PROGRESSIVE ACHIEVEMENT TESTS
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Research on the

Progressive Achievement Tests

and Academic Achievement in Secondary Schools

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Research on the *Progressive Achievement Tests* and Academic Achievement in Secondary Schools

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Study 1
Predictive Validity of the Progressive Achievement Tests for Boys

Psychometric testing can be used for many purposes. In the present case, a battery of tests was used to assess vocabulary, comprehension, and numeracy skill levels of students commencing study at a regional high school. The tests were used as a screening tool to identify students who might benefit from additional instruction and also to select high achieving students for participation in extension work, maths competitions, and the like. Test results were later correlated with performance in various school subjects. Given that the tests were sampling behaviours that are required in most school subjects, a strong relationship was expected between test scores and school grades.

The proximity between the school and the university offered an opportunity to collect longitudinal data on cohorts of students at Year 7 and progressing through to Year 12. The relationship between test scores and school grades was expected to diminish over time.

Method

Subjects & Procedure

As part of a supplementary educational testing program conducted by the University of Southern Queensland, the *Progressive Achievement Tests (PAT)* in *Reading Vocabulary*, *Reading Comprehension*, and *Mathematics* were administered to four cohorts of Year 8 boys from a school in a regional Queensland city. The school has a strong academic tradition and draws its students from a wide range of urban, rural, and remote locations. The average age of the boys was 12 years and 7 months. The first cohort (N = 119) was tested in the first week of the school year (February) in 1992. The second (N = 152), third (N = 119), and fourth cohorts (N = 123) were tested in successive years at the same time of the year. A total of 513 boys were tested over four years. The timeline is illustrated in Table 1.

Table 1. Timeline for testing and progression of different cohorts

	Year							
Cohort	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**
1	Year 8	Year 9	Year 10	Year 11	Year 12			
2		Year 8	Year 9	Year 10	Year 11	Year 12		
3			Year 8	Year 9	Year 10	Year 11	Year 12	
4				Year 8	Year 9	Year 10	Year 11	Year 12

Materials

Progressive Achievement Tests (PAT)
The tests have been developed by the Australian Council for Educational Research to assess skills in verbal comprehension and mathematics. The test battery contains three tests, which collectively are called the *Progressive Achievement Tests (PAT)*. All three tests employ a multiple-choice format. Raw scores (equal to the number of correct items) for these tests were used in subsequent analyses.

Reading Vocabulary 2nd Edition (1986)(Form A – Part 7)
This is a test of words and their meanings. The test is made up of 65 short sentences, each with a word underlined. Below each sentence are five answers. Students have to choose the answer which has the same meaning as the underlined word. The time limit for this test is 30 minutes.

Reading Comprehension 2nd Edition (1986)(Form A – Part 7)
The purpose of this test is to measure two important parts of reading skill – namely, the abilities involved in inferential and factual comprehension of written text. The reading comprehension test consists of a series of passages which the student is required to read and then answer related questions. The test contains 47 multiple choice items which must be answered within 40 minutes.

Mathematics (1984)(Form 3A)
This is a test of understanding and skill in mathematics. This test consists of 55 multiple-choice questions, which assess mathematical skills within the areas of numbers, space, measurement, chance and data, and algebra. The time limit for this test is 45 minutes.

Academic Achievement

Students were tracked through their high school years, and subject grades assigned at the end of each year by teachers were used as a measure of students' academic performance. Subject grades fell into the following five categories: Very High Achievement (VHA), High Achievement (HA), Sound Achievement (SA), Limited Achievement (LA) and Very Limited Achievement (VLA). Within each of these broad categories were three levels which further differentiated scholastic performance. For example, within Very High Achievement, a student could be assigned grades of a high standard (VHA+), an average

standard (VHA), or a lesser standard (VHA-). The same breakdowns apply to the other four categories. Therefore, altogether there were 15 possible grading levels. For analytical purposes, a scale was adopted that assigned the lowest grade a score of 1 and the highest grade a score of 15.

