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Introduction

This chapter describes the patterns of productive and unproductive student behaviour of students in Years 2-11. The analyses that follow draw principally on the results of the Student Behaviour Checklist which profiles the behaviour of students according to ten categories of productive and unproductive behaviour.

The issues of whether the behaviour of individual students is consistently productive or unproductive over a four-year period, and the impact of the students’ behaviour on their academic progress, will be addressed in later chapters.

SPSS data files were produced for each of the four cohorts comprising the students being tracked during the study. For students in Years 2 to 7, the primary school classroom teachers used the Student Behaviour Checklist to report on the students’ behaviour. For Years 8 to 11 the students’ English and mathematics teachers each reported the behaviour of students during their lessons.

Levels of unproductive behaviour from 2005 to 2008

Overall levels

Figure 5.1 below shows the percentage of each age cohort that was reported as exhibiting one or more of the ten categories of unproductive behaviour over the three-year period. First, it should be noted from these results aggregated across Years 2-11 that approximately 40 per cent of students behave unproductively in classrooms, according to their teachers. There are only slight fluctuations in this pattern across the four years of data collection.

Figure 5.1: Percentage of students showing unproductive behaviours across all cohorts, 2005-2008*

*In Years 8-11 the behaviours are those reported by English teachers

The slightly larger percentage of students showing unproductive behaviour during 2007 may be explained by the exit from the study at the end of 2006 of a large group of students who attended high schools not part of the Pipeline study. Those who left were shown, on average, to be higher performing and exhibiting more productive behaviour while in Year 7.

Primary students

The incidence of unproductive behaviour is generally constant during the primary years. Figure 5.2 depicts the percentage of students in each year level reported to behave unproductively on one or more categories of the Student Behaviour Questionnaire ranging from 35.7 per cent in Year 3 to 40.2 per cent in Year 5. There is no
evidence of a simple trend of increasing or decreasing levels of unproductive behaviour as the cohorts of students progress through primary school.

**Secondary students**

The picture grows more complex after the students make the transition to high school. During the early stage of their secondary education, there appears to be an initial decline in the extent of the unproductive behaviour, though there is a sharp escalation during Year 10. The incidence of reported unproductive behaviour in Year 10 is considerably higher than in any other year level. Nearly 57 per cent of students in English classes in Year 10 showed unproductive behaviour, nearly twice that reported in Year 8.

There were also notable differences after Year 8 between the levels of unproductive behaviour reported by English and mathematics teachers. As shown in Figure 5.3, the differences are greatest in Year 10 by a magnitude of nearly 13 per cent.

The substantial difference in levels of reported unproductive behaviour between the same students in English and mathematics classrooms after Year 8 is a noteworthy feature of Figure 5.3. This phenomenon will be considered in more detail in later chapters.
Frequency of specific categories of unproductive behaviour 2005-2008

Tables 5.1 and 5.2 that follow show the frequency with which each of the ten unproductive behaviours was reported by teachers. There are several key observations to be made about these results.

First, for each behaviour, the frequency with which it is reported is generally consistent from Years 2 to 7. In Years 8 to 10, there are differences from year to year and between English and mathematics classes, particularly in regard to inattentiveness, lack of motivation and unresponsiveness. However, generally, there is a common pattern between primary and secondary levels.

Second, there are relatively few students reported to be aggressive or non-compliant — on average between one and two students per class. These ‘externalising’ kinds of behaviours tend to dominate discussions of student behaviour management because in extreme cases, students who display these kinds of behaviour not only disrupt learning but may also put the wellbeing of teachers and students at risk. However, other forms of unproductive behaviour are much more common.

Third, the most frequently reported unproductive behaviour was inattentiveness. In the primary years, teachers were almost twice as likely to report a student as ‘inattentive’ than any other categories of unproductive behaviour. However, as students progress through school, teachers were increasingly inclined to categorise them as unmotivated, so much so that by Year 10 the level of inattentive and unmotivated behaviour were similar.

Table 5.1: Frequency of unproductive behaviour Years 2-7 as a percentage of the cohort

<table>
<thead>
<tr>
<th>Cohort</th>
<th>n</th>
<th>Aggressive</th>
<th>Non-Compliant</th>
<th>Disruptive</th>
<th>Inattentive</th>
<th>Erratic</th>
<th>Impulsive</th>
<th>Unmotivated</th>
<th>Unresponsive</th>
<th>Unprepared</th>
<th>Irregular Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 2</td>
<td>325</td>
<td>4.3</td>
<td>8.6</td>
<td>14.5</td>
<td>22.8</td>
<td>6.8</td>
<td>12.0</td>
<td>12.6</td>
<td>8.0</td>
<td>9.8</td>
<td>6.5</td>
</tr>
<tr>
<td>Year 3</td>
<td>325</td>
<td>4.9</td>
<td>5.8</td>
<td>13.5</td>
<td>19.1</td>
<td>8.0</td>
<td>9.8</td>
<td>10.8</td>
<td>8.0</td>
<td>9.2</td>
<td>4.6</td>
</tr>
<tr>
<td>Year 4</td>
<td>325</td>
<td>5.5</td>
<td>7.4</td>
<td>13.2</td>
<td>26.5</td>
<td>6.8</td>
<td>12.6</td>
<td>12.0</td>
<td>7.4</td>
<td>8.6</td>
<td>4.6</td>
</tr>
<tr>
<td>Year 5</td>
<td>373</td>
<td>4.8</td>
<td>6.2</td>
<td>13.7</td>
<td>24.9</td>
<td>8.8</td>
<td>13.4</td>
<td>11.5</td>
<td>7.2</td>
<td>11.5</td>
<td>6.7</td>
</tr>
<tr>
<td>Year 6</td>
<td>373</td>
<td>4.8</td>
<td>10.7</td>
<td>13.7</td>
<td>23.1</td>
<td>7.2</td>
<td>11.3</td>
<td>13.4</td>
<td>11.3</td>
<td>11.5</td>
<td>4.6</td>
</tr>
<tr>
<td>Year 7</td>
<td>360</td>
<td>6.4</td>
<td>9.2</td>
<td>13.6</td>
<td>19.4</td>
<td>9.4</td>
<td>10.5</td>
<td>13.6</td>
<td>8.1</td>
<td>8.6</td>
<td>6.1</td>
</tr>
</tbody>
</table>
Table 5.2: Frequency of unproductive behaviour in Years 8-11 reported by English and mathematics teachers as a percentage of the cohort

<table>
<thead>
<tr>
<th>Cohort</th>
<th>n</th>
<th>Aggressive</th>
<th>Non-compliant</th>
<th>Disruptive</th>
<th>Inattentive</th>
<th>Erratic</th>
<th>Impulsive</th>
<th>Unmotivated</th>
<th>Unresponsive</th>
<th>Unprepared</th>
<th>Irregular</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 8</td>
<td>English</td>
<td>236</td>
<td>1.3</td>
<td>3.0</td>
<td>10.6</td>
<td>16.1</td>
<td>6.4</td>
<td>10.2</td>
<td>12.3</td>
<td>4.2</td>
<td>8.9</td>
<td>6.4</td>
</tr>
<tr>
<td></td>
<td>Maths</td>
<td>228</td>
<td>0.4</td>
<td>0.9</td>
<td>11.4</td>
<td>16.7</td>
<td>8.3</td>
<td>7.9</td>
<td>8.3</td>
<td>4.4</td>
<td>15.4</td>
<td>6.1</td>
</tr>
<tr>
<td>Year 9</td>
<td>English</td>
<td>236</td>
<td>0.4</td>
<td>2.5</td>
<td>13.6</td>
<td>15.3</td>
<td>2.1</td>
<td>10.2</td>
<td>11.4</td>
<td>3.4</td>
<td>3.8</td>
<td>3.4</td>
</tr>
<tr>
<td></td>
<td>Maths</td>
<td>228</td>
<td>0.9</td>
<td>1.8</td>
<td>5.7</td>
<td>11.0</td>
<td>0.9</td>
<td>2.6</td>
<td>11.0</td>
<td>2.2</td>
<td>12.7</td>
<td>3.1</td>
</tr>
<tr>
<td>Year 10</td>
<td>English</td>
<td>236</td>
<td>2.5</td>
<td>6.8</td>
<td>14.4</td>
<td>30.1</td>
<td>8.9</td>
<td>8.9</td>
<td>28.8</td>
<td>15.7</td>
<td>18.6</td>
<td>5.9</td>
</tr>
<tr>
<td></td>
<td>Maths</td>
<td>228</td>
<td>2.6</td>
<td>9.2</td>
<td>17.1</td>
<td>26.3</td>
<td>6.1</td>
<td>7.9</td>
<td>22.4</td>
<td>9.6</td>
<td>6.1</td>
<td>7.5</td>
</tr>
<tr>
<td>Year 11</td>
<td>English</td>
<td>219</td>
<td>2.7</td>
<td>5.9</td>
<td>12.8</td>
<td>16.9</td>
<td>9.6</td>
<td>8.2</td>
<td>16.4</td>
<td>5.9</td>
<td>11.0</td>
<td>9.6</td>
</tr>
<tr>
<td></td>
<td>Maths</td>
<td>195</td>
<td>2.5</td>
<td>5.1</td>
<td>9.2</td>
<td>15.4</td>
<td>9.2</td>
<td>7.2</td>
<td>15.4</td>
<td>9.7</td>
<td>14.3</td>
<td>7.7</td>
</tr>
</tbody>
</table>

