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# BANGAWARRA'GUMADA – STRENGTHENING the SPIRIT: CAUSAL MODELLING of ACADEMIC SELF-CONCEPT and PATTERNS of DISENGAGEMENT for INDIGENOUS and NON-INDIGENOUS AUSTRALIAN STUDENTS

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## ■ Abstract

The notion of academic disengagement, regardless of its specific conceptualisation (e.g., cognitive, affective, or behavioural) is one that has received considerable attention within the educational and social psychological literature, especially with regard to disadvantaged minority groups. Although such research has done much to identify the complexity of factors as to why some minority groups may disengage from the schooling system (extending well beyond rightfully maligned deficit models), there is still a need to empirically identify factors that may lessen the risk of disengagement. This investigation tested the causal impact of secondary students' academic self-concept on patterns of school disengagement (once prior measures of disengagement had been accounted for) for both Indigenous and non-Indigenous Australian secondary students across two time waves of data. The results suggest that a heightened sense of academic self-concept is causally, yet differentially, related to varying patterns of disengagement for both Indigenous and non-Indigenous students. The implications of this research suggest that academic self-concept may be a key variable to unlocking trends of school disengagement that have been noted for Indigenous Australian students, although more effort should be made to increase the strength and importance of academic self-concepts for Indigenous students.

## ■ Introduction

The relations between academic disengagement and schooling outcomes have received considerable attention in internationally orientated educational and social psychological literature. This body of research has focussed upon how patterns of disengagement may be related to achievement and attempted to identify why individuals from varying minority and racial groups may also show a greater likelihood of disengaging from the academic environment (Crocker & Major, 1989; Fordham & Ogbu, 1986; Schwab, 2006). Although there is some diversity within the literature as to how disengagement may be conceptualised (e.g., dissociative self-esteem measures, dropouts/absenteeism, cognitive and affective dimensions), there is an increasing emphasis on the need to identify variables that lower the risk of students disengaging (Willms, 2003; Zubrick et al., 2006). With this emphasis in mind, this investigation attempted to identify the causal relations between students' self reports of academic self-concept and cognitive disengagement, aspirations to finish school, and self-reports of absenteeism. In addition, a series of moderating analyses were conducted across an Indigenous and non-Indigenous Australian student sample in an attempt to more accurately understand how academic self-concept may causally influence varying factors of disengagement.

## ■ Indigenous Australians and secondary education

Considering that education is often seen as one of the most important factors influencing a variety of future quality of life standards for all human beings (Hunter, 1997; Mellor & Corrigan, 2004), many researchers have argued that it is imperative that the quality of education be recognised as a pivotal point of intervention for righting the current and future inequities faced by Indigenous Australian students (Hunter & Schwab, 2003). Arguably one of the most

critical issues within the Australian education system is that of the retention rates of students into the later optional years of schooling. With regard to Indigenous Australian students, concern has been repeatedly raised as to patterns of lowered retention and progression rates when compared to non-Indigenous Australian students (Bourke et al., 2000; Schwab, 2006; Zubrick et al., 2006). Although recent reports concerning the educational patterns for Indigenous Australians have noted a substantial improvement in the retention rates of Indigenous secondary students into the optional schooling years (DEST, 2008), when compared to non-Indigenous students the results are still far from equitable. For example, when examining the retention rates for Indigenous and non-Indigenous students in 2006, only 91.3 percent of Indigenous students continued to Year 10 compared to 98.9 percent of non-Indigenous students. This discrepancy is further exaggerated when examining retention rates into Year 12 – 40.1 percent for Indigenous students compared to 70.6 percent for non-Indigenous students.

Given lowered schooling outcomes for Indigenous students, a number of scholars have suggested that a variety of psychological variables may have a direct role in influencing Indigenous students' levels of engagement and achievement within the education system (HREOC, 1997; Lester, 2000; Martin, 2006; Mellor & Corrigan, 2006; Munns et al., 2006; Purdie et al., 2000; Swan & Raphael, 1995). One such psychological variable that has received considerable attention within Indigenous educational literature (although not necessarily reflected in empirical research) is that of self-concept.

#### ■ Self-concept and Indigenous Australian students

Within early but detailed review of self-concept and self-esteem based literature (for the purposes of this paper, the labels of general self-concept and self-esteem will be considered interchangeable), Shavelson and Bolus (1982) defined self-concept as the perceptions of oneself largely drawn from an individual's interactions with the environment and other people. From this foundation, self-concept can be further understood as an important construct that is useful for predicting and explaining how an individual may act, in that the positive or negative self-evaluations are a critical motivating source behind the behaviour of an individual in any given situation.

Considering the importance of self-concept as a motivator for certain behaviours, it is understandable that this psychological construct has been repeatedly noted as a potential point for intervention in righting the inequities suffered by Indigenous Australians (Craven & Marsh, 2005; Zubrick et al., 2005). Indeed, an influential report on the mental health of Indigenous Australians, Swan and Raphael (1995) argued that a key factor in aiding self-determination

for Indigenous peoples would be the promotion of a stronger sense of self amongst the younger generations. Swan and Raphael also argued that in achieving this sense of self, Indigenous children must be assisted in developing a strong cultural identity, a sense of self-reliance, adequate coping strategies to aid in stress management, higher general self-esteem and self-confidence, the ability to achieve their full potential, and opening future pathways. Similarly, *The Report of the Review of Aboriginal Education* (NSW AECG & NSW DET, 2004, p. 110) also highlighted the need to bolster the self-esteem of Indigenous students by stating that "a recurring theme from the field trips indicated that the success of Aboriginal students in junior secondary school, as in other phases of schooling, will only improve if schools can support and strengthen the self-esteem of their students".

It is important to note that empirical research supporting the impact of more general levels of self-concept on varying outcomes for Indigenous students is considerably limited, especially within the field of education. For example, although a number of studies examine the relations between objective schooling outcomes (e.g., standardised achievement, student grades, and teachers' ratings of students) and general self-esteem for Indigenous students, none of them report significant relations between general measures of self-esteem and academic achievement and success (e.g., Bodkin-Andrews et al., in press; Pedersen & Walker, 2000; Zubrick et al., 2006). However, these results do not mean that self-esteem or self-concept should be considered irrelevant for Indigenous students' success at school, but rather they offer indirect support for recent advances towards an emphasis on more domain-specific, multiple dimensions of self-concept (Craven & Marsh, 2008).

