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## Aim(E) for completing school and university: analysing the strength of the Australian Indigenous Mentoring Experience

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## Aim(E) for completing school and university: analysing the strength of the Australian Indigenous Mentoring Experience

### Abstract

**Purpose:** Generally, theory and research investigating the effectiveness of mentoring has offered little resounding evidence to attest to mentoring programmes being a strategic initiative that make a real difference in reducing the educational inequities many minority students endure. In contrast to this existing research base, the Australian Indigenous Mentoring Experience (AIME) has often been cited as one of the most successful mentoring initiatives within Australia. It is the purpose of this chapter to examine how AIME may impact on the educational aspirations and school self-concept of Aboriginal and Torres Strait Islander students. **Methodology:** A series of multi-group analyses were centred around Confirmatory Factor Analysis (CFA) and structural equation modelling techniques that sought not only to explore the psychometric validity of the measures utilized within this study, but also to identify how the measures may be related after accounting for background variables (e.g. gender, parental education). **Findings:** The results found that the measures utilized held strong psychometric properties allowing an increased level of confidence in the measures used and the conclusion that may be drawn from their use in analyses. Overall, the results suggested that AIME is an effective tool for increasing not only the educational aspirations of Aboriginal and Torres Strait Islander students but also their levels (and utility) of School Self-concept and School Enjoyment. **Implications:** The implications suggest that not only is AIME an essential tool for closing the educational gap between Aboriginal and Torres Strait Islander and non-Aboriginal students, but also our understanding of mentoring must be extended well beyond simplistic notions of role-modelling.

### Keywords

analysing, strength, mentoring, australian, experience, indigenous, aim, e, completing, school, university

### Disciplines

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# **AIM(E) for Completing School and University: Analyzing the Strength of the Australian Indigenous Mentoring Experience**

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## **Abstract**

### *Purpose*

Generally theory and research investigating the effectiveness of mentoring has offered little resounding evidence to attest to mentoring programs being a strategic initiative that make a real difference in reducing the educational inequities many minority students endure. In contrast to this existing research base, the Australian Indigenous Mentoring Experience (AIME) has often been cited as one of the most successful mentoring initiatives within Australia. It is the purpose of this chapter to examine how AIME may impact on the educational aspirations and school self-concept of Aboriginal and Torres Strait Islander students.

### *Methodology*

A series of multi-group analyses were centered around confirmatory factor analysis and structural equation modeling techniques that sought to explore not only the psychometric validity of the measures utilized within this study, but to identify how the measures may be related after accounting for background variables (e.g., gender, parental education).

### *Findings*

The results found that the measures utilized held strong psychometric properties allowing an increased level of confidence in the measures used and the conclusion that may be drawn from their use in analyses. Overall, the results suggested that AIME is an effective tool for increasing not only the educational aspirations of Aboriginal and Torres Strait Islanders students, but also increasing their levels (and utility) of School Self-concept and School Enjoyment.

### *Implications*

The implications suggest that not only is AIME an essential tool for closing the educational gap between Aboriginal and Torres Strait Islander and non-Aboriginal students, but also that our understanding of mentoring must be extended well beyond simplistic notions of role-modeling.

**Key Words:** Mentoring, Educational Aspirations, University, Aboriginal and Torres Strait Islanders, Self-concept, Structural Equation Modeling

**Category:** Research Paper

Whilst varying forms of peer-mentoring have been recognized as a significant driver for the success of students within national and international research contexts (DuBois, Holloway, Valentine, & Cooper, 2002; Lester & Munns, 2011; Behrendt, Larkin, Griew, & Kelly, 2012), detailed analyses of mentoring experiences is a relatively new pursuit that has drawn considerable discussion centering around the diversity of foundations, perspectives, and practices in which mentoring programs may take place. Debates characteristic of such new fields of study largely center around core issues such as: the definition of mentoring (e.g. Crisp & Cruz 2009; Ferrar 2004; Huizing 2012); the distinction between mentoring and coaching (e.g. Ghaye & Lillyman 2008); the impact of mentoring on mentors and mentees (e.g. DuBois, Holloway, Valentine, & Cooper, 2002; Harding 2013); best practice principles for mentoring programs (e.g. Anastasia, Skinner, & Mundhenk 2012); and, appropriate methodologies and theoretical frameworks for studying mentoring (e.g. Allen, Eby, O'Brien, & Lentz, 2008; Crisp & Cruz 2009; Scanlon, 2009). The diversity of approaches to mentoring has resulted in uncertainty in regard to ideal mentoring practices. DuBois et al. (2002) has also noted that there is an under-representation of quantitative studies investigating this area, especially in research investigating the impact of mentoring programs on young people and their engagement, participation, and success with education and training. This gap in the literature is one that the current study attempts to address, specifically within the context of Aboriginal and Torres Strait Islander Education. More specifically, this study shall focus on the recent development of the Australian Indigenous Mentoring Experience (AIME) as one of the most comprehensive and successful mentoring programs to engage Aboriginal and Torres Strait Islander high school students to date (Lester & Munns, 2011).

