Transition To Secondary School:
Does it affect age-16 performance?

Evidence from the longitudinal Competent
Children, Competent Learners project

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CL @ 16 is the seventh phase of the Competent Children/Competent Learners longitudinal study.

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1.   Introduction

The transition from primary or intermediate school to secondary school is getting increased attention, in a context of concern about closing gaps in educational achievement, improving student engagement, and debates about the benefits of different school structures (intermediates versus middle schools versus Year 7–15 secondary schools versus composite (area) schools), and the needs of adolescents.

The longitudinal *Competent Children, Competent Learners* project, undertaken by the New Zealand Council for Educational Research and funded by the Ministry of Education, can provide useful insight into the nature of this experience, and its effects.[1] We published a report on our findings when our sample was aged 14, when a third were in Year 9, in 60 schools, and two-thirds in Year 10, in 63 schools (Wylie, Hodgen & Ferral 2006). Here we provide a follow-up analysis of any statistical effects we could see when the sample was aged 16, and taking part in NCEA assessments.[2]

The effects of transition to secondary education at age 14

In the report from the age-14 phase of the project, we described how the transition to secondary usually involved a change of school, and some marked change in the characteristics of the school an individual attended, particularly moving to a much larger school, or to a single-sex school. Friends were often lost in the process—but they were also gained. Secondary school offered students a wider range of experiences, rather than a totally new world.

Most of the sample settled into secondary school within two terms. The length of time it took to settle in reflected previous reactions to school as well as current. Prior feelings about going on to secondary school were not related to how soon students settled into secondary level schooling, and high performers were no more, or less likely to settle quickly than others. Students could take longer to settle into secondary school if:

- the school was not their first choice;

- they thought the discipline was stricter than at their primary school;

- they found teacher expectations hard to get used to;

- they thought there was more work to do than at primary;

- they thought the work was more challenging than at primary;

- getting to school took longer;

- they did not find school enjoyable;

- they had regular paid work;

- their parents had concerns about them at school at age 12;

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[1]   Four other reports from the age-16 phase of the project and reports from the earlier phases can be obtained from the Ministry of Education, on the website www.educationcounts.govt.nz, or from NZCER, on the website www.nzcer.org.nz.

[2]   National Certificate of Educational Achievement, the NZ secondary school qualification. For more information about NCEA, see www.nzqa.govt.nz.

- they had not had friends to help their transition;

- they were not used to having more than one teacher at their primary school;

- they had little experience of changing schools; or

- they were in schools where it was less likely that information about them from Year 8 was used.

These aspects are not determinative—students who settled straight away could also have similar experiences. We found no significant relationship between student motivation levels at age 14 and the length of time it took them to settle into secondary school.

Does the transition to secondary school affect student performance?

The transition to secondary school is often seen as a risky passage, and there has been attention in recent years to making it easier (Hawk & Hill 2001, 2004). Quantitative analysis of its impact on student performance suggests that it is more of a risky passage for some students, rather than all students. Grolnick, Kurowski, Dunlap, and Hevey (2000, p. 466) note that:

> One point on which most researchers agree is that there is great variability in children's responses to the transition. Thus, the literature has turned from an emphasis on whether, in general, the transition is disruptive for children, to an examination of who is vulnerable and what factors protect children from experiencing declines in self-perceptions and academic performance.

Grolnick et al. (2000) cite US studies finding greater vulnerability for already low-achieving students, those who had negative self-perceptions, and those with low peer support. They also note that one reason for the decline in reading and mathematics grades that they found in their own work was less a change in student performance, than "stricter grading practices of seventh- as opposed to sixth-grade teachers" (p. 482). However, a decline in grades can impact on student motivation, and increase the likelihood of dropping out of school (Anderson, Jacobs, Schramm, & Splittgerber, 2000). The latter cite other US studies finding that transition to secondary school was more likely to have a negative impact for students who had behavioural problems in elementary school, students from low-socioeconomic homes, and (not unrelated), African-Americans and Hispanic-Americans, and girls (in relation to self-esteem). They note the importance of both preparedness (academic knowledge and skills, independence and industriousness, conformity to adult behaviour standards, and coping mechanisms), and support from others (informational, resources or services, emotional, and social (peers)). The lower the levels of preparedness, the more support is needed.

From their 18-month study following just over 100 New Zealand students from eight primary and intermediate schools to two low decile secondary schools, Kennedy and Cox (2008), concluded that the transition to secondary schooling was best thought of as a process, "requiring students to make ongoing adjustments over quite some time". They found that while most students did make these adjustments, many became less engaged in some aspects of learning, suggesting that the deep issues underlying concerns about the transition to secondary schooling are connected to concerns about the nature of secondary schooling, and relationships of students and teachers.

In the *Competent Children, Competent Learners*' study, we found that students who took two terms or more to settle into secondary school had lower scores for attitudinal competencies (e.g. perseverance, communication, self-management), at age 14 after taking into account prior performance and social characteristics. But this was the only association between student competence or school-engagement levels, and the transition to secondary school that we found. We found no associations with a change of school (some students remained at the same area or composite school); the size of a student's new school relative to the size of the school they had attended

before moving onto secondary school, the gender-mix of the new school; or a change in decile level of the schools.

