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Validation of the Multi-Dimensional Student Perceptions of School Questionnaire (MSPSQ): Early findings and next steps

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Research in Indigenous and non-Indigenous education in Australia over the last two decades has begun to turn towards quantitative methods of understanding various factors affecting student outcomes. The current article presents a new measurement instrument, the Multi-Dimensional Student Perceptions of School Questionnaire (MSPSQ), validated with a moderate-sized sample of secondary students in Western Australia (Indigenous: *n* = 244; non-Indigenous: *n* = 258; not stated: *n* = 34). The MSPSQ aimed to measure student perceptions of select experiences within the family, community and school which may factor in school engagement and beliefs regarding normative education behaviour and likely outcomes. Exploratory factor analysis indicated that the 46 scalar items in the MSPSQ adequately reflected 12 underlying constructs for the given sample. The MSPSQ was found to have robust total internal consistency ($\alpha = 0.85$), as well as good measures of Cronbach's alpha ($\alpha > 0.7$) on six constructs of self-reported student experiences: Positive school culture, Student self-efficacy, Pathway development, Provision of study assistance, Family support, and Peer support. Five other constructs had moderate internal consistency ($\alpha > 0.6$). These were Promotion of Indigenous culture, Access to a suitable study environment, Future aspirations, School importance, and Perceived benefit of education.

Keywords: Indigenous schooling, instrument validation, student perceptions, factor analysis, education utility

Introduction

Research context

In an effort to promote equitable education engagement and achievement between Indigenous[1] and non-Indigenous Australians, and to increasingly model education systems in ways that reflect the lived experience of Indigenous Australians, research over the last two decades has begun to turn towards quantitative methods of understanding education experiences and decision-making amongst Indigenous school students (Biddle, 2014; Bodkin-Andrews, Ha, et al., 2010; Hillman, 2010; Lamb et al., 2004). Scholars hope that this growing area of research can quantify the influence of various factors on Indigenous education outcomes in order to influence education providers to more effectively meet the expressed needs of Indigenous Australians, as framed by communities themselves (Biddle, 2014; Rainie et al., 2017).

[1] The term "Aboriginal" is preferred nomenclature amongst Aboriginal people in Western Australia, whereas "Indigenous" is the preferred term in some other parts of Australia. In this article, the term "Aboriginal" is used when this information is known about the individuals or groups mentioned, or where discussion refers to literature that has used this terminology. In all other cases, the broader term "Indigenous" is used.

Within the last decade there has been a steady output of high-quality research into the psychological determinants of education behaviours such as self-concept and motivations (Biddle, 2014; Bodkin-Andrews, Ha, et al., 2010; Mooney et al., 2016). Some studies have validated pre-existing psychological measurement tools, for example, the Self-Description Questionnaire II (short version) (SDQII-S) for use with Aboriginal students (Bodkin-Andrews et al., 2005). Other researchers have also used large-scale quantitative studies to assess the impact of academic self-concept and secondary school engagement on post-secondary education aspirations, completion and occupational status for Australian students more generally, as well as for Indigenous Australian students specifically (Abbott-Chapman et al., 2014; Bodkin-Andrews, Ha, et al., 2010).

Accompanying the emergent quantitative focus on Indigenous student aspirations, motivations and identity is a need to obtain robust and statistically valid measures of other factors that influence student educational decisions. The list of factors known to affect education engagement is extensive, incorporating academic influences, such as pedagogy and teacher attitudes, curriculum relevance and student achievement; socioeconomic influences, such as parental education, access to schools of higher socioeconomic status, household and neighbourhood poverty, family trauma and dysfunction, and racism and discrimination; and demographic factors, such as geographic location, gender, Indigenous status, disability status and English speaking background (Hattie, 2003; Lamb et al., 2004; Reid, 2008; Standing Committee on Indigenous Affairs, 2017).

In the Australian data landscape, many of these variables have been conceptualised, measured and analysed within a Western epistemology aligning with human capital theory, and used in ways that have denied Indigenous ontology and sovereignty and contributed to perceptions of Indigenous deficit (Morphy, 2016; Walter, 2016). However, data can also be a tool of anti-imperialism and Indigenous self-determination, when the data quantifies information that is relevant and accurate to the ontologies and realities of Indigenous peoples, and is able to be used by Indigenous communities towards their own goals, rather than goals imposed by government policy (Rainie at al., 2017; Walter, 2016). In this way, even variables originally conceptualised from a Western epistemology may contribute towards Indigenous governance if used by Indigenous communities, organisations and scholars towards that purpose. These are likely to be most effective where they do not replace Indigenous-led research, but add to constructs identified by Indigenous scholars as affecting Indigenous student engagement in ways that have not been conceptualised within existing instruments (Bodkin-Andrews et al., 2012; de Plevitz, 2007; Rigney, 2011).

Recently, researchers have begun to develop and validate measures of culture-specific determinants, for example, Aboriginal perspective, perceived multiculturation (perceived cultural respect) and racial discrimination, and demonstrated their effect on Aboriginal school engagement and motivation (Bodkin-Andrews et al., 2012; Mooney et al., 2016). Although these studies have been robust, they have relied largely on data from respondents in only one Australian state, New South Wales.

In addition to the need for measurement of Indigenous-identified constructs, it is already established that psychological constructs, such as self-concept, sometimes differ in conceptualisation and operation between Indigenous and non-Indigenous students (Bodkin-Andrews et al., 2005; Craven & Marsh, 2004). Even where the literature has identified the importance of non-culture specific factors, such as family education levels, parental and peer support, student self-concept, and positive school culture, in relation to Indigenous and non-Indigenous student engagement (Biddle, 2014; Bodkin-Andrews et al., 2012; Lamb et al., 2004), the relative experiences of Indigenous students against these factors may vary according to individual, school and geographic constraints.

Bodkin-Andrews, Ha, Craven and Yeung (2010) reiterate that, due to the diversity and heterogeneity of Indigenous populations across Australia, psychometric validation of an instrument for one population should not be automatically considered to apply to all Indigenous Australians. Hence, there is a need to broaden the range of constructs for which measurement tools have been validated, as well as to broaden the sample that has participated in the validation of these tools.