The percentage of students reported as unmotivated in Year 10 is more than double the proportion reported in Year 9. Further, the difference in the incidence of unproductive behaviour in English and mathematics classes has narrowed. The mathematics teachers, hitherto inclined to report much less unproductive behaviour in their classrooms, indicate there to have been a major escalation. By Year 11 the differences between the behaviour of students in English and mathematics classes were negligible.

The pattern of behaviours of students in Education Support Centres (ESCs) differed from that of students in primary and high schools. As shown in Figure 5.4, there was a higher overall incidence in ESCs. With regard to the individual categories, ESC students were much more likely to exhibit externalising behaviours. They were approximately five times more likely to show aggressive, non-compliant and disruptive behaviour than the other students. Among the ESC students, 21.7 per cent were reported to be aggressive, 41.3 per cent non-compliant and 37.0 per cent disruptive.

Students showing multiple categories of unproductive behaviour

In general, more than half the students behave productively and nearly one fifth display one or two categories of unproductive behaviour. It is very uncommon for a student to show more than five or six categories of behaviour and less than one per cent show all ten. The distribution (see Table 5.3) was consistent for each year of data collection. One minor exception was the dip in the 2007 numbers of students behaving productively - about 5 per cent fewer than for the other years.
Table 5.3: The frequency of students reported to be unproductive according to multiple categories of behaviour

<table>
<thead>
<tr>
<th>Year of data collection</th>
<th>Number of reported categories of un-productive behaviour</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2005</td>
</tr>
<tr>
<td>n=1134</td>
<td>n=1134</td>
</tr>
<tr>
<td>0</td>
<td>60.2</td>
</tr>
<tr>
<td>1</td>
<td>12.4</td>
</tr>
<tr>
<td>2</td>
<td>9.0</td>
</tr>
<tr>
<td>3</td>
<td>6.8</td>
</tr>
<tr>
<td>4</td>
<td>4.4</td>
</tr>
<tr>
<td>5</td>
<td>2.0</td>
</tr>
<tr>
<td>6</td>
<td>2.1</td>
</tr>
<tr>
<td>7</td>
<td>1.2</td>
</tr>
<tr>
<td>8</td>
<td>1.0</td>
</tr>
<tr>
<td>9</td>
<td>0.4</td>
</tr>
<tr>
<td>10</td>
<td>0.4</td>
</tr>
</tbody>
</table>

Of the 2007 cohort, only 42.7 per cent of the Year 10 cohort did not exhibit an unproductive behaviour compared with 61.4 per cent of the Year 4s. The spike in unproductive behaviour in Year 10 was the main contributor to the lower percentage of students reported to be behaving productively in 2007.

Clusters of behaviours

Cluster analysis

The next question to be addressed is whether the full cohort of students can be divided into groups that are defined by particular sets of behaviours. This is an important question. If the population of students can be subdivided into subgroups, each sharing common classroom behaviour patterns, then it may be possible to provide teachers with support by establishing classroom behaviour management policies that differentiate among the subgroups. Interventions could be developed that specifically target one or another according to the exhibited behaviours.

It should be kept in mind that the behaviours most commonly exhibited might not be those most useful for defining group membership. To take the extreme case, if every student exhibited a particular behaviour it would be of no value for grouping the students, even though the form of behaviour might be very significant for other reasons.

Cluster analysis is a method for sorting cases into groups. The technique looks for patterns among the cases such that each case had more characteristics in common with other members of the group than with members of other groups. The particular method used below is known as two-step cluster analysis and suits categorical data and large data sets.

Cluster analyses were conducted for all students who exhibited an unproductive behaviour in 2005, 2006, 2007 and 2008. Students who did not display any unproductive behaviour were excluded from the analyses. Each cohort of students reported to be behaving unproductively was subjected to a separate cluster analysis.

Results of the cluster analyses

The cluster analyses of the 2005-2008 cohort databases yielded similar three-cluster solutions for each year. Though the profile of each cluster changed slightly over the four-year period, the differences from year to year were minor. The occurrence of minor differences is to be expected as the students matured over the four-year term of the Pipeline study and during each year were subject to new educational experiences. The size of each cluster group is shown in Table 5.4.

Table 5.4: Cluster membership for students showing one or more unproductive behaviours, 2005-2008

<table>
<thead>
<tr>
<th>Year</th>
<th>Total number of cases</th>
<th>Cluster 1</th>
<th>Cluster 2</th>
<th>Cluster 3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>% of total</td>
<td>n</td>
<td>% of total</td>
</tr>
<tr>
<td>2005</td>
<td>472</td>
<td>215</td>
<td>45.6</td>
<td>178</td>
</tr>
<tr>
<td>2006</td>
<td>549</td>
<td>255</td>
<td>46.4</td>
<td>177</td>
</tr>
<tr>
<td>2007</td>
<td>616</td>
<td>322</td>
<td>52.3</td>
<td>187</td>
</tr>
<tr>
<td>2008</td>
<td>493</td>
<td>217</td>
<td>44.0</td>
<td>160</td>
</tr>
</tbody>
</table>

There are two questions that arise from Table 5.4: first, what are the defining behaviours for each group? Second, to what extent do the groupings apply over the four-year period?

To address the first question, SPSS Two-Step Cluster analysis produces contingency tables for each variable that show
the distribution of responses for the cluster compared with the distribution for the group as a whole. A variable may contribute to the group definition if disproportionately high or low numbers of students in the particular cluster exhibit the behaviour compared to the other two clusters.

For example, consider aggressive behaviour. In 2005, no student among the 215 students in Cluster 1 was reported to show aggressive behaviour yet 62.4 per cent of students in Cluster 3 were reported to be aggressive. Clearly aggressive behaviour differentiates Clusters 1 and 3.

Consider as a second example unmotivated and unresponsive behaviours. No student in Cluster 2 was reported to be unmotivated or unresponsive whereas 68.2 per cent of students in Cluster 1 were reported to be unmotivated and 71.1 per cent were reported to be unresponsive. These behaviours differentiate Clusters 1 and 2.

In general terms the three clusters can be characterised as follows.

The largest cluster of students, about half of those reported to show an unproductive behaviour, includes those who in various ways do not engage with their schoolwork. Typically the students in this cluster are easily distracted, appear to make very little effort to get things right, give up quickly on demanding tasks, come to class unprepared and tend not to participate in class activities. It should be noted that members of this group were seldom aggressive, non-compliant or disruptive. Generally, they did not challenge the teacher or the classroom order. This cluster can aptly be referred to as the Disengaged Behaviour Group.

Cluster 3 had the fewest members, containing about 20 per cent of all students reported to be unproductive. It is almost the obverse of Cluster 1. Members of this group were most likely to be students who are assertive and uncooperative: for example, they lose their temper and are abusive towards the teacher or other students, refuse to follow class rules, are argumentative and provoke other students. However, in common with the members of Cluster 1, though to a lesser extent, they were also likely to be inattentive and unmotivated, as well as erratic and impulsive. For the purposes of the study this group has been named the Uncooperative Behaviour Group.