Contrary to fears that transition to secondary school negatively affects student performance, we found that while there were changes in individual students' performance, there were just as many students who achieved higher scores than they had been getting at primary school as students whose scores decreased. Indeed, despite the fact that as young adolescents, they could take advantage of experiences and friendships that could compete more with school than at previous ages, there was slightly greater stability of performance over the two years between age 12 and age 14, than there was for other 2-year periods when the sample was in primary school.

Cox and Kennedy (2008) tested students more frequently over the transition to secondary school, using the same tests. They found a decline in average mathematics scores but consistent reading and writing scores between the end of the students' Year 8 experience in primary or intermediate school, and the start of their Year 9 in secondary school. Average scores then improved by the end of Year 9. However, they found the same pattern of decline in average mathematics scores and stability in reading and writing at the beginning of Year 10, suggesting that this pattern may not be so much about the transition to secondary school per se, as a "summer" dip.

While we did not see any negative effects on student cognitive performance in the first or second years after their transition to secondary school, the association between lower scores for the attitudinal competencies and taking a longer time to settle into secondary school did give us pause, particularly given our analysis showing that attitudinal competency levels at one age can have a bearing on levels of both attitudinal and cognitive competencies two years later, and that both can be thought of as a different side to the same coin of learning (Wylie with Ferral 2005). Thus it seemed important to see what longer-term effects there might be on student learning from their transition to secondary school experiences when we returned to the sample at age 16, when they were either tackling the senior school qualification, the NCEA, or, for a small number, had already left school.

2. Effects at age 16 of the transition to secondary education

The fuller picture of the young people's learning experiences, performance, engagement in school, and how these relate to each other in another report from the age-16 phase of the project is reported in the main report from this phase (Wylie, Hipkins & Hodgen 2008). This brief report focuses on a sub-set of the variables we gathered information on at age 16 (the dependent variables), in relation to variables from the age-14 phase that described or were relevant to, the transition experience (the independent variables). The age-16 variables we chose to look at can be thought of as "outcome" variables: the number of NCEA level 1 credits, attitudinal and cognitive competency levels measured in the project (described more fully in Wylie & Hodgen 2007), or as factors found to be linked to those outcomes, such as levels of school engagement, intrinsic motivation, or risky behaviour, and the cluster of school subjects a student was taking. Table 1 sets out the variables used in the analysis undertaken for this report.

Table 1: Age-14 and age-16 variables used in the analysis

Age-14 variables (independent variables)	Age-16 variables (dependent variables): Outcomes & factors affecting them
Length of time it took for students to feel settled in new school (student report)	Status –at school/at school
	Number of NCEA level 1 credits
A change of school *per se*	Cognitive composite
Size of new school relative to size of old school	The 4 attitudinal competencies
Change of school gender mix	School engagement
Change of decile	School affirmation
School was first choice	Internal markers of progress
Year level	Subject cluster
Number of schools attended, including secondary school	Risky behaviour
Parent view of whether friends helped child make transition	
Motivation level	

First we cross-tabulated, or ran one-way ANOVA (analysis of variance) or regression models to see what associations there were between the independent and dependent variables, and whether the associations were statistically significant ($p<$ = 0.01, i.e. a probability of less than 1 in 100 that the association had occurred by chance). Next we used these results in multivariate models to see what effect the age-14 variables related to transition had over and above other variables that our age-16 analyses had shown were related to student performance and engagement.

The picture from one-way statistical models

We did find some associations between the transition-related variables from age-14, and our age-16 outcome-related variables in our one-way comparisons. However, most of these did not remain once we took other

variables into account, in the multivariate analyses. This indicates that the nature of student transition to secondary level is not a major factor in their later performance or engagement in secondary school.

Results from one-way comparisons

We found associations with:

- the kind of school change students had made between primary and secondary levels,

- the number of schools they had attended by age 14,

- their school decile level (if it had remained the same across this transition), or the kind of school decile change they had made,

- whether the secondary school was their first choice of school,

- the time they had taken to settle into secondary school, and

- whether friends had helped the student make the transition.

Two of the structural changes that were experienced by many in the study sample showed no associations with age-16 outcomes: moving to a much larger school, or changing from a co-educational to a single-sex school.

Table 2 shows the significant associations that we found, using one-way models.

Table 2:   One-way associations between transition variables & age-16 outcomes

Age-16 outcome	Transition variable					
	Kind of school change	Number of schools attended by age 14	School decile level/change pattern over transition	Secondary school was first choice	Time taken to settle into secondary school	Friends helped the transition
No. of level 1 NCEA credits	✓	✓	✓	✓	✓	
Cognitive composite score	✓	✓	✓	✓	✓	
Focused & responsible score	✓	✓	✓	✓	✓	
Thinking & learning score	✓	✓	✓	✓		
Social skills score	✓		✓			
Social difficulties score		✓	✓			
School engagement	✓	✓	✓	✓	✓	
Affirmed at school				✓		
Left school			✓			
Risky behaviour				✓	✓	✓

Students who had higher outcome levels—more level 1 NCEA credits, higher scores on the competency measures etc—were somewhat more likely to be those who had gone from a full primary school to secondary school, or stayed in the same school, had attended fewer than 3 schools by age 14, attended mid or high level decile schools both before and after the transition, or shifted downwards (from mid or high level decile schools), were in the school of their first choice, and had friends who moved to the same secondary school. Apart from the last

two variables, these categories are also more likely to be within the experience of young people from higher income homes, or whose mothers had high qualification levels, suggesting that those family resources could be behind some of the associations we found in these one-way comparisons.