The current article contributes to scholarly discourse a new measurement instrument, the Multi-Dimensional Student Perceptions of School Questionnaire (MSPSQ). The MSPSQ presented here is developed by a team of researchers that included, but did not have as a majority, Indigenous academics and practitioners. It is, therefore, not intended that this instrument measures the breadth of Indigenous-specific constructs, but that it contributes to scholarly discussion new measures of constructs useful for Indigenous research. That is, that the MSPSQ quantifies information known already to Indigenous peoples in a way that creates a powerful argument for external brokers, institutions and policy makers. Within this article, the initial instrument development and validation process are presented, as well as limitations inherent in the sampling process. The particular contribution of this tool to scholarly work is evident in its measures of new constructs, validated for a Western Australian sample of Indigenous and non-Indigenous students. Many of the Indigenous respondents hailed from towns and Aboriginal communities in Australia's remote North West, with ensuing strong cultural ties to language, lore and traditional practices of these areas.

It is therefore intended that the MSPSQ contribute to scholarly knowledge a broadening of the types of constructs and also cultural/geographic Indigenous groups for which validated quantitative instruments exist. It is acknowledged that this research presents one further step towards the development of surveys that prioritise the breadth and depth of the perspectives of Aboriginal and Torres Strait Islander students. Future iterations of the MSPSQ may further refine these measures for reliability across the diversity of Indigenous and non-Indigenous populations, and add in further relevant measures affecting students' social experiences both in and outside of schooling.

Research question

Does the MSPSQ provide valid measures of variables relevant to the conceptualised constructs, assessed according to an appropriate factor analysis and internal consistency?

Paramount to the development of a new measurement tool is that items fit appropriate factors that consistently reflect relevant constructs.

Methodology and method

The instrument development process was grounded in the theory of planned behaviour (TPB) (Ajzen, 2005), which describes all behavioural intentions as a response to the belief that those tasks are normative, beneficial, achievable and under one's control. To the best of our knowledge, no explicit cultural adaptation has been performed for TPB with Australian Aboriginal and/or other Indigenous cultures, although the theory has been successful at explaining the attitude–behaviour relationship across numerous contexts, cultures and behaviours. Within this conceptual framework, the MSPSQ was developed to investigate Indigenous students' perceptions of the normative level of education engagement within their social network, the benefits they ascribed to school attendance, year 12 completion and post-secondary pathways, and the degree to which they believed that it was within their

control to achieve positive outcomes from such endeavours. That is, items were considered relevant if they appeared to measure students' perception that education was normative, beneficial and achievable, and under the student's control, in accordance with TPB. Three further criteria also guided the development of the MSPSQ. The intended constructs needed to have a strong theoretical basis within the literature, reflect factors different from constructs that have already been accurately measured with Indigenous Australian students in recent studies, and have the potential scope to be reliably measured through a non-invasive, self-reported questionnaire.

With these guiding criteria, it was necessary to specify the scope of the MSPSQ not cover constructs that were sensitive (e.g., experiences of family poverty or trauma), or that could not be assessed through student self-perception (e.g., curriculum and teacher standards). In consideration of these constraints, the intended constructs chosen for the MSPSQ were: positive experiences of school culture; student awareness of post-secondary education and employment pathways; access to a high-quality homework environment; student academic self-concept and self-efficacy; perceived community norms; and student perceptions of the benefit of post-secondary education and employment (Hillman, 2010; Lamb et a., 2004; Reid, 2008; Standing Committee on Indigenous Affairs, 2017).

Development of materials

Considerations for reliability and validity

The MSPSQ was developed for administration to Indigenous and non-Indigenous secondary students in remote, regional and urban Western Australia. The most recent *Closing the Gap* report (Commonwealth of Australia, 2020) highlights that mean literacy levels of Indigenous Australian secondary students remain significantly below national minimum standards. Given the possibility that respondent literacy would be low, deliberate addition of other scales for the purposes of validity testing could have contributed to survey fatigue and attrition of respondents (Worthington & Whittaker, 2006), and reduced survey reliability and validity. Complex constructs were thus measured by two to four items, to allow construct and content validity while minimising the chance of participants' fatigue and/or attrition. Future use of the MSPSQ would be analytically strengthened by additional validation methods, perhaps using those instruments discussed previously (Bodkin-Andrews et al., 2005; Cohen et al., 2007). Internal consistency reliability was assessed after data had been collected (Cho & Kim, 2014).

With the TPB framework in mind, an important question of criterion validity arose, as to whether *actual behaviours* would accurately be reflected through self-reported education *intentions.* Ajzen (2005) found that specific attitudes (towards specific behaviours) do correlate strongly with specific measurable behaviours. For this reason, most questions asked were framed to measure specific attitudes and intentions, for example, asking "Will you complete year 12?", rather than a more generic question, such as, "Do you like school?", so to improve the likelihood of criterion validity.

Decision process for item development

The preceding discussions provided criteria for the development of a survey instrument that could provide efficient and useful measures of the intended constructs. The established criteria were:

1. The instrument should be short enough for most students to complete within 20 minutes.

2. The instrument should be easy to read and comprehend, in line with a minimum reading age of 11 years.

3. The instrument should measure constructs that were supported by the literature.

4. The instrument should be worded in a manner that would facilitate comparable comprehension across Indigenous, non-Indigenous, rural and urban students.

5. Items should explicitly target specific attitude-related behaviours, wherever possible.

6. Constructs that were composed of multiple traits would be tested through multiple items.

7. Constructs that were composed of single traits would be tested through single items.

8. Items would provide five-point Likert-type scales for responses, which would allow participants continuums for meaningful responses. These would also provide continuous measures for parametric statistics and measurable variances.

Consultation process for item development

Based on the criteria above, a pool of 167 potential items was developed, with a minimum of four per construct. Initial consultation on items was conducted with a panel of five experts and a small focus group of high school students (n = 18). Purposive sampling was used to source panel members, consisting of a non-Indigenous social psychology researcher with previous experience consulting for Aboriginal community members and scholars, three academics (one Indigenous and two non-Indigenous) experienced in Indigenous education, as well as one Aboriginal student support officer. It is further noted that all panel members bar one had previous experience working with Indigenous students in schools.