Members of Cluster 2, between a third and a quarter of the unproductive students, were typically disruptive by seeking attention, interrupting the flow of a lesson, annoying other students and calling out in class. However, unlike the members of Cluster 1, they were not typically reported by their teachers to be disengaged. They differ from Cluster 3 in that they were seldom reported to be aggressive towards other students or resistant to the teacher’s authority. The most appropriate way of describing this group is to refer to it as the Low-level Disruptive Behaviour Group.

Other cluster group characteristics

By cross-tabulating the cluster membership with other variables of interest it is possible to obtain a deeper understanding of the behaviour of students within each of the three cluster groups. One such variable is the number of unproductive behaviours reported by teachers as characterising the classroom behaviour of students. Table 5.5 shows the percentage of students in each cluster in 2006 that show only one category of unproductive behaviour, between 2 and 3, between 4 and 6, and between 7 and 10 categories.

There is a recognisable pattern. The students in Cluster 3, the Uncooperative Behaviour Group, were much more likely than students in the other clusters to behave unproductively across a wide range of categories. On the other hand, the unproductive behaviour of the majority of students in Clusters 1 and 2 were mainly restricted to an upper limit of three categories of unproductive behaviour.

Table 5.5: Number of reported behaviours by cluster, 2006 students

<table>
<thead>
<tr>
<th>Number of reported behaviours</th>
<th>Cluster 1 Disengaged</th>
<th>Cluster 2 Low-level Disruptive</th>
<th>Cluster 3 Uncooperative</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>44.7</td>
<td>33.9</td>
<td>0</td>
</tr>
<tr>
<td>2-3</td>
<td>44.3</td>
<td>55.4</td>
<td>0</td>
</tr>
<tr>
<td>4-6</td>
<td>11.0</td>
<td>10.7</td>
<td>65.0</td>
</tr>
<tr>
<td>7-10</td>
<td>0</td>
<td>0</td>
<td>35.0</td>
</tr>
</tbody>
</table>

Later in 2006, teachers were asked to judge whether the unproductive behaviours reported earlier in the year were having an impact on the students’ academic progress. There were significant differences among the clusters in regard to the severity of the impact (see Table 5.6).
Cluster 2, the Low-level Disruptive Behaviour Group, defined mainly by the incidence of disruptive and inattentive behaviours, contained only 10.7 per cent of students who teachers consider to be behaving in ways that have a severe impact. Students in the Uncooperative Behaviour Group were three times more likely to be behaving unproductively in ways that have a serious consequence for their learning.

Table 5.6: Reported impact of unproductive behaviour by cluster, 2006 students

<table>
<thead>
<tr>
<th>Impact on academic performance</th>
<th>Cluster 1 Disengaged</th>
<th>Cluster 2 Low-level Disruptive</th>
<th>Cluster 3 Uncooperative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe</td>
<td>18.4</td>
<td>10.5</td>
<td>31.1</td>
</tr>
<tr>
<td>Considerable</td>
<td>52.9</td>
<td>50.4</td>
<td>53.8</td>
</tr>
<tr>
<td>Very little</td>
<td>28.7</td>
<td>39.1</td>
<td>15.1</td>
</tr>
</tbody>
</table>

The three clusters of students described above will form the basis of a number of analyses to be reported in later chapters that explore the relationship between unproductive behaviour and academic performance. The disengaged, the low-level disruptive and the uncooperative behaviour groups will be compared with a fourth group, the students who behave productively.

**Conclusion**

In any year about 40 per cent of students across all year levels display at least one form of unproductive behaviour.

The picture is consistent across the primary school years from Year 2 to 7. There is no marked difference between junior primary and middle and upper primary students. The fact that the incidence is as high in Year 2 as in Year 7 is noteworthy since, according to the myth, all students begin school as endearing, curious young people who only later in their school life are turned off schooling by uninspiring experiences in the classroom.

The situation in secondary schools is more complex. In the secondary years there are marked differences between mathematics and English classes and across year levels. Initially, in Year 8 and 9, teachers report less unproductive behaviour than in Year 7. However, the incidence rises sharply in Year 10 before declining in Year 11. In Year 10 the level of unproductive behaviour is considerably higher than any other year level in either primary or secondary schooling.

There is a noteworthy difference in the levels of unproductive behaviour of students in English and mathematics classes. Mathematics teachers reported fewer students behaving unproductively than English teachers.

The high level of unproductive behaviour in Year 10 is due to sharp increases in the level of behaviour usually associated with academic disengagement: inattentiveness, lack of motivation, unresponsiveness and lack of preparation.

The level of unproductive behaviour in Education Support Centres is more than twice the level for primary or high schools.

It is possible to divide the total Pipeline group of students into four groups according to their behaviour patterns. The dominant group is composed of students who do not exhibit unproductive behaviours.

Of the students whose behaviour is unproductive, the largest group consists of those who do not engage with their schoolwork yet are seldom aggressive, non-compliant or disruptive. In 2006 there were approximately three times as many of these disengaged students as the students who are commonly reported to be ‘difficult’ or ‘challenging’ because they are aggressive or oppositional towards their teacher or their peers.

This latter group contains the students for whom most of the behaviour management resources are targeted. Much less attention is focused on the students who seldom ‘cause trouble’ but who lack motivation, interest in schoolwork, responsiveness and so on. Solving the problem of student disengagement is seen as the responsibility of the classroom teacher.

There is a third identifiable group. Its members are often also characterised by their disruptive behaviour and inattentiveness. However, they generally accept the authority of the teacher and engage with their schoolwork.
6. Classroom behaviour and academic performance

Introduction

This chapter examines the relationship between the classroom behaviour of students and their academic performance in reading and numeracy. The descriptors of student behaviour are taken from the Student Behaviour Checklist and the follow-up surveys of the teachers' judgments on the severity of the students' unproductive behaviours. Academic performance is measured by standardised tests of literacy and numeracy as well as their teachers' global assessments of their performance.

Student behaviour has been classified in two ways in the analyses that follow. First, each of the four student year level cohorts has been divided up into groups according to teachers' judgments of the severity of the impact of the students' behaviour on their academic progress and, second, according to the clusters of behaviours described in Chapter 5.

The analyses that follow are cross-sectional, linking the behaviour of students during 2006 with their performance on the 2006 WALNA Literacy and Numeracy assessments for that year. These analyses are repeated for the 2008 student behaviour data and the students' NAPLAN assessments of 2008. The consistency of the students' behaviour and their academic progress over the four-year span of the Pipeline Project will be discussed in Chapter 7.

The overall performance of Pipeline students on WALNA and NAPLAN

The students participating in the Pipeline study are not a random sample of government school students. Hence, there are likely to be some differences between the Pipeline statistics and the population parameters. Figure 6.1 compares the Pipeline sample with the population on the reading and numeracy assessments.

Figure 6.1: Mean scores for the 2006 WALNA population and the Pipeline sample

Figure 6.1 shows that at each point of comparison, the Pipeline students scored marginally lower.

For the 2006 WALNA Year 5 assessments 14.2 per cent of students performed below the numeracy benchmark and 7.9 were below the reading benchmark. For the
Pipeline sample 14.9 and 8.7 per cent had fallen below the numeracy and reading benchmarks, a slightly higher percentage. This is not a surprising result given that the Pipeline schools on average have a lower Socio-economic Index (SEI) than the State average.

**Teachers’ judgments of student performance**

Each year teachers rated the performance of students in literacy and numeracy on a three-point scale: below the benchmark, slightly above the benchmark and well above the benchmark. The purpose was to provide a second indicator of academic performance in addition to the test results. It was expected that there would be a high level of correspondence between the test results and the judgments of performance made by the students’ classroom teachers.

The pattern of results is generally consistent for reading and numeracy performance. The results for the Year 5 cohort in 2006, and again when the students had reached Year 6 in 2007, are shown in Figure 6.2. It is noteworthy that nearly twice as many students are judged by teachers to be performing below the benchmark than identified by the Year 5 WALNA tests. The difference between the test results and the teachers’ judgments is considerably greater for reading than numeracy, suggesting that either the reading benchmark is set too low or that teachers have been particularly tough-minded when making judgments about the students’ reading performance. The results might also be interpreted to suggest that teachers had lower performance expectations for numeracy than reading.

No student who was considered by teachers to be performing well above the benchmark actually performed below the benchmark on the WALNA numeracy test. However, a small percentage of students who scored below the benchmark on the WALNA assessment were considered by teachers to be performing slightly above the benchmark.

