University Aspirational Pathways For Metropolitan And Regional Students: Implications For Supporting School-University Outreach Partnerships

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Abstract

Young people in low socioeconomic (SES) regions, including regional and rural areas of Australia, aspire to attend university after high school at a comparable rate to young people in higher SES regions. However, without concrete opportunities to support and develop their aspirations, students in regional areas are unable to internalize the goals of a university education. Therefore, university participation rates are lower for regional than metropolitan students. This study examines the roles of aspiration and expectation to attend university for regional and metropolitan high school students living in a low-SES region of Western Australia, where a four-year university aspiration project was implemented. Specifically, the directionality of the development of university desire and expectation is tested using data collected over 18 months within a cross-lagged modeling framework. Differences within the region are explored using multiple group analysis, comparing the model of a regional sample with the model of propensity-score matched metropolitan sample. The results demonstrate that for metropolitan students within the region, higher early university desire feeds higher university expectations, which, in turn, crystalise subsequent university desires. For regional students, however, the cross-lagged effects were not demonstrated, suggesting other neighbourhood factors, beyond familiarity with university pathways, remain for when low-SES students live further from a major city. These findings suggest that within the same low-SES region, there is variation in how the culture and neighborhood factors interact to determine the efficacy of university participation widening programs. Addressing logistic factors that restrict access to university may further reduce the participation gap.

Keywords: University aspirations, university expectations, regional, metropolitan, high-school-students, partnerships

The locality in which Australian youth are schooled affects their probability of gaining a university degree, (Lamb, Jackson, Walstab, & Huo, 2015). Australian students that complete their schooling in low socio-economic status (SES) schools are less likely to access university than their high SES peers (Naylor, Baik, & James, 2013; Willis & Joschoko, 2012) and reduced access to university is also the experience for students who complete school in regional and remote Australia. In terms of gaining an Australian Tertiary Admission Rank (ATAR), which is the primary criterion for entry into most undergraduate-entry university programs in Australia, there is a marked decline in student ATAR attainment when comparing metropolitan to regional and remote locations. Specifically, around 62 per cent of metropolitan students gain an ATAR compared to only 44 per cent in regional areas; the figure drops to around 28 per cent of students who attend school in more remote areas of Australia (Lamb et al., 2015). Deficit-stigmatised perceptions of young people from regional Australia depict the students as less capable of attending university compared to their metropolitan counterparts. However, where regional and remote students do gain an ATAR, their scores are only three points lower than those of metropolitan students (Lamb et al., 2015).

Low SES student participation in higher education has always lagged in Australia, with the low SES share of undergraduate population reaching 18.2% in 2015 (Koshy, 2016). This is below the previous target for Australia, set by the Rudd government, of a 20 per cent share of undergraduate student population by 2020 (Bradley, Noonan, Nugent, & Scales, 2008). This underperformance is often attributed to lagging aspirations for higher education, which in turn is often attributed to neighborhood and family factors as a means for explanation (Johnston, Lee, Shah, Shields, & Spinks, 2014; Sellar & Gale, 2011). Typically, rural and remote disadvantage within the school, community, and home interact together to shape achievement and post-high school opportunities (Halsey, 2017; Johnston et al., 2014). Therefore, students from regional locations can be judged to have little or no aspiration (Gale, Parker, Rodd, Stratton, & Sealey, 2013; Prodonovich, Perry, & Taggart, 2014). However, evidence suggests there is no *poverty of aspiration* among disadvantaged adolescents, (Gale et al., 2013; Parker, Stratton, Gale, Rodd, & Sealey, 2013; Prodonovich et al., 2014; Rampino & Taylor, 2013; St. Clair, Kintrea, & Hourston, 2013). In particular, Gale and colleagues (2013) supported earlier research findings for regional students' university aspirations (Alloway & Dalley-Trim, 2009; Alloway, Gilbert, Gilbert, & Muspratt, 2004), finding that 67 per cent of students in regional Queensland report aspirations to attend university.

Despite healthy levels of aspirations for university study, rural and regional students' aspirations are less likely to be realised. Indeed, the transition to university declines as locality becomes more remote. For regional students, the limitations associated with distance are a barrier whereby transport or relocation costs can be prohibitive to pursuing a university degree (Webb, Black, Morton, Plowright, & Roy, 2015). Notably, the proportion of residents holding a degree in Australia declines from 42.2 per cent in metropolitan areas to around 21.2 per cent for inner-regional residents and 19.1 per cent for remote residents (Universities Australia, 2017). In effect, if you reside in a major city you are twice as likely to hold a degree than if you reside in regional or remote Australia (Universities Australia, 2017). The contexts and conditions where people live have a profound impact on their expectations to progress to university. This paper examines the impact of a program in outer metropolitan and regional Western Australia, Murdoch University's Aspirations and Pathways for University program, in view of the contextual factors identified in influencing aspiration and transition into higher education.

Context

Murdoch's Aspirations and Pathways for University (MAP4U; see Prodonovich et al., 2014) project was located in the southwest corridor of outer metropolitan Perth and parts of the neighbouring Peel region in Western Australia, an area which traverses Australian examples of

the metropolitan, regional and rural. The region has high levels of economic production and low levels of educational attainment, particularly at the tertiary level (Australian Bureau of Statistics, 2011; Brotherhood of St Laurence, 2014). The MAP4U region comprised both metropolitan and regional schools where a lack of quality education and training options had been identified, particularly at schools in the regional area (Department of Training and Workforce Development, 2015). Perry & McConney (2013) identify the widening gap between socio-economically advantaged and disadvantaged students whereby academic attainment between low and high SES Australian students is amongst the highest in countries that belong to the Organisation for Economic Cooperation and Development (OECD). Few government (public) schools in the region offered university-focused curriculum in subjects such as literature, maths, and sciences (Perry & Southwell, 2013), which is argued to contribute to the lack of ATAR attainment in the region (Lamb et al., 2015). For many students in this region, aspirational attainment relies on a narrow socio-economic and cultural identity that more often leads to vocational education and training compared to university. MAP4U was conceptualised on the premise that community and institutional cultures perpetuate the gap in participation in higher education; but also the premise that the gap can be reduced through targeted intervention. Interventions, then, had to be targeted at changing the culture of the school and wider community to promote changes in curriculum and pedagogy, expansion of supportive resources and the building of students' self-efficacy, all so that they may realize their higher education aspirations. That is, developing interventions that support the desires for university education by providing multiple occasions for students to construct an expectation of achieving that possibility.