#### ■ Multiple dimensional self-concepts: Academic self-concept

An ever increasing amount of international research is suggesting that the habit of relying on general, unidimensional conceptualisations of self-concept, without understanding self-concept's underlying multidimensional structure, is fraught with difficulties (Hattie, 1992; Shavelson & Bolus, 1982), and this is arguably most evident within the research discipline of education. One pivotal study to support the need to look past the most general of self-esteem constructs can be found in a longitudinal study by Marsh (1990), who found that the more specific measure of academic self-concept was able to predict a stronger performance in students' school grades and standardised academic ability tests even when the effects of prior achievement had already been accounted for. More recently, Marsh and O'Mara (2008) investigated the longitudinal relations between general self-esteem and academic

self-concept over academic achievement, and educational attainment over five time-waves of data (spread over eight years, beginning in Year 10). Across all waves of data, and after SES and prior ability had been controlled for, significant relations were found between academic self-concept and subsequent achievement/attainment (and vice-versa), yet general self-esteem displayed only a fraction of the significant (and much weaker) paths.

Although academic self-concept is not the most specific of self-concept dimensions identified by previous research (Shavelson & Bolus, 1982), when considering overall patterns of engagement and retention within the schooling system, it may be argued to be an ideal target point of intervention when compared to more domain specific self-concepts (e.g., math self-concept), as such levels may be too specific for general schooling attitudes. Indeed, some research has suggested that academic self-concept is an important variable for righting some of the educational inequities suffered by Indigenous Australian students (Craven & Marsh, 2008).

#### Academic self-concept and Indigenous Australian research

Even though there is only a small number of studies targeting relations between academic self-concept and varying educational outcomes for Indigenous students (Craven & Marsh, 2005; Craven et al., 2005; McInerney, 2003; Pedersen & Walker, 2000), the results of such studies are mostly consistent. The earliest of these studies targeted Indigenous and non-Indigenous primary school children aged between 6-12 years (Pedersen & Walker, 2000). Although Pedersen and Walker utilised a scale designed to capture differing facets that may impact upon schooling outcomes (e.g., in-group preference, general self-esteem, academic self-concept), only academic self-concept was found to be significantly and positively correlated with teachers' ratings of student ability for both Indigenous and non-Indigenous students. Such results were also reflected across a sample of Indigenous and non-Indigenous students ranging from primary to late secondary school (Purdie et al., 2000), whereby academic self-concept shared the strongest relations to students' self-perceptions of their achievement (when compared to peer, career, family, and overall self-acceptance self-concept measures).

The strength of academic self-concept is also not limited to achievement orientated items, as can be noted in a set of analyses by Craven and Marsh (2005). Utilising Indigenous and non-Indigenous secondary students (Craven et al., 2005), Craven and Marsh identified significant paths emanating from academic self-concept to varying schooling outcomes, over-and above predictive paths emanating from socio-economic status (SES). These paths suggested

that academic self-concept predicted more positive levels of school aspirations, future goals, school enjoyment and academic ability, in addition to lower levels of absenteeism for both Indigenous and non-Indigenous students than the paths emanating from SES. In another analysis of the data, Bodkin-Andrews et al. (2005) found that across 12 different dimensions of self-concept, academic self-concept was the most consistent variable in holding strong relations with the schooling outcomes of school enjoyment, school aspirations, and lowered levels of absenteeism. The consistency of these results suggest that academic self-concept may indeed be a pivotal construct for schooling intervention, at least for a sense of engagement within the schooling system. This implication may be of considerable importance when considering that Australian research has repeatedly raised concern as to the retention of Indigenous students into schooling, their higher levels of absenteeism, and overall disengagement from the academic environment (DEST, 2008; Schwab, 2006; Zubrick et al., 2006).

#### Disengagement patterns for Indigenous Australian students

In considering the lower progression and retention rates of Indigenous students into the optional years of schooling, some studies have attempted to identify factors that may explain not only why Indigenous students may leave school (either through need, want or both), but also why Indigenous students may cognitively and affectively disengage from the academic environment (Howard, 2002; Schwab, 1999, 2006). For example, Schwab (1999) suggests peer pressure, along with drug and alcohol use as key factors that may contribute to school disengagement in Indigenous youth. Howard (2002) suggests family issues (either lack of support or more specific problems), racial discrimination and bullying, negative perceptions of teacher relations (e.g., disinterest and prejudicial attitudes), and lowered levels of confidence as contributing factors to disengagement. Schwab (2006, p. 2) also highlights the overall failure of the Australian education system to actively engage Indigenous students, in that:

In the rush to attain literacy and numeracy benchmarks, educators and policy makers seldom recognise the degree to which Indigenous people are disappointed in the failure of western education to conserve and reaffirm elements of traditional culture ... Making education locally and culturally relevant is one of the key challenges for the future of Indigenous education.

Overall, there is a body of research that suggests that Indigenous Australian students are more likely



to become disinterested with schooling when compared to non-Indigenous students. Although some of the above mentioned factors potentially predicting increased disengagement may be unique to Indigenous Australians, it is important to avoid deficit reasoning (Bodkin-Andrews et al., 2009; Eckerman, 1987; Parbury, 1999). Deficit approaches to explaining differences in educational outcomes for varying ethnic or minority groups are often centred on assumptions that minority group students were deprived of early childhood experiences that would facilitate educational success and engagement (e.g., exposure to the majority group language, the negative effects of poverty, poor parental skills, identity issues), and may even stress now outdated arguments of genetic inferiority (Eckerman, 1987). Considering the wealth of statistics and research highlighting disengagement and underachievement patterns for Indigenous Australian students, and the relative consistency of such results over decades of research, deficit models almost seem like a logical conclusion. However, such a naïve conclusion offers no insight into the negative and oppressive legacy the Australian education system has enforced on Indigenous Australians for generations.

The history of educational policies, programs, and attitudes targeting Indigenous Australian peoples has been for the most part extremely negative in its orientation to the extent that “throughout most of the history of schooling Aboriginal culture was seen not only as worthless but inimical to education” (Parbury, 1999, p. 64). Arguably, it has not been until the last 30 years that the negative influence of education has finally begun to be reversed, and a more positive, equitable, and culturally inclusive approach has begun to emerge (Schwab, 2006). This new direction in education has become recognised as one of the strongest factors that may increase the engagement of Indigenous students in education (Lester, 2000; NSW AECG & NSW DET, 2005; Schwab, 1999).

Unfortunately there is little empirical research seeking to extensively identify the potential positive effects from recent culturally inclusive changes in educational practice within Australia (O'Rourke et al., 2009). Regardless, considering the inequities between Indigenous and non-Indigenous students' retention and progression through the schooling system (DET, 2008), the question arises as to how best to address these inequities from both a theoretical and practical standpoint. More specifically, are Indigenous students affectively and cognitively disengaging from school more so than non-Indigenous students? If so, can an emphasis on psychological variables such as academic self-concept be targeted as a meaningful and negative predictor of patterns of disengagement? It is these questions that will be addressed within this investigation.

