SUPPORT DOCUMENT

The factors affecting the educational and occupational aspirations of young Australians — support document

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NCVER

This document was produced by the authors based on their research for the report *The factors affecting the educational and occupational aspirations of young Australians*>, and is an added resource for further information. The report is available on LSAY's website: <www.lsay.edu.au>.

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Table A1 Descriptive statistics for socio-demographic predictor variables (unweighted)

Predictor	Categories	n	%
Gender	Female	7 231	50.74
	Male	7 020	49.26
Indigenous status	Not Indigenous	13 108	91.98
	Indigenous	1 143	8.02
Immigration background	Australian-born students	8 396	58.92
	First-generation students	4 103	28.79
	Foreign-born students	1 365	9.58
	Missing	387	2.72
Family structure	Nuclear family	10 973	77.00
	Not nuclear family	2 999	21.04
	Missing	279	1.96
Location	Metropolitan	9 890	69.40
	Not metropolitan	4 361	30.60
Parents' higher ed. aspirations	Not university	3 012	21.14
	University	5 029	35.29
	Missing	6 210	43.58
Peers' higher ed. aspirations	Not university	3 529	24.76
	University	3 298	23.14
	Missing	7 424	52.09
SES	Continuous	Mean: 0.32	SD: 0.76
	Missing	318	2.23
Academic performance[1]	Continuous	Mean: 508	SD: 94.26
Attitudes to school (PISA composite variable)	Continuous	Mean: 0.15	SD: 1.02
	Missing	794	5.58
Teacher-student relations (PISA composite variable)	Continuous	Mean: 0.09	SD: 0.98
	Missing	285	2.00
Disciplinary climate (PISA composite variable)	Continuous	Mean: -0.1	SD: 1.01
	Missing	290	2.04
Teacher quality (PISA composite variable)	Continuous	Mean: 0.21	SD: 1.04
	Missing	337	2.37

[1] Academic performance is the average of PISA mathematics performance and reading performance scores.

Table A2 Descriptive statistics for perception of schooling predictor variables (unweighted)

Predictor	Categories	n	%
Attitudes to school			
(a1) School has done little to prepare me for adult life [reverse] [2]	Strongly disagree	5 073	35.60
	Disagree	6 176	43.34
	Agree	2 040	14.31
	Strongly agree	610	4.28
	Missing	352	2.47
(a2) School has been a waste of time [reverse]	Strongly disagree	6 674	46.83
	Disagree	6 102	42.82
	Agree	837	5.87
	Strongly agree	265	1.86
	Missing	373	2.62
(a3) School helped give me confidence	Strongly disagree	435	3.05
	Disagree	1 917	13.45
	Agree	8 674	60.87
	Strongly agree	2 871	20.15
	Missing	354	2.48
(a4) School has taught me things which could be useful in a job	Strongly disagree	330	2.32
	Disagree	842	5.91
	Agree	7 045	49.44
	Strongly agree	5 702	40.01
	Missing	332	2.33
Teacher-student relations			
(r1) I get along well with most of my teachers	Strongly disagree	457	3.21
	Disagree	1 683	11.81
	Agree	9 132	64.08
	Strongly agree	2 670	18.74
	Missing	309	2.17
(r2) Most of my teachers are interested in my well-being	Strongly disagree	563	3.95
	Disagree	2 581	18.11
	Agree	9 028	63.35
	Strongly agree	1 708	11.99
	Missing	371	2.60
(r3) Most of my teachers really listen to what I have to say	Strongly disagree	708	4.97
	Disagree	3 371	23.65
	Agree	8 373	58.75
	Strongly agree	1 448	10.16
	Missing	351	2.46
(r4) If I need extra help, I will receive it from my teachers	Strongly disagree	422	2.96
	Disagree	1 813	12.72
	Agree	9 329	65.46
	Strongly agree	2 328	16.34
	Missing	359	2.52
(r5) Most of my teachers treat me fairly	Strongly disagree	474	3.33
	Disagree	1 673	11.74
	Agree	9 583	67.24
	Strongly agree	2 173	15.25
	Missing	348	2.44

Table A2 continues on next page.

[2] [reverse] indicates that this item was reverse-coded when creating the composite perception of schooling scale (see section B of this document).

Predictor	Categories	n	%
Disciplinary climate			
(d1) Students don't listen to what the teacher says [reverse]	Never or hardly ever	2 118	14.86
	Some lessons	7 187	50.43
	Most lessons	3 424	24.03
	Every lesson	1 207	8.47
	Missing	315	2.21
(d2) There is noise and disorder [reverse]	Never or hardly ever	1 790	12.56
	Some lessons	6 562	46.05
	Most lessons	3 984	27.96
	Every lesson	1 588	11.14
	Missing	327	2.29
(d3) The teacher has to wait a long time for students to quiet down [reverse]	Never or hardly ever	3 615	25.37
	Some lessons	6 085	42.70
	Most lessons	3 022	21.21
	Every lesson	1 189	8.34
	Missing	340	2.39
(d4) Students cannot work well [reverse]	Never or hardly ever	4 463	31.32
	Some lessons	6 886	48.32
	Most lessons	1 869	13.11
	Every lesson	702	4.93
	Missing	331	2.32
(d5) Students don't start working for a long time after the lesson begins [reverse]	Never or hardly ever	4 335	30.42
	Some lessons	6 209	43.57
	Most lessons	2 382	16.71
	Every lesson	1 000	7.02
	Missing	325	2.28
Teacher quality			
(t1) The teacher explains beforehand what is expected of students	Never or hardly ever	1 114	7.82
	Some lessons	4 568	32.05
	Most lessons	5 663	39.74
	All Lessons	2 538	17.81
	Missing	368	2.58
(t2) The teacher checks that students are concentrating while working on an assignment	Never or hardly ever	887	6.22
	Some lessons	3 896	27.34
	Most lessons	6 528	45.81
	All Lessons	2 565	18.00
	Missing	375	2.63
(t3) The teacher discusses students' work after they have finished an assignment	Never or hardly ever	1 073	7.53
	Some lessons	4 257	29.87
	Most lessons	6 111	42.88
	All Lessons	2 424	17.01
	Missing	386	2.71

Table A2 continues on next page.

Predictor	Categories	n	%
(t4) The teacher tells students in advance how their work is going to be judged	Never or hardly ever	963	6.76
	Some lessons	3 637	25.52
	Most lessons	5 882	41.27
	All Lessons	3 383	23.74
	Missing	386	2.71
(t5) The teacher asks whether every student has understood how to complete an assignment	Never or hardly ever	858	6.02
	Some lessons	3 320	23.30
	Most lessons	5 815	40.80
	All Lessons	3 867	27.13
	Missing	391	2.74
(t6) The teacher marks students' work	Never or hardly ever	703	4.93
	Some lessons	3 403	23.88
	Most lessons	4 890	34.31
	All Lessons	4 828	33.88
	Missing	427	3.00
(t7) The teacher gives students the chance to ask questions about an assignment	Never or hardly ever	424	2.98
	Some lessons	2 779	19.50
	Most lessons	5 730	40.21
	All Lessons	4 899	34.38
	Missing	419	2.94
(t8) The teacher poses questions that motivate students to participate actively	Never or hardly ever	1 148	8.06
	Some lessons	4 314	30.27
	Most lessons	5 834	40.94
	All Lessons	2 559	17.96
	Missing	396	2.78
(t9) The teacher tells students how well they did on an assignment immediately after	Never or hardly ever	2 121	14.88
	Some lessons	5 186	36.39
	Most lessons	4 678	32.83
	All Lessons	1 879	13.19
	Missing	387	2.72

Table A3 Descriptive statistics for outcome variables (unweighted)

Outcome	Categories	n	%
Aspirations to complete Year 12	Yes	10 684	74.97
	No	1 788	12.55
	Missing	1 779	12.48
Aspirations to go on to university	Yes	4 185	29.37
	No	4 518	31.70
	Missing	5 548	38.93
Occupational aspirations	Continuous	Mean: 67.25	SD: 23.45
	Missing	4 866	34.14

Section B: Interaction between Indigenous status and academic performance

In the logistic regression model of Year 12 expectations, Indigenous status emerges as a significant predictor with a positive sign. This result contradicts existing statistics (e.g., ABS 2011) by suggesting that Indigenous students have a *higher* probability of completing Year 12 than non-Indigenous students.

First, note that if the 'Academic performance' variable is removed from the model, this association disappears, and Indigenous status becomes non-significant. Indeed, if one examines the cross-tabulation of Indigenous status with Year 12 plans in table B1, it can be seen that Indigenous status has little impact on whether students plan to complete Year 12. Thus, one would not expect Indigenous status to be a significant predictor, and if it were, to have a negative sign, since Indigenous students are slightly less likely to intend to complete Year 12.

Table B1 Cross-tabulation of Indigenous status and plans to complete Year 12

Indigenous status	Plans to complete Year 12	
	Yes (%)	No (%)
Non-Indigenous	87	13
Indigenous	81	19

Source: LSAY09, 2009 survey, weighted estimates.

So, it was suspected that the relationship between academic performance, Indigenous status and Year 12 plans may be causing this unexpected result. A cross tabulation of academic performance, Indigenous status and Year 12 plans was thus performed (table B2).

Table B2 Cross-tabulation of Indigenous status, plans to complete Year 12, and PISA score

Indigenous students				Non-Indigenous students			
Academic performance score	Plans to complete Year 12		n	Academic performance score	Plans to complete Year 12		n
	Yes (%)	No (%)			Yes (%)	No (%)	
0 - 199	0	100	1	0 - 199	41	59	7
200 - 299	68	39	14	200 - 299	47	53	67
300 - 399	72	28	76	300 - 399	66	34	977
400 - 499	80	20	157	400 - 499	77	23	3 717
500 - 599	89	11	96	500 - 599	93	7	5 121
600 - 699	95	5	13	600 - 699	98	2	2 220
700 - 799	.	.	0	700 - 799	100	0	203
800 - 899	.	.	0	800 - 899	100	0	2

Source: LSAY09, 2009 survey, weighted estimates.

For those students with PISA academic performance scores in the 200-299 range, the pattern of Yes/No answers is reversed for Indigenous students compared to non-Indigenous students. Indigenous students in this range are *more* likely than non-Indigenous students in this range to complete Year 12.

Another explanation for the unusual result is that it may be related to the parental expectations variable. It could be that parents of Indigenous students have considerably *lower* higher education aspirations than parents of non-Indigenous students, so that Indigenous status requires a positive coefficient to counteract this strong negative relationship. Cursory additional analysis reveals that this hypothesis is not supported by the dataset. First, a cross-tabulation of parental expectations by Indigenous status was examined (table B3). Parents of Indigenous students are slightly less likely to expect their children to attend university than parents of non-Indigenous students. However, the difference is not extreme.

Table B3 Cross-tabulation of Indigenous status and parents' higher education aspirations

Indigenous status	Do your parents expect you to attend university?	
	Yes (%)	No (%)
Non-Indigenous	60	40
Indigenous	40	60

Source: LSAY09, 2009 survey, weighted estimates.