More than two-thirds of the students who scored below the benchmark on WALNA were also judged by teachers to be performing below the benchmark by their teachers, the remainder being considered by teachers to be performing slightly above the benchmark.

The patterns of results for numeracy and reading are similar. Nearly all the students who were identified on WALNA as performing below the benchmark on reading were also independently judged by teachers to be performing below the benchmark.

While it would be surprising if there were a perfect correspondence between the two forms of assessment because of misclassifications arising from measurement error and teacher misjudgement, nevertheless, teachers appear to be applying a more conservative standard than the experts who set the WALNA benchmark standard.
Severely unproductive student behaviour and academic performance

Descriptions of student behaviour were acquired on two occasions each year. On the first occasion teachers were asked to report whether the student exhibited any of the ten categories of unproductive behaviour. As it was relatively early in the school year, teachers were not asked to judge the impact of the behaviour on the student’s progress.

Later in the year, if students were continuing to behave unproductively, teachers were asked to make a global judgment of the impact of the behaviour. The behaviour of students was rated according to the extent that it restricted their academic progress. Teachers were then asked in relation to these students, to what extent their unproductive behaviour had contributed to their academic under-performance on a four-point scale: none, very little, considerable, severe.

It should be noted that teachers were rating the impact of the behaviour on learning rather than the frequency of its occurrence. A moderate correlation between the number of reported behaviours and the later rating of the severity of the impact of the student’s behaviour ($r = 0.48$) was revealed: the more unproductive behaviours reported, the more a student was likely to be reported to be behaving in ways that had a severe impact on their learning.

Figure 6.3 shows for each year level cohort the reading performance of the students according to their behaviour classification. The line graphs generally show a consistent gradient between behaviour categories for the Years 3, 5 and 7 cohorts: but student performance deteriorates according to the teachers’ judgments of the severity of the impact.

For secondary students the judgments of the students’ behaviour made by English teachers were reported. The intervals in reading assessment scores between cohorts for the four categories of behavioural impact were slightly uneven, particularly for the 7 and 9 cohorts. For the students who were behaving productively in Years 7 and 9, the gap was much narrower than between Years 5 and 7. Further, for the students whose behaviour was judged to be having a severe impact on learning, there was only a slight difference between the Year 7 and 9 levels.

The numeracy results show a consistent relationship between the students’ WALNA performance and teachers’ judgments of the severity of their behaviour. However, Figure 6.4 illustrates the difference between Years 7 and 9 students to be even smaller for numeracy, than for reading (see Figure 6.3). It is possible that because of the small numbers of cases in the severe impact category the results may be unstable; only 5 per cent of all cases were classified as ‘severe’.

Figure 6.3: Teachers’ judgements of behavioural impact on learning compared with 2006 WALNA reading performance

![Figure 6.3](image_url)

Figure 6.4: Teachers’ judgements of behavioural impact on learning compared with 2006 WALNA numeracy performance

![Figure 6.4](image_url)
The 2008 NAPLAN results for Years 5, 7 and 9 were analysed according to the teachers' judgements of the impact of the behaviour on the students' learning. The 2005 Year 8 cohort had by 2008 progressed to Year 11 and did not sit the NAPLAN tests. Hence, there are only three trend lines in the Figures 6.5 and 6.6 that follow.

Overall, the WALNA and NAPLAN analyses yielded a similar picture. The NAPLAN results for reading are shown in Figure 6.5. In Years 5 and 7, the results show a consistent trend: the more severe the teacher-reported impact of the unproductive behaviour, the lower the reading score. The difference between the productive behaviour and the severely unproductive behaviour groups is approximately 100 NAPLAN points. While the Year 9 students who behaved productively clearly out-performed the unproductively behaved groups of students, the margin of differences is smaller than for Year 5 and Year 7.

Figure 6.5: Teachers' judgements of behavioural impact on learning compared with 2008 NAPLAN numeracy performance

A second noteworthy observation to be made about the numeracy results is that the magnitude of the differences in the level of performance between the productively behaved and the unproductively behaved students, especially in Year 9, is considerably smaller than for reading.

The main conclusion to be drawn from Figures 6.3 to 6.6 is that for reading and numeracy there is a general, downward association between the severity of the unproductive behaviour reported by teachers and the actual performance of the students on state and national tests. The more severe the impact of the students' unproductive behaviour, in the judgment of their teachers, the lower the performance of students on measures of academic performance.

Teacher judgments of academic performance and student classroom behaviour

In Chapter 5, cluster analyses revealed that the student cohorts can be divided into four relatively distinct groups according to their behaviour. The largest group was composed of students who regularly met teachers' expectations of appropriate, productive behaviour.

The next largest group comprised students who were disengaged from schoolwork but did not challenge
the teacher. The third group consisted of students who were nuisances in class, distracting the teacher and fellow students while they went about their work. The final group, the smallest, was made up of students who displayed uncooperative behaviours, for example, refusing to follow directions, losing their tempers and provoking other students.

Of the students who exhibited uncooperative behaviours, two thirds were considered by teachers to be underperforming academically. Approximately an eighth of the students who were behaving productively were reported to be under-performing. The reasons for their under-performance were not reported. The most obvious explanation is that factors other than classroom behaviour contributed to their underperformance. It is also likely that in some cases they may have been misclassified and, in others, their behaviour could have deteriorated during the year, prior to the second data collection point.

When teachers rated the academic performance of the students in relation to benchmark standards of performance in literacy and numeracy, the results followed a similar pattern. The breakdown for literacy is shown in Figure 6.7.

Figure 6.7: Percentage of students in each cluster group judged by teachers to be performing below the Literacy benchmark, 2006.

In summary, so far the relationship between student behaviour and academic performance has yielded consistent patterns of results. Students judged by teachers to behave unproductively perform less well than those who behave productively. WALNA test results and teachers' global judgments of performance yield consistent results. In the final sets of analyses, the performance of students in the four cluster groups will be compared against the 2006 WALNA results and the 2008 NAPLAN results.

2006 WALNA performance in literacy and numeracy and student classroom behaviour

In 2006, the students participating in the Pipeline study were in Years 3, 5, 7 and 9 and sat for the WALNA tests. It is therefore possible to compare the performances of the four cluster groups described in Chapter 5 – the productive, disengaged, low-level disruptive and uncooperative behaviour groups – on the reading and numeracy assessments.

The Year 3, 5 and 7 groupings are the same for the reading and numeracy analyses since in primary schools students are usually taught reading and numeracy by their classroom teacher and only a single measure of student behaviour was collected. In high schools, most students have separate English and mathematics teachers, and students are more likely to vary their behaviour depending on the subject being taught to them. Therefore, independent measures of the students' behaviour were collected from their English and mathematics teachers. Hence, separate cluster analyses were employed to form the groupings for secondary English and mathematics. Thus students may be included in different groups depending on whether reading or numeracy is being analysed.

It is clear from Figure 6.8 that for WALNA Reading, the students reported to behave productively tended to outperform other students in each of the three unproductive behaviour groups. The lowest performing group was composed of the students in the uncooperative behaviour group, although the students who formed the disengaged behaviour group performed only slightly better.
To test the significance of the differences in mean performances for each cluster group in each year level cohort, a one-way ANOVA was applied. In all cases, the analyses yielded F ratios that were significant at P< .05. To test the significance of the differences in the means of each pair of cluster groups, Scheffe’s test was applied. Most, though not all differences, were significant.

In the case of WALNA Reading results, tests for the statistical significance of the difference between each pair of cluster group means showed the difference between the productive group and each of the unproductive groups to be significant at P<.05 in Years 3 and 5. In Year 7 Reading the difference between the productive behaviour group and the low level disruptive behaviour group was not statistically significant. The mean differences in Reading between the pairs of unproductive groups were not statistically significant.

The analysis of the WALNA Numeracy results (see in Figure 6.9) yielded a similar pattern to the Reading results shown in Figure 6.8. ANOVA and multiple comparisons of mean differences showed that the difference between the group of students behaving productively and each of the three other groups was statistically significant (F=25.2, P<.01).

Although the group characterised by low level disruptive behaviour again outperformed the disengaged and uncooperative behaviour groups, the differences in mean performance were not statistically significant. It would therefore be unwise to differentiate the three unproductive behaviour cluster groups concerning their performances in reading and numeracy, even though consistently small differences were observed. These may be due to errors of classification or WALNA measurement error.