The size of the difference between groups, or the difference that differences in transition experiences made, was generally not large: where we used 10-point scales (for all the dependent variables that were competencies, or related to school engagement, use of internal markers of progress, or risky behaviour out of school), it was usually less than 0.5 of a point (or converted to a percentage, around 5 percentage points). However, one difference was more marked, in relation to the number of schools attended by the 16-year-olds.

Number of schools attended by age 14

Table 3 shows that students who had attended 3 or fewer schools by age 14 were around three times more likely than those who had attended 5 or more schools by the same age to have achieved a high number of level 1 NCEA credits.

Table 3:   Relationship between number of schools & level 1 NCEA credits

Number of schools up till age 14	Number of Level 1 NCEA credits		
	< 80 level 1 NCEA credits	80- <120 level 1 NCEA credits	120 + level 1 NCEA credits
1 or 2 (n = 128)	12	36	52
3 (n = 187)	23	32	46
4 (n = 59)	27	48	25
5+ (n = 29)	38	48	14

Time taken to settle into secondary education

Table 4 shows that those who settled quickly into secondary education were not always those who performed well. There were more students who were in the top quartile performers at age 16 who took two terms or more to settle, than those who were in the lowest quartile of performers.

Table 4:   Relationship between time to settle into secondary school and age-16 cognitive composite quartile

Length of time taken to settle in to secondary school (n = 446)	Cognitive composite quartile			
	Lowest quartile (1) %	Quartile 2 %	Quartile 3 %	Top quartile (4) %
Straightaway (n = 160)	31	20	25	24
Less than a term (n = 207)	21	27	27	26
1–2 terms (n = 53)	32	21	17	30
2 terms + (n = 26)	8	54	23	15

The picture from multivariate analysis

Individual student experience of the transition to secondary level education is coloured by differences in the structure of primary and secondary education. It is also informed by previous experience of school, and

experiences and supports beyond school. The one-way analyses suggested that changing school structures in itself was not a major interrupter of patterns previously established, for most students. To see how much aspects of transition *did* contribute over and above existing levels of performance and social characteristics, we carried out multivariate models. The results of these models are summarized in Table 5, and are reported in terms of the percentage of variability in the age-16 measure that is accounted for by the other variables in the model. The parameter estimates and associated *p*-values for the models are given in the tables following Table 5. These percentages are approximate estimates, and should be read as giving an indication of the relative importance of each of the variables in the model.

The second column in Table 5, headed R^2 gives the total proportion of variance in student scores accounted for by the variables in the model. These proportions are given in bold. The third column gives previous levels of performance at age 8 (i.e. well before the transition to secondary education). The measures used here are the cognitive composite (literacy, maths, logical-problem-solving); and measures of attitudinal competencies (akin to the new key competencies in the revised national curriculum). These measures of prior knowledge, skills, and attitudes account for most of the difference between scores on current measures of knowledge, skills and attitudes, and number of level 1 NCEA credits gained at age 16. The exceptions are experiencing of social difficulties, and the level of risky behaviour at age 16. Column 4 gives the contribution of social characteristics, with maternal education levels most likely of these to be associated with age-16 performance. The next five columns give associations over and above the variables in columns 3 and 4, with the transition variables that showed some association in the one-way models. In the final column is the total contribution made by these transition variables.

Table 5: Contribution of transition variables to age-16 performance

Age 16 performance or behaviour	R^2	Matching age-8 competency	Social characteristics	% of variability accounted for					Total % of variability accounted for by transition variables
				Change in school type	Time to settle to secondary	Change of decile	First choice of school	Number of schools	
L1 NCEA credits	44.0	Cognitive 15.1 Social 5.3	Maternal qualifications 5.3 Family income at 14 5.7 Year level 0.8 Status 3.2	3.1			2.3	3.5	8.9
Cognitive	66.4	Cognitive 41.9 Perseverance 9.2	Maternal qualifications 7.2 Family income at 14 3.4	1.9	1.0		1.9		4.8
Literacy	45.8	Cognitive 29.8	Maternal qualifications 4.9 Year level 2.4 Gender 3.4			5.3			5.3
Numeracy	49.2	Cognitive 33.0	Maternal qualifications 6.2 Family income at 14 4.2 Gender 1.1	2.2			2.6		4.8
Thinking and learning	30.3	Cognitive 13.8 Social skills with adults 5.1	Maternal qualifications 5.2 Family income at 14 3.5	2.6					2.6
Social difficulties	19.6	Cognitive 6.8	Maternal qualifications 5.2 Gender 5.1					2.5	2.5
Risky behaviour	11.7	Perseverance 8 2.0	Maternal qualifications 3.5 Family income at 14 3.2				3.1		3.1

The results are reported for each of the outcome variables in turn. Where no transition variables contributed significantly to the model, no model is reported, as equivalent models have been reported elsewhere (Hodgen, 2008).