In a final step, the parental expectations variable was removed from the model altogether to see how this would affect the coefficient for Indigenous status. After removing the parental expectations variable, the coefficient for Indigenous status still had a positive sign and was still statistically significant at $\alpha = 0.05$. In other words, it does not appear that the unusual sign for the Indigenous status coefficient is related to the parental expectations variable.

Section C: A structural model of aspirations

This section first offers a brief background on structural equation modelling (SEM) before providing detailed SEM results with respect to the three aspiration outcomes of interest in this paper.

SEM Background

Latent variable structural equation modelling is used to test complex direct and mediated theoretical relationships (or 'paths') between latent constructs. In this study, SEM allows us to determine the direction and strength of direct and mediated paths between relevant predictors and young people's educational and occupational aspiration outcomes.

A structural equation model consists of two parts: the measurement model and the structural model. The structural model is the higher-level portion and consists of the latent variables and the pathways between them, while the measurement model contains the underlying factor models behind each of the latent variables.

The relationship between the observed and unobserved variables is called the 'measurement model'. Each observed variable has an associated error term to represent measurement error. Meanwhile, each dependent latent variable has a disturbance term, which is an error (residual) term. This disturbance term reflects only omitted causes and not measurement error (Kline 2011).

Structural equation models can experience convergence problems, and researchers are advised to check several properties of the dataset to ensure that the variance matrix is not ill-scaled and that variables in the model are not too highly correlated. See the section 'Data screening' for further information and examples.

The primary advantages of structural equation modelling over standard regression modelling are:

- One can examine relationships between both observed and unobserved (latent) variables.
- One can incorporate direct and indirect effects of variables on the outcome.
- One can let factors interact in complex ways to explain the outcome, and test the plausibility of the proposed relationships.

Data screening

In order for structural equation modelling (SEM) to execute correctly, several properties of the data must be checked. Some of these properties are outlined below; however readers are referred to Kline (2011) for a more comprehensive discussion.

Extreme collinearity

If two variables have a correlation of more than 0.85, then they are essentially the same variable, and one of them should be removed from the model to avoid estimation problems (Lei & Wu 2007). In the case of the LSAY 2009 dataset, in wave 1, science performance was very highly correlated with both

mathematics performance and reading performance, with correlations greater than 0.9. As such, science performance was removed from the model.

Relative variances

In the covariance matrix, the ratio of the largest variance to the smallest variance should be no more than 10, otherwise the covariance matrix is said to be 'ill-scaled', which can cause convergence problems (Kline 2011). Any variables with extremely high or low variances can be rescaled by multiplying their scores by a constant, which changes the variance by a factor that equals the squared constant. Importantly, rescaling a variable does not change its correlation with other variables.

In table C1, the variances of all variables used in the SEM dataset for this study are listed in descending order. One can see that the variances of 'maths', and 'reading' are around 10,000 times bigger than the variances of most other predictors. To rectify this, one must divide 'maths', and 'reading' by 100, since if all values are scaled by a constant, the variance is scaled by the square of that constant. i.e.:

$\mathrm{Var}(cX) = c2 \;\; \mathrm{Var}(X)$, where *c* is a constant.

For example:

$$\mathrm{Var}(\mathrm{maths}) = 8916; \qquad \text{so} \;\; \mathrm{Var}\left(\frac{\mathrm{maths}}{100}\right) = \left(\frac{1}{100}\right)^2 \times 8916 = 0.8916.$$

In other words, the required scaling factor is $c = \frac{1}{100} = 0.01$.

In addition, the variance of the occupational aspirations outcome variable (occ_asp_ is around 100 times bigger than most other predictors. To fix this, we need to divide occ_asp by $\sqrt{100}$. So the required scaling factor is $c = \frac{1}{\sqrt{100}} = 0.1$.

We also need to rescale some of the smallest variances. For example, the variance of indigenous status is 10 times smaller than most other variances, so we need to multiply indigenous status by $\sqrt{10}$. The variance for Year 12 aspirations is also quite small; it was doubled by multiplying it by $\sqrt{2}$.

Before re-scaling, the ratio of the largest variance to the smallest variance was around 137 000. After re-scaling the ratio is only around 6.0, which is well below the cut-off of 10.

Table C1 Variances of the predictors

Predictor	Variance	Scaling factor	Re-scaled variance
Reading performance	10 182.19	0.01	1.0182
Mathematics performance	8 915.95	0.01	0.8916
Occupational aspirations	549.73	0.1	0.5497
SES	0.5757	1	0.5757
Immigration background	0.4469	1	0.4469
Gender	0.2500	1	0.2500
Parents' higher ed. aspirations	0.2491	1	0.2491
Aspire to go on to university	0.2462	1	0.2462
Peers' higher ed. aspirations	0.2314	1	0.2314
Location	0.2124	1	0.2124
Family structure	0.1686	1	0.1686
Aspire to complete Year 12	0.1228	$\sqrt{2}$	0.2456
Indigenous status	0.0738	$\sqrt{10}$	0.7378
Ratio of largest variance to smallest variance	137 595	-	6.0

Direct and indirect influences on aspirations

Often, there are not only strong relationships between predictors and outcomes, but *among the predictors themselves* (Wall & Li 2003). For example, aside from influencing Year 12 aspirations directly, parental and peer expectations may influence a student's academic performance and perceptions of school, which in turn impact on aspirations. Structural equation modelling (SEM) can illustrate such relationships by:

- modelling relationships between *one predictor and another*, as well as between a predictor and the outcome (e.g., one can propose that parental expectations have an influence on academic performance in addition to their influence on the aspirations outcome).
- testing whether the network of proposed relationships is plausible, based on whether the model fits the data.

Using SEM, this section proposes an *overall* model of how relevant predictors might interact with each other to shape aspirations both directly and indirectly. SEM can be thought of as a hybrid of factor analysis and path analysis (Weston & Gore 2006), whereby interrelationships between latent constructs can be modelled[3]. The use of latent constructs allows for much greater parsimony in the number of predictors: background, academic performance, parental and peer expectations and the overall perceptions of school[4]. All SEM procedures were carried out using Mplus software (Muthén & Muthén 2010).

[3] A 'latent' construct is one that cannot be measured directly (e.g., aspirations, intelligence, etc.). It consists of 'manifest' variables that can be measured and are used to proxy the latent construct.

[4] When examining the effects of mediating variables, the general advantage of using SEM over individual regression models is that all direct and indirect relationships between variables are estimated simultaneously. Moreover, SEM is very efficient at dealing with observations that have partially missing data.

The components of each latent construct are listed in table C2. Note that 'Perceptions of school' is considered a 'second-order' latent construct, because it has indicators which are themselves latent variables. A first-order latent construct, by contrast, has indicators which are observed variables.

Table C2 Measures comprising each latent construct

Latent construct (2nd order)	Latent construct (1st order)	Measures
	Background	Gender
		SES
		Indigenous status
		Location
		Family structure
		Immigration status
	Academic performance	PISA mathematics performance score
		PISA reading performance score
	Parents and peers	Parents' higher education aspirations
		Peers' higher education aspirations
Perceptions of school	Attitudes to school	4 items related to attitudes towards school (a1-a4)*
	Student-teacher relations	5 items related to teacher-student relations (r1-r5)*
	Teacher quality	9 items related to teacher quality (t1-t9)*
	Disciplinary climate	5 items related to the school's disciplinary climate (d1-d5)*

*For detailed information on the items, please see table D2 in section D of this support document.

Many different options exist when examining interrelationships between predictors and outcome variables. Guided by prior research (Marjoribanks 2005; Strand & Winston 2008), figure C1 depicts a proposed model for Year 12 aspirations[5]. While there may be many other plausible configurations of direct and indirect relationships, the purpose of SEM is to test how well this proposed model fits the data in the LSAY Y09 dataset.

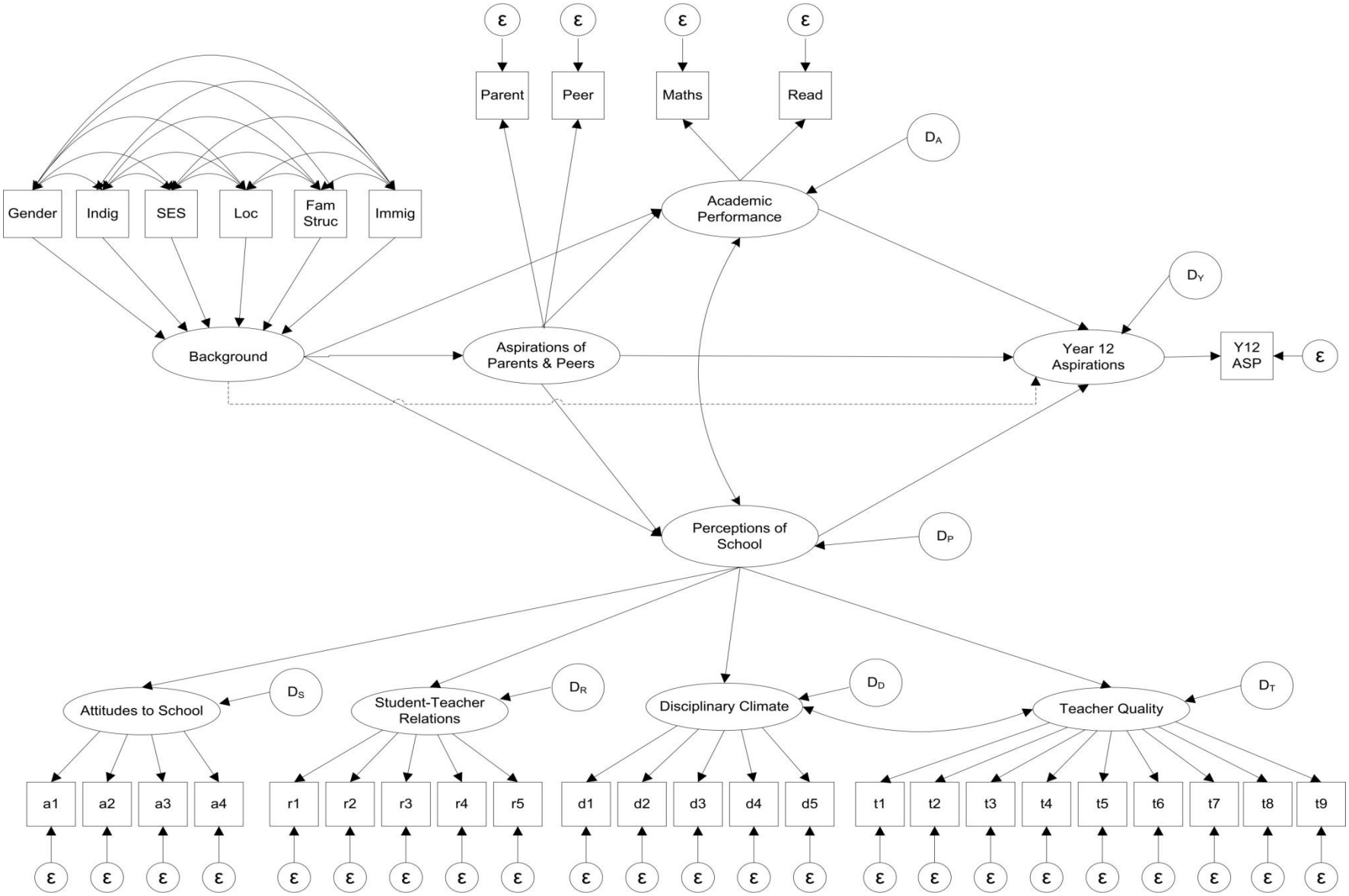
Structural equation models are typically presented in graphical form. Latent variables are represented by ovals, and observed variables are represented by squares. For example, the latent construct of 'Academic Performance' is represented by an oval, whereas its measurable components, the student's maths and reading scores, are represented by squares. Each observed variable has an associated error term, given by ε, to represent measurement error, while each dependent latent variable has a disturbance term, given by *D*, which accounts for any unexplained variance (i.e. omitted causes; Kline 2011). Relationships between manifest and latent variables are referred to as the 'measurement model' and are not usually of substantive interest; what is of interest are the interrelationships between latent constructs, which are referred to as the 'structural model'.