## ■ Method

### *Participants*

Four secondary public schools across rural and urban localities within the state of New South Wales participated in the present investigation. Given each school was of a public/government funded nature, a number of organisations and monitoring bodies (e.g., UWS and NSW DET ethics committees) were consulted prior to the recruitment of the schools themselves. Selection of the schools invited to participate in the study was based upon the schools having a minimum of 10 percent Indigenous Australians enrolment. From these schools, all students from Years 7 to 10 were invited to participate based on informed parental consent, resulting in a total sample of 1,234 secondary school students (with a mean age of 13.5 years). Of these students, 216 Indigenous students (17.50 percent of the total sample suggesting the sample has above average representation of Indigenous students; 103 male, 113 female) and 1018 (81.48 percent of the total sample; 523 male, 495 female) completed a survey on two occasions over a six month period. Of the total sample, 20 reported being born in another country (1.62 percent of the total sample). Considering the small sample of overseas students, and that government policy documents (e.g., ABS, 2008) and educational research within Australia often uses all other Australians as a comparative point for the progress of Indigenous students, no omissions or adjustments were made with regard to all further analyses within this paper.

## ■ Materials

### *Academic Disengagement (Martin, 2004)*

This measure of academic disengagement was designed to capture students' self-perceptions of disengaging and not caring about school overall (e.g., “Each week I am trying less and less”). The disengagement factor was drawn from a larger 44-item measure known as the Student Motivation and Engagement Scale (four items per factor), which was designed to measure a total of 11 motivational factors. Students respond on a seven-point Likert scale ranging from 1 = *Strongly Disagree* to 7 = *Strongly Agree*.

### *Academic Self-Concept (Marsh et al., 2005)*

This measure of academic self-concept sought to tap students' self-perceptions of their confidence about school and school work in general (e.g., “I am good at most school subjects”). This four-item factor was drawn from the larger, 11-factor Self Description Questionnaire II-Short, and participants were required to complete the questions on a 6 point Likert scale (1 = *False*, 6 = *True*).

### *School Aspirations (Craven et al., 2005)*

A single item measure designed to assess the point to which participants wish to leave school (i.e., “When would you like to leave school?”). Scores ranged from 1 – “As soon as I can” to 3 – “After I complete the final Year (Year 12)”.

### *Self-reported Absenteeism*

An open ended single item measure whereby participants estimated the amount of days they were away from school in the previous 6 months.

### *Aboriginality*

A single dichotomous item indicating whether the student identifies as being Indigenous Australian or not (e.g., Are you an Aboriginal and/or Torres Strait Islander person?).

### ■ Procedure

The survey was administered in school halls under exam conditions. To control for varying literacy levels, the survey was read aloud by the researchers using a microphone. Participants received the full survey and for the most part were requested to circle the correct response. Upon completion of the materials, participants were fully debriefed and thanked for their time.

### *Statistical software and analyses*

All data obtained for this investigation was entered and screened in SPSS v.17.0 and all statistical analysis techniques were undertaken in SPSS 17.0 and LISREL 8.72 (Joreskog & Sorbom, 2004) With the exception of identifying mean values and reliability estimates for designated factors, the majority of analyses undertaken employed the statistical procedures of structural equation modelling (SEM) and confirmatory factor analysis (CFA) techniques, which compare the goodness-of-fit between a sample covariance matrix and an a-priori hypothesised model. More specific applications of these analysis techniques will now be summarised.

### *Confirmatory Factor Analysis (CFA) and Factorial Invariance Testing*

CFAs test the extent to which indicator items reflect the theoretical a-priori underlying factor structure of the instrumentation (Byrne, 2001). In any one CFA, the tested models represent a combination of the factor loadings, factor variances/covariances, and unique errors in the measured variables. For this investigation, the iterative method known as maximum likelihood

estimation was used to estimate the parameters in the specified models (Kaplan, 2000) as this procedure is robust with respect to violations of normality that may affect parameter estimates and goodness-of-fit indices (Hu et al., 1992).

For this investigation, a total sample CFA model was utilised (see Figure 1), including 21 directly measured indicator items that were specified to represent Aboriginality and a total of eight factors (two time-waves of academic self-concept, disengagement, school aspirations, and absenteeism). As a condition set within this investigation, each indicator item was only set to load upon its designated factor, and no correlations of uniqueness were allowed, with the exception of matching test-retest items as per the advice of Marsh et al. (1999). To ascertain the strength of this model the following goodness-of-fit indices were emphasised: the Root Mean-Square Error of Approximation (RMSEA), the Non-Normed Fit Index (NNFI; also known as the Tucker Lewis Index), and the Comparative Fit Index (CFI) (Marsh et al., 1996). RMSEA values less than .08 and .05 are deemed to reflect a reasonable fit and close fit respectively, and values greater than .90 and .95 for the NNFI and CFI reflect reasonable and excellent fits to the data respectively (Marsh et al., 1996).

Although the CFA may partially validate the instrumentation across the total samples, considering the two diverse cultural groupings utilised within this investigation, it is essential that a multi-group test of invariance be conducted to assess whether the a-priori factor structures are the same across the Indigenous and non-Indigenous student samples (Marsh, 1994). The testing of factorial invariance consisted of five models which were set to become increasingly restrictive. The first model, acting as the comparison model, saw all parameters within the CFA set to be completely free across the groups. In the second model, the factor loadings were held invariant, and it should be noted that this model is considered the minimal requirement for measurement invariance (Parker et al., 2007). The third model held the factor loadings, factor variances, and the covariance matrices held invariant. The fourth model held the factor loadings and the uniquenesses invariant. Finally, the fifth model assessed was the most restrictive in that it held all parameters invariant across the groups (totally invariant model). As recommended by Cheung and Rensvold (2002), emphasis was placed upon the change in the CFI across each of the five models being tested (whereby a change of .01 in the CFI indicates assumptions of invariance are not met). Although the primary interest will be placed on variation in the CFI for assumptions of measurement equivalence, this investigation shall also follow the research practices of Marsh et al. (2006) who placed an emphasis on variation in fit indices, including the RMSEA.