Number of Level 1 NCEA credits

The 1-way ANOVAs indicated that transition variables that may make a statistically significant contribution to the number of Level 1 NCEA credits achieved are:

- change in school type
- change in school decile
- whether the school was the student's first choice.

The model accounted for 44 percent of the variability in the number of Level 1 NCEA credits achieved. Table 6 following shows that the strongest predictor in the model was age-8 cognitive ability.

There are two types of p-values given in the table for the discrete variables (only one for continuous variables). The first type is given on the same line as the variable name and/or the reference category for the variable (with parameter estimate of 0, the whole line in *italics*). This is the p-value for the variable as a whole: when fitted last to the model, does it make a significant difference (tested using an F-test)? The second type is given for each of the other levels of the variable, and is the probability that that level's parameter is the same as that of the reference group (tested using a t-test). This shows which levels are significantly different to the reference group (which non-reference levels differ is shown by pairs of matching superscripts). The relative importance value also applies for the variable as a whole, and so is on the same line in the table as the p-value for the F-test. Where there are only two levels (like year level), the two possible p-values are equal, and only one is presented.

In Table 6, significant differences between the reference group (parameter estimate of 0) and other groups can be read from the p-value column. Significant differences between other pairs of levels of the variable are indicated by superscripted letters. For example, those who from homes with an income of $60–100K achieved significantly more Level 1 credits than those from a home with an income of under $30K ($p = 0.005$ as shown in the table) and also those with an income of between $30K and $60K (no p-value given, but as indicated by the pair of superscripted "c").

For several of the discrete variables there were no significant differences other than those that can be read from the table. For example, whether the young person was still at school, with two levels, can only have the single comparison which is given in the table. Maternal qualifications, however, has only the significant differences between the level no qualifications and both senior secondary/tertiary, and university. This can be confirmed approximately from Table 6. The standard errors of all the estimates for this variable are of the same order of size, so in order to be significant, the differences between levels would need to be about 10–12 (as was that between no qualifications and senior secondary/tertiary), and none of the other pairwise differences are that large.

Table 6:   Number of Level 1 NCEA credits

	Parameter estimate	Standard error	*p*-value	Variability accounted for (%)
Intercept	33.4	9.2	0.0003	
Social characteristics				
Maternal qualifications – none	*0*		*0.011*	*5.3*
– Mid-secondary/trade	8.59	4.38	0.051	
– Senior secondary/tertiary	13.74	5.08	0.007	
– University	15.68	5.323	0.003	
Family income at 14 – Under $30K	*0*		*0.002*	*5.3*
– $30–60K[cd]	2.97	4.88	0.54	
– $60–100K[c]	13.32	4.71	0.005	
– $100K and over[d]	10.82	5.02	0.032	
Student still at school – Yes	*0*		*0.0002*	*3.2*
– Left school	-46.70	12.43		
Year level – Year 11	*0*		*0.09*	*0.8*
– Year 12	4.61	2.73		
Earliest cognitive and/or attitudinal				
Cognitive composite age 8	7.70	1.17	< 0.0001	15.4
Attitudinal composite age 8	3.01	1.15	0.009	5.3
Transition variables				
Number of schools by age 14 – Up to 2	*0*		*0.020*	*3.5*
– 3 schools[e]	-1.43	3.70	0.700	
– 4 schools	-8.79	4.75	0.065	
– 5 or more schools[e]	-14.98	5.93	0.012	
Change in school type				
– Full primary to secondary	*0*		*0.004*	*3.1*
– Intermediate to secondary[ab]	-4.94	3.62	0.17	
– Remained at a composite school[a]	11.72	5.93	0.05	
– Remained at secondary school (from Yr7)[b]	5.15	5.08	0.31	
– Other change	3.89	7.27	0.59	
Student's first choice of school – Yes	*0*		*0.007*	*2.3*
– Unsure	-7.55	5.23	0.15	
– No	-10.30	3.45	0.003	

Superscripted letters indicate pairs of levels of a variable that differ significantly.

What do the numbers in Table 6 tell us? Starting with the most important predictor, age-8 cognitive competency, which is also one of the continuous variables (the other is the attitudinal composite) used as covariates, the parameter estimate of 7.70 tells us that for every unit increase in the cognitive score (as the score was converted to a 0–10 scale this would be an increase from 5 to 6, or from 7.5 to 8.5, for example), on average, students achieved just under 8 additional credits, controlling for (or holding constant) all other variables. Similarly, for every unit increase in the attitudinal competency score, on average students achieved about 3 additional credits, controlling for all other variables.

Parameter estimates for the discrete variables give slightly different information. They give the average increase (if positive) or decrease (if negative) for each of the other levels compared with the reference group, again, controlling for all other variables. For example, those who who had attended 4 schools by age 14 achieved almost 9 fewer credits than those who had attended one or two schools. By subtraction, those who had attended 3 schools achieved about 13.5 more credits than those who had attended five or more schools. The standard errors of the estimates vary depending on, amongst other things, the size of the group (they are larger for small groups than for large groups — most clearly seen in the number of schools, where there are fewer students in each level as the number of schools attended by age 14 increases).