Controversies surrounding the efficacy of mentoring are indirectly, but aptly highlighted within the seminal work of John Hattie (2003, 2009), who reviewed and analyzed over 800 meta-analyses (which in turn incorporated over 52,637 studies targeting many millions of students), and identified a total of 138 potential drivers of student success at school. Of these 138 drivers which were rank-ordered from most to least effective, 63 were deemed to hold an above-average positive impact on student achievement (having an effect size of .40 or greater). As a result, Hattie argued that these drivers represented: “a level where the effects of innovation enhance achievement in such a way that we can notice real-world differences, and this should be a benchmark of such real-world change” (p. 17). Whilst these 63 factors contained a diversity of factors including: home environment (ranked 31), school environment (e.g., accelerated learning, ranked 5), student (e.g., self-reports of achievement, ranked 1), curriculum (vocabulary programs, ranked 15), teaching qualities (e.g., micro teaching, ranked 4), and teaching strategies (formative evaluation, ranked 3), Hattie’s (2009) listing of mentoring did not feature within the top 63 factors ‘worth having’. In fact, within Hattie’s conceptualization of mentoring, this factor came in at 120 of the 138 drivers of success.

Given Hattie’s (2009) results for mentoring could easily lead researchers, policy makers, teachers, and parents to dismiss the effectiveness of mentoring programs, it is critical to identify how Hattie conceptualized mentoring per-se. Hattie describes mentoring as a process by which ‘older people’ provide academic and social assistance to younger people to support their psychosocial growth. Hattie notes that mentoring has little-to-no ‘teaching’ and is simply based on apprentice-like role-

modeling. While it may be difficult to argue against the overall evidence provided by two meta-analyses that incorporated over 74 studies (BuBois, et al., 2002; Eby, Allen, Evans, Ng, & Dubois, 2008), one can question how broad understandings of mentoring may inhibit identification of more diverse mentoring programs' true strengths.

Much of the analysis of mentoring to date has centered around its use for facilitating professional development and success in corporate settings (e.g., Ehrich, Hansford, & Tennent 2002; St. Claire-Ostwald 2007; Ghaye & Lillyman 2008; Burgess & Dyer 2009; Plaister-Ten 2009). However, the role of mentoring in terms of bettering educational participation and success and mentoring for young people (including those 'at risk') has generated its own literature. Mentoring and its impact on disengaged and/or 'at risk' young people has become a focus of a large proportion of the mentoring literature (Kenyon et al., 2001; Dubois et al., 2002; Evans, 2005; Rhodes & Lowe, 2008; Hyman, Aubry, & Klodawsky, 2010; Meyer & Bouchey, 2010; Wilson, Stemp, & McGinty, 2011; Anastasia, Skinner, & Mundhenk 2012;). School-based and university- or college-based mentoring programs designed to engage young people in education and transition them to tertiary studies are also frequently reviewed (Ehrich, Hansford, & Tennant, 2002; Holden 2004; Randolph & Johnson, 2008; Provitera McGlynn, 2009; McCann & Johannessen, 2010; Beer, Livingston, & Tobacyk 2011; Naidoo, 2011; Wood & Mayo-Wilson, 2012). Rhodes and Lowe (2008) have critiqued such reviews for failing to represent the complexity of mentoring programs, as variation in terms of duration of mentoring relationships, background characteristics of mentee and mentors, frequency of meetings between mentors and mentees, the abilities of mentors to be representative role models, and the balance of friendship vs. informative dynamics, are but a few confounding variables that have been largely ignored by the literature. As a result of such omissions, Rhodes and Lowe forcefully argued that "Unfortunately, standards for identifying effective programs and policies are in short supply. Evaluations that employ sound measures and rigorous methods are needed to determine the efficacy of the various approaches to mentoring" (p.12).

What is clear from the existent literature is that generalized reviews may be of serious risk of misrepresenting the strength of varying mentoring programs. As a result, it is critical that specific mentoring programs be explored carefully with regard to their aims, strategies, and outcomes, with particular sensitivity being shown to the participants who are argued to benefit from the mentoring programs. Before exploring the mentoring program of AIME in more detail, it is necessary to understand how Aboriginal and Torres Strait students have fared within Australia's education system.