The relationships between the students’ cluster group membership and their academic performance was examined using the 2004 WALNA assessment data and the 2005 student behaviour checklist data. Although the two sets of variables are separated by approximately nine months, one would expect the relationships to resemble those a year later. The number of cases was smaller because there were no WALNA results for the Year 2 students in the 2005 cohort. The 2004 WALNA assessments show a nearly identical pattern to the 2006 results.

**Differences in 2008 NAPLAN performance among the cluster groups**

The analyses described above were replicated using the 2008 NAPLAN test results and the cluster groups formed on the basis of the 2008 student behaviour data. Students in Years 5, 7 and 9 in the Pipeline Project sat for the NAPLAN tests as part of the State-wide administration of the tests. These same students had sat for the WALNA tests in 2006.
Overall, the 2008 NAPLAN assessments showed a similar pattern to the 2006 WALNA assessments. The productive behaviour group consistently out-performed the unproductive behaviour groups. Of the three unproductive behaviour groups, the low level disruptive group tended to out-perform the other two groups. The uncooperative behaviour group performed at a lower level in reading than the disengaged behaviour group, although this was not always the case for numeracy. The performances for the four behaviour groups in reading and numeracy are graphed in Figures 6.10 and 6.11.

In NAPLAN numeracy, the pattern approximates the 2006 WALNA results, where the low level disruptive group tended to perform at a higher level perform than both the disengaged and the uncooperative behaviour groups. For reading, the Year 9 results show the low level disruptive group performing below the disengaged group.

It is evident that there has been a relatively even level of performance in each of the four behaviour groups in the Year 9 reading and numeracy tests shown in Figures 6.10 and 6.11. This parallels the results for the 2006 WALNA assessment of reading. This was not so for numeracy, where in 2006, the results of the uncooperative group plummeted.

The scale of the differences

With large sample sizes, a small mean difference may be shown to have statistical significance but have little practical significance. Hence, the question arises whether the differences among the cluster groups are of a sufficient scale to warrant serious consideration.

One way to answer this question is to compare the differences against the expected growth in performance for the year level cohort as a whole.
Figure 6.12: Differences between the mean WALNA results for year levels for the State population and the Pipeline sample, 2006

Figure 6.12 shows the mean differences between year levels for the WALNA population and the Pipeline sample. For example, it shows that the difference between the mean Year 3 performance and the mean Year 5 performance in reading for the population as a whole is approximately 70 points; for the Pipeline sample, the corresponding difference is nearly 65 points. Overall, a high level of correspondence exists between the two sets of results.

It should be noted firstly that the differences are on the same scale, and secondly, that the differences reflect two years' growth in academic performance – approximately 70 WAMSE points for the primary year level cohorts and 40 and 60 points for secondary reading and numeracy respectively. The differences between the Year 7 and Year 9 cohorts were smaller, particularly in reading. These figures provide an approximate scale for judging the importance of the differences between the four behaviour groups.

Table 6.2 records the differences between the WALNA means for the productive behaviour group and each of the three unproductive behaviour groups for the three primary cohorts. For example, the difference between the mean Year 3 WALNA result for the productive behaviour group and the disengaged behaviour group was 46.7 points. This difference was statistically significant with a probability of less than one in a hundred that it was a chance result. Further, reference to Figure 6.12 indicates that the difference between the two groups represents well over a year's growth in reading.

These differences between the means for each pair of behaviour groups, shown in Figure 6.2, correspond with the graphs of mean reading and numeracy performance shown in Figures 6.8 and 6.9. For reading, the students who form the uncooperative behaviour group have the largest difference when compared with the productive behaviour group, equivalent to approximately two years of academic growth in literacy. For the disengaged group, the difference is considerably more than a year. For numeracy, the differences between the disengaged and uncooperative groups are minor. In general terms, the disengaged group performs as nearly as poorly as the uncooperative behaviour group and in some years, the performance of both groups lag nearly two years behind the group of students who behave productively.

The 2008 NAPLAN results for Years 5, 7 and 9 shown in Table 6.3 follow a similar pattern though the mean differences for the uncooperative behaviour group are considerably lower than the productive behaviour group. These differences correspond with the graphs shown in Figures 6.10 and 6.11.

Table 6.2: WALNA differences between productive and unproductive behaviour group means, Years 3, 5, 7 & 9, Reading and Numeracy, 2006

<table>
<thead>
<tr>
<th>Year level</th>
<th>Reading</th>
<th>Numeracy</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Disengaged</td>
<td>Low-level disruptive</td>
</tr>
<tr>
<td>Year 3</td>
<td>46.7**</td>
<td>32.6*</td>
</tr>
<tr>
<td>Year 5</td>
<td>46.0**</td>
<td>33.7**</td>
</tr>
<tr>
<td>Year 7</td>
<td>47.5**</td>
<td>34.7*</td>
</tr>
<tr>
<td>Year 9</td>
<td>36.0ns</td>
<td>28.6ns</td>
</tr>
</tbody>
</table>

** Sig. p<.01, * Sig. p<.05, ns = not statistically significant.
Table 6.3: NAPLAN differences between productive and unproductive behaviour group means, Years 5, 7 & 9 Reading and Numeracy, 2008

<table>
<thead>
<tr>
<th>Year level</th>
<th>Reading</th>
<th></th>
<th></th>
<th>Numeracy</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Disengaged</td>
<td>Low level disruptive</td>
<td>Uncooperative</td>
<td>Disengaged</td>
<td>Low level disruptive</td>
<td>Uncooperative</td>
</tr>
<tr>
<td>Year 5</td>
<td>43.8**</td>
<td>35.9*</td>
<td>74.2**</td>
<td>58.9**</td>
<td>27.8**</td>
<td>57.2**</td>
</tr>
<tr>
<td>Year 7</td>
<td>48.9**</td>
<td>31.2*</td>
<td>77.6**</td>
<td>41.2**</td>
<td>12.9ns</td>
<td>86.2**</td>
</tr>
<tr>
<td>Year 9</td>
<td>36.6**</td>
<td>37.9**</td>
<td>35.8ns</td>
<td>36.7ns</td>
<td>6.1ns</td>
<td>33.6ns</td>
</tr>
</tbody>
</table>

** Sig. p<.01, * Sig. p<.05, ns = not statistically significant.

The standard deviation for each year level cohort on NAPLAN Reading and Numeracy ranges between 60 and 70 points. The ‘growth’ in performance on the NAPLAN tests between Year 5 and Year 7 amounts to about 40 points. For the uncooperative behaviour group their mean performance was about two standard deviations lower than the mean performance of the productively behaved group. This is a massive difference. Although the disengaged group was not as retarded according to the NAPLAN tests, even so, they had fallen behind the students in the productive behaviour group by the equivalent of slightly more than two years’ education.

In regard to the interpretation of these results, two caveats are important. First, student behaviour is not the only determinant of academic performance: it is possible other factors have contributed to the differences among the groups. Second, as discussed in Chapter 2, the causal relationship between behaviour and performance is most likely recursive. In other words, successful (or unsuccessful) performance may shape students’ behaviour rather than the other way round: academic failure might prompt unproductive behaviour. This issue is considered further in Chapter 11.

Conclusion

Chapter 5 showed that about 60 per cent of students typically behave in ways that are conducive to success. Of those who behave unproductively, the largest group is composed of students who do not consistently engage with their schoolwork. These students are seldom aggressive, non-compliant or disruptive. In 2006 there were about three times as many of these disengaged students as those who are commonly reported to be ‘difficult’ or ‘challenging’ because of being oppositional or defiant towards their teacher or their peers.

The analyses in this chapter confirm that students who behave productively reap the benefit with better results in reading and numeracy on average. This was found to be the case for both the WALN A and NAPLAN assessments and for the teachers’ global judgments of student academic performance.

In general, students whom teachers considered to be behaving in ways having a serious impact on their learning performed less well on the measures of academic performance than other students behaving unproductively, and much less so than students behaving productively. This is a predictable finding. However, there were exceptions to this general conclusion; some students whose behaviour was highly unproductive still managed to perform well above the benchmark. Cases of such students will be examined in Chapter 9.