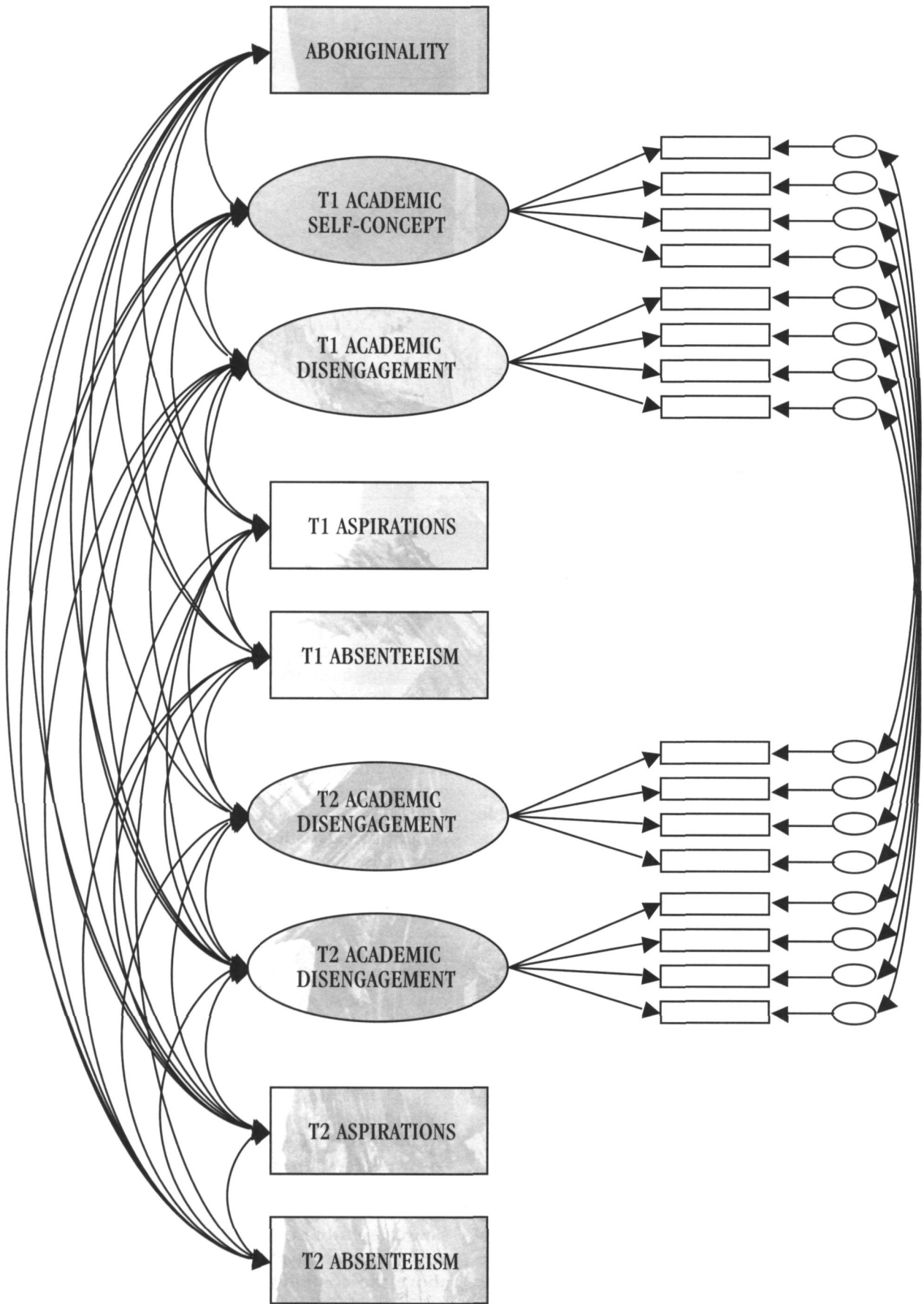


Figure 1. Factor structure for the total sample CFA. Note: Aboriginality = 1 Indigenous – 2 non-Indigenous; T1 = Time 1 measures; T2 = Time 2 measures.

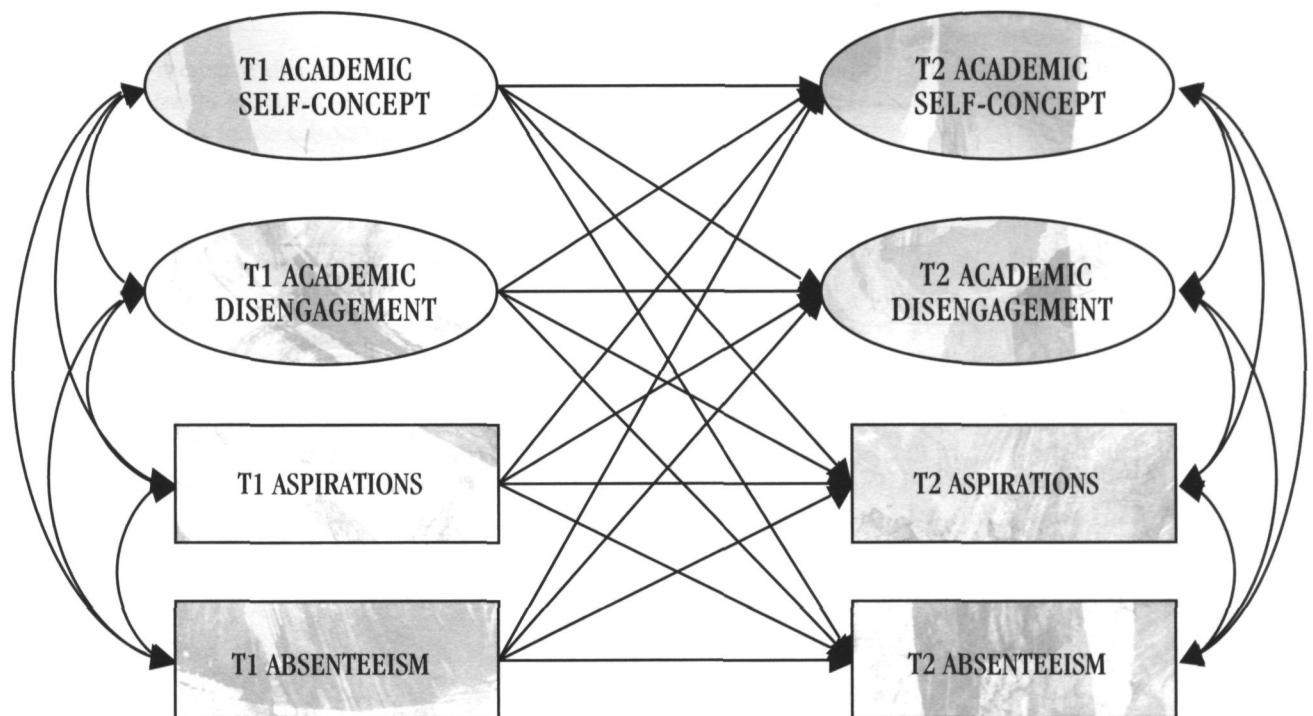


Figure 2. Causal Structural Model for the Indigenous and non-Indigenous students. Note: T1 = Time 1 measures; T2 = Time 2 measures.