#### *Aboriginal and Torres Strait Islander Education*

Aboriginal and Torres Strait Islander peoples have not only been labeled as one of the most disadvantaged minority groups within Australia (Australian Bureau of Statistics & Australian Institute of Health and Welfare, 2009; Bodkin-Andrews & Craven, 2011), but also as one of the most disadvantaged of Indigenous peoples throughout the world (Cooke, Mitrou, Lawrence, Guimond, & Beavon, 2007). Arguably, one of the most critical outcomes in need of redressing with regard to the inequities between Aboriginal and Torres Strait Islander and non-Aboriginal peoples is the patterns of retention and achievement within Australia's education system.

An example of current educational inequities between Aboriginal and Torres Strait Islander and non-Aboriginal students can be found within the Programme for International Student Assessment (PISA) report for Australia (Thomson, De Bortoli, Nicholas, Hillman, & Buckley, 2010). Australian students as a whole were consistently ranked within the top 15 countries (from a total of 66 countries) across reading, mathematics, and science literacy. An analysis of the results for Aboriginal Australian students though revealed that they ranked no higher than 45 across the three literacy outcomes. Although there is a consensus that the factors that may contribute to inequities between Aboriginal and non-Aboriginal Australian students are diverse (Craven & Bodkin-Andrews, 2011; Gray & Partington, 2012), numerous authors have raised the link between patterns of achievement and the need to more strongly culturally engage Aboriginal students towards their short- and long-term educational outcomes (Bodkin-Andrews, Dillon, & Craven, 2010; Munns, Martin, & Craven, 2008; Sarra, 2011; Schwab, 2012). Unfortunately, a recent report suggested that as of 2009, there was a 31.9% gap between the retention of Aboriginal Australian students (when compared to non-Aboriginal Australian students) into Year 12 (Ainley, Buckley, Beavis, Rothman, & Tovey, 2011).

Whilst some researchers have argued that education should be considered the key point of intervention in righting the inequities for future generations of Aboriginal and Torres Strait Islander students (Craven & Marsh, 2008), the education system and how it currently stands with its engagement and retention of Aboriginal and Torres Strait Islander students may be seen as unacceptable. Indeed, as argued by Sarra (2011, p. 159): “Clearly, overall progress in Aboriginal education is severely limited, and must continue to be challenged at many levels. White Australia would never accept the rate of progress and/or the student outcomes that Aboriginal Australia is expected to tolerate”.

#### *The Australian Indigenous Mentoring Experience*

The Australian Indigenous Mentoring Experience (AIME) is a university based mentoring program that was first developed by Jack Manning Bancroft in 2005. The pilot stages of the program first emerged within the University of Sydney, where 25 high school students were matched with 25 university students who acted as mentors. From this small yet meaningful beginning, AIME had effectively expanded in 2012 to become a large multi-faceted initiative expanding across a growing network of 11 university sites and 121 high schools within Australia, with over 1000 high school student mentees, and 1000 university student mentors (AIME, 2012; Behrendt et al., 2012; Lester & Munns, 2011).

The overarching purpose of AIME is to breakdown low expectations that Aboriginal and Torres Strait Islander students may hold towards furthering their education, and to install positive relations with their schools, universities, and communities that will promote students value of, aspirations towards, and success within their educational pursuits (AIME 2012; O’Shea, Harwood, Kervin, & Humphry, in press). In doing so, the desired outcomes for AIME are to substantially increase Aboriginal and Torres Strait Islander student Year 10 progression rates, Year 12 completion rates, and university admission rates so that AIME students are completing high school at the same rate as all Australian students.

To achieve more positive relations between Australia's education system and Aboriginal and Torres Strait Islander students, AIME takes a highly structured, yet broad approach to ensure positive interactions between school student mentees and university student mentors are maximized to their full potential (O'Shea, et al., in press). Across the country and throughout the many programs it runs, AIME partners Aboriginal and Torres Strait Islander high school students with Aboriginal and Torres Strait Islander and non-Aboriginal university student mentors. The programs operate at university campuses and have been specifically written for students in years 9-12. Sessions include focusing on learning varying pathways into university, employment and further education and training, leadership skills, school subject selection, anti-racism, resume building, writing your first speech as Prime Minister and many more. To complement the university based programs, AIME also run Tutor Squads across the AIME sites where groups of AIME mentors travel to participating schools during the program period to provide further academic and personal support for the students.

The effectiveness of AIME is not only seen within opportunities offered to Aboriginal and Torres Strait Islander students, but also in its actual success. In 2012, the results coming from the AIME program are difficult to ignore, with the Year 12 completion rate of AIME students being 91.1% (when compared to national average of 71.8% for Aboriginal and Torres Strait Islander students), and University progression rate being 31.0% (when compared to national average of 10% for Aboriginal and Torres Strait Islander students – AIME, 2012).