Procedure

Because the *PAT* tests are measures of learning skills, they have been designed so that they can be administered by teachers to large groups. However, in the particular high school where these data were collected, trained psychologists administered the tests to the Year 8 student body at the commencement of their high schooling. Administration instructions outlined in the manuals were followed verbatim. Answer sheets for the three tests were scored by the same trained psychologists who administered the tests. For this study, archival data were obtained with the permission of the school Principal and the Director of Studies. The tests were administered in a single session. The *Comprehension* test was presented first (45 minutes), followed by the *Vocabulary* test. The *Mathematics* test (40 minutes) was then administered after a short break. Total testing time, including breaks, was 2.5 hours.

Results

As would be expected for a study of this nature, the sample size decreased over the life span of the study because of student movement and also students' selection of subjects. Attrition and subject selection had least impact in Year 8 where most students studied the same subjects and the subject pool remained intact, so the data for this year are presented first. Table 2 shows means and standard errors on each of the tests for the four cohorts. The N below each year shows the number of boys in that year.

Table 2. *PAT* mean scores and standard errors of Year 8 students by cohort and overall

PAT Test	1992 (N = 119)	1993 (N = 152)	1994 (N = 119)	1995 (N = 123)	TOTAL (N = 513)
Vocabulary	40.56 (1.09)	43.10 (0.89)	42.93 (0.90)	40.72 (0.99)	41.90 (0.49)
Comprehension	25.50 (0.86)	27.32 (0.71)	27.67 (0.79)	26.98 (0.84)	26.89 (0.40)
Mathematics	25.29 (0.96)	25.76 (0.87)	28.20 (0.91)	28.63 (0.99)	26.91 (0.47)

To provide information about the distribution of school performance, the school grades for each cohort in each of the main subjects are shown below. School grades were converted to scores that ranged from 1 to 15, with 8.0 as the midpoint.

Table 3. School grade means and standard errors for Year 8 students by cohort

Subject	1992	1993	1994	1995	TOTAL
English	8.51 (0.21)	8.88 (0.20)	8.83 (0.22)	8.72 (0.21)	8.74 (0.11)
Maths	7.64 (0.28)	7.75 (0.26)	8.37 (0.29)	8.76 (0.28)	8.11 (.14)
Science	8.42 (0.25)	9.43 (0.23)	9.57 (0.26)	9.80 (0.25)	9.31 (0.13)
History	10.03 (0.24)	8.61 (0.22)	9.00 (0.25)	9.53 (0.24)	9.26 (0.12)
Geography	8.45 (0.25)	9.19 (0.23)	9.10 (0.26)	9.32 (0.28)	9.00 (0.13)
French	9.54 (0.30)	8.61 (0.32)	9.41 (0.36)	9.13 (0.33)	9.14 (0.17)
Japanese	8.14 (0.36)	7.01 (0.36)	6.95 (0.39)	7.14 (0.36)	7.29 (0.19)

Setting alpha at .01, there were no significant differences between the grades obtained by different cohorts on each of these school subjects.

Table 4. Correlations among the PAT scores (N = 513)

	Vocabulary	Comprehension	Mathematics
Vocabulary	1.00		
Comprehension	0.81	1.00	
Mathematics	0.65	0.69	1.00

As shown in Table 4, all three *PAT* tests were significantly correlated. Previous factor analytic work on the *PAT* has demonstrated that there is a single dominant factor that affects performance in these assessed areas. These findings support the view that there is overlap among the tests, especially with *Vocabulary* and *Comprehension*, which cover aspects of the understanding of the English language. More detailed analyses are provided in the later part of this document.

Correlations Between *PAT* Scores and Subject Grades

Correlations between the *PAT* scales and subject grades in Year 8 are presented in Table 5. The left hand column in this table shows the main subjects taught at this school in Year 8. The second column lists the numbers of students in each of the four cohorts (1992, 1993, 1994, and 1995). Missing data and varying enrolments in school subjects account for the small variations in numbers across school subjects (e.g., 123 boys took French in 1994 whereas only 95 took Geography in the same year).