Discussion amongst the panel of experts covered topics such as the use of the terms "respect" and "Indigenous", which have different meanings to different culture groups. A decision was made to replace the term "Indigenous" with "Aboriginal or Torres Strait Islander" in the questionnaire, in line with Western Australian norms. The word "respect" was retained, although Indigenous and non-Indigenous respondents might have slightly different interpretations of the term, these were thought to be similar enough for the intended construct.

Feedback from student focus groups consisted of non-Indigenous day students (n = 13) and Indigenous boarding students (n = 5). The boarding students requested that the items regarding study arrangements be re-worded to read "In the boarding house …", as they felt marginalised by item wording that assumed they lived "At home …". This was a useful example of the benefit of testing items with members of the target population when developing a measure (Cohen et al., 2007). After consultation was completed, 46 items remained in the MSPSQ instrument.

Participants

Sampling and limitations

The target population for this study was Indigenous secondary students, male and female, in year 8 to year 12, attending non-public schools in Western Australia. Although the majority of these students are likely to be Aboriginal and not Torres Strait Islander, within the survey, students were asked to identify if they were "Aboriginal or Torres Strait Islander", and are hence referred to by the broader term "Indigenous" in the current paper. For comparative analysis of the survey findings, and to determine whether the instrument had potential for broader validity across samples, data were also collected from non-Indigenous secondary students in the same year groups at most participating schools. Within the

Catholic and Independent sectors, all schools that offered year 11-12 curriculum and had at least 20 Indigenous secondary students enrolled were invited to participate. School leaders then self-selected whether to take part.

Despite only private schools providing respondents for this study, participant schools accurately reflected the diversity of socioeconomic status (SES) in Australia. The Index of Community Socio-Educational Advantage (ICSEA) statistics for each school, as reported by the Australian Curriculum, Assessment and Reporting Authority (ACARA, 2013) ranged from a low of 899 to a high of 1,203, with a mean of 1,018 and a standard deviation of 96. These statistics closely mirrored the spread of Australian schools overall, with a mean of 1,000 and standard deviation of 100 on the ICSEA scale.

The inclusion of students only from Catholic and Independent schools in the study is acknowledged as a potential source of bias, although the confounding effect of such bias may not have been significant. As the ICSEA data above indicate that the schools that participated were reflective of Australian socioeconomic norms, it may appear at first instance that the fact that Indigenous Australian families experience a disproportionate level of economic hardship in Australia is not represented within the study sample. Qualitative data gained during the study, however, indicated that the majority of Indigenous boarding students in this study who attended high ICSEA schools were the recipients of scholarships or financial aid, and were not themselves from high SES families.

Notwithstanding the socioeconomic situation of families represented in this study, it is acknowledged that variables which are not socioeconomic can vary the experiences of students across schools and school sectors. It is possible that differences in professional development and associated cultural competency level of teachers; quality of school and community relationships (particularly between boarding and community-based schools); the number of Indigenous staff employed at the school; and the existence of Indigenous-student-focused aspirational/participation programs, such as Follow the Dream, Future Footprints or Clontarf Academy, all can create differences in experience for students between government and non-government sectors. Although the effect of school sector could not be measured in the present study, these variables may influence the experiences and perceptions of participants reported in the data.

A second type of bias that may have been introduced through the restriction of this study to students attending Catholic or Independent schools was that of family attitudes towards education. Students were not asked to report their reasons for attending their particular school, however, it has previously been identified that families may select a Catholic or Independent school education for a variety of reasons, such as religious belief, remote domicile, availability of boarding or scholarship opportunities, following footsteps of other family members, or a perception that such schools may have higher levels of academic rigour, educational opportunity and behavioural discipline (Macdonald et al., 2018).

Hence, although the restriction of the study sample to non-government schools is acknowledged by the authors as a limitation of the present study, the extent and type of this bias should also be interpreted cautiously. It is hoped that future validation of the MSPSQ with respondents from government schools would strengthen reliability of the survey instrument.

Respondents

Data were collected from 536 students from 14 schools. Of these schools, seven were situated in Perth, four were regional, and three were remote. A total of 207 (38.62%) students reported that they lived in a boarding house, 293 (54.66%) students reported that they were day students, and 36 (6.72%) students did not report their residential status.

The study consisted of an almost symmetrical proportion of students by age and Indigenous status, and a small majority of female students, for the 502 of respondents who provided full demographic information. The gender, Indigenous status and school year of students are presented in Table 1.

Table 1. Respondents by school year, Indigenous status and gender

	Indigenous		Non-Indigenous		Total
	Female	Male	Female	Male	*n*
Year 8	27	18	1	0	46
Year 9	46	13	34	47	140
Year 10	39	20	41	26	126
Year 11	34	19	36	33	122
Year 12	14	14	26	14	68
Total	160	84	138	120	502*

* 34 students did not provide full demographic data

Procedure

The materials included the Multi-Dimensional Student Perceptions of School Questionnaire, and information and consent letters for school principals, parents, and students. Ethics approval was granted by Edith Cowan University's Human Research Ethics Committee, the Association of Independent Schools of Western Australia and the Catholic Education Office in Western Australia.

All secondary students had the option of completing the survey either online through the Qualtrics portal, or on a hard copy. The only exception to this was one remote school (n = 18) where Internet access and student literacy were limited. For this group, the researcher read out questions to students individually or in groups of two, and recorded participants' oral responses on the paper survey. As an incentive for participation, a prize draw consisting of a $100 Woolworths voucher was allocated at random to three parents of participating respondents. In addition, a random prize draw of a $20 iTunes voucher was allocated to one student from each school.

The MSPSQ instrument collected demographic data regarding students' gender, Indigenous status, year level at school, geographic home region, post-school employment or education intentions, highest level of parental education and whether they resided in a boarding house or home environment.