#### *The AIME and Hattie's Visible Learning discrepancy*

In consideration of the effectiveness of AIME initiatives, the question of why mentoring within Hattie's (2009) *Visible Learning* (and other meta-analyses) received such a poor result when compared to the success of AIME remains unanswered. As already argued, the answer may rest in how mentoring is conceptualized and applied. For Hattie (2009), mentoring was simply listed as a role-modeling approach with 'older people' that utilized little-to-no teaching activities. AIME on the other hand specifically targets the university generation (primarily undergraduates) as mentors whose recent experiences are directly relevant to high school students. As previously summarized, AIME offers a diversity of structured personal development and support activities to students that are directly related to optimizing and realizing future aspirations and educational achievement (AIME, 2012; Lester & Munns, 2011; O'Shea et al., in press). As such, linking AIME to the effectiveness of previous mentoring programs is unjustified, and what is needed is more research designed to carefully examine the possible benefits of AIME to the educational aspirations and confidence of Aboriginal and Torres Strait Islander students.

#### *Aboriginal Education Research*

It is critical that one be aware of the lack of trust many Aboriginal communities and researchers in Aboriginal education hold towards the use of generalized and Westernized statistical models in attempting to understand the diverse lived experiences of Aboriginal and Torres Strait Islander peoples (Penman, 2006). Ranzijn, McConnochie, and Nolan (2008) explain that such mistrust is justified through the early (and arguably continual) misuse of quantitative methodologies that either supported early Social Darwinist models popular in the 19<sup>th</sup> century (e.g., culturally invalid IQ testing), or more recently, the continuation of deficit orientations designed to 'solve' the 'Aboriginal problem'.

Although it may be argued that today most Aboriginal Education research may have been overtly purged from Social Darwinist perspectives, and that there has been a considerable movement away from deficit orientations, a Ministerial Council on Education, Employment, Training, and Youth Affairs (2006) report into future directions within Aboriginal and Torres Strait Islander education warned that: “While this ‘deficit’ view is now contested, the perception that Indigenous students are to blame for their poor educational outcomes lingers on. Disparity in educational outcomes of Indigenous and non-Indigenous students has come to be viewed as ‘normal’ and incremental change seen as acceptable” (p. 16). Even today, the failure of quantitative statistics within Aboriginal Education is characterized by its inability to effectively contribute research that will point to a more positive future for Aboriginal students. Arguably, while appearing less overtly ‘Social Darwinist’, by adhering to deficit orientations, such practices do indeed have discriminatory effects and contribute to perpetuating deficit orientated discourses of the ‘Aboriginal problem’. Walter (2010) summarizes these alleged limitations of quantitative research, and argues that they stem not necessarily from the methodology itself, but rather the lens, or axiological framework, from which quantitative analyses are conducted. Although Walter listed a series of means by which quantitative data may misrepresent Aboriginal and Torres Strait Islander peoples (e.g., simplistic representations, ideological biases), she does suggest that quantitative data should emanate from an Aboriginal perspective that moves away from a problematic positioning of Aboriginality. She argues that it should instead focus towards the development of a positive social change that is respectful to the identities and voices of Aboriginal Australians. Such an approach was also earlier espoused by in a review of Indigenous research by Mellor and Corrigan (2004, p. 48), who firmly stated that: “The orientation of research into Indigenous education outcomes must not simply adopt a deficit or reactionary approach. Research must be forward-looking, proactive and ultimately strive to obtain social justice – equal opportunity and equitable education outcomes for Indigenous students”.

Within the Aboriginal Education research context, it may argued that quantitative researchers are now standing at a junction between repetitive and continually divisive deficit orientations, and a movement towards a more positive and inclusive framework that ensures the voices and experiences of Aboriginal and Torres Strait Islander peoples are heard, and more importantly acted upon. Taking just such a positive approach, the analyses utilized in this chapter are, we maintain, well past this juncture. As a result, this investigation captures the voices of Aboriginal and Torres Strait Islander students through representative self-report measures, and thus aims to:

1. Identify if confidence can be drawn from psychometric validity estimates of the measures across a sample of Aboriginal and Torres Strait Islander high school students who have either participated in the AIME program (AIME group) or not participated in the AIME program (School group);
2. Identify differences in how the AIME group and School group students responded to measures of School Self-concept, School Enjoyment, Aspirations to finish Year 12, and Aspirations to go to University, to test the efficacy of the AIME program in regard to these constructs; and
3. After controlling for varying background variables (e.g., whether their parents have attended university), determine the extent to which increased



levels of School Self-concept predict School Enjoyment, Year 12 Aspirations, and University Aspirations for the School and AIME student groups in order to.....

