
		.72	.72	.71	.68
	Affiliation	.68	.78	.66	.54
	Social	.68	.73	.63	.62
	Concern	.68	.73	.63	.62

*Note.* PNG= Papua New Guinea, non-Indig = non-Indigenous Australians, Indig = Indigenous Australian, Comp = competition.

*Invariance Testing.* To determine whether the factor structure was equivalent across diverse groups, invariance testing was carried out for culture on all first-order and higher-order parameters. As can be seen from Table 2, the change in the RMSEA, TLI, and CFI indices does not exceed the .01 criteria whilst the factor loadings (first-order and higher-order), correlations, and factor variance/covariance parameters were held invariant.

When the factor uniqueness (i.e., error terms) parameters were also constrained, the goodness-of-fit-indices deteriorated under the full constraints of the model and this aspect of the model cannot be considered invariant. However, since the model met the minimum requirement for structural invariance (Byrne, 1998), it can be concluded that the ISM higher-order model is invariant across the three cultural groups. The factor loadings and correlations were previously reported in Magson (2007).

Table 2  
*Invariance Tests Across Culture for the ISM*

Model	$\chi^2$	df	CFI	TLI	RMSEA
FREE	4496.85	1551	.943	.939	.058
FL, HFL	4743.96	1605	.940	.937	.059
FL, HFL, FC	5122.99	1636	.934	.934	.061
FL, HFL, UN	5152.27	1639	.933	.931	.061
FL, HFL, FC, UN	5405.39	1707	.906	.968	.072

*Note.* RMSEA = root mean square error of approximation, TLI = Tucker Lewis Index, CFI = comparative fit index fixed, FL = factor loadings fixed, HFL = higher-order factor loadings fixed, FC = factor correlations fixed, UN= item uniquenesses fixed.

As shown in Table 3, the correlations between factors show substantial variation across cultures. For example, the correlation between Mastery and Affiliation is moderate in both the PNG (.49) and Indigenous (.59) samples; however this correlation is zero in the non-Indigenous group. Another considerable cultural variation occurs in the correlations between the social factors and the Performance factors. In the Indigenous group these correlations are moderate (.60 and .55) whereas in the other two groups these correlations are low (non-Indigenous .20 and .36; PNG .38 and .28). There was also a strong correlation between the Affiliation and Social concern factors for both Indigenous groups, whereas the correlation between these two factors was weak in the non-Indigenous sample.

Table 3  
*Correlations Between the Latent Factors of the ISM for Each Cultural Sample*

Latent Factor	Mastery			Performance		
	PNG	Non-Indig	Indig	PNG	Non-Indig	Indig
Mastery	1	1	1			
Performance	.53	.52	.65	1	1	1
Affiliation	.40	.00	.59	.38	.20	.60
Concern	.64	.70	.75	.28	.36	.55

*Table 3 continued.*

Latent Factor	Affiliation			Concern		
	PNG	Non-Indig	Indig	PNG	Non-Indig	Indig
Mastery						
Performance						
Affiliation	1	1	1			
Concern	.61	.22	.60	1	1	1

*Note.* Concern = Social Concern, Indig = Indigenous, and Non-Indig = Non-Indigenous

### Discussion

The present findings support claims that the ISM measure is psychometrically sound and demonstrates comparable factor structure for across non-Indigenous Australian, Indigenous Australian and Papua New Guinea school students. Additionally, invariance testing showed that each scale item within the ISM had similar meaning for PNG, Indigenous, and non-Indigenous students. Although research has sought to compare various groups with regard to the mean scores across different measures, too often little thought has been given as to whether the measures themselves are equivalent in meaning and structure across the differing groups (Byrne, 1998; Byrne, 2003; Byrne & Campbell, 1999).

Overall, before between-construct research can take place, it is essential to address within-construct issues. Within-construct testing needs to be conducted concurrently across sample groups, with adequate consideration given to the variation between groups with regard to within-construct issues (Byrne, 1998, 2003; Marsh, et al., 1999; Marsh, Ellis, et al., 2002). With within-construct issues sufficiently addressed and psychometric properties of instrumentation demonstrated, it is then plausible to make between-construct comparisons. This finding is important and has considerable practical significance, as this is one of the first studies demonstrating the generalisability of the ISM measure to a non-Western sample drawn from an Indigenous developing nation. As a result of the findings in this paper, it is plausible

to argue that the ISM is a psychometrically sound instrument that researchers can utilise to advance Indigenous, non-Indigenous and Papua New Guinean educational theory, research, and practice.

Highlighting cross-cultural differences, the correlations between the ISM factors showed substantial variation between cultural groups. Whereas Mastery and Affiliation were moderately correlated for the PNG and Indigenous sample, this correlation approached zero in the non-Indigenous group. Another considerable cultural variation was found between the social factors and the performance factor. In the Indigenous Australian group these correlations were moderate, whereas in the other two groups these correlations were low. As there is some controversy surrounding the similarities and differences in students' motivational profiles across diverse cultural groups (see McInerney et al., 1997; Triandis, 2004; Urdan & Mestas, 2006;), the current findings suggest that there may be cross-cultural differences that need to be investigated further, particularly with students living in developing nations.

In conclusion, this research project has demonstrated that the ISM is a valid and reliable measure for use with Indigenous and non-Indigenous Australian and Papua New Guinean students. This makes it a useful tool when examining relations between students' motivational goals and desired educational outcomes such as academic achievement. Future research could investigate the role that students' different motivational goals play in achievement, engagement, depth of learning and students' future aspirations in order to extend existing educational research, theory and practice. This is particularly important with students from developing nations such as Papua New Guinea as, to date, very little motivational research exists on students from a developing nations being schooled in a Western schooling system.

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