Conceptualisation of constructs in the MSPSQ instrument

A total of six overarching constructs were presented in the Methodology section as meeting the constraints of the present study, and these were further conceptualised into 12 intended variables to be measured by the MSPSQ. The conceptualisation and intended itemisation of these constructs, based in supporting literature, is described in the following section.

Positive experiences of school culture

Initially the MSPSQ was hoped to measure three variables within this construct, Positive school culture (the student's perception of belonging and positive self-image at school), Positive role models (the student's perception of positive relationships with staff at school) and Promotion of Indigenous culture (the student's perception that Indigenous culture was valued and accepted at school).

Under quantitative analysis, it was identified that there was one underlying construct for the seven items written to reflect Positive school culture and Positive role models, assessing students' perception of belonging (four items), for example, "I feel like I fit in at school", and positive experiences with staff at school (three items), such as "Through school, I meet people who help me to make good choices in my life" and "I feel like I fit in at school". Item development was influenced by the "Perceptions of their Teachers by Aboriginal Students" scale (Godfrey et al., 2001) and "Assessing Role Model Influences on Students' Academic and Vocational Decisions" (Nauta & Kokaly, 2001), as well as educational literature defining positive school culture as that which celebrates all levels of student achievement and aims to reduce shame. Positive relationships between staff and students, evidenced by praise and encouragement, have been linked to better school engagement for all students, as well as for Indigenous students specifically (Lamb et al., 2004; Sarra, 2007).

Positive experiences of Indigenous identity within the school environment were intended to be measured separately through the construct Promotion of Indigenous culture. Three items were written for this variable, including "At school, we do things that make me proud of Aboriginal culture" and "Teachers at my school understand Aboriginal students".

In a study of over 1,500 students in New South Wales, Bodkin-Andrews, Denson, and Bansel (2012) conveyed that Indigenous students simultaneously reported higher levels of discrimination from school staff as well as a lower self-concept compared with non-Indigenous students. Where students believe that teachers have lower expectations of Indigenous students than non-Indigenous students, there are implications for both perceptions of racism and academic aspirations (Mander et al., 2015). Previous research has identified that teacher understandings of and respect for Indigenous protocols are viewed by Indigenous secondary students as significant markers of the value to which school staff value and respect Indigenous culture (Macdonald et al., 2018), and schools that demonstrate respect for culture and legitimise cultural identity have been shown to engender positive attitudes in students (Mooney et al., 2016; Sarra, 2007).

Awareness of employment pathways and focused transition to employment

Items were developed to measure experiences that helped students transition to employment, or that improved student knowledge of available employment pathways. This construct was called Pathway development. A total of seven items were developed, measuring the type of experiences provided by the school to develop students' capacity to transition to employment (four items), as well as student knowledge of available employment pathways (three items). This construct included such items as "Teachers talk to me about things I should study after I finish year 12", "School gives us work experience with local employers", and "At school I have learnt how to do a job interview".

In general, it has been found that career reasons are the overwhelmingly largest motivator for Australian secondary students to stay at school (Lamb et al., 2004). Research suggests that the poor education participation rates of Indigenous students in remote areas may reflect a lower perceived utility of

education for these students, as well as socioeconomic circumstances in the community, transience and cultural factors (Biddle, 2014; Hillman, 2010).

Access to a high-quality study environment

The MSPSQ aimed to measure student perceptions of both Provision of study assistance (frequency and quality of homework assistance provided by the school) and Access to a home study environment (access to educated adults and a place to do homework).

For the construct Provision of study assistance, students were first asked whether there was a homework club or tuition available at their school. Where they answered in the affirmative, this construct included two items, "How often do you use the homework club at school?" and "When I go to the homework club, it is very useful for me".

The intended construct Access to a home study environment contained two items measuring the quality of their home study environment. An example item is "At home there is someone who can help me with my homework". Where students attended boarding or residential environments, the MSPSQ instructed students to consider these locations when considering their "home" study environment.

Biddle (2014) showed that two of the variables most strongly associated with education participation are overcrowding (which prevents a child from studying at home, and may operate as a proxy for financial hardship) and level of education of adults in the household (which is an indicator of the potential education support to be found at home). Both of these measures are known to differ between Indigenous and non-Indigenous populations at the national data level, with Indigenous students more likely to experience lower levels of economic participation in their geographic community, as well as lower levels of parental education in formal institutions, in comparison with other Australians. Although the reasons for this are complex and entrenched in historic racist policies, these variables nevertheless represent ongoing educational barriers for Indigenous students in Australian schools.

Academic self-concept and self-efficacy

The initial stages of development of the MSPSQ contained discrete conceptualisations of Academic self-concept (self-perception of the student's ability to succeed in an academic environment) and Student self-efficacy (self-perception of the student's agency and ability to effect their intentions and goals). Under both qualitative review and quantitative analysis, it became clear that the conceptualisation used for these constructs was highly correlated, and in fact were one construct, which we named Student self-efficacy. This variable contained items reflecting student agency and belief in their ability to succeed in academic, career and social endeavours. This differed from the conceptualisation used in previous studies that explored academic self-concept (Abbott-Chapman et al., 2014; Bodkin-Andrews, Dillon, & Craven, 2010). Thus, while previous scales were used as reference points (Bodkin-Andrews, Dillon, & Craven, 2010; Jerusalem & Schwarzer, 1981), new measures were developed in the present study. In total, there were seven items measuring both academic self-concept, for example, "I am smart enough to keep studying beyond year 12, if I want to", and general agency (five items), for example, "When I see other people do well, I think I can do the same".

Student academic self-concept was identified by Lamb et al. (2004) to be significant at the 0.01 level in determining year 12 retention for Australian students. Bodkin-Andrews, Dillon and Craven (2010), in their study of New South Wales students, identified that Aboriginal students had lower measures of academic

self-concept, and lower school aspirations, than their non-Indigenous counterparts, and that for these students, academic self-concept was a predictor of future school attendance and of post-secondary aspirations. Other researchers have similarly used large-scale quantitative studies to assess the impact of academic self-concept and secondary school engagement on post-secondary education completion and occupational status for students in Australia (Abbott-Chapman et al., 2014).