## **Methodology**

This study has drawn data from two separate participant groups containing self-reports of Aboriginal and Torres Strait Islanders high school students from Year 9 to Year 12. For the purposes of clarity, these data sets will be labeled as the School group (with data gathered in 2007) and the AIME group (with data gathered in 2012). Both participant groups were part of research projects the lead author was involved in (and who has conducted all analyses), and was collected with full ethical clearance and consultation with representative Aboriginal and Torres Strait Islander organisations (e.g., NSW Aboriginal Education Consultative Group, and The AIME Institute). The total sample consisted of 228 participants (all Aboriginal and/or Torres Strait Islander students), with 140 from the school group (65 male, 75 female, mean age of 14.66 years) and 90 from the AIME group (45 male and 45 female, mean age of 15.81 years).

### *Instrumentation*

#### *Demographic Variables*

Key demographic variables to be assessed include: gender, age, whether their parents went to university, and home educational resources (a list of ten resources that may assist study at home e.g., a desk to study on, access to the internet – cf. Craven, et al., 2005).

#### *Self-Perception Measures*

*School Self-concept* (Marsh et al., 2005). Drawn from the larger Self-Description Questionnaire II- Short Version, this measure was designed to capture students' overall confidence within school (e.g., I am good at most school subjects). Answers ranged from False (1) to True (6).

*School Enjoyment Scale* (Craven et al., 2005). A measure designed to capture the degree to which students enjoy being at school (e.g., I like school). Answers ranged from False (1) to True (6).

#### *Outcome Variables*

Two key binary aspiration variables acted as the primary outcome variables for this investigation. They were aspirations to complete Year 12 (Year 12 Aspirations coded as -1.00 = no, 1.00 = yes), and aspirations to go to university (University Aspirations coded as -1.00 = no, 1.00 = yes).

#### *Statistical Analyses*

A variety of statistical techniques were utilized for this study to glean the most information from the data sets available. The analyses were conducted with either IBM SPSS or MPLUS 6.12, and included not only simple frequency and descriptive (e.g., Means) analyses, but also more advanced inferential statistics. Firstly, to aid in determining confidence in the validity of the variables, confirmatory factor analyses (CFA) and factorial invariance testing techniques were utilized (see Bodin-Andrews, Ha, Craven, & Yeung, 2010 for an overview). In addition, logistic regression and moderating path analytical techniques were utilized within a structural equation modeling (SEM) framework (Byrne, 2012; Muthén, & Muthén, 2007) to identify how

participation in AIME impacted upon the variables within this investigation, and how School Self-concept predicted the outcome variables.

## Results

### *Aim 1: Creating the Foundation - Psychometric Validity*

Prior to drawing any far reaching conclusions obtained from the results, it is essential to determine that we can be confident that the results are valid to a certain degree. The importance of such a foundation cannot be underestimated within and across sensitive cultural groups in socio-cultural research (Parker, Dowson, & McInerney, 2007), with Aboriginal and Torres Strait Islander participants being no exception (Walter, 2005). As a result, Confirmatory Factor Analysis (CFA) was used to test the extent to which indicator items reflected the theoretical a-priori underlying factor structure of the measures.

With CFA results, it is important to determine the extent to which the items reflect what they are meant to measure (e.g., School self-concept), as evidenced by the standardized factor loadings. As can be noted within Table 1, all factor loadings were significant and substantial in size (greater than .51) for both participant groups. This meets the required assumptions for satisfactory factor loading estimates (Byrne, 2012).

*Table 1.* Standardized factor loadings for the key measurement instruments

| Item # | Factor Loadings     |      |                  |      |                     |      |                        |      |
|--------|---------------------|------|------------------|------|---------------------|------|------------------------|------|
|        | School Self-concept |      | School Enjoyment |      | Year 12 Aspirations |      | University Aspirations |      |
|        | SCH                 | AIME | SCH              | AIME | SCH                 | AIME | SCH                    | AIME |
| Item 1 | .58*                | .68* | .80*             | .86* | 1.00                | 1.00 | 1.00                   | 1.00 |
| Item 2 | .60*                | .81* | .51*             | .75* |                     |      |                        |      |
| Item 3 | .82*                | .80* | .89*             | .81* |                     |      |                        |      |
| Item 4 | .90*                | .91* | .83*             | .91* |                     |      |                        |      |

*Note.* SCH = School Group, AIME = AIME Group. \* =  $p < .05$ .

Secondly, correlations amongst the key factors should be examined to assess not only how the constructs may be correlated, but to ensure that the factors are relatively independent constructs (correlating less than .80 - Bodkin-Andrews, Craven, Parker, Kaur, & Yeung, 2013). Table 2 revealed that although most of the correlations were moderately correlated, no correlation exceeded .52 for either group. This suggests that the factors, although somewhat related, were distinct constructs.