Students' educational and career aspirations in the low-SES context of the MAP4U region are high (Prodonovich et al., 2014), clearly demonstrating that there is limited evidence of a poverty of aspirations among the students in the region (Archer, DeWitt & Wong, 2013; Sellar & Gale, 2011). Despite this, their aspirational desires for university study do not translate into opportunities to participate in higher education (Brotherhood of St. Laurence, 2014; Halsey, 2017; Universities Australia, 2017). The issue for young people in regional areas becomes one of being unable to operationalise their existing aspirations or desires to go on to attend university. Low SES youth, including those in regional Australia, are predisposed to "nonlinear fragmented pathways" (Taylor, Borlagdan, & Allan, 2012, p. 3) where their early desires to go to university may not be supported in the same way as metropolitan youth. Therefore, the role of expectations for students to gain a university degree must be explored as an explanatory mechanism, and potential intervention point for supporting university desires (Baker et al., 2014).

Theoretical Framework

Neighbourhood factors, such as school culture, family expectations, cultural traditions, and individual life events and experiences appear to differentially influence both desires for university and expectations to attend university (Johnston et al., 2014; Webb et al., 2015). Eccles' and colleagues' (Wigfield & Eccles, 2000) theoretical framework describes the ways in which neighbourhood factors impact on the individuals' perceptions or appraisal of their attainable achievements (i.e. Expectancy-Value theory). Examining aspirations in terms of the expectancy-value theory illustrates how behavioural choices related to education and occupations in turn influence students' desires and subsequent expectations for their future. The expectancy-value theory (Eccles, 2009) outlines how expectations function around two sets of beliefs: the first, an individual's expectations for success and, the second, the importance or value the individual attaches to the various options available. Therefore, for students to maintain their university desires they must expect to attend university, they must believe that they will achieve success at university, and the belief that achieving a university degree is important for the future they want for themselves. For high SES students, the transition to achieving a university degree is relatively

passive; however, for low SES students including regional students this does not seem to be replicated and the gap between early desires and later expectations widens (Kirk et al., 2012).
Current Study

Development of aspirations: desires and expectations

There is confusion in the literature regarding the terms *aspiration.* Aspirational desires, and aspirational expectations are conceptualised as interchangeable, often collectively labelled as *aspirations*, be it occupational or academic aspirations (Khattab, 2014). Gottfredson (1981) broadly suggested that aspirations as desires are less realistic than expectations and that expectations are more embedded in realistic ideas about what is achievable, which are informed by behaviours and feedback. Both are described as salient influences on students' outcomes (Boxer, Goldstein, DeLorenzo, Savoy, & Mercado, 2011). For our study, we ask our students about a desire or wish to study at university, which appears to be an abstract idea about the goal one would like to reach. However this desire may not be feasible upon reflection of *their* reality; therefore, we consider this aspect as an *expectation* or the likelihood they will attend university (Khattab, 2014). Considering the reality of the neighborhood factors and their influence on desires, expectations are more likely to be related to reality and consequently influence future choices (Baker et al., 2014). It has been suggested that university desires and expectancies are separate concepts but linked and that the development of each is different (Khattab, 2014), particularly for disadvantaged students. Gale (2015) in his review on widening participation in higher education and aspiration strategies, reported that for disadvantaged students expectancy mediates desire. This paper explores this posited link between desire and expectation in relation to university study after high school. We suggest that students' early university desires could feed later desires through the mechanism of expectancies of what can be achieved. Increasing students' university expectations provides a feedback loop to desires as highlighted by Gottfredson (1981). Gale (2015) suggests that for less disadvantaged students, desires mediate the relation between early and later possibilities. It may be that expecting to go to university is established early for more advantaged students and is fed by desire over time. Certainly, longitudinal data are needed to better disentangle the developmental pathway of the components of aspirations.

Although previous research has identified contemporaneous associations between adolescents' desire for higher education and the likelihood or expectation of achieving those desires (Gale & Parker, 2015; Johnston et al., 2014), no studies have as yet attempted to identify the direction of the effects. The present study uses a multiple group, three-wave cross-lagged panel design to examine competing hypotheses about longitudinal associations between students' desire to attend university and their expectation to achieve their desires. We present results of the longitudinal study to address our primary research aim: to examine the associations between students' university desires and their university expectations post-high school and how desires and expectations differ for regional versus metropolitan students. Specifically, we test whether university desires predict university expectations, or vice versa. We also examine the indirect effects to determine if university desires mediate expectations, or if university expectations mediate university desires. We aim to explore whether or not there are indications of a cultural change towards increased expectation of higher education for students from schools in metropolitan low SES areas versus regional low SES locations. The results we present here also provide evidence of how targeted interventions can reduce the participation gap and shift the culture of both communities and educational institutions to support the existing high educational aspirations of students in the region (Prodonovich et al., 2014). To demonstrate the feedback nature of the concepts of university desires and expectations within the aspirations construct, we examined the following indicators over time: student desire for university; student

expectations to attend university; and desires and expectations for metropolitan students versus regional students. The following research questions were investigated:

R1. To what extent do students' university desires predict their subsequent university expectations?

R2. To what extent do students' university expectations predict their subsequent university desires?

R3. To what extent do students' university desires and expectations mutually influence each other in a feedback loop?

R4. If there is a feedback loop does either concept mediate the development of the other?

R5. Is the pattern of influence between students' university desires and expectation different for regional versus metropolitan low SES students?

Methods

Participants

Data were drawn from a longitudinal collection (five data collections across three years), whereby 1,429 participants responded at least once to the *Murdoch Tertiary Aspirations Survey* (MTAS; for a survey description see Watson, Vernon, Seddon, Andrews, & Wang, 2016). Participants came from the Southwest corridor of outer metropolitan Perth (71%) and the Peel Regional area (29%). Regional schools, in the context of this paper, were identified as any school not located in a major city (Halsey, 2017) and the Peel Region boundaries were defined by the Regional Development Act (1993). Participants were all high school students from 15 (Peel Region = 6) of the total 23 high schools located in the MAP4U region. The sample region was considered below-average SES, with 41 per cent indicating they were first-in-family to go to university and included predominantly Australian, Caucasian students. Participants were selected for propensity score matching (PSM) if they had completed at least two of the first three waves of data collection (*n* = 450; 58% female). The final sample differed only in terms of the region where the student lived (Metropolitan *n* = 131, or Regional *n* = 131). This sample comprised students from all grades of high school; 54 per cent from the junior grades (Grade 7 to 10), and 46 per cent from the senior grades (Grade 11 to 12).