[5] Similar models were fitted for university aspirations and occupational aspirations.

At first glance, the arrows connecting the observed variables to the latent variables may appear to be pointing in the wrong direction. Intuitively, one might expect the arrows to go *from* the observed variables *to* the latent variables. However, in SEM the general assumption is that the true level of the latent variable is 'borne out' by what is observed in the manifest variables (Weston & Gore 2006). For example, someone's true level of academic performance is reflected in their mathematics and reading scores, rather than the other way around[6].

[6] The one exception is the 'background' construct, where the arrows do in fact point from the latent variable to the observed variables. This is because background is a so-called 'formative' construct. A formative construct is *formed* by its measures, as opposed to a reflective construct where the measures are *reflections* of the underlying latent construct (Fornell & Bookstein [1982], cited in Edwards & Bagozzi [2000]). In other words, a formative construct is *defined* by its items, which are assumed to be independent, yet correlated. If one of the items were to be removed, it would affect the meaning of the construct (see Petter et al. [2007] for further explanation).

Figure C1 Full structural equation model for Year 12 aspirations



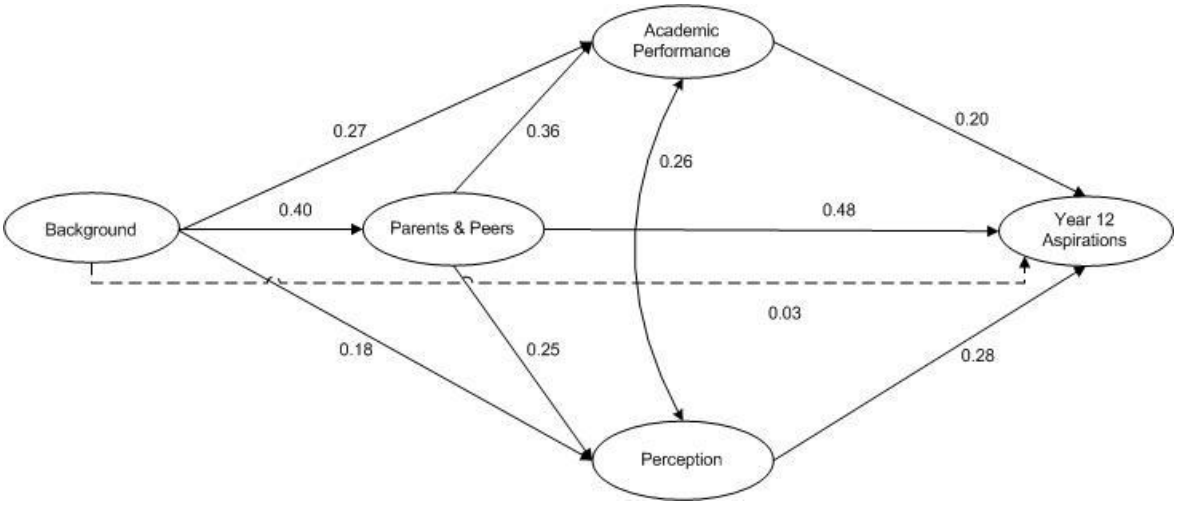
Interpreting coefficients of structural equation models

Calculating direct and indirect effects

One advantage of structural equation modelling over traditional multivariate regression is that both the direct and *indirect* influences of a predictor on the outcome can be examined.

For example, consider figure C2, showing the structural model for Year 12 plans. Consider the "parents and peers" variable. There is a direct path from this variable to the outcome; thus the direct effect of "parents and peers" on Year 12 aspirations is 0.48. The coefficients presented are standardised coefficients. Thus a coefficient of 0.48 means that if parental and peer support increases by one standard deviation while all other variables are held constant, Year 12 aspirations would be expected to increase by 0.48 of a standard deviation.

Figure C2 Structural model for Year 12 plans



"Parents and peers" also has an influence on Year 12 aspirations via other variables. For instance, there is a path from "parents and peers" to "academic performance", and then from "academic performance" to "Year 12 aspirations". So we say that "parents and peers" also has an *indirect* effect on Year 12 aspirations via "academic performance".

To calculate the size of an indirect effect, the coefficients on the component paths are multiplied together. The rationale behind the multiplication is that "parents and peers" affects "academic performance" by 0.36 of a standard deviation, but only 0.20 (or 20%) of this effect is passed on to "Year 12 aspirations" (Kline 2011). Hence we take 20% of 0.36, or 0.20*0.36 = 0.072. Notice that the indirect effect usually ends up being much smaller than the direct effect, due to the multiplication of the coefficients, which are always less than 1.

All figures in this section display the standardised coefficients, which enable the relative impacts of predictors to be compared on a common scale, as described. The unstandardised coefficients are given for completeness at the end of this section. Although standardised coefficients are more convenient to interpret, their interpretation rests on the assumption that different standard deviations can be thought of as equivalent. See Grace and Bollen (2005) for further discussion.

A single predictor can have more than one indirect effect on the outcome. Notice that "parents and peers" also has a second indirect effect on the outcome via the "perception" construct. To gain an understanding of the overall effect of one variable on another, one must consider total effects.

Calculating total effects

The total effect can be thought of as the overall effect of a predictor on the outcome, accounting for both the direct *and* indirect pathways. The total effect is simply the sum of all direct and indirect effects of one variable on another (Kline 2011). For example, one can calculate the total influence of "parents and peers" (see figure C2) on the outcome as follows:

Total effect = Direct effect + Indirect effects

= 0.48 + Indirect effect via "academic performance" + Indirect effect via "perception"

= 0.48 + (0.36)(0.20) + (0.25)(0.28)

= 0.48 + 0.072 + 0.07

= 0.62.

Thus, the total effect of "parents and peers" on Year 12 plans is 0.62. In other words, increasing "parents and peers" by one standard deviation increases students' plans to complete Year 12 by 0.62 standard deviations via all presumed direct and indirect causal links between these two variables.

When variables are correlated, as is the case for "academic performance" and "perception", the double-headed curved path is taken as a path when determining the indirect effects. That is, the double-headed arrow is treated as creating a path from "academic performance" to "perception" to the outcome. Similarly, the double-headed arrow also creates a path from "perception" to "academic performance" to the outcome. The correlation thus is involved in the creation of indirect paths.

Hence our previous calculation needs to be altered slightly, to also take into account the path from "academic performance" to "perception". For "parents and peers":

Total effect = Direct effect + Indirect effects

= 0.48 + Indirect effect via "academic performance" + Indirect effect via "perception" + Second indirect effect via "academic performance" + Second indirect effect via "perception"

= 0.48 + (0.36)(0.20) + (0.25)(0.28) + (0.36)(0.26)(0.28) + (0.25)(0.26)(0.20)

= 0.48 + 0.072 + 0.07 + 0.03 + 0.01

= 0.62 + 0.04

= 0.66

Thus the total effect of "parents and peers" on Year 12 plans is 0.66.

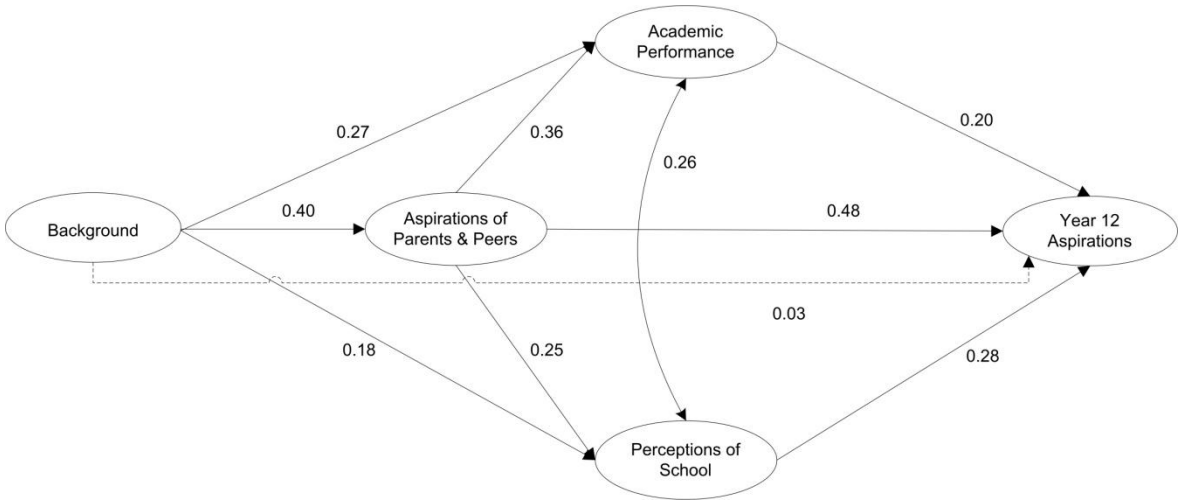
To save one having to complete the above calculation for every predictor, SEM software normally lists the total effects as part of the output. The complete SEM output is listed at the end of this section.

Results by aspiration outcome

For brevity, only results for the structural models (i.e., the substantive models of interest) are shown here. Figure C3 shows the structural model for Year 12 aspirations. All coefficients are standardised (i.e., put on a common scale) so that the relative strength of the paths can be compared. All paths are statistically significant and represented by solid lines, except for the path from 'Background' to 'Year 12 Aspirations', which is indicated with a dashed line.

Gender differences in the formation of educational aspirations were also examined, yet the models for males and females were not significantly different from each other. The results presented here are thus not split by gender; instead, gender is one of the variables that make up the formative 'Background' construct.

Figure C3 Structural model for Year 12 plans



Results show that parental and peer influences have the strongest direct effect on Year 12 aspirations, followed by 'Perceptions of School' and 'Academic Performance'. This is broadly consistent with the results in previous sections of this paper.

What is new here is that the magnitudes of the relationships *between* pairs of predictors are now becoming apparent. For example, parental and peer influences have a moderately strong effect on academic performance, and a lesser influence on perceptions of school. Also, background characteristics have the largest effect on parents and peers (0.40), followed by academic performance (0.27) and perceptions of school (0.18).