#### *Structural Equation Modelling (SEM) Causal Ordering (Marsh et al., 1999)*

If a researcher has access to longitudinal data with repeated measures of the constructs, an SEM technique known as causal ordering is possible (Marsh et al., 1999). That is by utilising repeated measures, and extending upon a simple path analysis framework, one can assess the degree to which a predictor variable at Time 1 may “cause” a separate outcome variable at Time 2, once the predictive power of that outcome variable upon itself (from Time 1 to Time 2) has been accounted for. For the purpose of this investigation, two separate causal models were conducted for the Indigenous and non-Indigenous groups (see Figure 2 for prototype structural model), whereby Time 1 measures of Academic Self-concept, Academic Disengagement, School Aspirations, and Absenteeism all predicted Time 2 measures of Academic Self-concept, Academic Disengagement, School Aspirations, and Absenteeism.

#### *Nested goodness of fit moderating analysis*

In an extension upon the causal ordering analyses, a moderating analysis was also conducted whereby the causal models across the Indigenous and non-Indigenous student groups were assessed as to the differences in the predictive power of specific indicator variables over the outcome variables. Considering this approach tests individual predictive paths, the Chi-square difference test was utilised to determine

if specific matching causal parameters differed significantly across the two groups.

#### ■ Results

##### *Descriptive statistics and internal consistency estimates*

Descriptive statistics and reliability estimates for the factors are presented in Table 1 for the Indigenous, non-Indigenous, and total student samples. With regard to the mean scores, it should be noted that all sample groups (Indigenous, non-Indigenous, and total) reported having positive academic self-concepts across both time-waves. The reverse pattern can be observed for academic disengagement, whereby all samples generally reported disagreeing with disengaging from school. This pattern is reflected in the mean results for school aspirations, which indicated that both Indigenous and non-Indigenous students were aspiring to complete the final year of school (i.e., Year 12). With regard to levels of self-reported absenteeism, on average, students reported being away roughly 12 to 14 days within the previous six months, regardless of the sample splitting utilised. As can be noted, all multi-item variables produced sound reliability estimates above the common .70 cut-off criteria (Tabachnick & Fidell, 2007) for the Indigenous, non-Indigenous, and total sample groups.



### CFA and Factorial Invariance Testing

Table 2 noted that the total sample CFA produced excellent fit indices as the RMSEA, CFI, and NNFI all produced estimates suggesting that the model was well represented by the data (Marsh et al., 1996). In addition, all item-to-factor loadings were significant and of reasonable strength. Significant factor relations were noted, with consistently larger correlations between matching Time 1 and Time 2 latent factors, which offer a good indication of the test-retest strength of these factors.

In examining the factor correlations, the relations between the dichotomous Aboriginality variable (1 = Indigenous; 2 = non-Indigenous) and the other constructs offer an indication as to whether the differences in the levels of the constructs across Indigenous and non-Indigenous students are significant or not. With positive correlations suggesting that non-Indigenous students possess higher scores, it can be noted that the non-Indigenous students reported significantly higher levels of academic self-concept (consistent across both time waves) and school aspirations (consistent across both time waves). Conversely, Indigenous students reported higher levels of academic disengagement (consistent across both time waves), and levels of absenteeism (only for the second time wave).

Table 3 displays the results for factorial invariance testing, from which it can be noted that not only were the minimal requirements for factorial invariance across the factor loadings met (i.e., model 2), but invariance was also achieved across the third model (factor loadings and factor variance and covariance held invariant) which some researchers have argued

should also be considered as a minimal requirement of invariance for more sensitive cultural groups (Marsh, 1994). Although invariance was not met for models four and five, researchers have argued that these models are too restrictive in their assumptions (Cheung & Rensvold, 2002).

### SEM causal modelling of academic self-concept and patterns of disengagement

To run a causal model that will identify reciprocal effects between the indicator and outcome variables, all Time 1 variables must be correlated and predict all Time 2 outcomes, including test-retest variables across the predictors (Marsh et al., 1999). As a result, for both Indigenous and non-Indigenous samples, the minimal requirements for SEM reciprocal effects causal modelling were met, including estimating the correlated uniqueness of matching Time 1 and Time 2 items to correct for halo-effect biases (Marsh et al., 1999; Marsh & Hau, 1996). Table 4 presents the results for the Indigenous student sample.

The goodness of fit indices in Table 4 suggest that across the Indigenous sample the model produced strong fit indices, partially supporting the earlier factorial invariance results. Although the full CFA did not identify any large correlations between the Time 1 indicators, factor correlations between the Time 1 and Time 2 were also presented in Table 4 to aid in the identification of possible suppression and/or multicollinearity effects that may see causal paths being unrealistically inflated or changing direction (Billings & Wroten, 1978; Kaplan, 2000). In examining the causal paths there are two areas of possible concern. Firstly, the predictive causal path from Time

Table 1. Descriptive statistics for Indigenous and non-Indigenous student responses.

Variable (Range)	Mean			Standard Deviation			Cronbach's Alphas		
	Indig	Non-Indig	TOT	Indig	Non-Indig	TOT	Indig	Non-Indig	TOT
T1 – Academic Self-Concept (1-6)	4.15	4.58	4.51	1.08	1.01	1.03	.74	.83	.82
T1 – Academic Disengagement (1-7)	2.71	2.32	2.39	1.28	1.20	1.22	.72	.80	.79
T1 – School Aspirations (1-3)	2.55	2.71	2.68	.72	.62	.64	–	–	–
T1 – Absenteeism (days)	13.64	12.17	12.43	11.99	11.37	11.49	–	–	–
T2 – Academic Self-Concept (1-6)	4.10	4.59	4.50	1.11	1.05	1.08	.79	.87	.86
T2 – Academic Disengagement (1-7)	2.78	2.41	2.48	1.39	1.35	1.37	.80	.85	.84
T2 – School Aspirations (1-3)	2.51	2.64	2.62	.74	.69	.70	–	–	–
T2 – Absenteeism	13.90	11.13	11.62	12.93	9.67	10.24	–	–	–

Note. Indig = Indigenous Australian; non-Indig = non-Indigenous Australian; TOT = total sample; T1 = Time one data; T2 = Time two data.

Table 2. CFA results for all measures including goodness of fit criteria, factors loadings and factor correlations.