The last three columns show the Pearson Product Moment correlations between *PAT* scores and grades in the various school subjects. All correlations are highly significant ($p < .001$).

Table 5. Correlations between *PAT* scores and subject grades

Subject	Cohort	*PAT* Test		
		Vocabulary	Comprehension	Mathematics
Yr 8 English	1 (N = 119)	.731	.784	.758
	2 (N = 142)	.736	.705	.627
	3 (N = 113)	.658	.653	.702
	4 (N = 120)	.794	.753	.655
	Σ (N = 494)	.732	.726	.675
Yr 8 Maths	1 (N = 119)	.485	.527	.645
	2 (N = 142)	.679	.660	.831
	3 (N = 113)	.628	.589	.853
	4 (N = 118)	.629	.622	.871
	Σ (N = 492)	.595	.600	.807
Yr 8 Science	1 (N = 119)	.682	.699	.725
	2 (N = 142)	.768	.706	.672
	3 (N = 113)	.721	.662	.804
	4 (N = 120)	.738	.705	.757
	Σ (N = 494)	.720	.695	.735
Yr 8 History	1 (N = 119)	.685	.711	.691
	2 (N = 142)	.632	.577	.578
	3 (N = 113)	.506	.496	.562
	4 (N = 118)	.727	.709	.627
	Σ (N = 492)	.608	.597	.595
Yr 8 Geography	1 (N = 119)	.661	.659	.673
	2 (N = 142)	.689	.656	.637
	3 (N = 112)	.586	.529	.656
	4 (N = 95)	.658	.616	.654
	Σ (N = 468)	.648	.621	.652

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Subject	Cohort	*PAT* Test		
		Vocabulary	Comprehension	Mathematics
Yr 8 French	1 (N = 119)	.715	.681	.713
	2 (N = 152)	.487	.440	.507
	3 (N = 119)	.521	.548	.552
	4 (N = 123)	.683	.660	.687
	Σ (N = 513)	.575	.558	.595
Yr 8 Japanese	1 (N = 119)	.567	.560	.640
	2 (N = 152)	.503	.495	.582
	3 (N = 119)	.422	.466	.543
	4 (N = 123)	.497	.526	.614
	Σ (N = 513)	.482	.493	.574

The following analyses provide an indication of the predictive validity of the *PAT* scores in relation to subject grades obtained in Year 8.

Table 6. Predictive validity of *PAT* scores for school performance in Year 8

Subject		*PAT* Test			R^2	ANOVA
		Vocab	Comp	Maths		
Yr 8 English	*b*	.26**	.35**	.27**		
	sr	.20	.14	.19	.63	F(3, 490) = 273.56 **
Yr 8 Maths	*b*	.13*	.00	.73**		
	sr	.07	.00	.52	.66	F(3, 488) = 317.08 **
Yr 8 Science	*b*	.34**	.13*	.43**		
	sr	.20	.07	.30	.65	F(3, 490) = 300.27 **
Yr 8 History	*b*	.28**	.17**	.30**		
	sr	.16	.09	.21	.45	F(3, 488) = 132.17 **
Yr 8 Geography	*b*	.33**	.10*	.37**		
	sr	.19	.05	.26	.52	F(3, 464) = 164.63 **
Yr 8 French	*b*	.26**	.10	.36**		
	sr	.15	.06	.25	.42	F(3, 509) = 122.58 **
Yr 8 Japanese	*b*	.13*	.10	.42**		
	sr	.07	.06	.30	.35	F(3, 509) = 92.46 **

* $p < .05$; ** $p < .01$
b = standardised beta coefficient; *sr* = semi-partial correlation

R^2 indicates the proportion of variance in the grade that can be predicted or explained by the *PAT* scores. Hence, in Table 6, about 63% of the variance in English grades can be explained by the combined *PAT* scores.

These regression equations indicate that measures of vocabulary and comprehension are important predictors of performance in English, Science, History, and Geography. However, they are not helpful in predicting performance in Year 8 Mathematics. An interesting outcome was the influential role of *PAT Maths* in the various predictor

equations, even for subjects like English and History. There is no obvious explanation for this relationship. One possibility is that *PAT Maths* measures general reasoning processes that underlie performance on various subjects like English.