Most interestingly, before considering the influence of parents and peers, the direct effect of background characteristics on Year 12 aspirations was the strongest in the model (not shown here). However, once parental and peer influences are added to the model, they, in conjunction with academic performance and perceptions of school, almost entirely mediate the effect of individual background. Of course, with respect to young people's aspirations, parental and peer influences are, to some extent, born out of individual background. Nonetheless, this finding suggests that background has no direct effect on year 12 aspirations. Instead, background affects Year 12 aspirations via academic performance, perceptions of school and, most strongly, the aspirations of parents and peers.

Direct effects, indirect effects and total effects

In SEM, the effect of a variable on the outcome can be broken down into two components: direct and indirect effects. For example, consider the 'Parents and Peers' construct in figure C3. The direct effect is simply the standardised coefficient associated with the direct path from the variable to the outcome (i.e., 0.48). The interpretation is that if parental and peer support increases by one standard deviation, while all other variables are held constant, Year 12 aspirations would be expected to increase by 0.48 of a standard deviation.

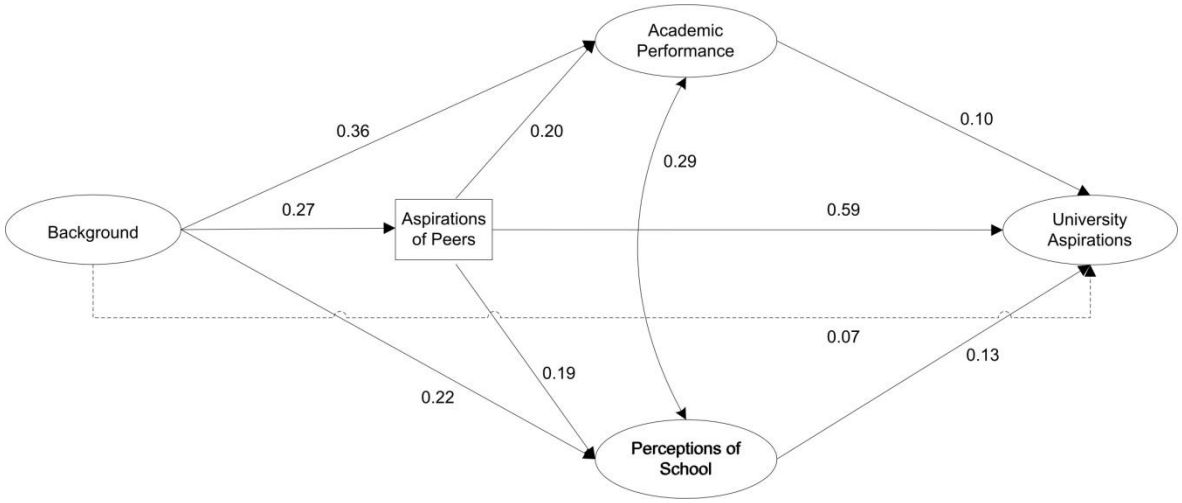
However, the 'Parents and Peers' construct also has an influence on Year 12 aspirations via *other* variables (e.g. there is a path from parents and peers → academic performance → Year 12 aspirations). This is called an *indirect* effect. To calculate the magnitude of an indirect effect, the coefficients on the component paths are multiplied. The rationale behind the multiplication is that 'Parents and Peers' affects 'Academic Performance' by 0.36 of a standard deviation, but only 20 per cent of this effect is passed on to 'Year 12 Aspirations' (Kline 2011). Hence, the indirect effect of 'Parents and Peers' on 'Year 12 Aspirations' via 'Academic Performance' is 0.20*0.36 = 0.072.

The total effect is then the sum of the direct and indirect effects (Kline 2011). A more detailed discussion of direct, indirect and total effects (including worked examples) is provided in section D of the accompanying support document.

University plans

The SEM model for university plans, with standardised coefficients, is shown in figure C4. Note that due to statistical estimation problems, parental expectations had to be removed for the model on university plans.

Figure C4 Structural model for university plans



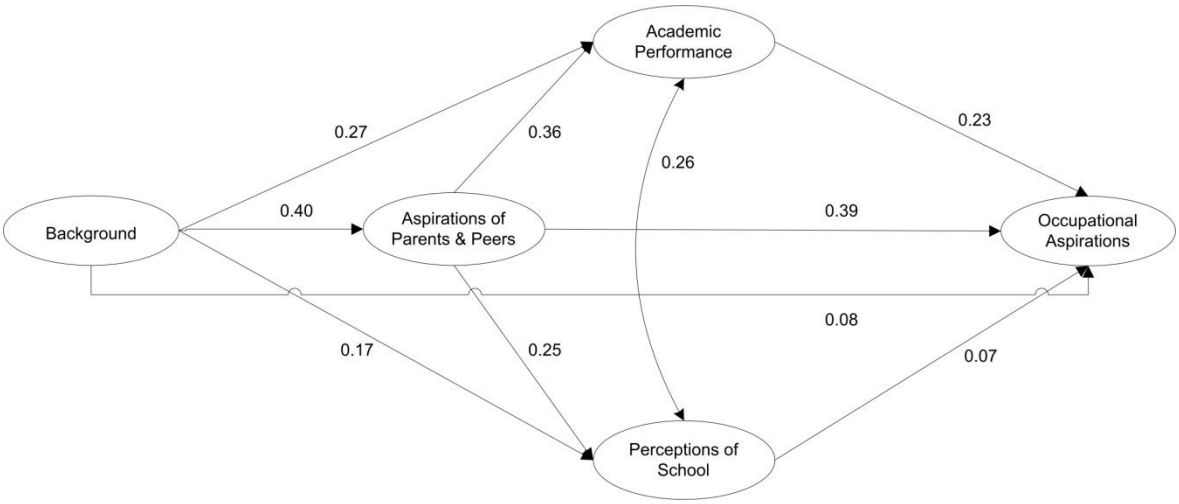
Results suggest that peer plans has by far the strongest influence on a student's university plans, while academic performance and perceptions of school have only weak influences. In fact, the direct effect of peer plans is approximately six times as strong as the effects of academic performance and perceptions of school. As was the case with Year 12 aspirations, the effect of background is almost entirely mediated by peer plans, academic performance and perceptions of school. However, the

exclusion of parental expectations due to estimation problems somewhat weakens the model on university aspirations.

Occupational aspirations

The structural model for occupational aspirations is given in figure C5.

Figure C5 Structural model for occupational aspirations



Once again, the strongest influence on the outcome is parental and peer expectations. Parents and peers also have a strong influence on academic performance and perceptions of school. Also, the direct effect of academic performance is roughly *three times* that of perceptions of school. This agrees with the OLS results, where parents' higher education aspirations was the top predictor, followed by academic performance.

Summary of results

Table C3 summarises the total effects of the predictors across all three outcome variables.

Table C3 Summary of total effects across outcomes

Predictor construct	Year 12 aspirations	University aspirations	Occupational aspirations
Background	0.43	0.32	0.37
Academic performance	0.27	0.14	0.24
Parents and peers	0.66	0.65	0.65
Perceptions of school	0.33	0.16	0.13

Overall, the structural equation models indicate that, for each outcome, parents and peers is the most influential predictor. However, a key insight emerges when the SEM findings are compared with the findings from the simple regressions.

The previous tree diagrams suggest that the most influential predictors are (in the case of Year 12 aspirations) academic achievement, followed by parental and peer expectations. While parental and peer expectations still comes up as a very strong predictor, it now appears that background is more important than we first understood from the earlier analysis, due to its indirect effects, particularly through academic performance and parents and peers.

In other words, the structural equation models have led to a deeper understanding of the way background indirectly affects the three outcomes through its influence on parental and peer expectations, academic performance and perceptions of school.

Assessing model fit

In structural equation modelling, model fit is assessed using several indicators. Model fit indicates the extent to which the proposed network of relations among variables is plausible (Lei & Wu 2007). Exactly which fit indices to use, and the associated cut-offs to apply, is a topic of contention amongst researchers. However, in general, for a structural equation model to be considered a 'good fit', the following must hold: the Comparative Fit Index (CFI) should be close to 1, the Root Mean Square Error of Approximation (RMSEA) should be close to zero, and the Standardised Root Mean Square Residual (SRMR) should be close to zero.

The precise cut-offs for each of these indices differs depending on sample size. For sample sizes larger than n= 500, the CFI should be ≥ 0.95, the RMSEA ≤ 0.06 and the SRMR ≤ 0.08 (Weston & Gore 2006). These cut-offs are slightly less stringent for sample sizes under 500 observations, as shown in table C4.

Table C4 Summary of the fit criteria to apply, dependant on sample size

Fit index	For sample sizes less than n = 500	For sample sizes greater than n = 500
CFI	≥ 0.90	≥ 0.95
RMSEA	≤ 0.10	≤ 0.06
SRMR	≤ 0.10	≤ 0.08

Source: Weston and Gore (2006)

In addition, the χ^2 value should be nonsignificant. A significant χ^2 suggests that the model does not fit the data well (Weston & Gore 2006). However, a word of caution is in order, since for large samples, the χ^2 is likely to become significant due to increased statistical power, even though the model may be a close fit to the data (Weston & Gore 2006). Thus limited weight should be given to the χ^2 statistic for large sample sizes. Note that the three structural equation models presented in this report all satisfy the criteria for sample sizes greater than n=500. The values of the fit indices are presented at the end of this section.

Detailed SEM results by outcome

Table C5 presents a summary of the model fit statistics for all three outcomes.

Table C5 Summary of model fit statistics across all outcomes (n = 13 628)

Outcome	χ^2	df	p	RMSEA	RMSEA CI_{90}	CFI
Year 12 Asp.	7 611.143	499	<0.000	0.032	0.032-0.033	0.974
Uni Asp.	7 375.864	468	<0.000	0.033	0.032-0.034	0.974
Occ. Asp.	7 500.759	499	<0.000	0.032	0.031-0.033	0.974

Tables C6 to C8 present the covariance matrices for each of the three outcomes, respectively. The correlation matrices are listed in tables C9 to C11. For details on individual variables, please see the LSAY metadata spreadsheet for the Y09 cohort, available from the LSAY website, <http://www.lsay.edu.au/publications/2621.html>.

Note that some variables from the LSAY Y09 dataset have been renamed for the purposes of this study. These variables are listed below, together with the original LSAY variable name:

- PAR_ASP = st65n02
- PEER_ASP = st65n03
- MATHS = pv1math
- READING = pv1read
- YR12_EXP = st64n01
- UNI_EXP = st65n01
- OCC_ASP = anzscoq69, recoded to the AUSEI06 scale.