Goodness of Fit Criteria									
	$\chi^2$	df	NNFI	CFI	RMSEA				
	456.25	150	.99	.99	.04				
Factor Loadings									
Item Number	Aboriginality	T1 Academic Self-concept	T1 Academic Disengagement	T1 School Aspirations	T1 Absent	T2 Academic Self-concept	T2 Academic Disengagement	T1 School Aspirations	T1 Absent
1	1.00	.67	.60	1.00	1.00	.74	.66	1.00	1.00
2		.65	.75			.65	.76		
3		.82	.62			.86	.76		
4		.82	.83			.85	.83		
Factor Correlations									
	Aboriginality	T1 Academic Self-concept	T1 Academic Disengagement	T1 School Aspirations	T1 Absent	T2 Academic Self-concept	T2 Academic Disengagement	T1 School Aspirations	T1 Absent
Aboriginality	1.00								
T1 Academic Self-concept	.16**	1.00							
T1 Academic Disengagement	-.12**	-.63**	1.00						
T1 School Aspirations	.09**	.31**	-.42**	1.00					
T1 Absent	-.05	-.16**	.17**	-.08**	1.00				
T2Academic Self-concept	.18**	.77**	-.48**	.27**	-.13**	1.00			
T2 Academic Disengagement	-.10**	-.49**	.64**	-.34**	.11**	-.57**	1.00		
T2 School Aspirations	.07*	.31**	-.12**	.50**	-.08**	.39**	-.47**	1.00	
T2 Absent	-.10**	-.16**	.13**	-.12**	.38**	-.15**	-.10**	-.11**	1.00

Note: Aboriginality – 1 = Indigenous, 2 = non-Indigenous; TOT = total sample; T1 = Time one data; T2 = Time two data;  $\chi^2$  = Chi-Squared, df = Degrees of Freedom, NNFI = Non-Normed Fit Index, CFI = Comparative Fit Index, RMSEA = Root Mean Squared Error of Approximation. \* =  $p < .05$ , \*\* =  $p < .01$ .

1 academic self-concept to Time 2 academic self-concept is larger than the corresponding correlation. Considering that no other variable significantly predicts Time 2 academic self-concept though, and that the inflation is only minimal (less than .01 in magnitude), it is deemed that this potential multicollinear effect is minimal in its impact, and can naturally be expected

within any analysis with some moderately correlated predictors (Billings & Wroten, 1978). The second area of concern is in the negative predictive path between Time 1 disengagement and Time 2 absenteeism (which is in the opposite direction to the corresponding correlation). Although indicative of a possible suppression effect (Massen & Bakker, 2001), the lack

Table 3. Multi-Group Invariance Testing for Indigenous and non-Indigenous students.

Model	$\chi^2$	df	CFI	NNFI	RMSEA	90% Confidence
Model 1: Completely Variant (free)	622.65	276	.987	.982	.045	.040 – .049
Model 2: Fix Factor Loadings (FL)	636.75	288	.987	.982	.044	.040 – .049
Model 3: Fix FL and Variance/Co-variance	730.86	324	.986	.983	.045	.041 – .050
Model 4: Fix FL and Correlated Uniqueness	1138.38	313	.977	.972	.066	.062 – .067
Model 6: Completely Invariant (fixed)	1255.95	348	.976	.974	.065	.061 – .069

Note:  $\chi^2$  = Chi-Squared, df = Degrees of Freedom, NNFI = Non-Normed Fit Index, CFI = Comparative Fit Index, RMSEA = Root Mean Squared Error of Approximation

Table 4. Causal Ordering Model for the Indigenous Australian students.

Goodness of fit indices								
	$\chi^2$	df	CFI	NNFI	RMSEA			
	268.71	138	.96	.95	.07			
Factor correlation between Time 1 and Time 2 variables								
	T1 Academic Self-concept	T1 Academic Disengagement	T1 School Aspirations	T1 Absent				
T2 Academic Self-concept	.79**	-.51**	.34**	-.09				
T2 Academic Disengagement	-.46**	.73**	-.43**	.05				
T2 School Aspirations	.28**	-.42**	.56**	-.07				
T2 Absent	-.27**	.15	-.14	.56				
Causal Paths								
	T1 Academic Self-concept		T1 Academic Disengagement		T1 School Aspirations		T1 Absent	
	B	VE	$\beta$	VE	$\beta$	VE	$\beta$	VE
T2Academic Self-concept	.80**	62.88%	.05	–	.03	–	.08	–
T2 Academic Disengagement	.05	–	.72**	52.78%	-.09	–	-.11	–
T2 School Aspirations	.04	–	-.22*	9.41%	.47**	26.57%	-.07	–
T2 Absent	-.28**	7.37%	-.14	–	.02	–	.37**	14.13%

Note: T1 = Time one data; T2 = Time two data;  $\chi^2$  = Chi-Squared, df = Degrees of Freedom, NFI = Non-Normed Fit Index, CFI = Comparative Fit Index, RMSEA = Root Mean Squared Error of Approximation,  $\beta$  = predictive paths, VE = Significant variance explained within the Time 2 outcome variable by the Time 1 predictive variable. \* =  $p < .05$ , \*\* =  $p < .01$ .

of significance in the causal path suggests that this effect should be ignored.

Naturally, the largest causal paths identified were between matching Time 1 and Time 2 test and re-test variables, but two other significant causal paths were also identified for the Indigenous students. Firstly, Time 1 academic self-concept significantly and negatively predicted Time 2 absenteeism ( $\beta = -.28, p < .01$ ) to the extent that 7.37 percent of the variance in absenteeism was explained by this predictor. Secondly, Time 1 disengagement significantly and negatively predicted Time 2 school aspirations ( $\beta = -.22, p < .05$ ), explaining 9.41 percent of the variance in this variable.

Table 5 presents the causal ordering results for the non-Indigenous sample, and once again potential multicollinear effects can be identified (e.g., Time 1 academic self-concept over Time 2 academic self-concept), yet the minimal nature of such effects makes them of no practical concern. In identifying significant causal paths over and above the test-retest variables for the non-Indigenous students, Table 6 shows that Time 1 academic self-concept significantly and negatively predicted Time 2 disengagement ( $\beta = -.17, p < .001$ ), with 8.56 percent of the variance in this variable explained. Time 1 academic self-concept also positively

and significantly predicted Time 2 school aspirations ( $\beta = .13, p < .01$ ) with 3.88 percent of the variance in this variable explained. Time 2 school aspirations was also significantly (negatively) predicted by Time 1 disengagement ( $\beta = -.11, p < .01$ ) with a further 4.01 percent in this variable being explained. Finally, Time 1 school aspirations significantly and negatively predicted Time 2 absenteeism ( $\beta = -.07, p < .05$ ), with .74 percent of variance in the variable being explained (although the weakness of this path raises questions as to the substantiveness of this finding).

*Moderating analyses across the Indigenous and non-Indigenous sample*

Since a number of differing significant causal paths outside the test-retest variables were identified for both Indigenous and non-Indigenous samples, the next logical step was to determine whether the overall predictive model differed significantly between the two groups. Although informative, such an approach may nullify important differences between specific causal paths, so in addition to an overall moderating model, a series of more specific SEM moderating analyses were conducted across the two groups for any

Table 5: Causal Ordering Model for the non-Indigenous Australian students.