The magnitude of the differences in academic performance among the behaviour groups is educationally significant. Setting aside the difficult question of whether the students’ behaviour explains their academic performance or whether their performance has shaped their behaviour, students whose behaviour is unproductive perform on average at a standard between one and two year levels below their counterparts who behave productively.

Concerning the differences among the three unproductive behaviour groups, students who were members of the uncooperative behaviour group generally performed at lower levels than students in the other unproductive behaviour groups. The differences were considerably more marked on the 2008 NAPLAN test results than on the 2006 WALN A results. However, for some of the year level comparisons, the differences among the three unproductive behaviour groups were not always statistically significant, partly due to the small numbers of students who composed the group.
Therefore, when the impact of classroom behaviour on academic performance is considered, even though the trends suggest that students who form the uncooperative behaviour group have lost the most ground, generalisations concerning differences in reading and numeracy performance among the three unproductive behaviour groups must be considered cautiously. There is only a small difference in the educational outcomes of students who are compliant though disengaged, and those students who are uncooperative and non-compliant.

This uncooperative behaviour group comprises students for whom most of the behaviour management resources are targeted. Much less attention is focused on students who seldom 'cause trouble' but who lack motivation and show little interest in schoolwork. Solving the problem of student disengagement is seen as the responsibility of the classroom teacher. This finding raises the important question of whether sufficient support is being directed toward the group of disengaged students whose behaviour is holding them back.

The analyses revealed a more complex picture of behaviour and learning in the secondary years than in the primary years. In Chapter 5 it was evident that behaviour of the same students reported by mathematics teachers differed sharply from that reported by English teachers. It is not clear whether students behaved differently depending on the subject being taught, or whether mathematics and English teachers applied different standards. The analyses in this chapter revealed a somewhat anomalous set of results for the Year 9 NAPLAN tests where the relationship between behaviour and academic performance appeared weaker for numeracy than for reading. Without access to technical information pertaining to the psychometric properties of the NAPLAN tests, held in confidence by MCEETYA, it is not possible to determine whether the Year 9 results are a technical aberration or indicative of genuine differences in how students respond to English and mathematics instruction.
Introduction
The aim of this chapter is to describe the extent to which students whose behaviour was described as unproductive in 2005 behaved unproductively over the next three years.

The chapter will also describe the academic trajectories of students over the four-year period, estimating the extent to which a student’s performance in 2004 was a good predictor of how the student would perform in 2008. The chapter will describe the extent to which the academic and behaviour trajectories indicate a smooth progression or decline, or whether there is a mix of peaks, dips and plateaus.

Finally, the chapter will explore the relationship between the behavioural and academic trajectories of the students, with a view to determining the correspondence between the two.

The analyses reported in this chapter draw upon the records of the 1357 students who formed the original year level cohorts in 2005 and continued throughout the four years of the project.

The consistency of student behaviour
Changes during the school year
So far in the analyses of behaviour and performance, it has been assumed that classroom behaviour patterns are generally stable during the school year. This assumption appears to be unfounded.

Towards the end of each year teachers were asked to review the behaviour of students whose behaviour they had described earlier in the year. In particular, they were asked with respect to each student whether their behaviour had improved, deteriorated or stayed the same. The responses of teachers collected during the 2007 school year were analysed and the results are shown below.

With regard to primary (or secondary English) classrooms, across Years 4, 6, 8 and 10, the behaviour of 27.2 per cent of all students was considered by their teachers to have improved during the year, and 7.7 per cent to have worsened, a ratio of nearly 4 to 1. Of the students who were reported to have shown an unproductive behaviour earlier in the year, slightly more than half (51.8 per cent) were reported later to have improved. This result runs counter to a stereotypical view that classroom norms of good behaviour gradually unwind as the year wears on. It would seem to the contrary that over time the norms of acceptable behaviour are more widely observed.

The results for each year level cohort are shown in Tables 7.1 and 7.2. Table 7.1 shows the 2007 results for students in Years 4 and 6. Relatively few changes occur for the students who were earlier reported to behave productively. Little difference is noted between the year levels in question. While teachers have reported large-scale improvement in individual student behaviour, this should not be interpreted to mean that all of the students whose behaviour had changed for the better were subsequently behaving productively – just better than before.

Table 7.1: Changes in behaviour during 2007 for students initially reported to be productive or unproductive while in Years 4 and 6

<table>
<thead>
<tr>
<th>Cohort</th>
<th>Group</th>
<th>N</th>
<th>Behaviour deteriorated during 2007</th>
<th>Behaviour improved during 2007</th>
<th>No change in 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 4</td>
<td>Productive behaviour</td>
<td>273</td>
<td>4.0</td>
<td>7.7</td>
<td>86.8</td>
</tr>
<tr>
<td></td>
<td>Unproductive behaviour</td>
<td>160</td>
<td>10.0</td>
<td>52.1</td>
<td>35.6</td>
</tr>
<tr>
<td>Year 6</td>
<td>Productive behaviour</td>
<td>284</td>
<td>5.6</td>
<td>11.6</td>
<td>81.0</td>
</tr>
<tr>
<td></td>
<td>Unproductive behaviour</td>
<td>182</td>
<td>8.2</td>
<td>50.0</td>
<td>39.6</td>
</tr>
</tbody>
</table>
The picture for the Years 8 and 10 cohorts of 2007 reveals a similar pattern. There are relatively few changes for the better or worse to the behaviour of the group of students reported to behave productively. Generally, they form a stable group. There is a slight tendency for Year 10 teachers to rate a larger proportion of their students to be more badly behaved than the teachers of Years 8 and 9; this is consistent with the discussion in Chapter 5, where it was pointed out that Year 10 appeared to be the most 'difficult' year.

Table 7.2: Changes in behaviour during 2007 for students initially reported to be productive or unproductive while in Year 8 and Year 10 English and mathematics classes

<table>
<thead>
<tr>
<th>Cohort</th>
<th>Group</th>
<th>N</th>
<th>Behaviour deteriorated during 2007</th>
<th>Behaviour improved during 2007</th>
<th>No change in 2007</th>
</tr>
</thead>
<tbody>
<tr>
<td>Year 8</td>
<td>Productive</td>
<td>59</td>
<td>10.2</td>
<td>13.6</td>
<td>76.3</td>
</tr>
<tr>
<td></td>
<td>Unproductive</td>
<td>66</td>
<td>6.1</td>
<td>63.6</td>
<td>30.3</td>
</tr>
<tr>
<td>Year 10</td>
<td>Productive</td>
<td>88</td>
<td>7.2</td>
<td>0</td>
<td>92.8</td>
</tr>
<tr>
<td></td>
<td>Unproductive</td>
<td>46</td>
<td>8.7</td>
<td>47.8</td>
<td>43.5</td>
</tr>
<tr>
<td>Year 10</td>
<td>Productive</td>
<td>108</td>
<td>10.2</td>
<td>1.9</td>
<td>88.0</td>
</tr>
<tr>
<td></td>
<td>Unproductive</td>
<td>138</td>
<td>12.3</td>
<td>45.7</td>
<td>42.0</td>
</tr>
<tr>
<td>Year 10</td>
<td>Productive</td>
<td>136</td>
<td>10.3</td>
<td>6.6</td>
<td>83.1</td>
</tr>
<tr>
<td></td>
<td>Unproductive</td>
<td>99</td>
<td>15.2</td>
<td>38.4</td>
<td>46.5</td>
</tr>
</tbody>
</table>

What can be made of these results? First, the unproductive classroom behaviour of many students changes during the school year, mainly for the better. This is more the case in the primary than the high school years. Second, only a small percentage of students begin the year behaving productively and acquire bad habits later.

Since this pattern applies across the four year level cohorts, the results raise an important question: If there is an overall improvement in behaviour by the end of the school year, why isn’t there an accumulated improvement for the population of students over a number of years? The results presented in Chapter 5 do not indicate a cumulative year-by-year improvement for the population as a whole.

It would seem therefore that each year constitutes a cycle during which teachers strive to enhance the classroom behaviour of their students, achieving more successes than failures. Then in the following year a new cycle commences, usually with a new teacher and sometimes a freshly constituted class of students, who together spend a large part of the year negotiating, then adopting, more acceptable norms of behaviour.

The consistency of student behaviour, 2005-2008

As explained in Chapter 4, when teachers completed the Student Behaviour Checklist they did not make judgments about the severity of the students’ unproductive behaviour. For example, a student was judged to be unproductive if he or she showed a tendency to be inattentive. Since it is unlikely that any student fully attended during every minute of every lesson, the decision to report a student as being inattentive is a matter of judgment. There will always be some inconsistency in the classification of borderline cases.