Perceived community norms

Three constructs were developed to measure student experiences and perceptions of educational support among their family and social network. These were Family support for education (student perception of the importance their family members placed on school attendance, year 12 completion and employment), Peer support for education (student perception of the importance their peers placed on school attendance, year 12 completion and employment), and Collaboration with family (frequency and nature of communication between students' families and school staff).

The two constructs Family support for education and Peer support for education were intended to measure perceived social norms regarding education. The three items for each construct measured student perception of the attitudes that their family or peers held toward school attendance, year 12 completion and employment, for example, "My family think it is important that I attend school every day".

Collaboration with family contained three items intended to measure student perceptions of the frequency and nature of communication between students' families and school staff, for example, "The school contacts my family when I am absent".

According to the theory of planned behaviour, perceived societal norms (such as those based on peer or family attitudes) can have a strong influence on behavioural intentions, especially when an individual is strongly motivated to conform to those perceived norms (Ajzen, 2005). Family involvement and in-principle support is a key factor in improving engagement, motivation and retention for students, and schools which focus on building rapport with families report improved student engagement (Behrendt & McCausland, 2008; Lamb et al., 2004; Macdonald et al., 2016).

Student perception of the benefit of post-secondary education and employment

Three constructs were developed with the intention of measuring student perceptions of the benefit and utility of education for future goals: Future aspirations (student goals relating to future employment and income), Student perception of the benefit of education (student perception of the connection between schooling and future income and employment prospects), and Student perception of the importance of schooling (student perception of the intrinsic value of attending and completing school).

Future aspirations contained two items measuring student evaluations of the importance of career status, for example, "It is important to have a respected career". Student perception of the benefit of education contained four items measuring student perceptions that educational pursuits directly benefited future employment opportunity, for example, "If I complete year 12, I will have better job options". Student perception of the importance of schooling asked students to evaluate the importance of school attendance and year 12 completion through three items, for example, "Is it important to finish year 12?" and "Is it important to attend school every day?"

Lamb et al. (2004) cite studies in the United Kingdom and Australia which found that career reasons are the overwhelmingly largest motivator for staying at school. Indigenous Australians appear to give less consideration to future employment and economic benefits when making education decisions than do their non-Indigenous counterparts (Biddle, 2014), which may reflect realities of the utility of formal education for Indigenous peoples under confounding factors such as systemic discrimination as well as remote geographic employment infrastructure. Educational aspirations and post-school goals were identified by Lamb et al. (2004) as significant at the 0.01 level in determining year 12 retention. It has long been recognised that absenteeism is a significant factor in the lower education levels of Indigenous Australian youth (Biddle, 2014; COAG, 2013). Karmel and Liu (2011) found that, regardless of a student's academic success in secondary school, year 12 completion and higher education or apprenticeships provide benefit through status, income and life satisfaction.

Analysis

Many of the variables measured by the MSPSQ instrument were tested through multiple survey items. The aim of so doing was to capture all aspects of given constructs, that is, to increase the construct validity of the instrument. Although items were developed from the literature, it remained necessary to establish whether items did correlate to the conceptualised variables through robust quantitative analysis.

In the first instance, total internal consistency of the MSPSQ instrument was measured using Cronbach's alpha coefficient. Alpha (α) is typically higher for large samples ($n > 1{,}000$) and for homogeneous samples. Considering the relatively small sample size, and that the sample was intentionally heterogeneous, including students from remote Indigenous communities as well as high socioeconomic urban backgrounds, a minimum value of (α) = 0.6 was considered acceptable for internal consistency of items within a construct (Cho & Kim, 2014; Cohen et al., 2007). All statistical tests were conducted using SPSS 22.0.

Following omnibus internal consistency testing, an exploratory factor analysis (EFA) was conducted for all scalar items. Although it may have been justifiable to apply confirmatory factor analysis (CFA) to determine the appropriateness of the *a priori* intended constructs, we chose to follow a more conservative approach utilising exploratory factor analysis as per Cabrera-Nguyen (2010), Hurley et al. (1997), and Worthington and Whittaker (2006). These scholars identify two advantages of EFA over CFA in the early stages of scale development: EFA can easily identify non-hypothesised factors (Cabrera-Nguyen, 2010; Worthington & Whittaker, 2006) and does not require the researchers to input any hypothesised relationship between factors (Hurley et al., 1997). In our study, the first advantage was realised as EFA identified some of our hypothesised individual factors should be combined (Academic self-concept and Student self-efficacy). The second advantage provided a strong rationale for our use of EFA as, although the constructs were well-defined in the literature, the relationship between them was not. Future research could engage confirmatory factor analysis to further assess validation of the MSPSQ measure with new samples.

Within the EFA, Varimax rotation was used with Kaiser Normalisation to maximise variance between factors and enhance construct distinctiveness, that is, to identify the unique variables being measured by the items in the MSPSQ instrument. Bartlett's test of sphericity was significant ($p < 0.05$), indicating that the dataset was suitable for factor analysis. KMO = 0.85 indicated that a sufficient amount of variance was explained by the constructs. Coefficients < 0.3 were suppressed. Tabachnick and Fidell (2014) suggest that a sample size over 300 is usually sufficient to identify a solution in factor analysis for co-efficients > 0.3

and, for this reason, the sample was not disaggregated by Indigeneity during factor analysis. Although future studies should look to larger samples so that factor analysis can be conducted separately for Indigenous and non-Indigenous groups, in the present study, further descriptive and inferential statistics were used to verify that variables within constructs were experienced in statistically similar ways by Indigenous and non-Indigenous respondents.

After factor analysis, latent variables were created for each of the 12 variables measured by the MSPSQ instrument. For each construct, a single scalar measure was formed using the arithmetic mean of all scalar items within the construct (sum of individual sub-scales).

Results

For the final 46 scalar items, the Cronbach's alpha coefficient was high ($\alpha = 0.85$, $n = 449$), which indicated that the MSPSQ had robust total internal consistency.