The *percentage of variability accounted for* values give a guide as to the relative importance of the different variables in the model. These values sum to the (unadjusted) value of R^2, the total percentage of the variability accounted for. Most of the variables would be considered to be medium effects (with values of just under 6), apart from the age-8 cognitive competency which is a large effect (a large effect would be about 14 percent or more), and year level would be considered small effects (one or two percent—in fact not significant in the model once the other sources of variation had been accounted for, in spite of the fact that, on average, Year 12 students had more Level 1 credits than Year 11 students).

While the most important predictor of the number of Level 1 NCEA credits was the students' cognitive achievement at age 8, an almost equal percentage of the variability was accounted for (in almost equal measure) by maternal qualifications, family income at age 14, and attitudinal competency at age 8. Students who had left school by age 16 had fewer NCEA credits (not unexpectedly)—on average about 47 fewer. There are indications that students who attended an intermediate school achieved fewer credits than those who attended a composite (often these were private schools) school at both primary and secondary level, and than those who began secondary school in Year 7, but not fewer than those who attended a full primary school. These differences will be confounded to some extent with school decile and longer-term family resources. The other difference that is confounded with school decile is whether the student was able to attend their first choice of school. Those who could achieved more credits, and were also more likely to be at higher-decile schools than those who could not.

Number of Level 1 NCEA credits measures a wider range of cognitive achievement, and is more dependent on what is happening to and around the young person when they are in Year 11, than the *Competent Children, Competent Learners'* cognitive competencies of literacy and numeracy. Our earlier cognitive competency scores are stronger predictors of age-16 literacy, and even more so, numeracy, than of number of Level 1 NCEA credits.

Literacy score

The 1-way ANOVAs indicated that transition variables that may make a statistically significant contribution to the literacy score are:
- change in school type
- change in school decile
- whether the school was the student's first choice.

Table 7 shows the results of this model. The model accounted for 46 percent of the variability in literacy score. The strongest predictor in the model was age-8 cognitive ability.

Table 7:   Literacy score

	Parameter estimate	Standard error	*p*-value	Variability accounted for (%)
Intercept	3.37	0.32	< 0.0001	
Social characteristics				
Maternal qualifications – none	*0*		*0.069*	*4.9*
– Mid-secondary/trade[a]	0.01	0.18	0.945	
– Senior secondary/tertiary	0.24	0.21	0.25	
– University[a]	0.39	0.22	0.07	
Gender – Male	*0*		*< 0.0001*	*3.4*
– Female	0.44	0.11		
Year level – Year 11	*0*		*0.002*	*2.4*
– Year 12	0.37	0.12		
Earliest cognitive and/or attitudinal				
Cognitive composite age 8	0.54	0.04	< 0.0001	29.8
No significant attitudinal competency				
Transition variables				
Change in school decile – Moved down	*0*		*0.015*	*5.3*
– Always high-decile (9 or 10)[bc]	0.21	0.21	0.32	
– Always mid-decile (3–8)[d]	0.02	0.21	0.92	
– Always low-decile (1 or 2)[b]	-0.53	0.31	0.09	
– Moved up from low-decile[cde]	-0.69	0.33	0.03	
– Moved from mid- to high-decile[e]	0.00	0.22	0.99	

Superscripted letters indicate pairs of levels of a variable that differ significantly.

Literacy at age 16 was well predicted by earlier literacy (about 30 percent compared to the total of 46 percent accounted for), and maternal qualifications and "change in school decile" — or patterns of school decile attended — accounted for almost equal percentages of variability in age-16 literacy score. The changes in decile that appear to be associated with a higher literacy score are:

- Starting in a higher-decile school, and at some point moving to a lower decile school (rather than moving up from a low-decile school)

- Always attending a high-decile school (rather than starting, or staying, in a low-decile school)

- Always attending a mid-decile school (rather than starting in a low-decile school and moving to a higher-decile school)

- Moving from a mid- to a high-decile school—that is, starting in a mid-decile school (rather than starting in a low-decile school)

Students who always attended a high decile school, or had started in one, tended to do better than those who always attended a low decile school, or who had started in one.

Numeracy score

Male and female students achieved approximately equal numbers of Level 1 NCEA credits, once other variables had been taken into account, but females achieved slightly higher literacy scores (by about 0.4, which would be the equivalent to between 4 and 5 points on a percentage scale). For numeracy, the advantage was the other way round, with males achieving higher scores by about the same amount, controlling for all other variables in the models.

The 1-way ANOVAs indicated that transition variables that may make a statistically significant contribution to the numeracy score are:

- change in school type

- change in school decile

- whether the school was the student's first choice

- (possibly) number of schools attended by age 14.

Table 8 shows the results of this model. The model accounted for 49 percent of the variability in numeracy score. The strongest predictor by far in the model was the age-8 cognitive competency score.