Predictive Validity of *PAT* Scores for School Performance in Years 8-12

The significant R^2 values obtained for school subjects taken in the same year of testing are impressive but it is even more impressive to note the strength of the relationships with performance on school subjects taken up to five years after testing. These correlations and R^2 values are shown below in Table 7.

Table 7. Predictive validity of *PAT* scores for school performance in Years 8-12

Subject	N	Vocab	Comp	Maths	R^2
Yr 8 English	494	.732	.726	.675	.626
Yr 8 Maths	492	.595	.600	.807	.661
Yr 8 Science	494	.720	.695	.735	.648
Yr 8 History	492	.608	.597	.595	.448
Yr 8 Geography	468	.648	.621	.652	.516
Yr 8 French	513	.575	.558	.595	.419
Yr 8 Japanese	513	.482	.493	.574	.353
Yr 9 English	470	.720	.697	.634	.586
Yr 9 Maths (Advanced)	350	.383	.428	.684	.469
Yr 9 Maths (Ordinary)	111	.252	.208	.406	.177
Yr 9 Science	470	.607	.600	.666	.504
Yr 9 History	251	.537	.516	.528	.362
Yr 9 Geography	366	.509	.485	.519	.339
Yr 9 French	136	.449	.456	.579	.362
Yr 9 Graphic Design	140	.226	.299	.542	.300
Yr 9 Business Principles	327	.550	.496	.642	.457
Yr 9 Manual Arts	350	.383	.428	.684	.469
Yr 10 English	428	.728	.724	.656	.616
Yr 10 Maths (Advanced)	298	.405	.417	.668	.455
Yr 10 Maths (Ordinary)	126	.301	.305	.430	.207
Yr 10 Science	425	.654	.660	.739	.612
Yr 10 History	226	.587	.542	.537	.411
Yr 10 Geography	312	.465	.472	.491	.299
Yr 10 French	124	.425	.446	.599	.385
Yr 10 Graphic Design	130	.268	.379	.587	.353
Yr 10 Business Principles	300	.501	.496	.610	.403

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Subject	N	Vocab	Comp	Maths	R^2
Yr 10 Manual Arts	298	.405	.417	.668	.455
Yr 11 English	401	.602	.603	.573	.446
Yr 11 Maths A	157	.263	.236	.444	.202
Yr 11 Maths B	249	.283	.301	.572	.328
Yr 11 Maths C	51	.150	.180	.640	.418
Yr 11 Science (Physics)	117	.432	.458	.649	.423
Yr 11 Science (Biology)	173	.533	.492	.580	.393
Yr 11 Geography	145	.568	.574	.561	.427
Yr 11 Economics	112	.551	.508	.515	.355
Yr 12 English	294	.572	.556	.581	.412
Yr 12 Maths A	124	.275	.205	.353	.139
Yr 12 Maths B	167	.258	.212	.542	.312
Yr 12 Maths C	37	.185	.286	.581	.389
Yr 12 Science (Physics)	88	.474	.434	.652	.439
Yr 12 Science (Biology)	118	.599	.604	.673	.535
Yr 12 Geography	93	.447	.480	.582	.385
Yr 12 Economics	79	.551	.508	.515	.446