Measures

The self-report MTAS survey design included sets of Likert-type scales to measure student desire and expectation to go to university, academic self-concept, problem behavior, and school satisfaction (see Watson et al., 2016). Participant characteristics collected at baseline included gender, year level, residential postcode and cultural indicators.

Propensity score matching covariates: To create the metropolitan and regional groups of matched students at baseline, the following covariates determined the propensity score for each participant: Gender; grade level; first-in-family to attend university; three items about students' beliefs about their general abilities at school including items such as "I have the ability to be good at most subjects if I try"; and three items about students' behavior at school including items such as "About how many times in the last six months have you cheated on an exam or copied someone else's school work?" Student location was determined initially by students' residential postcode; however, if this information was missing, the students' school postcode was substituted. The students with postcodes in the Peel region as defined within the nine Regional Development Commissions across Western Australia (Regional Development Commissions Act, 1993) were assigned *Regional* = 1, and the students with postcodes in the outer region of metropolitan Perth were assigned *Metropolitan* = 0.

University aspiration: Students' aspiration or desire to study at university after high school was measured using one item, "I want to go on to university after high school." The item was measured using a 6-point scale, where 1 = *Not at all true for me*, to 6 = *Very true for me*.
University expectation: Students' expectation to attend university after high school was measured using the item "How likely is it that you will go onto university after high school?" The item was measured using a 7-point scale, where 1 = *Not at all likely* to 7 = *Very likely*.
School-university partnership programs: The number of university partnership programs the school engaged in was collated, with schools participating in up to 12 partnerships. Metropolitan students were exposed to a greater number of school-university partneships programs (97% of the surveyed students where in schools that received eight or more programs) than regional students (82% of the surveyed students were in schools that received eight or more programs). All school-university partnerships were based on a memorandum of agreement between stakeholders with an underlying key performance indicator being to increase the number of willing and able students to attend university.

Procedure

Ethical approval to conduct research was obtained from Murdoch University's Human Research Ethics Committee and the Western Australian Department of Education. Data were collected by letter of invitation to the schools in the Southwest corridor of Perth and the Peel region. The distribution of parent and student information and consent packs to students was at the discretion of principals. Due to these internal school administrative procedures, the rate of participation in the survey cannot be determined. All final participants provided both their own written consent and their parent/guardian's written consent before being surveyed.
The baseline MTAS survey was administered in early 2014 followed by two more collections at six-monthly intervals. The survey was administered in schools in 20-minute sessions using 30 *ipads* and an online survey software program, *SurveyMonkey.* Paper surveys were also used if requested by schools. Students were informed of their right to confidentiality and voluntary participation in the survey.

Covariates used in the PSM process had missing data (<5%) due to either nonresponse or attrition, so the missing values were imputed using expectation-maximization in SPSS 24.0. All students were surveyed at least twice with 26% participating in all three waves of data collection. For analysis in the presence of missing data for the comparison data set, parameters were estimated in *MPlus* 8.0, using the full information maximum likelihood procedure (Yuan & Bentler, 2000).

Plan of analysis

Initially, we ran the PSM process (Rosenbaum & Rubin, 1983) to create the residential location comparison groups (metropolitan versus regional) of highly similar students at baseline. Using PS-Matching (Thoemmes, 2012) plug-in for SPSS 24.0, each student received an estimated propensity score predicting membership in the comparison groups. This propensity score, which is the probability of being regional, was determined by logistic regression using the observed covariates detailed above. Using the same software, students from regional areas were then matched (1:1 nearest neighbour) to metropolitan students who had similar propensity scores. Examination of the standardized mean differences for all covariates before and after matching showed covariate balance improved in the matched sample. The matched sample now included 262 students, distributed evenly among the two groups, *regional* and *metropolitan*.
To examine the directions of the relations between desires and expectations to go to university, we utilised a cross-lagged panel design and multigroup analysis to compare the models for metropolitan and regional students. The advantage of path modeling over other multivariate

analysis is that multiple factors (i.e., desire to go to university and expectation to go to university) can be entered into the model simultaneously, as opposed to being forced in a predetermined sequence (e.g., hierarchical regression). The resulting panel models (See Figure 1) comprise autoregressive paths for three time measurements (a1, a2, b1 and b2) and cross-lagged effects (d1,d2, e1 and e2). The strength of the repeatedly measured factors (autoregressions) allows for estimating the development of the aspirational factors over time while controlling for interindividual differences in previous measures of aspirations. The focus is also on the diagonal or cross-lagged paths in the models, which represent the associations between one variable and another variable at the next time point. Vertical paths (cross-sectional; c1, c2, and c3) between variables can be used to control statistical covariation. Therefore, the diagonal, cross-lagged paths represent partial regressions that indicate the unique predictive influence of a variable at a particular time point.
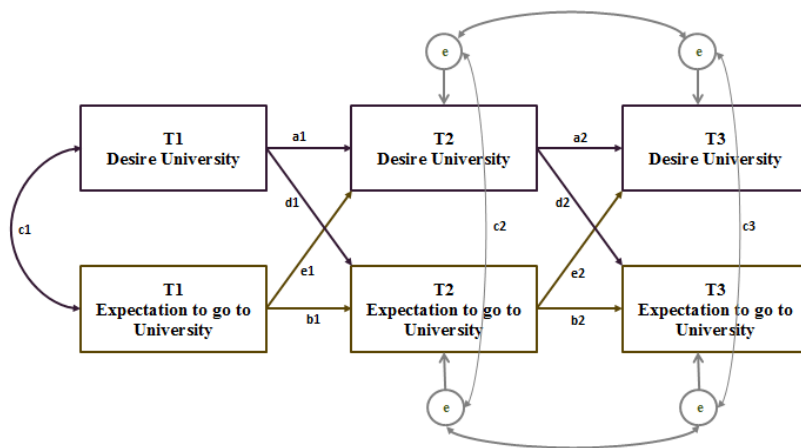
Figure 1. *Autoregressive, cross-lagged panel path model. Model 1: no cross-lagged associations (d and e paths are dropped). Model 2: University desire effects model (university desire predicts university expectations, e paths are dropped). Model 3: University expectation effects model (university expectations predicts university desires, d paths are dropped). Model 4: Reciprocal associations model (all paths included). T1 = time 1; T2 = time 2; T3 = time 3; e = residual error parameter. Indirect paths tested d1 →e2 and e1→d2*

We used SPSS 24 for descriptive data analyses and *Mplus 8.0* (Muthen and Muthen, 1998- 2016) for the structural equation modeling (SEM). A number of nested models were analyzed for estimates of cross-lagged effects and analysis of groups. Goodness-of-fit was estimated with a non-significant Chi-square (χ^2) test; the Comparative Fit Index [CFI] with values of > .95 indicating good fit to the data; Root Mean Square Error of Approximation [RMSEA] with values <.08 indicating reasonable fit to the data; and Standardized Root Mean Square Residual [SRMR] < .08 indicating reasonable fit for the data (Hu & Bentler, 1999).