The results of internal consistency testing, factor analysis, and means and standard deviations for each of the 12 constructs measured by the MSPSQ are presented in Table 2. All item loadings on to their respective factors were significant, and greater than 0.4, besides one item for the construct Awareness of employment pathways and focused transition to employment, and one item for Student perception of the importance of schooling.

Eleven constructs met the minimum requirement for Cronbach's alpha coefficient ($\alpha > 0.6$), sufficient for the exploratory nature of the current study and generally acceptable for sub-scales (Cho & Kim, 2014), and six variables had good reliability ($\alpha > 0.7$) (see Table 2). As can be seen in Table 3, the majority of the correlations between the constructs were significant at $p < .05$, but were less than .60, indicating that each of the constructs reflected a unique aspect of the variance of the overarching instrument.

Table 2. Internal consistency, descriptive statistics and EFA loading

Variable	Cronbach's alpha	Mean	*SD*	Factor loadings						
				Item 1	Item 2	Item 3	Item 4	Item 5	Item 6	Item 7
Positive school culture	.81	3.52	0.79	.69	.71	.56	.58	.53	.49	.63
Promotion of Indigenous culture	.62	2.99	0.84	.66	.46	.65				
Pathway development	.82	3.03	.93	.63	.67	.52	.70	.54	.33	.41
Provision of study assistance	.77	2.96	1.60	.83	.84					
Study environment	.63	3.56	1.00	.75	.83					
Student self-efficacy	.82	3.99	0.60	.55	.51	.68	.69	.65	.54	.51
Collaboration with family	.56	3.33	1.15	.71	.78	.41				
Family support	.73	4.56	.56	.75	.56	.57				
Peer support	.73	3.79	.77	.76	.75	.72				
School importance	.64	4.56	0.61	.74	.34	.71				
Future aspirations	.62	4.34	.810	.76	.79					
Perception of benefit of education	.61	4.05	.57	.38	.57	.63	.41			

EFA with Varimax rotation. Factor loadings < 0.3 are not reported.

Table 3. Bivariate correlations between factors

Variable	Positive school culture	Promotion Indigenous culture	Self-efficacy	Pathway develop.	Collab. with family	Study assist.	Family support	Peer support	Study environ.	Future aspiration	Education benefit	School importance
Positive school culture	1.00											
Promotion of Indigenous culture	.51***	1.00										
Self-efficacy	.52***	.30***	1.00									
Pathway development	.51***	.45***	.35***	1.00								
Collaboration with family	.18***	.23***	.17***	.24***	1.00							
Study assistance	ns	ns	ns	ns	ns	1.00						
Family support	.21***	ns	.27***	.15***	ns	ns	1.00					
Peer support	.17***	ns	.23***	.13**	ns	.14**	.38***	1.00				
Study environment	ns	ns	.17***	ns	ns	ns	.13**	.11*	1.00			
Future aspirations	.25***	.27***	.23***	.15***	.09*	ns	.17***	.12**	.13**	1.00		
Education benefit	.46***	.28***	.42***	.47***	.16**	ns	.30***	ns	.15**	.15**	1.00	
School importance	.41***	.23**	.45***	.28***	.15**	.18**	.35***	.19***	ns	.24***	.48***	1.00

*Significant at the 0.05 level. **Significant at the 0.01 level. ***Significant at the 0.001 level.

Pathway development, Awareness of employment pathways and Focused transition to employment

Although the purpose of the present article is not the reporting of descriptive and inferential statistics, basic findings are included in Table 4 as illustrations of the operationality of the variables across Indigenous and non-Indigenous students in the sample.

Table 4 presents the results of descriptive statistics for the latent variables, disaggregated by Indigenous status, as well as inferential statistics. For comparison of Indigenous and non-Indigenous students' responses, the independent samples *t*-test was used to test the null hypothesis that the two samples have equal distributions, for each variable measured by the MSPSQ (Gravetter & Wallnau, 2009).

For a difference in means to be considered significant, a 95% confidence interval is commonly used in the social sciences. Due to the number of hypotheses tests conducted, Bonferroni adjustment was used to determine the appropriate significance level of $p = 0.05/12$, or $p = 0.004$. One variable differed between Indigenous and non-Indigenous students just outside this range (Peer support), although the actual difference was small and three variables were significantly different at the 0.004 level (Provision of study assistance, Collaboration with family and School importance). The results for these three are briefly presented below.

For the variable Provision of study assistance, scores on the frequency and usefulness of attendance at a school homework club were categorically higher for Indigenous (M = 3.21/Sometimes, SD = 1.75) than for non-Indigenous (M = 2.74/Rarely, SD = 1.71) respondents; t (381) = 2.87, p = .004, $\eta^2 = .021$.

Although there was a significant difference in means for Indigenous and non-Indigenous student responses to the variable Collaboration with family, these differences were not large enough to cross Likert scale categories (Indigenous *M = 3.05/Sometimes, SD = 1.42* compared with non-Indigenous *M = 3.61/Sometimes, SD = 0.75*).

Likewise, although inference testing revealed significant differences in mean between Indigenous and non-Indigenous students for Perception of the importance of schooling, in practice the differences in mean for these measures were very small, and did not represent a difference in Likert scale categories between the two groups.

Table 4. Descriptive and inferential statistics, separated by Indigenous status

Variable		*M*	*Mod*	*SD*	Indigenous status	
					t	*p*
Positive school culture	Indigenous	3.59	3.50	.85		
	Non-Indigenous	3.48	4	.73		
	Total	3.52	4	.79	1.64	.101
Promotion of Indigenous culture	Indigenous	2.99	3.00	.84	N/A	N/A
Pathway development	Indigenous	3.12	4	.96		
	Non-Indigenous	2.98	3.58	.89		
	Total	3.03	4	.93	1.74	.083
Study assistance	Indigenous	3.21	1	1.75		
	Non-Indigenous	2.74	1	1.41		
	Total	2.96	1	1.60	2.87	.004***
Study environment	Indigenous	3.66	4	1.04		
	Non-Indigenous	3.49	3.50	.92		
	Total	3.56	4	1.00	1.92	.055
Student self-efficacy	Indigenous	4.04	4	.59		
	Non-Indigenous	3.99	4	.59		
	Total	3.99	4	.60	.79	.430
Collaboration with family	Indigenous	3.05	3.50	1.42		
	Non-Indigenous	3.61	3.50	.75		
	Total	3.33	3.50	1.15	-5.66	.000***
Family support	Indigenous	4.57	5	.60		
	Non-Indigenous	4.59	5	.50		
	Total	4.56	5	.56	- .50	.619
Peer support	Indigenous	3.70	3.67	.83		
	Non-Indigenous	3.88	4	.70		
	Total	3.79	4	.77	-2.74	.006
School importance	Indigenous	4.59	5	.52		
	Non-Indigenous	4.38	5	.64		
	Total	4.46	5	.61	3.67	.000***
Education benefit	Indigenous	4.13	4	.54		
	Non-Indigenous	3.99	4	.59		
	Total	4.05	4	.57	2.39	.017