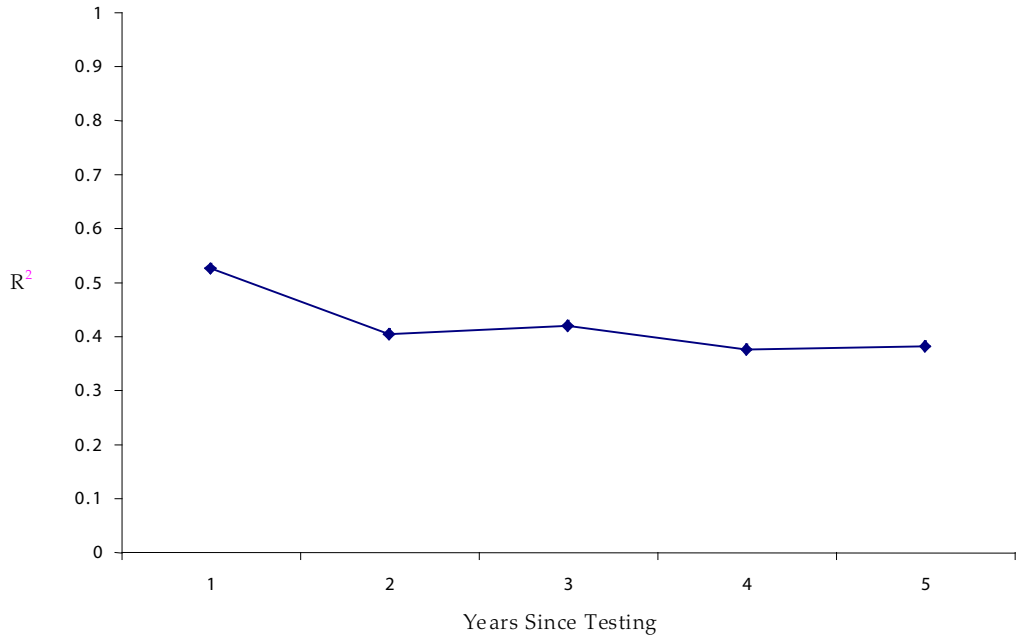
Table 7 shows that predictive validity of the *PAT* tests held up over the five years of schooling. Subjects like English, for example, started out with 63% of the variance being explained by a combination of the *PAT* scores in Year 8. At the end of Year 12, 41.2% of the variance in English grades could still be explained by *PAT* scores obtained five years earlier.

PAT Vocabulary and *Comprehension* had relatively lower correlations with Maths (Ordinary), Years 11 and 12 Maths C, and Graphic Design. However, they were highly correlated with other subjects that required a good understanding of material presented in text.

Consistent with information provided before, *PAT Maths* was highly correlated with all subjects across the year levels. The strength of the relationship between the *PAT* scores and performance in the various Maths subjects at later years is very impressive considering the restriction of range introduced by the division of students into Maths A (not difficult), Maths B (moderately difficult), and Maths C (very difficult).

Tracing the Decline in Predictive Validity from Year 8 to Year 12

Figure 1 traces the decline in the predictive validity of the *PAT* scores over the years by averaging the R^2 values for each year. While there is a decrease from Year 8 to Year 9, there was little decline from Year 9 onwards.



Conclusion

The *PAT* scales used in this study have all demonstrated impressive levels of predictive validity over a number of years. A battery of tests that can be administered by teachers in less than two hours in Year 8 can still predict up to 50% of the variance in performance in some school subjects completed five years after testing. However, other factors also contribute to the variance in performance, such as the students' ongoing educational and life experiences. It appears that after Year 8, these take on a more significant role.

Study 2
Predicting Core Skills at Year 12 from *PAT* scores in Grade 8

Study 1 showed that the *PAT* was capable of predicting a significant proportion of the variance in school subjects taken four to five years after the *PAT* testing sessions. Study 1 used a strong methodology with four independent cohorts returning almost identical data. The present study set out to extend these findings by including individual Core Skills results in Year 12 as a criterion variable.

The following information relating to the *Queensland Core Skills (QCS)* was downloaded from the website of the Queensland Studies Authority in August 2007 <http://www.qsa.qld.edu.au/testing/cross-curric/qcstest.html>.