Firstly, model 1 (M1) without the cross-lagged structural paths was specified to determine the temporal stabilities over the three-time measurements. M1 was then compared with three more complex models using Chi square difference testing (See Table 2 for sequence of comparisons using Satorra-Bentler Scaled Chi Square for non-normality; Satorra, 2000). The models included:
- a model (M2) with the cross-lagged structural path from Time 1 (T1) university desire to time two university expectation (Figure 1, d1) and time 2 (T2) university desire to time 3 (T3) university expectation (Figure 1, d2; reflecting research question 1, R1).
- a model (M3) with the cross-lagged structural path from T1 university expectation to T2 university desire (Figure 1, e1) and T2 university expectation to T3 university desire (Figure 1, e2; reflecting research question 2, R2).

- a model (M3) with both cross-lagged structural paths representing reciprocal effects (reflecting research question 3, R3).

We then used a sequence of tests that started with individual parameters in the cross-lagged model across the two groups of students (metropolitan and regional) constrained to be equal. We then allowed each pathway, one-by-one, to be estimated individually for both groups and used the chi-square difference test (Satorra, 2000) to determine if the two groups are significantly different for that particular parameter or combination of parameters (see Table 2 unconstrained multi-group model M5).

Results

Descriptive Statistics

Table 1 provides the correlations, means, standard deviations and ranges (see note) for all study measures. The measures of university desires and expectations were on average relatively high. Consistent with previous literature documenting the high degree of association between desires and expectations for university study, university desire and university expectation were significantly associated at concurrent waves (r = .76 - .85). Examination of the diagonal relations reveals significant correlations over time between early desires and future expectations for university ($r_{T1,2}$ = .74 and $r_{T2,3}$ = .68). In addition, significant reciprocal relations between early expectations and future desires ($r_{T1,2}$ = .65 and $r_{T2,3}$ = .75) provide initial support for our research questions, both in terms of contemporaneous relations between university desires and expectations and in terms of reciprocal relations between university desires and university expectations over time. As the school-university partnership programs were not established in the region until after T2 the number of MAP4U programs was only correlated with university desires and expectations at T2 and T3. Interestingly, as the number of programs increased the initial significant negative association with university desires and expectations at T2 was found to be non-significant for both measures at T3. Initially high early university desires were associated with low university expectations however, after program interventions this negative correlation was not evident.

Table 1: *Zero-Order Correlations, Means, Standard Deviations of University Aspirations*

	Variable		1	2	3	4	5	6	7	8	9	M	SD
1.	Number of MAP4U programs	(T2)										9.45	2.16
2.	Gender		-.07										
3.	Grade Level	(T1)	na	.11								4.15	1.39
4.	Locality		.18**	.02	.03								
5.	University Expectation	(T1)	na	.20**	.16*	-.03						5.09	1.74
6.	University Expectation	(T2)	.-17*	.24**	.22**	.16*	.70**					5.21	1.75
7.	University Expectation	(T3)	-.04	.26**	.10	.14	.63**	.72**				5.01	1.90
8.	University Desire	(T1)	na	.22**	.19**	.01	.76**	.74**	.68**			4.71	1.71
9.	University Desire	(T2)	-.19**	.21**	.30**	.14	.65**	.85**	.68**	.80**		4.70	1.67
10.	University Desire	(T3)	-.02	.17*	.11	.09	.64**	.75**	.84**	.70**	.77**	4.59	1.67

Note. For Gender Boys' (n =108) values coded as 0 and Girls' (n = 154) values coded as 1; For Locality Metropolitan (n = 131) values coded as 0 and Regional (n = 131) values coded as 1. Number of Programs ranged from 0 to 12. na = not applicable as programs were not implemented. Grade Level ranged from 1 = Grade 7 and 6 = Grade 12. University Expectation Range 1-7; University Desire Range 1-5.

Evaluation of cross-lagged models

The fits for the four competing models were compared, and Model 4, with reciprocal and autoregressive associations, fitted the data well (see Table 2). Model 4 was retained, as it accounts for both university desire and university expectation effects and produced excellent fit: $\chi^2(4) = 7.64$ (p = .106), RMSEA = .06, CFI=.99, SRMR=.03. Figure 2 provides the standardised

estimates for this model. The coefficients presented in Figure 2 for the cross-lagged paths were significant at the .05 level and were consistent with a positive feedback loop so addressing research question four (R4). From T1 to T2 and T2 to T3, reciprocal relations between university desires and university expectations were shown; university desire at T1 was associated with increased university expectation T2. Similarly T2 university desires were associated with increased expectation, however, the strength of the association from T2 to T3 was diminished (T1-T2 = .46; T2-T3 = .30); early levels of university desires were positively associated with later univeristy expectations. Simultaneously examining the cross-lags from university expectations to desires we see a strengthening of relations (T1-T2 = .17; T2-T3 = .37). In this positive feedback loop students desires to go to university, increase the likelihood of students expecting to go to university, which strengthened later desires to go to university. Because the school-university partnership programs were introduced after T1, students' desires to go to university were supported and so their expectations to go to university increased which further supported their university desires. Thus, this stronger reciprocal relation is observed in later stages of the feedback loop.

The R^2 values indicate the amount of variability in T2 and T3 variables that can be explained by the sum of autoregressive and cross-lagged effects. Overall 64 per cent of individual differences can be explained for university desires for both T2 and T3 (see Figure 2). At the second measure (T2) the amount of explained variance for university expectations was 59 per cent and at T3, the sum of the autoregressive and cross-lagged paths explained 58 per cent of the variance for university expectations (see Figure 2).