***Significant at $p = 0.004$. Bonferroni adjustment applied to 95% CI for 12 tests.

Discussion

The critical investigation in this article concerned the development and validation of a new instrument to measure Indigenous Australian students' perceptions of secondary school. The purpose was to identify whether the MSPSQ provided valid scales of the 12 constructs under consideration.

The results of exploratory factor analysis (Table 2) indicate that the 46 scalar items in the MSPSQ are appropriate measures of the 12 constructs under consideration for the given sample. The correlations between constructs, presented in Table 3, were sufficiently low as to determine that the 12 constructs were indeed unique. Six constructs (sub-scales) had good internal consistency ($\alpha > 0.7$), namely, Positive school culture, Student self-efficacy, Pathway development, Provision of study assistance, Family support, and Peer support. Thus, the items measuring these constructs were determined to be valid measures for the given sample group. Hence, these scales could now be used with different sample groups to compare generalisability across students of different Indigenous backgrounds, from different geographic regions, and different school sectors, within Australia.

A further five constructs, namely, Promotion of Indigenous culture, Study environment, Importance of schooling, Future aspirations, and Perception of the benefit of education, were acceptable for sub-scales in an instrument that has strong internal consistency, with $0.6 < \alpha < 0.7$ (Cho & Kim, 2014). Finally, one construct, Collaboration with family, had below acceptable internal consistency. The scales for each of these six constructs could be refined through further consultation with the target population, and new items added or replaced to improve validity.

The bivariate correlations presented in Table 3 indicate that, for respondents in this study, there were several important connections between constructs. Students who reported experiencing a Positive school culture were moderately likely to also report Promotion of Indigenous culture and Pathway development opportunities within their school, as well as to report a positive sense of Student self-efficacy, Perception of the benefit of education, and the Importance of schooling. These results support qualitative research (Macdonald et al., 2018; Sarra, 2007) regarding the link between positive student experiences at school and school engagement.

Future research could identify whether the correlations in Table 3 remain similar once data are disaggregated between Indigenous and non-Indigenous respondents. Although it might not be surprising that student experiences of Pathway development were positively correlated with Perception of the benefit of education, this finding could be particularly important when it is considered that perceived utility of schooling for employment is a strong motivator of school engagement (Lamb et al., 2004), and Indigenous Australian students report receiving less information about post-secondary opportunities (Hillman, 2010; Macdonald et al., 2018). Should these connections prove robust in future samples of Indigenous students, data from the MSPSQ could provide evidence for recruitment and retention strategies in schools. For example, if Promotion of Indigenous culture is linked to Pathway development opportunities for many Indigenous Australian students, future research may identify whether investment in targeted career and education transitions, which are explicitly linked to cultural perspectives and identities of students, particularly those from low socioeconomic and remote geographic backgrounds, may lead to increased school engagement.

Descriptive statistics (Tables 2 and 4) revealed that Indigenous and non-Indigenous students in the current study reported experiencing a moderately positive school culture, exposure to pathway development, level of family support for education, access to a suitable study environment, and sense of

self-efficacy. Although some bias may have resulted from schools self-selecting to participate in this study, it is interesting to note that Indigenous students in the present study had equitable experiences of the school environment in these regards. Two of the three constructs for which difference in means for Indigenous and non-Indigenous students were significant (Provision of study assistance and Collaboration with family) likely reflected the demographic of Indigenous students in the sample, who were significantly more likely to be boarding students, with associated access to after-school homework assistance, and to be boarding a very long distance from home, with associated impact on school–family communication, compared with non-Indigenous students. Yet, the purpose of the present study was not to present summative results, and limited interpretation is intended for the descriptive results in the present article.

For eight of the 12 constructs measured by the MSPSQ, inferential and descriptive statistics revealed there were no significant differences in the way these constructs were experienced by Indigenous and non-Indigenous students in the present sample. Between these respondent groups, there were two constructs for which was recorded a small and significant difference in mean that did not cross categories of the Likert type scale, and two variables recorded significant differences that reflected known socioeconomic and geographic demographics of Indigenous and non-Indigenous students in the study. Thus, it is unlikely that these differences reflected genuine differences in conceptualisation by students in the Indigenous and non-Indigenous groups of the sample.

What the data presented in Table 4 do not demonstrate is whether there were differences in the interactions between these variables for Indigenous and non-Indigenous students, nor whether the experiences of students as measured by the variables in the MSPSQ for this sample are likely to be generalisable to Indigenous and non-Indigenous students at other schools and in other sectors. Further analysis and research are needed to explore these questions further, although such analysis is beyond the scope of the present article.

Finally, the literature is clear on the importance of several more sensitive factors affecting school engagement generally, and Indigenous students in greater proportion than non-Indigenous students. Indigenous Australians are much more likely to have experienced incarceration, homelessness, housing mobility, suicide, racism, family violence, chronic health conditions, and be victims of crime, than non-Indigenous Australians. These crisis statistics do not happen in a vacuum; they reflect the family circumstances of Indigenous students in Australian schools and are known to be more frequently experienced by Indigenous students from remote areas (ABS, 2015). Such experiences are known to impact significantly on mental health and have been shown to be correlated with non-attendance at school (Biddle, 2014). The MSPSQ in its present form is deliberately limited in scope to include variables that were less sensitive and could be accurately measured through student self-perception. Future research on the MSPSQ and other instruments could continue to identify valid measures of the diverse, relevant factors impacting Indigenous students' experiences and success in schooling. Importantly, differences between the experiences of Indigenous students in urban, remote and very remote schools, across the diversity of cultural identities, as well as differences between day and boarding students, and across school sectors, should be examined as a matter of course by instruments aiming to inform education policy.