At the other extreme, for a student who is reported to behave unproductively on several categories of the checklist during one year, the probability that the student has been unproductive in one or more categories of behaviour greatly increases.

In Chapter 5, cross-sectional analyses revealed that in each year of the project, about 40 per cent of each year level cohort was reported by their teachers to behave unproductively on one or more categories of the Student Behaviour Checklist, while 60 per cent behaved productively. These results were corroborated by analyses using the database containing only those students who had continued with the project over four years: there was less than one percent variation. This database of 1357 continuing students provides the source of the analyses included henceforth in this chapter.

The consistency of productive behaviour

The question that will now be addressed is whether the same students who were behaving productively in 2005 continued to behave productively in each of the following
years. To answer this question, the students who, in 2005, were reported to show one or more unproductive behaviours, were tracked over each of the following years. In 2005, 60 per cent of students were classified as behaving productively. As shown in Table 7.3, by 2006, 81.3 per cent of that group continued to behave productively. A similar proportion of the 2005 cohort behaved productively in 2007 and 2008. In each year, about 20 per cent of the 2005 productive behaviour group were reported to behave unproductively on one or more categories of the Student Behaviour Checklist.

Table 7.3: Percentage of the students who behaved productively in 2005, continuing to behave productively in 2006, 2007 and 2008

<table>
<thead>
<tr>
<th>Pipeline students</th>
<th>Continuing to behave productively in 2006</th>
<th>Continuing to behave productively in 2007</th>
<th>Continuing to behave productively in 2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of productively behaving students in 2005</td>
<td>81.3</td>
<td>79.8</td>
<td>78.8</td>
</tr>
</tbody>
</table>

These results suggest that the productive behaviour group was quite stable but this is not the case. In fact, upon closer analysis a relatively high degree of instability was revealed. In summary, only 38.7 per cent of the 2005 productive behaviour group were never reported to show an unproductive behaviour in any of the four years, whereas about half of the students who were reported to behave productively in 2005 were reported to behave unproductively during at least one of the subsequent three years.

The consistency of unproductive behaviour

Regarding unproductive behaviour, 46.3 per cent of the students were reported to behave unproductively during one or more years of the four-year period, and 15.7 per cent during all four years. These results also indicate a high level of instability.

Of the students who were consistently unproductive over the four years, they were more likely than other students to be unproductive across multiple behaviour categories, averaging slightly more than three. Table 7.4 compares the percentage of reported categories of unproductive behaviour for students who were continuously unproductive and those who were unproductive, with the percentages for all students.

These results indicate that students who consistently exhibit challenging behaviours are approximately three to four times more likely to be reported as behaving unproductively than students generally. This applies to all 10 categories of the Student Behaviour Questionnaire.

To summarise, the Pipeline Project sought to map the behaviour of students over a four-year period. The analyses of the responses to the Student Behaviour Questionnaire showed that the behaviour of 37.9 per cent of students is set on a steady productive trajectory extending over four consecutive years. Of the remaining 58.2 per cent, nearly one-third of this group (19.5 per cent of all students) were reported to be unproductive in each of the four years. To put it simply, about 40 per cent of students are consistently productive and about 20 per cent are consistently unproductive. Of those students whose behaviour is consistently unproductive, their behaviours cover the full spectrum incorporated in the Student Behaviour Checklist. The behaviour of the remainder, about 40 per cent of all students, fluctuates from year to year.

Table 7.4: Comparison of the frequency of unproductive behaviour for the total group in 2008 with the subgroup of students who were continuously unproductive over four years

<table>
<thead>
<tr>
<th>Frequency of Unproductive Behaviour</th>
<th>Aggressive</th>
<th>Non-Compliant</th>
<th>Disruptive</th>
<th>Initiative</th>
<th>Erratic</th>
<th>Improper</th>
<th>Unmotivated</th>
<th>Unproductive</th>
<th>Unprepared</th>
<th>Irregular Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>All students n=1207</td>
<td>4.5</td>
<td>7.3</td>
<td>13.6</td>
<td>20.4</td>
<td>7.5</td>
<td>9.6</td>
<td>13.3</td>
<td>7.1</td>
<td>10.4</td>
<td>6.7</td>
</tr>
<tr>
<td>Continuously unproductive over 4 years n=149</td>
<td>16.1</td>
<td>29.5</td>
<td>43.6</td>
<td>59.1</td>
<td>29.5</td>
<td>34.9</td>
<td>35.6</td>
<td>24.2</td>
<td>32.9</td>
<td>21.5</td>
</tr>
</tbody>
</table>
The students with seriously unproductive patterns of behaviour, 2005-2008

The core of students whose behaviour is seriously unproductive

According to their teachers, the unproductive behaviour of some students does not appear to have much impact on their academic performance. On the other hand, teachers report that for others, their behaviour has a significant impact. The analyses that follow will examine the subset of students whose behaviour was considered to have a severe impact on their learning. As this group is a subset of the 15 per cent described above, it therefore contains only a relatively small number of students.

Table 7.5 shows the percentage of the total group of students in each Pipeline year who were reported to be behaving in ways that have a considerable or severe impact on their learning. Approximately 20 per cent of students in each year were reported to be so behaving by their primary classroom or English teachers, and their mathematics teachers.

The percentages varied only slightly from year to year, and learning area to learning area. To examine the consistency of seriously unproductive student behaviour, the students who were categorised as having a serious behaviour problem in 2005 were tracked for each of the following three years. The results are shown in Table 7.6.

The behavioural characteristics of the core

In order to describe the features of this core group of students who consistently behave in a seriously unproductive manner, their behaviour was compared with all students composing the 2005 and 2008 groups, according to the 10 categories reported on the Student Behaviour Checklist. The analyses are restricted to those instances where behaviour was reported by classroom or English teachers for students who began in 2005 and continued through to 2008.
Table 7.7: Comparison of the behaviour of the continuously and seriously unproductive core group of students 2005-2008, with the total groups of 2005 and 2008

<table>
<thead>
<tr>
<th>Percentage/Frequency of Unproductive Behaviour</th>
<th>Aggressive</th>
<th>Non-Compliant</th>
<th>Disruptive</th>
<th>Inattentive</th>
<th>Erratic</th>
<th>Impulsive</th>
<th>Unmotivated</th>
<th>Unresponsive</th>
<th>Unprepared</th>
<th>Irregular</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>All students 2005 n=1159</td>
<td>5.0</td>
<td>9.0</td>
<td>13.6</td>
<td>25.4</td>
<td>10.0</td>
<td>14.1</td>
<td>15.5</td>
<td>8.6</td>
<td>12.6</td>
<td>6.8</td>
<td></td>
</tr>
<tr>
<td>All students 2008 n=1207</td>
<td>4.5</td>
<td>7.3</td>
<td>13.6</td>
<td>20.4</td>
<td>7.5</td>
<td>9.6</td>
<td>13.3</td>
<td>7.1</td>
<td>10.4</td>
<td>6.7</td>
<td></td>
</tr>
<tr>
<td>Seriously unproductive 2005-2008 n=27</td>
<td>14.8</td>
<td>37.0</td>
<td>37.0</td>
<td>70.4</td>
<td>37.0</td>
<td>44.0</td>
<td>51.9</td>
<td>37.0</td>
<td>55.6</td>
<td>25.9</td>
<td></td>
</tr>
</tbody>
</table>

Table 7.7 shows that a student who is seriously unproductive over four consecutive years is about four times more likely to exhibit one or more unproductive behaviours than other students. Further, 44.4 per cent were in the uncooperative behaviour group (characterised by aggressive, non-compliant and disruptive behaviours) and 33.3 per cent were in the disengaged behaviour group (characterised by inattentive, unmotivated and unresponsive behaviours). The group of 27 students also harbours 11.1 per cent of the students suspended during 2008, 18.5 per cent of those ESC students being integrated in regular classrooms and 14.8 per cent of those students who had been diagnosed with a socio-emotional disorder.

In summary, only a small proportion of the cohort of students behave in severely unproductive ways over a four-year period – fewer than one student per class on average. This result challenges the perception of large groups of students who habitually behave in ways that seriously undermine their academic prospects.