Table C6 Covariance matrix for Year 12 aspirations

	PAR_ASP	PEER_ASP	MATHS	READING	ST33Q01
PAR_ASP					
PEER_ASP	0.53				
MATHS	0.217	0.167	0.713		
READING	0.257	0.198	0.635	0.769	
ST33Q01	0.093	0.072	0.113	0.133	
ST33Q02	0.116	0.089	0.14	0.166	0.558
ST33Q03	0.1	0.077	0.12	0.142	0.479
ST33Q04	0.104	0.08	0.125	0.148	0.499
ST34Q01	0.127	0.098	0.154	0.182	0.313
ST34Q02	0.136	0.105	0.164	0.194	0.334
ST34Q03	0.139	0.107	0.168	0.198	0.342
ST34Q04	0.127	0.098	0.153	0.182	0.313
ST34Q05	0.133	0.102	0.161	0.19	0.327
ST36Q01	0.053	0.041	0.064	0.076	0.13
ST36Q02	0.054	0.042	0.066	0.078	0.134
ST36Q03	0.057	0.044	0.069	0.081	0.14
ST36Q04	0.056	0.043	0.068	0.081	0.139
ST36Q05	0.056	0.043	0.067	0.08	0.137
ST38Q01	0.058	0.045	0.07	0.083	0.143
ST38Q02	0.072	0.056	0.087	0.103	0.178
ST38Q03	0.074	0.057	0.089	0.106	0.182
ST38Q04	0.071	0.055	0.086	0.102	0.176
ST38Q05	0.079	0.061	0.095	0.113	0.194
ST38Q06	0.059	0.045	0.071	0.084	0.144
ST38Q07	0.08	0.062	0.097	0.115	0.198
ST38Q08	0.075	0.057	0.09	0.107	0.184
ST38Q09	0.065	0.05	0.079	0.093	0.16
Y12_EXP	0.515	0.396	0.341	0.404	0.224

	ST33Q02	ST33Q03	ST33Q04	ST34Q01	ST34Q02
ST33Q03	0.596				
ST33Q04	0.62	0.533			
ST34Q01	0.389	0.335	0.348		

	PAR_ASP	PEER_ASP	MATHS	READING	ST33Q01
ST34Q02	0.416	0.357	0.372	0.693	
ST34Q03	0.425	0.365	0.38	0.708	0.756
ST34Q04	0.389	0.334	0.348	0.649	0.692
ST34Q05	0.407	0.35	0.364	0.679	0.725
ST36Q01	0.162	0.139	0.145	0.178	0.19
ST36Q02	0.166	0.143	0.149	0.183	0.195
ST36Q03	0.174	0.15	0.156	0.191	0.204
ST36Q04	0.173	0.149	0.155	0.19	0.203
ST36Q05	0.17	0.146	0.152	0.187	0.2
ST38Q01	0.178	0.153	0.159	0.196	0.209
ST38Q02	0.221	0.19	0.198	0.243	0.259
ST38Q03	0.226	0.194	0.202	0.248	0.265
ST38Q04	0.218	0.188	0.195	0.24	0.256
ST38Q05	0.242	0.208	0.216	0.265	0.283
ST38Q06	0.18	0.154	0.161	0.197	0.21
ST38Q07	0.246	0.211	0.22	0.27	0.288
ST38Q08	0.229	0.196	0.204	0.251	0.268
ST38Q09	0.199	0.171	0.178	0.218	0.233
Y12_EXP	0.279	0.24	0.25	0.306	0.327

	ST34Q03	ST34Q04	ST34Q05	ST36Q01	ST36Q02
ST34Q04	0.707				
ST34Q05	0.74	0.678			
ST36Q01	0.194	0.178	0.186		
ST36Q02	0.199	0.182	0.191	0.675	
ST36Q03	0.209	0.191	0.2	0.707	0.726
ST36Q04	0.207	0.189	0.198	0.701	0.72
ST36Q05	0.204	0.187	0.195	0.691	0.71
ST38Q01	0.213	0.195	0.205	0.155	0.159
ST38Q02	0.265	0.242	0.254	0.192	0.197
ST38Q03	0.27	0.248	0.259	0.196	0.201
ST38Q04	0.261	0.239	0.25	0.19	0.195
ST38Q05	0.289	0.265	0.277	0.21	0.215
ST38Q06	0.215	0.197	0.206	0.156	0.16
ST38Q07	0.295	0.27	0.282	0.214	0.219
ST38Q08	0.274	0.25	0.262	0.198	0.204
ST38Q09	0.238	0.218	0.228	0.173	0.178
Y12_EXP	0.334	0.306	0.32	0.127	0.131

	ST36Q03	ST36Q04	ST36Q05	ST38Q01	ST38Q02
ST36Q04	0.755				
ST36Q05	0.744	0.737			
ST38Q01	0.167	0.165	0.163		
ST38Q02	0.207	0.205	0.202	0.422	
ST38Q03	0.211	0.209	0.206	0.431	0.535
ST38Q04	0.204	0.202	0.199	0.417	0.517
ST38Q05	0.226	0.224	0.22	0.461	0.572

	PAR_ASP	PEER_ASP	MATHS	READING	ST33Q01
ST38Q06	0.168	0.166	0.164	0.342	0.425
ST38Q07	0.23	0.228	0.225	0.469	0.582
ST38Q08	0.213	0.212	0.209	0.436	0.541
ST38Q09	0.186	0.184	0.182	0.38	0.471
Y12_EXP	0.137	0.136	0.134	0.14	0.174

	ST38Q03	ST38Q04	ST38Q05	ST38Q06	ST38Q07
ST38Q04	0.528				
ST38Q05	0.584	0.564			
ST38Q06	0.434	0.419	0.464		
ST38Q07	0.595	0.575	0.636	0.473	
ST38Q08	0.552	0.534	0.591	0.439	0.602
ST38Q09	0.481	0.465	0.514	0.382	0.524
Y12_EXP	0.178	0.172	0.19	0.141	0.194

	ST38Q08	ST38Q09	Y12_EXP
ST38Q09	0.487		
Y12_EXP	0.18	0.157	

Table C7 Covariance matrix for university aspirations

	PEER_ASP	MATHS	READING	ST33Q01	ST33Q02
PEER_ASP					
MATHS	0.155	0.713			
READING	0.186	0.635	0.769		
ST33Q01	0.088	0.111	0.132		
ST33Q02	0.109	0.138	0.164	0.556	
ST33Q03	0.094	0.119	0.142	0.48	0.596
ST33Q04	0.098	0.124	0.148	0.499	0.619
ST34Q01	0.122	0.153	0.183	0.312	0.388
ST34Q02	0.13	0.164	0.196	0.334	0.414
ST34Q03	0.133	0.168	0.2	0.341	0.423
ST34Q04	0.122	0.153	0.183	0.312	0.387
ST34Q05	0.127	0.161	0.192	0.327	0.405
ST36Q01	0.05	0.063	0.075	0.128	0.159
ST36Q02	0.051	0.065	0.077	0.132	0.164
ST36Q03	0.054	0.068	0.081	0.138	0.171
ST36Q04	0.053	0.067	0.08	0.137	0.17
ST36Q05	0.053	0.066	0.079	0.135	0.167
ST38Q01	0.055	0.07	0.084	0.142	0.177
ST38Q02	0.069	0.087	0.104	0.176	0.219
ST38Q03	0.07	0.089	0.106	0.18	0.224
ST38Q04	0.068	0.086	0.102	0.174	0.216
ST38Q05	0.075	0.095	0.113	0.193	0.239
ST38Q06	0.056	0.07	0.084	0.143	0.178
ST38Q07	0.076	0.096	0.115	0.196	0.244
ST38Q08	0.071	0.09	0.107	0.182	0.226
ST38Q09	0.062	0.078	0.093	0.159	0.197
UNI_EXP	0.641	0.19	0.227	0.13	0.161

	ST33Q03	ST33Q04	ST34Q01	ST34Q02	ST34Q03
ST33Q04	0.535				
ST34Q01	0.335	0.348			
ST34Q02	0.358	0.372	0.693		
ST34Q03	0.366	0.38	0.708	0.757	
ST34Q04	0.335	0.348	0.648	0.693	0.708
ST34Q05	0.35	0.364	0.678	0.725	0.741
ST36Q01	0.138	0.143	0.178	0.19	0.194
ST36Q02	0.141	0.147	0.182	0.195	0.199
ST36Q03	0.148	0.154	0.191	0.204	0.209
ST36Q04	0.147	0.152	0.189	0.202	0.207
ST36Q05	0.145	0.15	0.187	0.2	0.204
ST38Q01	0.153	0.159	0.197	0.211	0.215
ST38Q02	0.189	0.197	0.244	0.261	0.267
ST38Q03	0.193	0.201	0.25	0.267	0.272
ST38Q04	0.187	0.194	0.241	0.258	0.263
ST38Q05	0.207	0.215	0.267	0.285	0.291
ST38Q06	0.153	0.159	0.198	0.212	0.216
ST38Q07	0.21	0.219	0.272	0.29	0.297

	PEER_ASP	MATHS	READING	ST33Q01	ST33Q02
ST38Q08	0.196	0.203	0.252	0.27	0.276
ST38Q09	0.171	0.177	0.22	0.235	0.24
UNI_EXP	0.14	0.145	0.18	0.193	0.197

	ST34Q04	ST34Q05	ST36Q01	ST36Q02	ST36Q03
ST34Q05	0.678				
ST36Q01	0.177	0.186			
ST36Q02	0.182	0.191	0.675		
ST36Q03	0.191	0.2	0.707	0.726	
ST36Q04	0.189	0.198	0.701	0.72	0.754
ST36Q05	0.187	0.195	0.691	0.71	0.744
ST38Q01	0.197	0.206	0.155	0.159	0.167
ST38Q02	0.244	0.256	0.192	0.197	0.207
ST38Q03	0.249	0.261	0.196	0.201	0.211
ST38Q04	0.241	0.252	0.19	0.195	0.204
ST38Q05	0.267	0.279	0.21	0.215	0.226
ST38Q06	0.198	0.207	0.156	0.16	0.167
ST38Q07	0.272	0.284	0.214	0.219	0.23
ST38Q08	0.252	0.264	0.198	0.204	0.213
ST38Q09	0.22	0.23	0.173	0.178	0.186
UNI_EXP	0.18	0.188	0.074	0.076	0.08

	ST36Q04	ST36Q05	ST38Q01	ST38Q02	ST38Q03
ST36Q05	0.737				
ST38Q01	0.165	0.163			
ST38Q02	0.205	0.202	0.422		
ST38Q03	0.209	0.206	0.431	0.535	
ST38Q04	0.202	0.199	0.417	0.517	0.528
ST38Q05	0.224	0.221	0.461	0.572	0.584
ST38Q06	0.166	0.164	0.342	0.424	0.433
ST38Q07	0.228	0.225	0.469	0.582	0.595
ST38Q08	0.212	0.209	0.436	0.541	0.552
ST38Q09	0.185	0.182	0.38	0.472	0.482
UNI_EXP	0.079	0.078	0.082	0.102	0.104

	ST38Q04	ST38Q05	ST38Q06	ST38Q07	ST38Q08
ST38Q05	0.564				
ST38Q06	0.419	0.464			
ST38Q07	0.575	0.636	0.472		
ST38Q08	0.534	0.591	0.438	0.601	
ST38Q09	0.466	0.515	0.382	0.525	0.487
UNI_EXP	0.1	0.111	0.083	0.113	0.105