Limitations

Although 11 of the 12 constructs were demonstrated to have acceptable or good internal consistency for the present study, there remain important opportunities for further research. The present sample allowed

for limited examination of the differences between Indigenous and non-Indigenous groups, boarding and day students, or between urban and rural students. Similarly, the absence of respondents from government schools provides an unknown level of bias related to social clustering. Furthermore, the self-report nature of the measurement tool may not closely encapsulate the actual behaviours of students and may have included some acquiescence bias. Yet, the theory of planned behaviour contends that perceived norms are related to intended behaviours, which are significant predictors of actual behaviour.

Conclusion

This article presented the theoretical and analytical considerations that guided the development, administration and validation of the MSPSQ instrument. The overall scale achieved robust internal consistency ($\alpha = 0.85$) and identified six reliable construct measures, useful for future research application; these were Positive school culture, Student self-efficacy, Pathway development, Provision of study assistance, Family support, and Peer support. A further five constructs had acceptable internal consistency and are worthy of further development and investigation; these were Promotion of Indigenous culture, Study environment, Importance of schooling, Future aspirations, and Perception of the benefit of education.

Factor analysis was unable to be disaggregated by Indigenous and non-Indigenous respondents, although difference in means testing revealed that for the three constructs where groups differed, these differences likely reflected demographic differences between Indigenous and non-Indigenous respondents to the present study, rather than differences in conceptualisation of constructs.

Further validation of this promising measure would include criterion validity, which could be assessed by comparing student responses with actual behaviours over time; construct validity, and social desirability bias, which could be measured by assessing responses against other scales measuring similar as well as different constructs; and reliability, measured through a test-retest procedure. The results presented here suggest that the MSPSQ provides a valuable first step towards development of a valid measure of the breadth and depth of factors affecting Indigenous students' perceptions of schooling.

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Appendix 1 – MSPSQ

Questions marked with an asterisk (*) relied on skip logic, that is, the visibility or wording of the question relied on students' prior responses to demographic questions.

A majority of items used the following Likert scale:

Never	Rarely	Sometimes	Most of the time	Always
1	2	3	4	5

In some items, students were provided the Likert scale below. These items are denoted with a (^).

Definitely not	Probably not	Don't know	Probably yes	Definitely yes
1	2	3	4	5

Positive school culture

Item 1) School makes me feel good about myself.
Item 2) I like school.
Item 3) I feel like I fit in at school.
Item 4) Tick all the statements that are true. Because of [school name]:
- I feel happier about school
- I feel like I fit in at school
- I want to come to school every day
- None of these are true.

Item 5) My teachers push me to do well in school.
Item 6) Through school, I meet people who help me to make good choices in my life.
Item 7) At school, I have met adults who I want to be like.

Promotion of Indigenous culture*

Item 1) At school, we do things that make me proud of Aboriginal culture.
Item 2) My teachers understand Aboriginal students.
Item 3) Through school, I meet Aboriginal or Torres Strait Islander adults who have really interesting jobs.

Pathway development

Item 1) Tick all the statements that are true. Because of school:*
- I know how to get into a university course
- I know how to get into a TAFE course
- I know how to get the job I want to have
- I have learnt about different jobs that I could do
- None of these are true.

Item 2) School gives us work experience with local employers.*
Item 3) Does school prepare you for getting a job?
Item 4) Tick all the statements that are true. At school I have learnt how to:*
- Do a job interview
- Write a resume or CV
- Apply for a job or apprenticeship
- None of these.

Item 5) At school, do you learn about jobs you can get with companies in this town?
Item 6) At school we learn about many different types of jobs.
Item 7) Teachers talk to me about things I should study after I finish year 12.

Provision of study assistance*

Item 1) How often do you use the homework club at school?
Item 2) When I go to the homework club, it is very useful for me.

Access to a home study environment

Item 1) *In the boarding house/At home, I have somewhere quiet to do my homework.

Item 2) *In the boarding house/At home, there is someone who can help me with my homework.

Student self-efficacy

Item 1) I will have a good job when I am older.^

Item 2) When I see other people do well, I think I can do the same.

Item 3) I can change my future with the choices I make.^

Item 4) If I work hard, I can make my goals come true.^

Item 5) When I have problems, I can find a way to fix them.

Item 6) I am smart enough to do well at school.^

Item 7) I am smart enough to keep studying beyond year 12, if I want to.^

Collaboration with family

Item 1) The school contacts my family when I am absent.

Item 2) If I act up, the school will contact my family to talk about my behaviour.

Item 3) My family know what's happening with me at school.

Student perception of the importance of schooling

Item 1) Is it important to finish year 12?

Item 2) Is it important to attend school every day?

Item 3) Will you stay at school until you finish year 12?^

Future aspirations

Item 1) It is important to have a respected job.

Item 2) It is important to earn a good income.

Student perception of the benefit of education

Item 1) If I complete year 12 I will have more job options.

Item 2) If I do more study after I leave school, I will have better job options.

Item 3) People who stay at school can get a higher paying job.

Item 4) At school I learn things that I will need in life.

The following question used this Likert scale:

None of my family	A few of my family	Some of my family	Most of my family	All of my family
1	2	3	4	5

Family support

Item 1) My family think it is important that I attend school every day.

Item 2) My family think it is important that I finish year 12.

Item 3) My family think it is important that I get a good job when I am older.

The following question used this Likert scale:

None of my friends	A few of my friends	Some of my friends	Most of my friends	All of my friends
1	2	3	4	5

Peer support

Item 1) My friends think it is important that I attend school every day.

Item 2) My family think it is important that I finish year 12.

Item 3) My family think it is important that I get a good job when I am older.

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