Goodness of fit indices								
	X <sup>2</sup>	df	CFI	NNFI	RMSEA			
	395.95	138	.99	.99	.04			
Factor correlation between Time 1 and Time 2 variables								
	T1 Academic Self-concept	T1 Academic Disengagement	T1 School Aspirations	T1 Absent				
T2 Academic Self-concept	.76**	-.46**	.24**	-.14**				
T2 Academic Disengagement	-.49**	.62**	-.31**	.12**				
T2 School Aspirations	.31**	-.36**	.48**	-.08*				
T2 Absent	-.12**	.11**	-.11**	.38**				
Causal Paths								
	T1 Academic Self-concept		T1 Academic Disengagement		T1 School Aspirations		T1 Absent	
	B	VE	$\beta$	VE	$\beta$	VE	$\beta$	VE
T2Academic Self-concept	.77**	58.29%	.02	–	.03	–	-.02	–
T2 Academic Disengagement	-.17**	8.56%	.49**	30.31%	-.06	–	.01	–
T2 School Aspirations	.13**	3.88%	-.11**	4.01%	.40**	19.28%	-.01	–
T2 Absent	-.04	–	-.01	–	-.07*	.74%	.37**	13.72%

Note: T1 = Time one data; T2 = Time two data; X<sup>2</sup> = Chi-Squared, df = Degrees of Freedom, NFI = Non-Normed Fit Index, CFI = Comparative Fit Index, RMSEA = Root Mean Squared Error of Approximation,  $\beta$  = predictive paths, VE = Significant variance explained within the Time 2 outcome variable by the Time 1 predictive variable. \* =  $p < .05$ , \*\* =  $p < .01$ .



path that reached significance (excluding test-retest variables). Table 6 identifies the predictive path, the path sizes across the Indigenous and non-Indigenous samples, and the corresponding Chi-square different test results. Although the overall predictive model did not reach significance, one significant difference was found in the individual causal paths. That is the only path to differ significantly between Indigenous and non-Indigenous students was that of Time 1 academic self-concept predicting Time 2 absenteeism, where the negative prediction was significantly stronger for Indigenous students.

## ■ Discussion

This study found that the measurement instrumentation utilised was psychometrically sound and it was also noted that both Indigenous and non-Indigenous students reported positive levels of academic self-concept and school aspirations, and low levels of academic disengagement. However, Indigenous students were significantly more likely to report lower academic self-concepts and school aspirations, and higher levels of absenteeism (Time 2 only), and disengagement. Causal modelling suggested that there were more similarities than differences between Indigenous and non-Indigenous, however more specific path by path analysis revealed that for Indigenous students, the negative causal path from academic self-concept to absenteeism was significantly stronger than the same path for non-Indigenous students.

The preliminary finding that both Indigenous and non-Indigenous students reported positive self-concepts at an initial glance seems to contradict existing research (e.g., Craven & Bodkin-Andrews, 2006; Craven & Marsh, 2005, 2008; Craven et al., 2005; Craven & Tucker, 2003), and other research articles and reports (NSW AECG & NSW DET, 2004; Swan & Raphael, 1995; Zubrick et al., 2005) that have stressed the need to correct the lower levels of self-

confidence in Indigenous students. The implication of such a line of argument suggests that overall, Indigenous students may not possess more adaptive levels of self-confidence, especially in academic domains. The significance of the correlation between Aboriginality and academic self-concept in this study supports this assertion, as Indigenous students did have a significantly lower academic self-concept than non-Indigenous students. Yet, as already reported, the mean academic self-concept of the Indigenous students was positive, and if one were to compute the  $R^2$  of the correlation reported within this paper ( $r = .16, p < .001$ ), it can be seen that regardless of what other predictor variables may be used in competition with Aboriginality, the maximum amount of variation in academic self-concept that can be attributed to being Aboriginal or not was no more than 2.56 percent, suggesting that Aboriginality was weakly related to academic self-concept.

A similar critical observation can be levelled at disengagement, which has frequently been cited as a significant issue for Indigenous students (Bodkin-Andrews et al., 2006; Howard, 2002; Schwab, 1999; 2006). Indeed, when considering the measure of academic disengagement, although the correlation suggested that Indigenous students held significantly higher levels of disengagement ( $r = -.12, p < .001$ ), it must be noted that the mean score suggested that Indigenous students also disagreed with disengaging from school, and the  $R^2$  (the upper limit of possible variance explained) was only 1.69 percent, again suggesting that Aboriginality was only weakly related to academic disengagement.

The question remains as to whether these muted findings are inconsistent with previous research. Although little research has sought to quantitatively measure Indigenous students varying levels of cognitive/affective disengagement, however, a number of authors have captured and compared varying forms of Indigenous and non-Indigenous students' academic self-concepts (Craven & Marsh, 2005; McInerney,

Table 6. Moderating analyses between Indigenous and non-Indigenous students.

Path	Indig $\beta$	Non-Indig $\beta$	$\chi^2$ dif	$f$ dif	$p$ value
Overall Predictive Model	–	–	28.55	16	ns
T1-Academic Self-concept $\rightarrow$ T2 Absenteeism	-.28	-.04	12.53	1	< .001
T1-Academic Self-concept $\rightarrow$ T2 Disengagement	.05	-.17	3.83	1	ns
T1-Academic Self-concept $\rightarrow$ T2 Aspirations	.04	.13	.050	1	ns
T1 Disengagement $\rightarrow$ T2 Aspirations	-.22	-.11	1.55	1	ns
T1 Aspirations $\rightarrow$ T2 Absenteeism	-.12	-.07	.65	1	ns

Note: T1 = Time 1; T2 = Time 2; dif = Difference;  $\chi^2$  = Chi-Squared;  $df$  = Degrees of Freedom;  $p$  value = level of significance reached.

2003; Pedersen & Walker, 2000). Purdie et al. (2000) found that although Indigenous students possessed a significantly higher general school self-concept compared to non-Indigenous students, their academic achievement self-concept was significantly lower. Craven and Marsh (2005) found that Indigenous students held significantly lower levels of academic, math, and verbal self-concepts, whereas Pedersen and Walker (2003) and McNerney (2003) found no significant differences in academic domains of self-concepts between Indigenous and non-Indigenous students. Despite the inconsistency of these findings with regard to significance, every one of these studies reported that overall, both Indigenous and non-Indigenous students held positive rather than negative academic self-concepts.