Table 8:   Numeracy score

	Parameter estimate	Standard error	*p*-value	Variability accounted for (%)
Intercept	2.59	0.28	< 0.0001	
Social characteristics				
Maternal qualifications – none	*0*		*0.011*	*6.2*
– Mid-secondary/trade[a]	0.23	0.16	0.17	
– Senior secondary/tertiary	0.40	0.19	0.04	
– University[a]	0.66	0.21	0.001	
Gender – Male	*0*		*0.0001*	*1.2*
– Female	-0.41	0.11		
Family income at 14 – Under $30K	*0*		*0.009*	*4.2*
– $30–60K[cd]	-0.12	0.18	0.521	
– $60–100K[c]	0.38	0.18	0.033	
– $100K and over[d]	0.10	0.19	0.608	
Earliest cognitive and/or attitudinal				
Cognitive composite age 8	0.58	0.04	< 0.0001	33.0
No significant attitudinal competency				
Transition variables				
Change in school type				
– *Full primary to secondary*	*0*		*0.007*	*2.2*
– Intermediate to secondary[ab]	0.17	0.12	0.139	
– Remained at a composite school[a]	0.88	0.23	0.0001	
– Remained at secondary school (from Yr7)[b]	0.10	0.20	0.600	
– Other change	-0.09	0.28	0.76	
Student's first choice of school – Yes	*0*		*0.007*	*2.6*
– Unsure	-0.39	0.21	0.061	
– No	-0.29	0.13	0.031	

The pattern for numeracy is similar to that for literacy in that the matching earlier cognitive achievement is markedly more important than background or transition variables, and is similar to that for the number of Level 1 NCEA credits in that the decile effect is observed through the confounded variables of change in school type and first choice of school. There is no difference between students who transition from an intermediate or a full primary school.

Cognitive composite score

The 1-way ANOVAs indicated that transition variables that may make a statistically significant contribution to the composite cognitive competency score are:

- whether the school was the student's first choice

- change in type of school

- (possibly) number of schools attended by age 14.

The model accounted for 66 percent of the variability in cognitive competency score. Table 9 shows that the strongest predictor by far in the model was the age-8 cognitive competency score.

Table 9: Cognitive competency score

	Parameter estimate	Standard error	p-value	Variability accounted for (%)
Intercept	1.91	0.22	< 0.0001	
Social characteristics				
Maternal qualifications – none	*0*		*0.0001*	*7.2*
– Mid-secondary/trade[a]	0.17	0.12	0.17	
– Senior secondary/tertiary	0.44	0.15	0.003	
– University[a]	0.59	0.15	0.0002	
Family income at 14 – Under $30K	*0*		*0.021*	*3.4*
– $30–60K[c]	-0.13	0.14	0.330	
– $60–100K[c]	0.22	0.13	0.095	
– $100K and over	0.06	0.14	0.698	
Earliest cognitive and/or attitudinal				
Cognitive composite age 8	0.61	0.03	< 0.0001	41.9
Perseverance age 8	0.05	0.02	0.011	9.2
Transition variables				
Change in school type				*1.9*
– Full primary to secondary	*0*		*0.001*	
– Intermediate to secondary[a]	0.00	0.09	0.933	
– Remained at a composite school[ab]	0.62	0.17	0.0003	
– Remained at secondary school (from Yr7)[c]	0.17	0.15	0.269	
– Other change [bc]	-0.44	0.21	0.042	
Student's first choice of school – Yes	*0*		*0.037*	*1.9*
– Unsure	-0.30	0.16	0.059	
– No	-0.20	0.10	0.044	
Time to settle – Settled immediately	*0*		*0.0004*	*1.0*
– Under a term	0.35	0.09	< 0.0001	
– A term or longer	0.14	0.12	0.227	

Around two-thirds of the variability in the cognitive competency score explained by this model was explained by the age-8 cognitive competency score. The second most important source of variability was the perseverance score at age 8 (but the cognitive competency score accounted for four times as much of the variability as the perseverance score). The social characteristics together accounted for about 10 percent of the total variability and the transition variables for only about five percent between them. The pattern shown for change in school type

and whether the school attended was the students' first choice (both confounded with decile) was similar to that for the separate competencies.

Focused and responsible

The 1-way ANOVAs indicated that transition variables that may make a statistically significant contribution to the number of Level 1 NCEA credits achieved are:

- change in school decile

- whether the school was the student's first choice

- number of schools attended by age 14.

None of the transition variables was significant in a multivariate model.

Thinking and learning

Thinking and learning was slightly less well explained by the series of models than focused and responsible was. This is in line with previous results, where focused and responsible has proved to be the attitudinal competency most closely aligned to the cognitive competencies.

The 1-way ANOVAs indicated that transition variables that may make a statistically significant contribution to thinking and learning are:

- change in school type

- whether the school was the student's first choice

- number of schools attended by age 14.

Table 10 shows that the model accounted for 30 percent of the variation in thinking and learning. The strongest predictor in the model was the age-8 cognitive competency.