*Table 2.* Standardized factor correlations for the key measurement instruments

|                        | Correlations        |                  |                     |                        |
|------------------------|---------------------|------------------|---------------------|------------------------|
|                        | School Self-concept | School Enjoyment | Year 12 Aspirations | University Aspirations |
| School Self-concept    | --                  | .51*             | .46*                | .42*                   |
| School Enjoyment       | .52*                | --               | .32*                | .11                    |
| Year 12 Aspirations    | .34*                | .35*             | --                  | .32*                   |
| University Aspirations | .32*                | .20*             | .39*                | --                     |

*Note.* Correlations above the diagonal were for the AIME group, and correlations below the diagonal were for the School Group. \* =  $p < .05$ .

Thirdly, and possibly most critically, it is essential that the overall CFA model (including all the factors) meets multiple and strict criteria suggesting that the model is well defined. This is done through an investigation of the multiple goodness of fit indices, where based on the advice of Marsh, Balla, and McDonald (1988); emphasis was placed upon Root-Mean-Square Error of Approximation (RMSEA), Comparative Fit Index (CFI), and Tucker-Lewis Index (TLI). For the RMSEA, values less than .05 indicate reflect close fit (.08 acceptable), and values above .95 for the CFI and TLI represent excellent fits (.90 acceptable) for the data. Table 3 reveals that all the fit indices were excellent fits to the data.

Table 3. Goodness of fit indices for the CFA model.

| Goodness of Fit Indices |    |     |     |       |
|-------------------------|----|-----|-----|-------|
| $\chi^2$                | df | CFI | TLI | RMSEA |
| 70.27                   | 62 | .99 | .99 | .03   |

Note.  $\chi^2$  = Chi-square statistic, *df* = degrees of freedom.

Although strong CFA results allow a substantially increased level of confidence that the measurement instruments may be valid in their measurement properties, it does not answer whether the measurement instruments mean the same thing across different groups (Bodkin-Andrews, Ha, et al., 2010). As a result, factorial invariance testing was conducted, and the criteria of no more than a +/- .01 change in the CFI (when compared to the baseline model), and overlap in the 90% confidence interval of the RMSEA was utilized (Bodkin-Andrews et al., 2010; Cheung & Rensvold, 2002) across increasingly restrictive models (Model 1 = baseline model with no restrictions; Model 1 factor loadings invariant across groups; Model 3 factor loadings and intercepts invariant across groups).

The findings presented in Table 4 reveal that although invariance assumptions were met for Model 2 - factor loadings (suggesting that the items reflect the same factors across groups), the assumptions for Model 3 – factor loadings and intercepts (additional setting of invariant mean scores for individual items) were not met. Although invariance for Model 3 may be considered desirable (assuming one expects the same pattern of mean responses across items), invariance across factor loadings is argued to be the minimal requirement of measurement invariance, (Parker et al., 2007). Thus some confidence can be assumed that the measurement instruments are equivalent in meaning across the two groups.

Table 4. Factorial Invariance testing.

| Goodness of Fit Indices |          |    |     |            |
|-------------------------|----------|----|-----|------------|
|                         | $\chi^2$ | df | CFI | 90% RMSEA  |
| Model 1                 | 70.27    | 62 | .99 | .00 to .07 |
| Model 2                 | 93.81    | 70 | .98 | .02 to .08 |
| Model 3                 | 182.96   | 78 | .89 | .09 to .13 |

Note.  $\chi^2$  = Chi-square statistic, *df* = degrees of freedom.

#### *Aim 2: Difference Testing between the AIME and School Groups*

To examine if the AIME and School participant groups responded differently to the factors measured within this investigation, the mean responses were first identified across the two groups. Table 5 shows that although both participant groups responded

positively to the School Self-concept and School Enjoyment (mean scores above 3 indicate agreeing to these factors) and Year 12 Aspirations (scores above .00 indicated agreeing to aspire to complete Year 12), on average both groups disagreed to aspiring to go to university (as indicated by scores below .00). Whilst these results are relatively positive, difference testing (done by correlating the participant group with the variables in a supplementary CFA) revealed that across all the variables, the AIME group were more likely to respond positively to these measures. The AIME group were also found to have statistically significant higher scores in School Self-concept and Year 12 Aspirations, with the scores approaching significance ( $p < .10$ ) for School Enjoyment and University Aspirations.