The *QCS* test is claimed to be an achievement test covering 49 common curricular elements, rather than a measure of intelligence or aptitude. It is held over two consecutive days late in Term 3. Test results are used for scaling purposes to allow comparisons between subjects and between schools. The 49 common curriculum elements are as follows:

1. Recognising letters, words and other symbols
2. Finding material in an indexed collection
3. Recalling/remembering
4. Interpreting the meaning of words or other symbols
5. Interpreting the meaning of pictures/ illustrations
6. Interpreting the meaning of tables or diagrams or maps or graphs
7. Translating from one form to another
8. Using correct spelling, punctuation, grammar
9. Using vocabulary appropriate to a context
10. Summarising/condensing written text
11. Compiling lists/statistics
12. Recording/noting data
13. Compiling results in a tabular form
14. Graphing
15. Calculating with or without calculator
16. Estimating numerical magnitude
17. Approximating a numerical value
18. Substituting in formulae
19. Setting out/presenting/arranging/displaying
20. Structuring/organising extended written text
21. Structuring/organising a mathematical argument
22. Explaining to others
23. Expounding a viewpoint
24. Empathising
25. Comparing, contrasting
26. Classifying
27. Interrelating ideas/themes/issues

28. Reaching a conclusion which is necessarily true provided a given set of assumptions is true
29. Reaching a conclusion which is consistent with a given set of assumptions
30. Inserting an intermediate between members of a series
31. Extrapolating
32. Applying strategies to trial and test ideas and procedures
33. Applying a progression of steps to achieve the required answer
34. Generalising from information
35. Hypothesising
36. Criticising
37. Analysing
38. Synthesising
39. Judging/evaluating
40. Creating/composing/devising
41. Justifying
42. Perceiving patterns
43. Visualising
44. Identifying shapes in two and three dimensions
45. Searching and locating items/information
46. Observing systematically
47. Gesturing
48. Manipulating/operating/using equipment
49. Sketching/drawing

Source: <http://www.qsa.qld.edu.au/testing/cross-curric/cce.html>

Method

Participants

This project involved the same students in Study 1 using the same methodology described earlier.

Measures

Measures used in this study included the *PAT Comprehension*, *PAT Vocabulary* and *PAT Maths*; academic grades and scores on the *Queensland Core Skills (QCS)*.

Results

Table 8. Correlations, beta coefficients, and R^2 values for *PAT* scores and *QCS* (N = 400)

	PAT Test			
	Vocab	Comp	Maths	R^2
Correlation with *QCS* score	-.713	-.682	-.741	
Standardised regression coefficient	-.333	-.123	-.453	.657

The correlations on the first line of data in Table 8 are between *PAT* scores from Year 8 and the overall *QCS* score from Year 12. The breadth of the skills captured by the *QCS* has resulted in a situation where all three *PAT* components correlated about equally with the overall *QCS* score. As its name implies, the *QCS* is a measure of core skills rather

than a measure of achievement in actual school subjects. The *PAT* is also a measure of basic skills. It is therefore not surprising to see that the correlations between the *PAT* and the *QCS* were higher than those observed between the *PAT* and performance in school subjects in Year 12 (cf. Study 1).

The figures in the second line are the standardised regression (beta) coefficients reflecting the unique contribution of each of the predictor variables. The R^2 value indicates that the *PAT* results obtained in Year 8 were able to predict 66% of the variance in core skills at the end of Year 12 [F(3, 396) = 252.40]. By way of comparison, a total of 311 of these students had also completed the *Differential Aptitude Tests* (Verbal Reasoning, Numerical Reasoning, Abstract Reasoning, Language Usage) at the beginning of Year 10. The *DAT* tests were able to predict 63% of the variance in core skills.

Study 3
Predictive Validity of the *PAT* for Female Students

The first two studies were based on data collected from boys. Study 3 used a similar methodology to test the predictive validity of the *PAT* for girls.

Method

Subjects

In a supplementary educational testing program conducted by the University of Southern Queensland, the *Progressive Achievement Test (PAT)* in *Reading Vocabulary*, *Reading Comprehension* and *Mathematics* were administered to three cohorts of Year 8 girls from a private school in a regional Queensland city. Like the boys' school described in Study 1, the school also has a strong academic tradition and draws its students from a wide range of urban, rural, and remote locations. The average age of the girls was 12 years and 3 months. The first cohort (N = 106) was tested in the first week of the school year (February) in 1998. The second (N = 88) and third (N = 98) cohorts were tested in successive years at the same time of the year. A total of 292 girls were tested over three years.