	ST38Q09	UNI_EXP
UNI_EXP	0.092	

Table C8 Covariance matrix for occupational aspirations

	PAR_ASP	PEER_ASP	MATHS	READING	ST33Q01
PAR_ASP					
PEER_ASP	0.53				
MATHS	0.218	0.165	0.713		
READING	0.258	0.196	0.635	0.769	
ST33Q01	0.093	0.07	0.112	0.132	
ST33Q02	0.115	0.087	0.139	0.164	0.557
ST33Q03	0.099	0.075	0.119	0.142	0.48
ST33Q04	0.103	0.078	0.124	0.147	0.499
ST34Q01	0.128	0.097	0.154	0.183	0.312
ST34Q02	0.137	0.104	0.165	0.195	0.333
ST34Q03	0.14	0.106	0.168	0.199	0.34
ST34Q04	0.128	0.097	0.154	0.182	0.312
ST34Q05	0.134	0.102	0.161	0.191	0.326
ST36Q01	0.053	0.04	0.064	0.076	0.13
ST36Q02	0.055	0.041	0.066	0.078	0.133
ST36Q03	0.057	0.043	0.069	0.082	0.139
ST36Q04	0.057	0.043	0.068	0.081	0.138
ST36Q05	0.056	0.042	0.067	0.08	0.136
ST38Q01	0.058	0.044	0.07	0.083	0.142
ST38Q02	0.073	0.055	0.087	0.103	0.177
ST38Q03	0.074	0.056	0.089	0.106	0.181
ST38Q04	0.072	0.054	0.086	0.102	0.175
ST38Q05	0.079	0.06	0.095	0.113	0.193
ST38Q06	0.059	0.045	0.071	0.084	0.143
ST38Q07	0.081	0.061	0.097	0.115	0.197
ST38Q08	0.075	0.057	0.09	0.107	0.183
ST38Q09	0.065	0.05	0.079	0.093	0.159
OCC_ASP	0.272	0.206	0.19	0.225	0.076

	ST33Q02	ST33Q03	ST33Q04	ST34Q01	ST34Q02
ST33Q03	0.596				
ST33Q04	0.62	0.534			
ST34Q01	0.387	0.334	0.347		
ST34Q02	0.414	0.357	0.371	0.693	
ST34Q03	0.423	0.364	0.379	0.708	0.757
ST34Q04	0.387	0.333	0.347	0.648	0.693
ST34Q05	0.405	0.349	0.363	0.678	0.725
ST36Q01	0.161	0.139	0.144	0.179	0.191
ST36Q02	0.165	0.142	0.148	0.184	0.196
ST36Q03	0.173	0.149	0.155	0.192	0.206
ST36Q04	0.172	0.148	0.154	0.191	0.204
ST36Q05	0.169	0.146	0.152	0.188	0.201
ST38Q01	0.177	0.152	0.158	0.197	0.21
ST38Q02	0.22	0.189	0.197	0.244	0.261
ST38Q03	0.224	0.193	0.201	0.249	0.266
ST38Q04	0.217	0.187	0.194	0.241	0.257
ST38Q05	0.24	0.207	0.215	0.266	0.285

	PAR_ASP	PEER_ASP	MATHS	READING	ST33Q01
ST38Q06	0.178	0.153	0.16	0.198	0.211
ST38Q07	0.244	0.21	0.219	0.271	0.29
ST38Q08	0.227	0.195	0.203	0.252	0.269
ST38Q09	0.198	0.17	0.177	0.22	0.235
OCC_ASP	0.094	0.081	0.084	0.104	0.112

	ST34Q03	ST34Q04	ST34Q05	ST36Q01	ST36Q02
ST34Q04	0.707				
ST34Q05	0.74	0.677			
ST36Q01	0.195	0.179	0.187		
ST36Q02	0.2	0.183	0.192	0.675	
ST36Q03	0.21	0.192	0.201	0.707	0.726
ST36Q04	0.208	0.191	0.199	0.701	0.72
ST36Q05	0.205	0.188	0.196	0.691	0.71
ST38Q01	0.215	0.196	0.205	0.155	0.159
ST38Q02	0.266	0.244	0.255	0.192	0.197
ST38Q03	0.272	0.249	0.26	0.196	0.201
ST38Q04	0.263	0.241	0.252	0.19	0.195
ST38Q05	0.291	0.266	0.278	0.21	0.215
ST38Q06	0.216	0.198	0.207	0.156	0.16
ST38Q07	0.296	0.271	0.284	0.214	0.219
ST38Q08	0.275	0.252	0.263	0.198	0.204
ST38Q09	0.24	0.219	0.23	0.173	0.178
OCC_ASP	0.114	0.104	0.109	0.043	0.045

	ST36Q03	ST36Q04	ST36Q05	ST38Q01	ST38Q02
ST36Q04	0.754				
ST36Q05	0.744	0.737			
ST38Q01	0.166	0.165	0.163		
ST38Q02	0.207	0.205	0.202	0.422	
ST38Q03	0.211	0.209	0.206	0.431	0.535
ST38Q04	0.204	0.202	0.199	0.417	0.517
ST38Q05	0.226	0.224	0.221	0.461	0.572
ST38Q06	0.168	0.166	0.164	0.342	0.425
ST38Q07	0.23	0.228	0.225	0.469	0.582
ST38Q08	0.213	0.212	0.209	0.436	0.541
ST38Q09	0.186	0.184	0.182	0.38	0.471
OCC_ASP	0.047	0.046	0.046	0.048	0.059

	ST38Q03	ST38Q04	ST38Q05	ST38Q06	ST38Q07
ST38Q04	0.528				
ST38Q05	0.584	0.565			
ST38Q06	0.434	0.419	0.464		
ST38Q07	0.595	0.575	0.636	0.472	
ST38Q08	0.552	0.534	0.591	0.439	0.602
ST38Q09	0.481	0.465	0.515	0.382	0.524
OCC_ASP	0.06	0.058	0.065	0.048	0.066

	PAR_ASP	PEER_ASP	MATHS	READING	ST33Q01
	ST38Q08	**ST38Q09**	**OCC_ASP**		
ST38Q09	0.487				
OCC_ASP	0.061	0.053	0.466		

Table C9 Correlation matrix for Year 12 aspirations

	PAR_ASP	PEER_ASP	MATHS	READING	ST33Q01
PAR_ASP					
PEER_ASP	0.530				
MATHS	0.286	0.206	0.713		
READING	0.282	0.192	0.857	0.769	
ST33Q01	0.127	0.070	0.200	0.224	
ST33Q02	0.167	0.115	0.213	0.236	0.617
ST33Q03	0.073	0.074	0.018	0.022	0.418
ST33Q04	0.105	0.043	0.085	0.095	0.469
ST34Q01	0.097	0.141	0.227	0.236	0.275
ST34Q02	0.081	0.114	0.215	0.222	0.321
ST34Q03	0.109	0.154	0.193	0.199	0.305
ST34Q04	0.113	0.147	0.183	0.202	0.303
ST34Q05	0.090	0.157	0.216	0.232	0.304
ST36Q01	0.099	0.120	0.155	0.162	0.134
ST36Q02	0.074	0.115	0.131	0.141	0.133
ST36Q03	0.074	0.140	0.180	0.190	0.148
ST36Q04	0.075	0.128	0.179	0.197	0.181
ST36Q05	0.063	0.110	0.155	0.171	0.177
ST38Q01	0.016	0.015	0.005	0.037	0.144
ST38Q02	0.028	0.003	0.003	0.038	0.182
ST38Q03	0.056	0.018	0.050	0.085	0.166
ST38Q04	0.074	0.035	0.154	0.190	0.190
ST38Q05	0.028	0.053	0.058	0.099	0.184
ST38Q06	0.080	0.057	0.062	0.098	0.170
ST38Q07	0.091	0.054	0.145	0.201	0.224
ST38Q08	0.040	0.045	0.056	0.092	0.172
ST38Q09	0.020	0.024	-0.043	-0.026	0.110
Y12_EXP	0.568	0.260	0.425	0.444	0.307
	ST33Q02	**ST33Q03**	**ST33Q04**	**ST34Q01**	**ST34Q02**
ST33Q03	0.520				
ST33Q04	0.549	0.646			
ST34Q01	0.418	0.345	0.335		
ST34Q02	0.421	0.385	0.368	0.723	
ST34Q03	0.417	0.395	0.369	0.693	0.783
ST34Q04	0.406	0.372	0.392	0.591	0.638
ST34Q05	0.420	0.344	0.361	0.711	0.686

	PAR_ASP	PEER_ASP	MATHS	READING	ST33Q01
ST36Q01	0.165	0.069	0.068	0.157	0.175
ST36Q02	0.147	0.083	0.067	0.159	0.175
ST36Q03	0.156	0.078	0.075	0.162	0.161
ST36Q04	0.218	0.115	0.123	0.180	0.187
ST36Q05	0.206	0.126	0.121	0.186	0.200
ST38Q01	0.167	0.186	0.190	0.189	0.203
ST38Q02	0.213	0.224	0.232	0.208	0.251
ST38Q03	0.213	0.207	0.210	0.214	0.248
ST38Q04	0.202	0.165	0.198	0.222	0.261
ST38Q05	0.228	0.213	0.222	0.234	0.276
ST38Q06	0.191	0.172	0.195	0.189	0.211
ST38Q07	0.264	0.215	0.232	0.270	0.307
ST38Q08	0.228	0.224	0.219	0.237	0.286
ST38Q09	0.161	0.188	0.186	0.184	0.232
Y12_EXP	0.430	0.248	0.295	0.332	0.277

	ST34Q03	ST34Q04	ST34Q05	ST36Q01	ST36Q02
ST34Q04	0.705				
ST34Q05	0.728	0.701			
ST36Q01	0.185	0.173	0.182		
ST36Q02	0.178	0.158	0.173	0.722	
ST36Q03	0.173	0.168	0.178	0.709	0.764
ST36Q04	0.195	0.194	0.196	0.680	0.663
ST36Q05	0.222	0.203	0.211	0.650	0.652
ST38Q01	0.215	0.213	0.208	0.085	0.099
ST38Q02	0.253	0.272	0.242	0.192	0.196
ST38Q03	0.249	0.280	0.227	0.193	0.181
ST38Q04	0.241	0.270	0.247	0.185	0.187
ST38Q05	0.281	0.320	0.278	0.205	0.193
ST38Q06	0.214	0.242	0.214	0.153	0.147
ST38Q07	0.319	0.364	0.330	0.222	0.203
ST38Q08	0.283	0.297	0.265	0.248	0.226
ST38Q09	0.236	0.247	0.208	0.155	0.156
Y12_EXP	0.276	0.268	0.300	0.137	0.139

	ST36Q03	ST36Q04	ST36Q05	ST38Q01	ST38Q02
ST36Q04	0.738				
ST36Q05	0.728	0.781			
ST38Q01	0.086	0.119	0.114		
ST38Q02	0.207	0.228	0.258	0.552	
ST38Q03	0.193	0.212	0.221	0.465	0.598
ST38Q04	0.183	0.207	0.193	0.428	0.479
ST38Q05	0.211	0.249	0.251	0.442	0.550
ST38Q06	0.155	0.184	0.182	0.321	0.397
ST38Q07	0.226	0.269	0.267	0.415	0.515
ST38Q08	0.231	0.259	0.267	0.390	0.512