Table 10: Thinking and learning

	Parameter estimate	Standard error	p-value	Variability accounted for (%)
Intercept	3.13	0.40	< 0.0001	
Social characteristics				
Maternal qualifications – none	*0*		*0.016*	*5.1*
– Mid-secondary/trade[ab]	-0.05	0.21	0.790	
– Senior secondary/tertiary[a]	0.33	0.24	0.17	
– University[b]	0.49	0.25	0.052	
Family income at 14 – Under $30K	*0*		*0.022*	*3.5*
– $30–60K[c]	0.01	0.23	0.973	
– $60–100K[c]	0.41	0.22	0.054	
– $100K or more	0.18	0.24	0.444	
Earliest cognitive and/or attitudinal				
Cognitive composite age 8	0.34	0.05	< 0.0001	13.8
Social skills with adults age 8	0.15	0.04	0.0002	5.1
Transition variables				
Change in type of school:				
– Full primary to secondary	*0*		*0.013*	*2.6*
– Intermediate to secondary[de]	-0.34	0.14	0.015	
– Composite at ages 12 and 14[d]	0.31	0.27	0.244	
– Year 7–15 secondary at 12[e]	0.30	0.24	0.208	
– Other change	-0.37	0.34	0.282	

Superscripted letters indicate pairs of levels of a variable that differ significantly.

The attitudinal competencies are less strongly associated with the corresponding age-8 measures than the cognitive competencies are, and in fact thinking and learning at 16 is more strongly associated with the age-8 cognitive composite than with the age-8 competency, social skills with adults. The only transition variable that was significant in the model was change in type of school, accounted for only 2.6 percent of the variability in thinking and learning, and the pattern of differences is similar to that described above. As noted earlier, this variable is somewhat confounded with school decile.

Social skills

Social skills is a measure of the extent to which students are respectful of the views of others, present their own point of view appropriately, are good at resolving disputes, and help and support others in the class.

The 1-way ANOVAs indicated that transition variables that may make a statistically significant contribution to social skills are:

- change in school type

- change in school decile

None of the transition variables was significant in a multivariate model.

Social difficulties

Social difficulties is a measure of the extent to which a student mixes with others who are anti-social or get into trouble, is influenced negatively by their peers, and is involved in bullying either as victim or as bully.

The 1-way ANOVAs indicated that transition variables that may make a statistically significant contribution to social difficulties score are:

- change in school decile
- number of schools attended by age 14
- and possibly change in size (roll) of school.

Table 11 shows that the model accounted for 20 percent of the variability in social difficulties. Social difficulties is one of the variables where a high value is a "bad" thing, and so this variable is negatively correlated with variables in which it is a "good" thing, and positively correlated with other variables in which it is a "bad" thing. This explains the negative parameter estimates for cognitive competency and for higher levels of maternal qualifications, and positive parameter estimates for increasing number of schools attended by age 14.

Table 11: Social difficulties

	Parameter estimate	Standard error	*p*-value	Variability accounted for (%)
Intercept	7.13	0.46	< 0.0001	
Social characteristics				
Gender – Male	*0*		*< 0.0001*	*5.1*
– Female	-0.96	0.19		
Maternal qualifications – none	*0*		*0.002*	*5.2*
– Mid-secondary/trade[a][b]	-0.09	0.31	0.764	
– Senior secondary/tertiary[a]	-0.88	0.37	0.017	
– University[b]	-0.95	0.37	0.011	
Earliest cognitive and/or attitudinal				
Cognitive composite age 8	-0.32	0.07	< 0.0001	6.8
No attitudinal competency significant				
Transition variables				
Number of schools by age 14 – Up to 2	*0*		*0.012*	*2.4*
– 3 schools[c]	0.36	0.22	0.108	
– 4 schools[d]	0.20	0.30	0.495	
– 5 or more schools[c][d]	1.34	0.41	0.001	

Superscripted letters indicate pairs of levels of a variable that differ significantly.

The only transition variable that showed a significant association with social difficulties was the number of schools attended. Students who had attended five or more schools by the time they were 14 were more likely to have a higher social difficulties score than all other students.

Engaged in school

The 1-way ANOVAs indicated that transition variables that may make a statistically significant contribution engaged in school are:

- time to settle (indicative)
- whether the school was the student's first choice (indicative)
- number of schools attended by age 14.

None of the transition variables was significant in a multivariate model.

Affirmed at school

The 1-way ANOVAs indicated that transition variables that may make a statistically significant contribution to affirmed at school are:

- whether the school was the student's first choice

None of the transition variables was significant in a multivariate model.

Use of internal markers of progress

The 1-way ANOVAs indicated that transition variables that may make a statistically significant contribution to use of internal markers of progress are:

- whether the school was the student's first choice (indicative)

None of the transition variables was significant in a multivariate model.

Risky behaviour

Risky behaviour is derived from activities self-reported by the young people. Like social difficulties, this score is one where a high score is "bad".

The 1-way ANOVAs indicated that transition variables that may make a statistically significant contribution to risky behaviour are:

- whether the school was the student's first choice
- whether friends moved to the same school.

The risk profile of students was not clear early on: Table 12 shows that the model accounted for 12 percent of age-16 risky behaviour.

Table 12: Risky behaviour

	Parameter estimate	Standard error	*p*-value	Variability accounted for (%)
Intercept	4.45	0.32	< 0.0001	
Social characteristics				
Maternal qualifications – none	*0*		*0.002*	*3.5*
– Mid-secondary/trade[ab]	0.40	0.21	0.056	
– Senior secondary/tertiary[a]	-0.21	0.24	0.378	
– University[b]	-0.05	0.25	0.843	
Family income at 14 – Under $30K	*0*		*0.013*	*3.2*
– $30–60K	-0.50	0.23	0.029	
– $60–100K	-0.76	0.22	0.0006	
– $100K or more	-0.54	0.23	0.021	
Earliest cognitive and/or attitudinal				
Perseverance age 8	-0.09	0.03	0.005	2.0
Cognitive competency not significant				
Transition variables				
School was student's first choice – Yes	*0*		*0.003*	*3.1*
– Unsure[c]	-0.41	0.26	0.112	
– No[c]	0.45	0.16	0.005	

Superscripted letters indicate pairs of levels of a variable that differ significantly.