Table 5. Mean responses and difference testing across the key variables.

|                           | School Self-<br>concept | School<br>Enjoyment | Year 12<br>Aspirations | University<br>Aspirations |
|---------------------------|-------------------------|---------------------|------------------------|---------------------------|
| AIME Group                | 4.21                    | 4.20                | .77                    | -.11                      |
| Aboriginal Group          | 3.87                    | 3.78                | .39                    | -.36                      |
| <i>Significance level</i> | .01*                    | .10 <sup>^</sup>    | .01*                   | .06 <sup>^</sup>          |

Note. \* =  $p < .05$ , <sup>^</sup> =  $p < .10$

Due to the Year 12 and University Aspiration variables being categorical in nature, a follow-up logistic regression (Muthén, & Muthén, 2007) was conducted to ascertain what the likelihood of participating in the AIME program would be for increasing the aspirational variables. Table 6 reveals that if participants were part of the AIME program within this sample, they were 1.87 times more likely to want to complete Year 12, and 1.30 times more likely to want to go to university.

Table 6. Logistic regression estimates for Year 12 and university aspirations.

| Background Frequencies |         |       |                  |       |
|------------------------|---------|-------|------------------|-------|
|                        | Year 12 |       | University       |       |
|                        | No      | Yes   | No               | Yes   |
| SCHOOL GROUP           | 30.7%   | 69.3% | 67.9%            | 32.1% |
| AIME GROUP             | 11.2%   | 88.8% | 54.4%            | 45.6% |
| Logistic Regression    |         |       |                  |       |
|                        | Year 12 |       | University       |       |
|                        | Beta    | Odds  | Beta             | Odds  |
| GROUP                  | .32*    | 1.87  | .14 <sup>^</sup> | 1.30  |

Note. \* =  $p < .05$ , <sup>^</sup> =  $p < .10$

For aim 2 of this investigation, it can be noted that for School Self-concept, Year 12 Aspirations, and University Aspirations, the AIME participant group responded statistically significantly more positively than the School participant group. These results offer evidence towards the likelihood that participating in AIME for Aboriginal and Torres Strait Islander students may not only be associated with increased their confidence within school, but also their desire to compete Year 12, and go to university.

*Aim 3: School Self-concept as a Predictor of School Enjoyment, and Aspirations for Year 12 and University*

The final analysis to be conducted within this investigation is known as a multi-group structural equation model (SEM - Byrne, 2012) whereby School Self-concept was set to predict Year 12 and University Aspirations, in addition to School Enjoyment. A substantial caveat was set for this multi-group SEM in that the predictive strength of School Self-concept had to be *over-and-above* the effects of the students' gender, age, home educational resources, and whether their parents had gone to university. Due to the relatively small sample size in both the AIME and School participant groups, separate multi-group SEMs had to be conducted for each outcome variable. Table 7 presents the overall findings across these SEMs.

Table 7. Multi-group SEMS across students aspirations and enjoyment.

|                     | Multi-group Regression |           |            |           |           |           |
|---------------------|------------------------|-----------|------------|-----------|-----------|-----------|
|                     | Year 12                |           | University |           | Enjoyment |           |
|                     | School                 | AIME      | School     | AIME      | School    | AIME      |
| Gender              | .24*                   | <i>ns</i> | .30**      | <i>ns</i> | <i>ns</i> | <i>ns</i> |
| Age                 | <i>ns</i>              | <i>ns</i> | <i>ns</i>  | <i>ns</i> | <i>ns</i> | <i>ns</i> |
| HER                 | <i>ns</i>              | <i>ns</i> | <i>ns</i>  | <i>ns</i> | <i>ns</i> | <i>ns</i> |
| Parental University | .24^                   | <i>ns</i> | .20*       | <i>ns</i> | <i>ns</i> | <i>ns</i> |
| School Self-concept | .43**                  | .59**     | .46**      | .49**     | .54**     | .48**     |

Note. HER = Home educational resources, *ns* = non-significant. \* =  $p < .05$ , ^ =  $p < .10$

The first multi-group SEM over Year 12 Aspirations (goodness of fit indices -  $\chi^2 = 55.21$ ,  $df = 40$ , CFI .92, RMSEA = .06) revealed that for the School participant group, such aspirations were predicted by Gender (whereby females were more likely to aspire to finish Year 12), students with parents who went to university were also more likely to aspire to finish Year 12, and have higher levels of School Self-concept. For the AIME participants though, only increased levels of School self-concept predicted a greater likelihood of aspiring to complete Year 12.

A similar pattern of results could be seen in the second multi-group SEM predicting University Aspirations (goodness of fit indices -  $\chi^2 = 50.24$ ,  $df = 40$ , CFI .95, RMSEA = .05). That is, for the School participant group, university aspirations were predicted by Gender (whereby females were more likely to aspire to go to university), students with parents who went to university were also more likely to aspire to go to university, and increased levels of School Self-concept. For the AIME participants though, only increased levels of School Self-concept predicted a greater likelihood of aspiring to complete Year 12.

For the final multi-group model predicting School Enjoyment (goodness of fit indices -  $\chi^2 = 275.33$ ,  $df = 122$ , CFI .84, RMSEA = .10), for both the School and AIME participant groups, only increased levels of School Self-concept predicted increased levels of School Enjoyment.