	PAR_ASP	PEER_ASP	MATHS	READING	ST33Q01
ST38Q09	0.146	0.164	0.164	0.368	0.441
Y12_EXP	0.175	0.175	0.167	0.113	0.113

	ST38Q03	ST38Q04	ST38Q05	ST38Q06	ST38Q07
ST38Q04	0.567				
ST38Q05	0.568	0.610			
ST38Q06	0.395	0.431	0.422		
ST38Q07	0.531	0.529	0.670	0.513	
ST38Q08	0.527	0.485	0.564	0.411	0.631
ST38Q09	0.505	0.461	0.509	0.436	0.502
Y12_EXP	0.134	0.171	0.128	0.166	0.176

	ST38Q08	ST38Q09	Y12_EXP
ST38Q09	0.564		
Y12_EXP	0.143	0.063	

Table C10 Correlation matrix for university aspirations

	PEER_ASP	MATHS	READING	ST33Q01	ST33Q02
PEER_ASP					
MATHS	0.206	0.713			
READING	0.192	0.857	0.769		
ST33Q01	0.070	0.200	0.224		
ST33Q02	0.115	0.213	0.236	0.617	
ST33Q03	0.074	0.018	0.022	0.418	0.520
ST33Q04	0.043	0.085	0.095	0.469	0.549
ST34Q01	0.141	0.227	0.236	0.275	0.418
ST34Q02	0.114	0.215	0.222	0.321	0.421
ST34Q03	0.154	0.193	0.199	0.305	0.417
ST34Q04	0.147	0.183	0.202	0.303	0.406
ST34Q05	0.157	0.216	0.232	0.304	0.420
ST36Q01	0.120	0.155	0.162	0.134	0.165
ST36Q02	0.115	0.131	0.141	0.133	0.147
ST36Q03	0.140	0.180	0.190	0.148	0.156
ST36Q04	0.128	0.179	0.197	0.181	0.218
ST36Q05	0.110	0.155	0.171	0.177	0.206
ST38Q01	0.015	0.005	0.037	0.144	0.167
ST38Q02	0.003	0.003	0.038	0.182	0.213
ST38Q03	0.018	0.050	0.085	0.166	0.213
ST38Q04	0.035	0.154	0.190	0.190	0.202
ST38Q05	0.053	0.058	0.099	0.184	0.228
ST38Q06	0.057	0.062	0.098	0.170	0.191
ST38Q07	0.054	0.145	0.201	0.224	0.264
ST38Q08	0.045	0.056	0.092	0.172	0.228
ST38Q09	0.024	-0.043	-0.026	0.110	0.161

	PEER_ASP	MATHS	READING	ST33Q01	ST33Q02
UNI_EXP	0.641	0.248	0.239	0.140	0.279

	ST33Q03	ST33Q04	ST34Q01	ST34Q02	ST34Q03
ST33Q04	0.646				
ST34Q01	0.345	0.335			
ST34Q02	0.385	0.368	0.723		
ST34Q03	0.395	0.369	0.693	0.783	
ST34Q04	0.372	0.392	0.591	0.638	0.705
ST34Q05	0.344	0.361	0.711	0.686	0.728
ST36Q01	0.069	0.068	0.157	0.175	0.185
ST36Q02	0.083	0.067	0.159	0.175	0.178
ST36Q03	0.078	0.075	0.162	0.161	0.173
ST36Q04	0.115	0.123	0.180	0.187	0.195
ST36Q05	0.126	0.121	0.186	0.200	0.222
ST38Q01	0.186	0.190	0.189	0.203	0.215
ST38Q02	0.224	0.232	0.208	0.251	0.253
ST38Q03	0.207	0.210	0.214	0.248	0.249
ST38Q04	0.165	0.198	0.222	0.261	0.241
ST38Q05	0.213	0.222	0.234	0.276	0.281
ST38Q06	0.172	0.195	0.189	0.211	0.214
ST38Q07	0.215	0.232	0.270	0.307	0.319
ST38Q08	0.224	0.219	0.237	0.286	0.283
ST38Q09	0.188	0.186	0.184	0.232	0.236
UNI_EXP	0.166	0.172	0.178	0.164	0.195

	ST34Q04	ST34Q05	ST36Q01	ST36Q02	ST36Q03
ST34Q05	0.701				
ST36Q01	0.173	0.182			
ST36Q02	0.158	0.173	0.722		
ST36Q03	0.168	0.178	0.709	0.764	
ST36Q04	0.194	0.196	0.680	0.663	0.738
ST36Q05	0.203	0.211	0.650	0.652	0.728
ST38Q01	0.213	0.208	0.085	0.099	0.086
ST38Q02	0.272	0.242	0.192	0.196	0.207
ST38Q03	0.280	0.227	0.193	0.181	0.193
ST38Q04	0.270	0.247	0.185	0.187	0.183
ST38Q05	0.320	0.278	0.205	0.193	0.211
ST38Q06	0.242	0.214	0.153	0.147	0.155
ST38Q07	0.364	0.330	0.222	0.203	0.226
ST38Q08	0.297	0.265	0.248	0.226	0.231
ST38Q09	0.247	0.208	0.155	0.156	0.146
UNI_EXP	0.183	0.198	0.092	0.078	0.083

	PEER_ASP	MATHS	READING	ST33Q01	ST33Q02
	ST36Q04	**ST36Q05**	**ST38Q01**	**ST38Q02**	**ST38Q03**
ST36Q05	0.781				
ST38Q01	0.119	0.114			
ST38Q02	0.228	0.258	0.552		
ST38Q03	0.212	0.221	0.465	0.598	
ST38Q04	0.207	0.193	0.428	0.479	0.567
ST38Q05	0.249	0.251	0.442	0.550	0.568
ST38Q06	0.184	0.182	0.321	0.397	0.395
ST38Q07	0.269	0.267	0.415	0.515	0.531
ST38Q08	0.259	0.267	0.390	0.512	0.527
ST38Q09	0.164	0.164	0.368	0.441	0.505
UNI_EXP	0.078	0.073	0.048	0.057	0.065
	ST38Q04	**ST38Q05**	**ST38Q06**	**ST38Q07**	**ST38Q08**
ST38Q05	0.610				
ST38Q06	0.431	0.422			
ST38Q07	0.529	0.670	0.513		
ST38Q08	0.485	0.564	0.411	0.631	
ST38Q09	0.461	0.509	0.436	0.502	0.564
UNI_EXP	0.094	0.058	0.086	0.097	0.079
	ST38Q09	**UNI_EXP**			
UNI_EXP	0.074				

Table C11 Correlation matrix for occupational aspirations

	PAR_ASP	PEER_ASP	MATHS	READING	ST33Q01
PAR_ASP					
PEER_ASP	0.530				
MATHS	0.286	0.206	0.713		
READING	0.282	0.192	0.857	0.769	
ST33Q01	0.127	0.070	0.200	0.224	
ST33Q02	0.167	0.115	0.213	0.236	0.617
ST33Q03	0.073	0.074	0.018	0.022	0.418
ST33Q04	0.105	0.043	0.085	0.095	0.469
ST34Q01	0.097	0.141	0.227	0.236	0.275
ST34Q02	0.081	0.114	0.215	0.222	0.321
ST34Q03	0.109	0.154	0.193	0.199	0.305
ST34Q04	0.113	0.147	0.183	0.202	0.303
ST34Q05	0.090	0.157	0.216	0.232	0.304
ST36Q01	0.099	0.120	0.155	0.162	0.134
ST36Q02	0.074	0.115	0.131	0.141	0.133
ST36Q03	0.074	0.140	0.180	0.190	0.148
ST36Q04	0.075	0.128	0.179	0.197	0.181

	PAR_ASP	PEER_ASP	MATHS	READING	ST33Q01
ST36Q05	0.063	0.110	0.155	0.171	0.177
ST38Q01	0.016	0.015	0.005	0.037	0.144
ST38Q02	0.028	0.003	0.003	0.038	0.182
ST38Q03	0.056	0.018	0.050	0.085	0.166
ST38Q04	0.074	0.035	0.154	0.190	0.190
ST38Q05	0.028	0.053	0.058	0.099	0.184
ST38Q06	0.080	0.057	0.062	0.098	0.170
ST38Q07	0.091	0.054	0.145	0.201	0.224
ST38Q08	0.040	0.045	0.056	0.092	0.172
ST38Q09	0.020	0.024	-0.043	-0.026	0.110
OCC_ASP	0.443	0.228	0.348	0.361	0.130

	ST33Q02	ST33Q03	ST33Q04	ST34Q01	ST34Q02
ST33Q03	0.520				
ST33Q04	0.549	0.646			
ST34Q01	0.418	0.345	0.335		
ST34Q02	0.421	0.385	0.368	0.723	
ST34Q03	0.417	0.395	0.369	0.693	0.783
ST34Q04	0.406	0.372	0.392	0.591	0.638
ST34Q05	0.420	0.344	0.361	0.711	0.686
ST36Q01	0.165	0.069	0.068	0.157	0.175
ST36Q02	0.147	0.083	0.067	0.159	0.175
ST36Q03	0.156	0.078	0.075	0.162	0.161
ST36Q04	0.218	0.115	0.123	0.180	0.187
ST36Q05	0.206	0.126	0.121	0.186	0.200
ST38Q01	0.167	0.186	0.190	0.189	0.203
ST38Q02	0.213	0.224	0.232	0.208	0.251
ST38Q03	0.213	0.207	0.210	0.214	0.248
ST38Q04	0.202	0.165	0.198	0.222	0.261
ST38Q05	0.228	0.213	0.222	0.234	0.276
ST38Q06	0.191	0.172	0.195	0.189	0.211
ST38Q07	0.264	0.215	0.232	0.270	0.307
ST38Q08	0.228	0.224	0.219	0.237	0.286
ST38Q09	0.161	0.188	0.186	0.184	0.232
OCC_ASP	0.227	0.093	0.113	0.178	0.163

	ST34Q03	ST34Q04	ST34Q05	ST36Q01	ST36Q02
ST34Q04	0.705				
ST34Q05	0.728	0.701			
ST36Q01	0.185	0.173	0.182		
ST36Q02	0.178	0.158	0.173	0.722	
ST36Q03	0.173	0.168	0.178	0.709	0.764
ST36Q04	0.195	0.194	0.196	0.680	0.663
ST36Q05	0.222	0.203	0.211	0.650	0.652
ST38Q01	0.215	0.213	0.208	0.085	0.099
ST38Q02	0.253	0.272	0.242	0.192	0.196

	PAR_ASP	PEER_ASP	MATHS	READING	ST33Q01
ST38Q03	0.249	0.280	0.227	0.193	0.181
ST38Q04	0.241	0.270	0.247	0.185	0.187
ST38Q05	0.281	0.320	0.278	0.205	0.193
ST38Q06	0.214	0.242	0.214	0.153	0.147
ST38Q07	0.319	0.364	0.330	0.222	0.203
ST38Q08	0.283	0.297	0.265	0.248	0.226
ST38Q09	0.236	0.247	0.208	0.155	0.156
OCC_ASP	0.149	0.135	0.140	0.111	0.093