Table 2. *Fit statistics for competing cross-lagged models*

Model		χ^2	d.f.	Correction Factor	Comparison			Satorra-Bentler Scaled $\Delta\chi^2$	Δd.f.	AIC
No Cross-lagged	(M_1)	148.82***	8	0.9						3808.97
Cross Desire $T_{1,2}$ - Expectation $T_{2,3}$	(M_2)	24.77***	6	1.04	M_1	vs	M_2	231.54***	2	3705.36
Cross Expectation $T_{1,2}$ - Desire$T_{2,3}$	(M_3)	52.35***	6	1.03	M_1	vs	M_3	164.06***	2	3733.72
Both cross	(M_4)	7.64	4	1.08	M_1	vs	M_4	175.4***	4	3691.85
					M_2	vs	M_4	18.21***	2	
					M_3	vs	M_4	48.62***	2	
Multi-group Metropolitan vs Regional	(M_5)	9.91	8	1.19	M_4	vs	M_5	2.74	4	3697.28

***$p \leq .001$

Note. $N = 262$; Multigroup metropolitan n= 161, regional n=161

Key. T1 = Time 1; T2 = Time 2; T3 = Time 3; d.f. = degrees of freedom; $\Delta \chi^2$= change in chi-square; AIC = Lowest value has most acceptable fit.
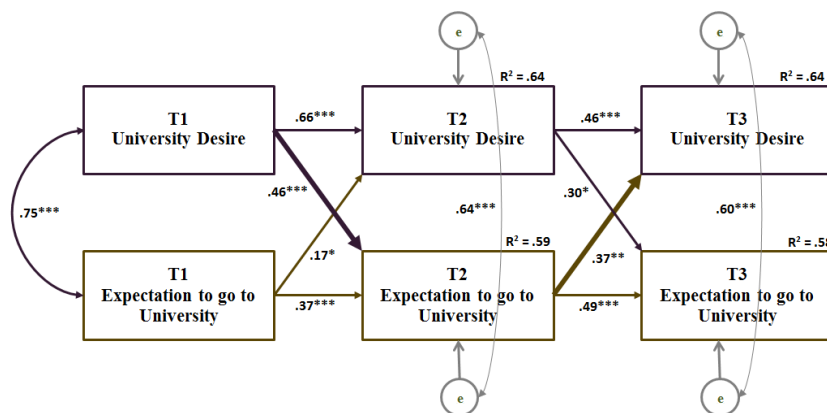
Figure 2. *Standardized path coefficients for the university aspiration effects between university desires and university expectations.* χ^2 (4) =7.64 (p = .106), RMSEA = .06, CFI=.99, SRMR=.03. Bolded paths indicate significant indirect effects.
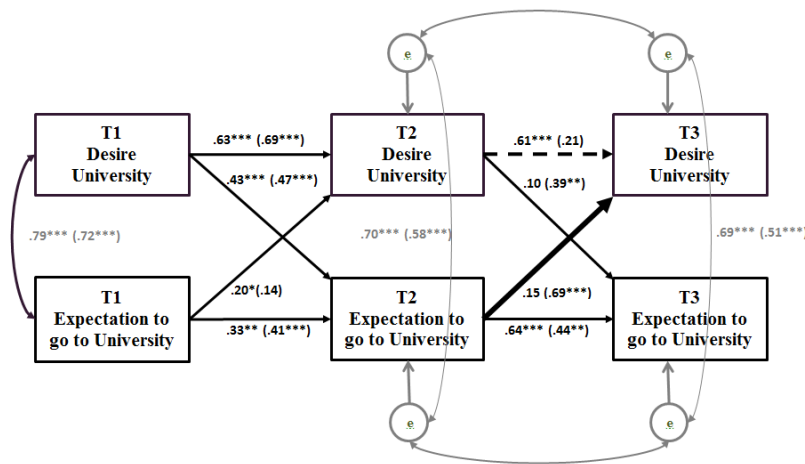*** $p < .05$; ** $p < .01$; *** $p < .001$;**

Indirect Paths

A series of indirect relations were tested to determine the mediation effects of specific paths in the cross-lagged model (Model 4 - Figure 1). The two cross-lagged mediational patterns that were tested over these three time points were: whether T2 university expectations mediated the relation between T1 and T3 desires to go to university (see figure 1 paths d1, e2); or whether T2 university desires mediate the relation between T1 and T3 expectations to go to university (see figure 1 paths e1, d2). That is, we tested whether students who had a desire for university study early in high school would be more likely to report greater expectation to go to university later in high school (d1) and, further, whether those students who perceived higher levels of university expectations would go on to report greater levels of desires for university studies (e2) and vice versa, for the diagonals. An indirect effect (*IE*) was established for the path from T1 university desires to T2 university expectation to T3 university desires (see figure 2 bolded paths) such that students with a desire to study at university reported increased levels of expectations to go to university, which in turn was later associated with stronger desires to study at university (*IE* = .17, *p* < .05). The ratio of this indirect effect to total effect (.17/.46 = .37) indicates that 37 per cent of the relation between T1 university desire to T3 university desire is explained through T2 expectations to go to university. The balance of this relation is explained by an indirect effect through the autoregressive university desire pathway (a1, a2; *IE* = .30, *p* < .05). There was no significant indirect effect from T1 university expectation to T3 university expectation through T2 university desire (e1, d2). Together, these results show that students who report high levels of desire for university study subsequently report greater levels of expectations to go onto university study, which will, in turn, associate with later stronger desire for university. That is university expectations mediated the relation between early and later university desires. Although the individual paths from T1 university expectations to T2 university desires to T3 university expectations were both significant the indirect effect was not significant, indicating that levels of desire to study at university do not explain the link from early expectations to university to later expectations. This link is explained through the autoregressive university expectation pathway (b1, b2; *IE* = .20, *p* < .05) whereby expectations to go on to university study need to be constantly supported. Similarly the autoregressive pathway for desires to go on to university shows an indirect effect through T2 university desires (a1, a2; *IE* = .30, *p* < .05).