With regard to the inconsistency of the findings for academic disengagement within this study and the repeated observations that Indigenous students are more likely to disengage from school (Bodkin-Andrews et al., 2006; Howard, 2002; Schwab, 1999, 2006), it must be stressed that there has been little consistency in Indigenous Australian research as to how disengagement is conceptualised. Is disengagement best measured in a cognitive/affective self-report (Martin, 2007) as done in this study, or is it best inferred through the discrepancy between general and academic self-esteem measures (Crocker & Major, 1999; Fordham & Ogbu, 1986), increasing levels of absenteeism (DEST, 2008; Schwab, 2006), or even dropping out of school altogether (Howard, 2002)? This issue is up for considerable debate, hence why a number of variables that may indicate patterns of disengagement were included in this study (cognitive disengagement, aspirations, and levels of absenteeism). Although differences between the Indigenous and non-Indigenous students in this investigation were minor, they were consistent across cognitive disengagement, school aspirations, and higher levels of absenteeism suggesting that although the effects are subtle, they may still be quite meaningful.

Although the existence of meaningful differences in Indigenous and non-Indigenous students' levels of self-concept and disengagement can be questioned within this study, this is not to suggest that any attempt to address the issue of academic self-concept or disengagement for Indigenous students is a fruitless cause. For in reality, it is near indisputable that both variables have been linked to a diverse variety of students' levels of engagement and performance within the schooling system (Craven & Marsh, 2008; Martin, 2004, 2007; Marsh & O'Mara, 2008). This study offers further support in that for the total sample, both academic self-concept and disengagement were consistently correlated with school aspirations and absenteeism across both time waves.

The overall moderating analysis suggested that there was a level of consistency in the causal relations

between academic self-concept, disengagement, school aspirations, and absenteeism. However, this should be interpreted with caution as a number of causal paths were significant for only one of the two cultural groups. Most notable was the causal prediction of academic self-concept over later levels of Absenteeism for Indigenous students, which in itself is an important finding considering that levels of increased absenteeism has been continually cited as a concern for Indigenous students (Schwab, 2006; Zubrick et al., 2006). The importance of this finding is further enhanced by the observation that academic self-concept was causally predominant over absenteeism, in that the earlier measure of absenteeism failed to causally predict the later measure of academic self-concept, thus further pointing to the worth of attempting to enhance Indigenous students' academic self-concept.

Although none of the remaining causal paths differed significantly between Indigenous and non-Indigenous students, some concern may be raised over the finding that academic self-concept did causally predict the later measure of disengagement for the non-Indigenous students, yet *not* for the Indigenous students. Although it may be argued that there is a plethora of research suggesting that academic self-concept is a vital construct for student engagement and success students overall (Craven & Marsh, 2005, 2008; Marsh, 1990), one should not ignore more diverse and unique identity-related constructs that may be of importance for Indigenous students (Kickett-Tucker, 2009). Although previous research has largely failed to link identity measures to educational engagement and achievement for Indigenous students (Purdie et al., 2000), it may be argued that recent advances in inclusive educational practices can provide a greater opportunity for Indigenous students' to link their unique cultural identities to their learning within the schooling environment (Ainsworth & MacRae, 2009; Malin & Maidment, 2003; MCEETYA, 2000). That is, by continually recognising the sharing of unique Indigenous knowledges within the curriculum, Indigenous students may be able to recognise that their personal, cultural, and educational self-meanings may become reciprocally related rather than being independent sources of strength.

Overall, although findings of an increased sense of disengagement was causally related to lower levels school aspirations for both Indigenous and non-Indigenous students, an increased academic self-concept was found to be uniquely beneficial for both groups. That is academic self-concept was causally related to lower levels of disengagement and Aspirations to complete all of high school for the non-Indigenous students, and lower levels of absenteeism for the Indigenous students. This suggests that academic self-concept is not only related to positive schooling outcomes as suggested by a growing body

of empirical research (Craven et al., 2005; Köller et al., 2008; Marsh et al., 2002; Marsh & Yeung, 1997; Martin, 2007), but also potentially an agent of resiliency against negative schooling outcomes. As a result, these findings support the conclusion of Craven and Marsh (2005, p. 228), who argue that for both Indigenous and non-Indigenous Australian students:

Academic self-concept has important relations with wanting to stay on longer at school, achieving future goals, enjoying school, school attendance and perceptions of academic ability ... These results imply that academic self-concept may indeed be a potent determinant of a wide variety of desirable educational outcomes.

A number of limitations are apparent within this investigation and should be considered to help direct future research in this area. Firstly, recognition must be given to the diversity of students in both the Indigenous and non-Indigenous samples. That is, it cannot be assumed that all samples of Indigenous Australians (or non-Indigenous Australians) are homogenous in their response patterns and the meanings associated with these measures. Indeed one of the strictest warnings found with regard to Indigenous education research is the erroneous assumption that Indigenous Australians are part of a homogenous culture (Mellor & Corrigan, 2004; Partington & McCudden, 1992). Historically research has repeatedly noted the diversity of languages, cultural values, and living conditions of Indigenous Australian nations (e.g., Parbury, 2005). Secondly, especially with regard to Indigenous Australian research, the notion of a broad sense of absenteeism must be treated with some caution. For example, Bourke et al. (2000) suggested that the lowered attendance rates of Indigenous students may be due to many factors including feelings of alienation, inexperienced teachers, and the unique needs of Indigenous communities and families. A final limitation that should be considered is the generalised nature of the measures utilised. As already discussed, disengagement from academia may include a number of concrete, behavioural, affective, cognitive and relational dimensions, some of which were tapped in this investigation. In addition, it may prove informative to examine patterns of disengagement with regard to a number of other dimensions of self-concept, whether such dimensions be more domain specific in academia (e.g., verbal self-concept) or even capturing differing self-concept categories (e.g., relational self-concepts).

Despite the limitations of this study, it is important to recognise the primary finding of this study; namely, that a positive academic self-concept should be considered as a causal construct that may effectively reduce the risk of at least some of the symptoms of student disengagement. By creating a school and classroom environment that will foster both

Indigenous and non-Indigenous students' value and confidence in the education, it is logical to argue that not only will there be improvements in the educational outcomes of underachieving students, but also for students who may be achieving. This position is well summarised by Munns et al. (2006, p.6), who in their discussion of ideal classroom practises for Indigenous students, suggested that "even the strongest spirit needs nurturing to push forward successfully into the future. For those less advantaged and secure in their classrooms there are even more compelling reasons to change the form and substance of classroom". Thus ideally the school and classroom environments should recognise, nurture, and promote students' academic self-concepts as a critical factor for increasing student resiliency. In doing so, it would be interesting to note whether the causal impact of academic self-concept over patterns of disengagement (and even school achievement) would become more pronounced, especially for the Indigenous students.

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#### ■ About the authors

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Professor Rhonda Craven is Head of the Educational Excellence and Equity Research Program, Centre for Educational Research, University of Western Sydney. She is a highly accomplished researcher having secured over 6 million dollars in competitive funding for 38 large-scale research projects and having produced a scholarly body of work largely focusing on educational psychology.