## Discussion

In consideration of the aims of this study, a number of positive findings emerged. Firstly, considerable strength can be found in the strict series of psychometric tests (CFA and factorial invariance testing) that were conducted, and the findings suggesting the measurement instruments not only held strong validity estimates for both the School and AIME students groups, but also the measurement instruments

held an acceptable degree of equivalence in meaning across the two groups. Such findings not only fulfilled the first aim of this study, but also in part, allayed the concerns that quantitative data is not suitable for representing the experiences of Aboriginal and Torres Strait Islander peoples (Penman, 2006; Walter, 2005).

The second finding to emerge offered insights on the effectiveness of the AIME program, as seen within the difference testing in this study. That is, it was found that the Aboriginal and Torres Strait Islander students who took part in the AIME program held higher levels of School Self-concept (significantly so) and School Enjoyment, and were more likely to aspire to finish Year 12 (1.87 times more likely and significantly so) and to aspire to go to University (1.30 times more likely). Such findings are of critical importance as the inequities between the retention and completion rates of Aboriginal students completing high school, and access to university, when compared to non-Aboriginal students, has long been of considerable concern (Ainley, et al., 2011; Craven & Bodkin-Andrews, 2011; Sarra, 2011; Behrendt et al., 2012). Similar concerns have been raised over the engagement, enjoyment, and confidence of Aboriginal and Torres Strait Islander students within school (Craven & Marsh, 2004; New South Wales Aboriginal Education Consultative Group and the New South Wales Department of Education & Training, 2004; Bodkin-Andrews et al., 2013). In short, the evidence suggests that the AIME program may be highly effective in addressing these concerns.

Finally, in addressing the third aim, the multi-group SEMs also offered evidence attesting to the strength of the AIME program. That is, School Self-concept predicted higher levels of Year 12 Aspirations, University Aspirations, and School Enjoyment for both the AIME and School participant groups. From this result, a number of subtle, yet potentially very important observations can be made. Firstly, although this effect was not observed for School Enjoyment, for the two aspirational variables, the predictive strength of School Self-concept was larger for the AIME group when compared to the School group. This finding may be argued to address the arguments of Bodkin-Andrews, Dillon, and Craven (2010) who raised concern over findings suggesting that School Self-concept was not as relevant (that is not as powerful predictor) to Aboriginal student levels of educational engagement and aspirations when compared to non-Aboriginal students. What the findings in this study suggest is that the increased levels of School Self-concept promoted by AIME may also be more strongly linking such confidence to meaningful schooling outcomes. Secondly, and arguably most importantly, whilst School Self-concept positively and significantly predicted the aspirational outcomes over and above the background variables (gender, age, Home Educational Resources, and Parental University Experience), School Self-concept did not override the predictive power of the gender and parental university variables for the School group. That these variables were not significant predictors for the AIME student group may be argued to suggest that AIME has the potential to override the effects of varying background variables for Aboriginal and Torres Strait Islander students. If this interpretation is correct, this evidence suggests that AIME is a truly effective mechanism for overcoming potential generational and social disadvantage.

Before concluding this paper, it is important to note a unique limitation this chapter may hold. Moving beyond clichéd listings of cross-sectional data, the so-called bias of self-reporting, the most substantial concern to be raised is the differing time-frame

in which these studies took place. That is the educational aspirations of Aboriginal and Torres Strait Islander students in 2007 may differ remarkably from students in 2012. Whilst a valid concern, one should also consider, especially for university admittance, how little progress has been made over the last decade with regard to the educational outcomes for Aboriginal and Torres Strait Islander students (Ainley et al., 2011; Behrendt et al., 2012). In addition, as already listed, the most recent AIME report (AIME, 2012) suggests that AIME participants hold much stronger completion rates and university admittance rates when compared to data on all Aboriginal and Torres Strait Islander students. That is the 2012 completion rates for Year 12 AIME students was 91.1% (as opposed to 71.8% for all Aboriginal and Torres Strait Islanders students), and the percentage of AIME students obtaining scores that would gain them university entrance was 22.1% (as opposed to 3.8% for all Aboriginal and Torres Strait Islanders students).

In conclusion, despite the limitations of this study, the results offer evidence to suggest that AIME is making a substantial and meaningful contribution to redressing the educational inequities many Aboriginal and Torres Strait Islander students may be forced to endure. It is critical to note that this contribution is not done through what can be argued to be ineffective approaches to mentoring as listed by Hattie (2009), but rather by running a disciplined yet diverse and engaging series of structured activities that guide both mentors and mentees towards a stronger educational future for Aboriginal and Torres Strait Islander students.

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