Moderation by Locality

To test the effects of locality as a moderating variable, multiple-group structural equation modeling analysis was used (Kline, 2011). Nested models with a non-significant Satorra-Bentler scaled χ^2 would indicate that the model fit equally well for both groups (i.e., metropolitan and regional); that is that there were no differences between the two groups. We tested whether the cross-lagged model for university aspirations fit equally well for metropolitan and regional students. Although there was a non-significant χ^2 difference between the nested models (see Table 2), the other fit statistics for both models showed good fit (RMSEA = .043 CFI=1, SRMR=.04). As the χ^2 difference test for the overall model can be subject to misfit (Kline, 2011), and because the contribution to the χ^2 provides a better fit (χ^2 = 2.59) for metropolitan students than for regional students (χ^2 = 7.32) further tests were carried out to determine if there were any differences between the groups for a particular path. Consequently, further parameters were constrained individually across the 2 groups. Figure 3 outlines the standardised parameter estimates for each locality (metropolitan estimates in brackets). Constraining the cross-lag

parameter from T2 university expectations to T3 university desires (Figure 3, bolded arrow) for locality across the two models showed a significant improvement in descrepancy between data and the model ($\Delta\chi^2$ (1) = 14.91). Figure 3 illustrates the standardized path estimates with the path from T2 university expectations to T3 university desires being of greater magnitude for metropolitan students (β = .69, $p < .05$) than for regional students (β = .15, $p > .05$; Figure 3 bolded arrow). As well constraining the autoregressive parameter from T2 university desire to T3 university desire (Figure 3, dashed arrow) led to a significant change model descrepancy ($\Delta\chi^2$ (1) = 13.70). In this instance the standardized path estimates from T2 university desire to T3 university desire was of greater magnitude for regional students (β = .61, $p < .05$) than for metropolitan students (β = .21, $p > .05$; Figure 3 dashed arrow). Constraining other parameters in the model did not lead to any significant reductions in model descerpancy with the data.

Figure 3. *Standardized path coefficients for the university aspiration effects between university desires and university expectations for regional locality* (metropolitan parameters in brackets).
* $p < .05$; **$p < .01$; ***$p < .001$;

Discussion

The present study provides important insight into the development of students' university aspirations over time, their desire to study at university and their expectation that they will be able to meet those desires and expect to study for a university degree. Specifically, this study examines the associations between students' university desires and their university expectations post-high school and how desires and expectations differ for regional versus metropolitan students. We tested whether university desires predict university expectations or vice versa over three, half-yearly measurements. Using a three-wave panel design we tested both directions simultaneously and determined the indirect effects via either the cross-lagged or the autoregressive paths for student desires and expectations for university study. Data came from students attending regional and metropolitan low-SES high schools, which were participating in a variety of university outreach programs in Western Australia. Although research has previously established that academic aspirations are high (Gale et al., 2013; Parker et al., 2013; Prodonovich et al., 2014; Rampino & Taylor, 2013; St. Clair et al., 2013) as well they exceed academic expectations for low SES students (Boxer et al., 2011), no study has assessed the longitudinal relation between the dimensions of the university aspirational construct, desires and expectations, particularly in relation to widening participation for low SES students in studying for a university degree.

The results demonstrate reciprocal patterns between university desires and expectations to go to university over time. This is sometimes known in the literature as a feedback loop because both diagonal pathways were found to be significant, whereby university desires and university expectations strengthen each other over time. High levels of early university expectations associated with high levels of university desires, which, in turn, associated with subsequent high levels of expectations to go to university, when taking into account previous levels of university expectations. Although this particular diagonal pathway was significant over the 3 measurements, the magnitude of the alternative cross-lag pathway from early university desires to later university expectations was stronger. Notably, an indirect model confirmed that strengthening university desires occurs through a mediator, university expectations, as posited by Gale and colleagues (Gale, 2015; Gale & Parker, 2015). That is, early levels of university desires associated with higher levels of university expectations, which lead to higher desires for studying at university. For this low SES region, the likelihood of university study mediated relations between early and later desire to go to university. Notably, later expectations to go to university exert a strong influence on early university desires and continued to support university desires over time. For those students who desired to go to university they needed to expect to go to continue to have desires. Therefore, for these low SES students who were situated in schools where school-university partnerships were implemented, desires to go to university were strengthened through an expectation that university was possible. The university programs included regular contact with current university students who were able to illustrate what was possible. Thus one way to support widening participation in university is to make sure desires are supported by presenting realistic conditions of what is possible for students to go to university.

We were particularly interested in understanding whether students' aspirations for university could be supported in regional areas. For regional students there were early reciprocal relations between university desires and university expectations. However, this was not evident in the later wave of data collection. That is, as students moved through high school, early high levels of desire supported later higher levels of university desire and early higher levels of university expectations supported later higher expectations, but they did not loop to support each other. Of importance, our findings indicate that there are differences in the university aspirational pathways for metropolitan students and regional students and school-university outreach programs need to address these differences. If these two dimensions of university aspirations do not loop then the discrepancies between desires and expectations to go to university may widen for regional students but not for metropolitan students. Thus, one way to help loop these two constructs may be to recognize that more needs to be done within the school-university partnerships to create programs, which highlight what is possible and how university can be personally useful for students in regional areas.

We found that students in the MAP4U region, regardless of their location, express a desire to transition to university post-high school. The gap between desires and expectations to attend university is consistent with theory positing that aspirational capacities are guided by individual evaluations of environment and culture (Wigfield & Eccles, 2000). In addition, these results are consistent with recent research reported by Johnston and colleagues (2014) and Webb and colleagues (2015), who found that expectations to attend university are affected by neighbourhood factors, particularly for regional students. For a metropolitan student, who is more likely to have tertiary educated parents, a school culture of encouraging and offering units of study for higher education pathways, linked with close proximity to a university campus, their individual evaluation of their aspirations is likely to result in strong expectations of a university pathway. Conversely, for a regional student, who is more likely to be first in their family to attend university, whose school is more likely to encourage vocational pathways, and linked with prohibitive travel or relocation costs to access a university campus, their individual evaluation of

their aspirations is likely to result in lower expectations to attend university. This reflects that evaluation of aspirations is bound by the perceived fit of a person to an environment (i.e. university) and is strongly influenced by the structural resources and capacity of the school to support higher education pathways (Wigfield & Eccles, 2000). Within the MAP4U regional area university desires were supported through the school-university partnerships however these interventions did not overcome the neighborhood factors that remain to dampen regional students university expectations; factors such as the travel and relocation costs and ease of access to a university campus. Despite expectations to attend university being lower for regional students establishing strong school-university pathways can support stability of desire for university. The role of university expectations to feed students' desires for university is experienced by metropolitan students however is more tenuous for regional students. Future investigation should investigate whether there is an interaction between the expectancy and value of university study and whether the interacting effect can overcome barriers for students' future plans to go on to university and whether this interaction is different for regional students (Nagengast et al., 2011).