The only transition variable that was significant in the model was whether the school was the student's first choice or not. This variable is somewhat confounded with decile, and students who could not attend their first choice of secondary school (which meant for some, attendance at a low decile school) were more likely to be involved in activities that could be risky.

3. A multihued picture

The picture of the contribution made by transition experiences is not clear-cut or consistent. None of the transition experiences have an association with all the performance measures; some are apparent when we use prior scores at one age, but not another. Half the performance measures have association with only one of the transition experiences. The nature of transition to secondary school is experienced quite differently by individual students, rather than being either a common ordeal or a common relief. This complexity is also evident when we look at the aspects within a variable that were significantly different. We discuss some of these below, using the results of the models reported in the previous chapter.

The time taken to settle into secondary school is only related to the cognitive composite score at 16 once all the other variables have been taken into account; with those who settled in immediately having a higher score than those who settled in between when they started and a term—but not higher than those who took more than a term. This does suggest that the time taken to settle does not affect all students the same way, and that other indicators of student engagement may be more meaningful to identify those who are struggling with school, or who are finding things outside school more absorbing.

The transition experience that seems to have the most consistent association is the *change of school type*: it accounts for up to 3 percent of the variance in the number of level 1 NCEA credits, the cognitive composite—largely driven by numeracy it seems, since there are no associations with literacy, and with the attitudinal competency, thinking and learning.

Where there were differences in age-16 performance associated with change in school type, the main significant differences were between those who had moved from an intermediate to a secondary school, and those who had remained at a composite or a year 7–15 secondary school. Those staying in the same type of school (either composite or secondary) had significantly higher scores than those who attended an intermediate school. There typically was no significant difference between those who moved from a full primary to a secondary school, and those who moved from an intermediate to a secondary school.

The *number of schools* attended up to age 14—not directly associated with the transition to secondary school, or only inasmuch as that might mean another change of school—was related, over and above prior performance and social characteristics to age-16 performance and behaviour, with the number of level 1 NCEA credits, and experiencing social difficulties. Levels of numeracy and literacy, or thinking and learning approaches, were not significantly affected. Students who had attended up to four schools had higher scores than those who had attended 5 or more; those who had attended three or four schools did almost as well as those who had attended one or two. The difference in number of NCEA credits between those who had attended one or two schools and those who had attended four might have been significant with a larger sample ($p = 0.065$).

A change of school decile was associated with literacy scores at age 16. On the whole, those who attended low-decile schools at some point (either at primary and/or secondary level), including those who moved up from a low-decile primary school to a mid- or high-decile secondary school, had lower literacy scores than those who only attended mid- or high-decile schools.

Students whose *secondary school was not their first choice of school* had lower scores than those who were at their first choice of school, in relation to the number of level 1 NCEA credits, and cognitive composite scores (which are probably driven by numeracy scores, since there is no association with literacy). Students who were

able to attend their first choice of school were less likely to show risky behaviour than those who had gone to a school that was not their first choice. This makes some sense: at age 14 we found that these students were already more likely to have engaged in risky behaviour, to have had two or more adverse experiences over the past year, to have been unhappy at school since age 8, have less positive interactions with family and friends, and to have lower average competency scores since age 12. This and the fact that we do not see more associations with performance levels at age 16 suggests that the transition variable—changing to a second-choice school—was not causal in the risky behaviour; and may have arisen from negativity about schooling and, perhaps, not having the family interest and support to gain a preferred school. Those who were not able to attend their first choice of school were more likely to be attending a low-decile school at age 16.

Discussion

Overall, the analysis we were able to do with this sample and the data we had collected at earlier ages would suggest that the transition to secondary school in New Zealand is currently not a major issue for many students, and that there is no single structural aspect to the change that stands out as something that could be tackled to improve student engagement or performance in secondary schools. Some have suggested, for example, eliminating intermediate schools: our analysis shows no clear support for or against this. We want to reiterate the importance of our finding that changes in performance over the transition, and since the transition, are no greater than changes in student performance over any two-year period in their earlier schooling; it is just that because there is a change in level, we pay this period more attention. And making sure that students feel welcome in the secondary level of schooling, supported, engaged in learning, and given opportunities for extracurricular stretch and growth is as important as it is in any stage of education. Our study, as with other longitudinal studies that include secondary as well as primary schooling, does find that on average, students' feelings about school do show some decline in secondary school, which may indicate the need to adopt different approaches and use different structures at this stage than the current norm (Bolstad & Gilbert 2008), particularly given the greater pull of other activities at this stage of life.

Yet the weight of prior performance in age-16 engagement and performance also shows that making the most of this transition may also rest on already existing confidence in school work and life, and a belief that school matters, more than other activities in which young adults can find their identity.

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