	ST36Q03	ST36Q04	ST36Q05	ST38Q01	ST38Q02
ST36Q04	0.738				
ST36Q05	0.728	0.781			
ST38Q01	0.086	0.119	0.114		
ST38Q02	0.207	0.228	0.258	0.552	
ST38Q03	0.193	0.212	0.221	0.465	0.598
ST38Q04	0.183	0.207	0.193	0.428	0.479
ST38Q05	0.211	0.249	0.251	0.442	0.550
ST38Q06	0.155	0.184	0.182	0.321	0.397
ST38Q07	0.226	0.269	0.267	0.415	0.515
ST38Q08	0.231	0.259	0.267	0.390	0.512
ST38Q09	0.146	0.164	0.164	0.368	0.441
OCC_ASP	0.104	0.107	0.108	0.033	0.044

	ST38Q03	ST38Q04	ST38Q05	ST38Q06	ST38Q07
ST38Q04	0.567				
ST38Q05	0.568	0.610			
ST38Q06	0.395	0.431	0.422		
ST38Q07	0.531	0.529	0.670	0.513	
ST38Q08	0.527	0.485	0.564	0.411	0.631
ST38Q09	0.505	0.461	0.509	0.436	0.502
OCC_ASP	0.054	0.099	0.066	0.075	0.103

	ST38Q08	ST38Q09	OCC_ASP
ST38Q09	0.564		
OCC_ASP	0.062	0.029	0.466

Section D: Creating the 'perceptions of schooling' measure

A single 'perceptions of schooling' composite measure was created from four relevant aspects of schooling, including students' attitudes toward school, their relations to teachers, the perceived disciplinary climate at their school, and their perceived quality of teachers. The single composite measure was used as part of the structural equation model in section C of this support document) to explore how students' overall perceptions of the school experience mediate other factors, such as individual student background characteristics, academic performance and parental and peer influences.

This section provides scree plots from factor-analysing the individual item responses for each of the four aspects of schooling (figures D1 to D4). Furthermore, a scree plot for the single 'perceptions of schooling' composite measure is provided (figure D5), which was created via a second-order factor analysis. This scree plot reflects the importance of all four aspects of schooling in the single perceptions of schooling measure, which in turn is used as part of the comprehensive structural equation model for aspirations. All factor analysis procedures were carried out using Mplus software (Muthén & Muthén 2010).

Figure D1 Scree plot from factor analysis on attitudes toward school

Figure D2 Scree plot from factor analysis on perceived student-teacher relations

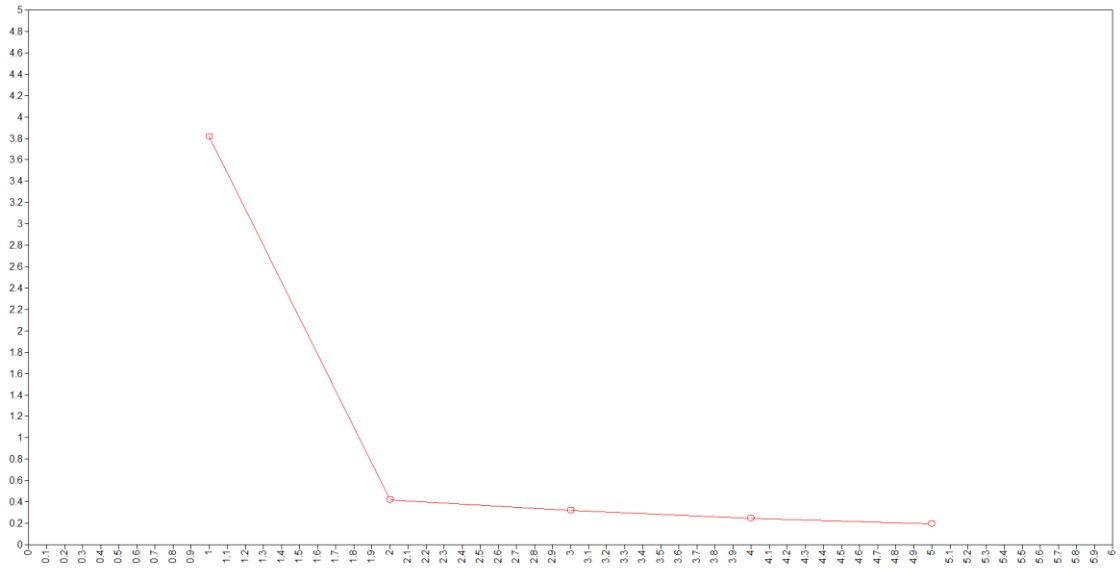


Figure D3 Scree plot from factor analysis on perceived disciplinary climate

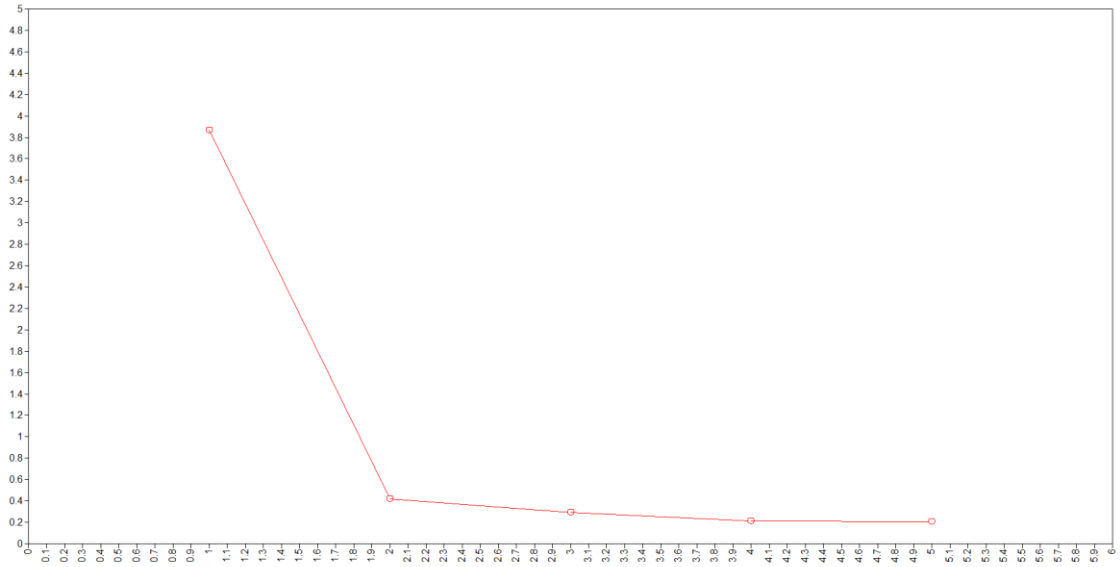


Figure D4 Scree plot from factor analysis on perceived teacher quality

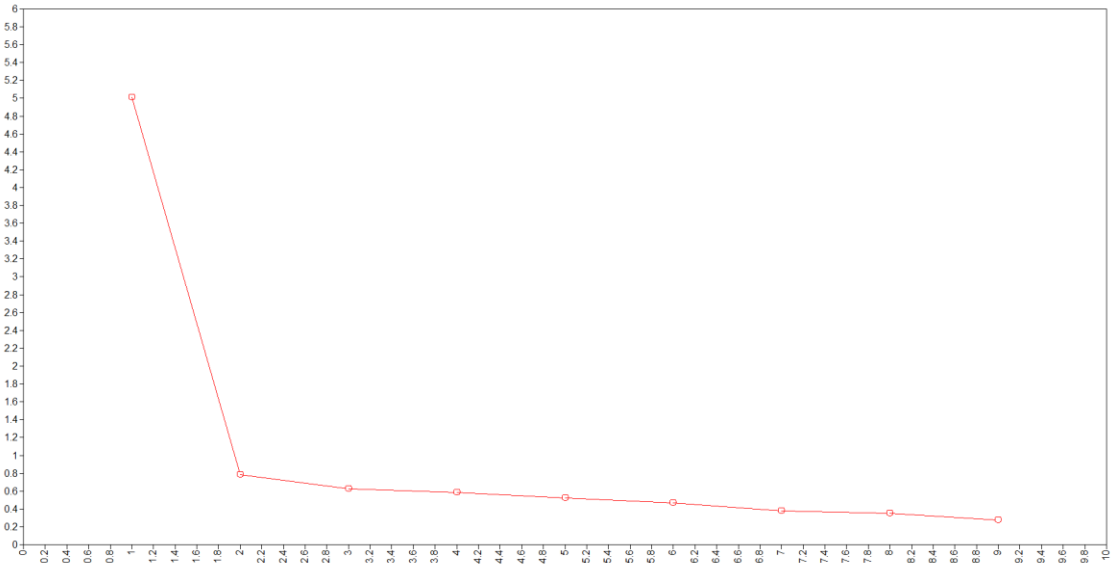
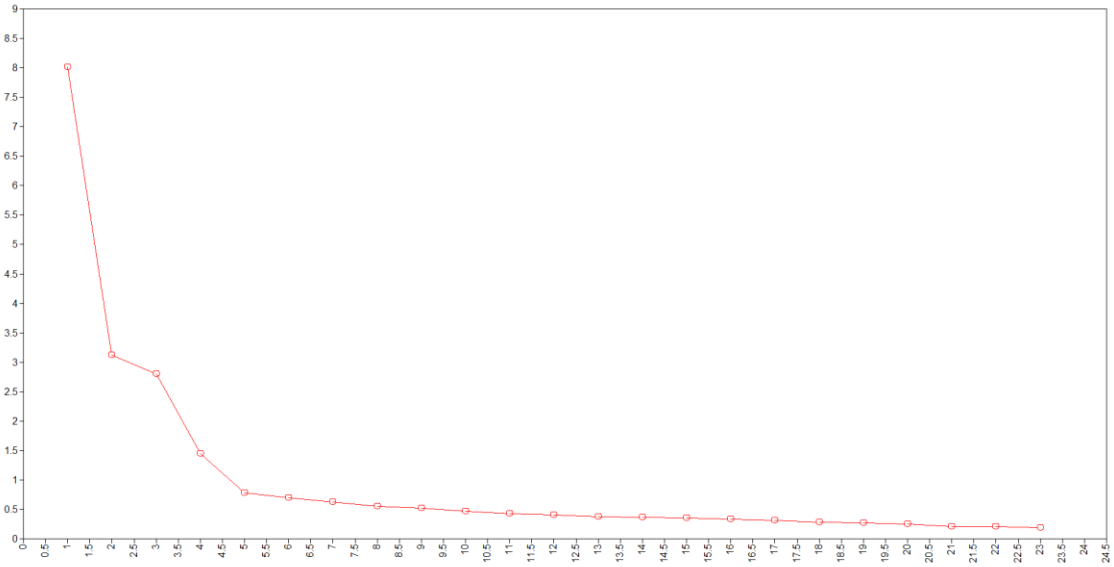


Figure D5 Scree plot from factor analysis on overall perceptions of schooling



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