For these low SES students a closer inspection of the lagged relations indicate additional support for university expectations is required throughout the high school years and is particularly important as students move closer to transitioning from school. By targeting the culture in which the student exists, the results show that school-university partnerships can reduce the gap between desires and expectations for university. We argue that by introducing broader access to school-university partnerships, promoting and improving support structures, and opening up the horizon of opportunities within regional areas, we are making the pathway to university more familiar, navigable, and ultimately with financial considerations achievable, within the minds of regional students. Given the vocational bias of government schools in the regional areas (Prodonovich, et al., 2014), increases in students' perception of an achievable goal of university study is a forward indicator of a change in school culture.

At least two limitations regarding the present study can be made. First, our data are collected during three discrete time measurements while the processes to be observed are continuous. There may be a mis-specification of the time-lag as being too short or too long to ascertain change (Kessler & Greenberg, 1981). The self-report measures about desires and expectations may fluctuate during the school term therefore this study needs to be replicated using different times for measurement and changing the lag periods to confirm the relations. As well, although this study is designed to identify both reciprocal and autoregressive effects over time, cross-lagged panel designs remain correlational in nature. A third or confounding variable that was not measured or controlled for may cause relations evident in this study. Therefore this study needs to be replicated and levels of neighborhood factors need to be incorporated into the subsequent model for analysis.

A second point involves the study sample of students. Studying students who are situated side by side but classified as regional versus metropolitan has advantages and disadvantages. The advantages are that both the metropolitan and regional schools were part of the MAP4U project and were offered similar programs, as well the area was classified broadly as low SES with government schools less likely to support an academic culture (Perry & Southwell, 2013). However, the disadvantage is that these regional schools were located close to an outer metropolitan area and some students in the area could access metropolitan schools. Transport to the city was more accessible for some of the regional students compared to the others further from the main rail transport hub. Therefore, further research should be in regional and remote areas further away from metropolitan areas or away from areas where a university campus is easily accessible.

In conclusion, this study builds on earlier cross-sectional findings that a gap exists between desires and expectations for university especially for disadvantaged students (Kirk et al., 2012). Overall, the results of this study suggest that university desires and university expectations are developmentally linked in a cumulative manner. Empirical support for the influence of early university desires on later university expectations which, in turn, continue to support university desires affirms Gale's (2015) postulations that for low SES students' expectations mediate the relation between early and later desires. As students transition through high school, partnerships with universities can crystallize realistic possibilities for students, simultaneously supporting their university desires and expectations. These partnerships are particularly important for students in regional areas where consolidating the feedback loop between university desires and expectations needs to be a priority to meet government targets for wider participation in higher education, especially for regional and remote students.

References

Alloway, N., & Dalley-Trim, L. (2009). 'high and dry' in rural australia: Obstacles to student aspirations and expectations. *Rural Society, 19*(1), 49-59. doi:10.5172/rsj.351.19.1.49

Alloway, N., Gilbert, P., Gilbert. R. & Muspratt, S. (2004). *Factors impacting on student aspirations and expectations in regional Australia*. Canberra: Commonwealth of Australia: DEST.

Archer, L., DeWitt, J., & Wong, B. (2014). Spheres of influence: What shapes young people's aspirations at age 12/13 and what are the implications for education policy? *Journal of Education Policy, 29*(1), 58-85.

Australian Bureau of Statistics (2011). Census of population and housing, 2011. Selected characteristics. Retrieved from http://censusdata.abs.gov.au

Baker, W., Sammons, P., Siraj-Blatchford, I., Sylva, K., Melhuish, E. C., & Taggart, B. (2014). Aspirations, education and inequality in England: Insights from the effective provision of pre-school, primary and secondary education project. *Oxford Review of Education, 40*(5), 525-542. doi:10.1080/03054985.2014.953921

Boxer, P., Goldstein, S. E., DeLorenzo, T., Savoy, S., & Mercado, I. (2011).Educational aspiration–expectation discrepancies: Relation to socioeconomic and academic risk-related factors. *Journal of Adolescence, 34*(4), 609-617.

Bradley, D., Noonan, P., Nugent, H., & Scales, B. (2008). *Review of Australian higher education: Final report.* Canberra, ACT: DEEWR. Retrieved from Department of Education,

employment and Workplace Relations: www.deewr.gov.au/highereducation/review/pagesiewofaustralianhighereducationreport.aspx/r

Brotherhood of St Laurence. (2014). *Australian Youth Unemployment 2014: Snapshot.* Fitzroy: Brotherhood of St Laurence. Retrieved from http://library.bsl.org.au/jspui/bitstream/1/7060/1/MyChanceOurFuture_Youth_unemployment_snapshot_Feb2014.pdf

Department of Training and Workforce Development. (2015). *Peel workforce development plan 2015-2018.* Retrieved from http://www.dtwd.wa.gov.au/sites/default/files/uploads/Peel-workforce-development-plan-2015-2018.pdf

Eccles, J. (2009). Who am I and what am I going to do with my life? Personal and collective identities as motivators of action. *Educational Psychologist, 44*(2), 78-89.

Gale, T. (2015). Widening and expanding participation in Australian higher education: In the absence of sociological imagination. *The Australian Educational Researcher, 42*(2), 257. doi:10.1007/s13384-014-0167-7

Gale, T., & Parker, S. (2015). Calculating student aspiration: Bourdieu, spatiality and the politics of recognition. *Cambridge Journal of Education, 45*(1), 81-96. doi:10.1080/0305764X.2014.988685

Gale, T., Parker, S., Rodd, P., Stratton, G., & Sealey, T. (2013). *Student aspirations for higher education in Central Queensland.* Melbourne: CREFI.

Gottfredson, L. S. (1981). Circumscription and compromise: A developmental theory of occupational aspirations. *Journal of Counseling Psychology, 28*(6), 545-579. doi:10.1037/0022-0167.28.6.545

Halsey, J. (2017). *Independent review into regional, rural and remote education: Discussion paper.* Retrieved from Commonwealth of Australia website: https://docs.education.gov.au/system/files/doc/other/independent_review_into_regional_rural_and_remote_education.pdf

Hu, L. T., & Bentler, P. M. (1999). Cut-off criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal, 6*, 1-55. doi:10.1080/10705519909540118

Johnston, D. W., Lee, W., Shah, C., Shields, M. A., & Spinks, J. (2014). *Are neighbourhood characteristics important in predicting the post-school destinations of young Australians?* Adelaide: National Centre for Vocational Education Research. https://www.ncver.edu.au/publications/publications/all-publications/are-neighbourhood-characteristicsimportant-in-predicting-the-post-school-destinations-of-young-australians

Kessler, R. C., & Greenberg, D.F. (1981) *Linear panel analysis.* New York: Academic Press.