Materials

The same three *PAT* scales – *Vocabulary*, *Comprehension*, and *Mathematics* – were administered by the same team of psychologists from the University of Southern Queensland. The grading system used by the school was the same as that used by the boys school with 15 grades ranging from Very Low Achievement (1) through to Very High Achievement (15).

Procedure

PAT tests were administered in the first week of the school year. School performance data were forwarded to the author at the end of the school year. Data were collected for Year 8 only.

Results

Table 9 shows the correlations among the *PAT* scales. The corresponding correlations for the boys' sample are shown in brackets. There were no differences between these correlations for boys and girls.

Table 9. Correlations among the *PAT* scores for girls

	Vocabulary	Comprehension	Mathematics
Vocabulary	1.00		
Comprehension	.81 (.82)	1.00	
Mathematics	.65 (.66)	.69 (.63)	1.00

Means and Standard Errors for Year 8 Grades by Cohort

Table 10 shows the correlations between the *PAT* scores and performance on the three main school subjects in Year 8. The sample size was not large enough to permit reporting of data for elective school subjects.

Table 10. Correlations Between *PAT* scores and subject grades at Year 8

		PAT Test		
Subject	**Cohort**	**Vocabulary**	**Comprehension**	**Mathematics**
Yr 8 English	1 (N = 106)	.623	.563	.625
	2 (N = 88)	.720	.702	.556
	3 (N = 98)	.693	.626	.606
	Σ (N = 292)	.672	.618	.592
Yr 8 Maths	1 (N = 106)	.646	.574	.792
	2 (N = 88)	.588	.547	.720
	3 (N = 98)	.557	.554	.728
	Σ (N = 292)	.578	.516	.719
Yr 8 Science	1 (N = 106)	.607	.651	.748
	2 (N = 88)	.599	.602	.593
	3 (N = 98)	.637	.591	.635
	Σ (N = 292)	.604	.598	.661

Standard regression analysis was then conducted to determine the proportion of variance in school performance that could be explained by *PAT* scores.

Table 11. Regression of school grades for Year 8 subjects on *PAT* scores

Subject		*PAT* Test Vocab	Comp	Maths	R^2
Yr 8 English	*b*	.40**	.14	.24**	
	sr	.22	.08	.18	.50
Yr 8 Maths	*b*	.22**	.00	.61**	
	sr	.12	.00	.44	.55
Yr 8 Science	*b*	.17*	.19*	.43**	
	sr	.09	.11	.32	.50

* $p < .05$; ** $p < .01$
b = standardised beta coefficient; *sr* = semi-partial correlation

It can be seen that the R^2 values were lower than those obtained for the sample of boys but still highly significant. Mathematics was once again a strong predictor, even for subjects that do not rely on numerical reasoning skills (e.g., English). The lower R^2 values could well be due to the more restricted variance in school grades for the sample of girls. The data (not reported here) show that their grades tended to be bunched towards the upper end of the grading distribution.

Overall Conclusion

The three *PAT* scales have high predictive validity for girls as well as boys and the predictive validity extends well beyond the year in which the *PAT* was administered. In an era when the educational curriculum has been extended to cover a wide range of skills, these data point to the continuing significance of students having a good vocabulary, being able to comprehend written text, and having good numeracy skills. The *PAT* results cannot tell us how far the students are likely to progress during their schooling but the data suggest that, on average, students who have acquired an advantage in these areas early in their schooling tend to maintain that advantage throughout their school years. That is, students who do well on the *PAT* battery tend to get better school grades. Conversely, students who do poorly on the *PAT* tend to end up with lower grades. It is therefore worthwhile identifying those students who have performed poorly on the *PAT* and implementing some form of intervention directed at skills improvement. That is one of the prime uses of the *PAT* in the two schools involved in these studies.

The large proportion of variance that remains unexplained – over 50% for most school subjects beyond Year 8 and increasing to 60% by Year 12 – points to the many other influences that come into play during later school years, including motivation, opportunities, and the quality of instruction. It is these other factors that will play the major role in determining a student's ultimate level of achievement.