Khattab, N. (2014). How and when do educational aspirations, expectations and achievement align? *Sociological Research Online, 19*(4) doi:10.5153/sro.3508

Kirk, C. M., Lewis, R. K., Scott, A., Wren, D., Nilsen, C., & Colvin, D. Q. (2012). Exploring the educational aspirations-expectations gap in eighth grade students: Implications for educational interventions and school reform. *Educational Studies, 38*(5), 507-519. doi:10.1080/03055698.2011.643114

Koshy, P. (2016). *Student Equity Performance in Australian Higher Education: 2008 to 2015,* National Centre for Student Equity in Higher Education, Curtin University. Perth,. Retrieved from: https://www.ncsehe.edu.au/wp-content/uploads/2016/08/Student-Equity-Performance-in-Australian-Higher-Education-2008-to-2015_FINAL.pdf

Lamb, S., Jackson, J., Walstab, A., & Huo, S. (2015). *Educational opportunity in Australia 2015: Who succeeds and who misses out.* Melbourne: Mitchell Institute. Retrieved from http://www.mitchellinstitute.org.au/wp-content/uploads/2015/11/Educational-opportunity-in-Australia-2015-Who-succeeds-and-who-misses-out-19Nov15.pdf

Muthén, L. K., Muthén B. O. (1998-2016) Mplus user's guide. Los Angeles: Muthén & Muthén.

Nagengast, B., Marsh, H. W., Scalas, L. F., Xu, M. K., Hau, K., & Trautwein, U. (2011). Who took the "×" out of expectancy-value theory?: A psychological mystery, a substantive-methodological synergy, and a cross-national generalization. *Psychological Science, 22*(8), 1058-1066. doi:10.1177/0956797611415540

Naylor, R., Baik, C., & James, R. (2013). *Developing a critical interventions framework for advancing equity in Australian higher education*. Canberra, DIICCSRTE. Retrieved from https://www.ncsehe.edu.au/wp-content/uploads/2014/09/Critical-Interventions-Framework-20-August-2013.pdf

Parker, S., Stratton, G., Gale, T., Rodd, P., & Sealey, T. (2013). Higher Education and Student Aspiration: A survey of the adaptive preferences of Year 9 students in Corio, Victoria. VIC: Deakin University. Retrieved from http://dro.deakin.edu.au/eserv/DU:30064919/parker-highereducation-2013.pdf

Perry, L. B., & McConney, A. (2013). School socioeconomic status and student outcomes in reading and mathematics : A comparison of Australia and Canada. *Australian Journal of Education, 57*(2), 124-140. doi:10.1177/0004944113485836

Perry, L. B., & Southwell, L. (2013). Access to academic curriculum in Australian secondary schools: A case study of a highly marketised education system. *Journal of Education Policy. 29*(4), 467-485.

Prodonovich, S., Perry, L. B., & Taggart, A. (2014). Developing conceptual understandings of the capacity to aspire for higher education. *Issues in Educational Research, 24*(2), 174-189.

Rampino, T., & Taylor, M. (2012). Educational aspirations and attitudes over the business cycle (No. 2012-26). ISER Working Paper Series. Retrieved from https://www.iser.essex.ac.uk/publications/working-papers/iser/2012-26.pdf

Regional Development Commissions Act. (1993). Regional Development Commissions Act-1993. Retrieved from https://www.slp.wa.gov.au/legislation/statutes.nsf/main_mrtitle_11583_homepage.html

Rosenbaum, P. R., & Rubin, D. B. (1983). The central role of the propensity score in observational studies for causal effects. *Biometrika, 70*, 41-55.

Satorra, A. (2000). Scaled and adjusted restricted tests in multi-sample analysis of moment structures. In D.D.H. Heijmans, D.S.G. Pollock, & A. Satorra (Eds.), *Innovations in multivariate statistical analysis* (pp. 233-247). US: Springer.

Sellar, S., & Gale, T. (2011). Mobility, aspiration, voice: A new structure of feeling for student equity in higher education. *Critical Studies in Education, 52*(2), 115-134. http://dx.doi.org/10.1080/17508487.2011.572826

St. Clair, R., Kintrea, K., & Hourston, M. (2013). Silver bullet or red herring? New evidence on the place of aspirations in education. *Oxford Review of Education 39*(6), 719-738.

Taylor, J., Borlagdan, J., & Allan, M. (2012). *Turning 21: Life chances and uncertain transitions.* Fitzroy: Brotherhood of St Laurence. Retrieved from acys.info/documents/42/05_Allan_v32n3_2013.pdf

Thoemmes, F. (2012). Propensity score matching in SPSS. Retrieved from https://arxiv.org/ftp/arxiv/papers/1201/1201.6385.pdf

Universities Australia. (2017). *Higher education and research facts and figures.* Canberra: Universities Australia. Retrieved from https://www.universitiesaustralia.edu.au/australias-universities/key-facts-and-data#.WYlif1FrHIU

Watson, S. J., Vernon, L., Seddon, S., Andrews, Y. & Wang, A. (2016). Parents influencing secondary students' university aspirations: A multilevel approach using school-SES. *Issues in Educational Research, 26*(4), 673-693. http://www.iier.org.au/iier26/watson.pdf

Webb, S., Black, R., Morton, R., Plowright, S., & Roy, R. (2015).*Geographical and place dimensions of post-school participation in education and work*. NCVER, Adelaide.

Wigfield, A., & Eccles, J. S. (2000). Expectancy–value theory of achievement motivation. *Contemporary Educational Psychology, 25*(1), 68-81.

Willis, S., & Joschko, L. (2012). A 'high quality, high access' university that aims to marry excellence and equity. *Widening Participation and Lifelong Learning, 14*, 8-26.

Yuan, K., & Bentler, P. M. (2000). Three likelihood-based methods for mean and covariance structure analysis with nonnormal missing data. *Sociological Methodology, 30*, 165-200. doi:10.1111/0081-1750.00078