On the other hand, a much larger proportion, about 20 per cent of each year level cohort, is likely to experience a ‘bad year’. This said, there is a reasonable probability that for some of these students their behaviour will improve. Most of them are on a trajectory characterised by dips and peaks.

There is not a simple stereotype of the chronic, seriously misbehaved student. While some show aggressive and oppositional behaviour towards their teacher and peers, a considerable proportion do not. The classic disengagement behaviours such as inattentiveness, unpreparedness and lack of motivation are more common.

The questions now to be addressed are: how do the students’ behaviour trajectories correspond with their academic trajectories; and, do some students make exceptional academic progress, and if so, to what extent can their trajectories be explained by productive or unproductive classroom behaviour?

**Trajectories of academic performance**

**The Matthew effect**

As explained in Chapter 2, the evidence acquired from large-scale studies of student academic progress shows a tendency for the gap between high and low performers to widen over time. This phenomenon is sometimes referred to as the Matthew effect. It would be reasonable to expect the WALNA and NAPLAN results to show similar trends.

**Correlations of student performance on the WALNA and NAPLAN tests, 2004-2008**

One way of measuring the consistency of student performance over time is to correlate the students’ results on two occasions. There were three sets of results for both the 2005 Year 4 and 2005 Year 6 cohorts. The results for the 2005 Year 4 cohort (Year 3 in 2004) are shown for numeracy and reading in Tables 7.8 and 7.9 below. The correlation coefficients in each range from 0.63 to 0.8, indicating that about half of the variation on a testing occasion can be explained by the student’s performance on a prior testing occasion. Some students performed better or worse than expected in 2006. The question of special interest is whether changes in student academic performance can be explained by changes in their classroom behaviour.
Table 7.8: Correlations among numeracy assessments, 2004, 2006 and 2008, for the 2005 Year 4 cohort

<table>
<thead>
<tr>
<th></th>
<th>2004 Numeracy Year 3</th>
<th>2006 Numeracy Year 5</th>
<th>2008 Numeracy Year 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004 Numeracy Year 3</td>
<td>1.00</td>
<td>.70</td>
<td>.63</td>
</tr>
<tr>
<td>2006 Numeracy Year 5</td>
<td>.70</td>
<td>1.00</td>
<td>.80</td>
</tr>
<tr>
<td>2008 Numeracy Year 7</td>
<td>.63</td>
<td>.80</td>
<td>1.00</td>
</tr>
</tbody>
</table>

For the 2005 Year 6 cohort, the numeracy correlation coefficients range from 0.75 to 0.82; the correlation coefficients were slightly lower for reading, ranging from 0.65 to 0.75.

These correlations indicate that for students who progress from Year 3 to Year 9, for both numeracy and reading there is a moderate to strong level of predictability. A perfect or near perfect correlation would indicate little change in relative standing and would suggest that there is little teachers can do in later years.

Table 7.9: Correlation among reading assessments, 2004, 2006 and 2008, for the 2005 Year 4 cohort

<table>
<thead>
<tr>
<th></th>
<th>2004 Reading Year 3</th>
<th>2006 Reading Year 5</th>
<th>2008 Reading Year 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004 Reading Year 3</td>
<td>1.00</td>
<td>.69</td>
<td>.68</td>
</tr>
<tr>
<td>2006 Reading Year 5</td>
<td>.69</td>
<td>1.00</td>
<td>.80</td>
</tr>
<tr>
<td>2008 Reading Year 7</td>
<td>.68</td>
<td>.80</td>
<td>1.00</td>
</tr>
</tbody>
</table>

The WALNA numeracy and reading results are also highly correlated with each other; the correlation coefficients for reading and numeracy for the 2005 Year 6 cohort range from 0.61 to 0.70. Put simply, student performance on either WALNA test is a good predictor of performance on the other. This would suggest that a significant proportion of students who are performing below the benchmark in numeracy are also performing below the benchmark in reading.

In fact, 65 per cent of the students who performed below the benchmark on WALNA Reading in 2006 were also sub-benchmark performers on the numeracy test.

This result can be interpreted from different perspectives. On the one hand there is a substantial level of predictability. Overall, students who performed well on one occasion tended to perform well on the next. On the other hand, the results also show that schooling is like the game of snakes and ladders: the moderate size of the correlation coefficients indicate a significant number of students must do better or worse than expected.

The consistency of student academic performance using teacher judgments

Another way to gauge the consistency of student performance is to examine the extent to which the students’ classroom teachers vary from year to year in their estimate of the standard at which the students have been performing.

In 2005, 2006 and 2007, teachers estimated the level of performance of students in reading and numeracy against a benchmark standard: well above, slightly above and below. This global judgment can be used to gain a rough indication of the consistency of student performance over a three-year period. The question that will now be addressed concerns the extent to which students who were judged to be performing below the benchmark in reading in 2006 continued to perform at this level in 2006 and 2007.

In 2006, across Years 3, 5, 7 and 9, teachers reported that 26.2 per cent of students were performing below the benchmark. In 2007, the percentage fell slightly to 25.7 percent. However, the membership changed quite radically. In 2007, 64 per cent remained at their 2006 level, and 32 per cent had improved and were now performing ‘around’ the benchmark. Four per cent had performed at an even higher level and were performing ‘above’ the benchmark. Their place in the 2007 sub-benchmark group was taken by students who had in the previous year been judged to be performing at a higher standard.

In 2008, there was even more mobility. By the third year, the group of students who had been judged by their teachers to be performing below the benchmark contained only 40.1 per cent of the students who were classified as performing at that level in 2006. The performance of 60 per cent had improved while the performance of a corresponding percentage had deteriorated.

These results, though based on broad teacher judgements, suggest that there is much more mobility in academic performance than is commonly thought to be the case. The extent of the variability in standards of performance will now be examined more closely using the assessment data.
The consistency of student academic performance using WALNA and NAPLAN

It was reported in Chapter 4 that only two of the four year-level cohorts participating in the study acquired three sets of reading and numeracy performance results, namely the 2005 Year 4 and Year 6 cohorts. Only two sets of reading and numeracy assessments were acquired for the 2005 Years 2 and 8 cohorts. It was therefore decided to map the academic progress of the two cohorts with three sets of performance measures.

Chapter 4 explained that the WALNA results had been scaled using a Rasch measurement technique so that the scores of students for either reading or numeracy were directly comparable, even though students sat different tests and were in different year levels. However, the NAPLAN results and the WALNA results are not on the same scale. To address this problem in some of the analyses that follow, the assessments of reading and numeracy were converted to percentiles or deciles. While these are ordinal measures and are not normally subjected to the kinds of statistical techniques applied to variables measured on an interval scale, they can however be used for limited mapping purposes.

One way to estimate the amount of variability of student performance from year to year is to track the performance of students at the 2nd and 9th deciles. The students in 2005 who achieved at the 9th decile are among the highest performing students. If the Matthew effect applies, then this group of students should maintain their high level of performance in 2006 and 2008 and consolidate or enhance their initial advantage. Conversely, the students at the 2nd decile in 2005 should be expected to languish on the bottom.

Figure 7.1 shows the distribution of results on WALNA numeracy 2006 and NAPLAN numeracy 2008 for the group of students who, in 2004 while in Year 3, scored at the 2nd decile level. For those students, in 2006, 56 per cent of them substantially improved their performance relative to other students. The performance of a smaller proportion, 29 per cent, fell into the first decile. Altogether, only 16.1 per cent maintained their ranking in the second decile.

In 2008, a similar pattern prevailed: a majority of the lower performing 2nd decile students improved their relative standing, while a majority of those performing at the 9th decile in 2004, fell below the 9th decile in 2008.

A similar level of variability is apparent for the students performing at the 9th decile in numeracy in 2004. The results for this decile are shown in Figure 7.2. In 2006, the performance of nearly 28 per cent had risen to the 10th decile and only 17 per cent continued to perform at the same decile. Of the remainder the performance of three per cent of the students declined dramatically, falling 7 deciles.

Figure 7.2: Trajectories of the 2005 Year 4 student performance at the 9th decile on 2004, 2006 and 2008 numeracy assessments

Figure 7.1: Trajectories of the 2005 Year 4 student performance at the 2nd decile on 2004, 2006 and 2008 numeracy assessments
The analysis of the reading assessment results yielded similar results. Approximately half of the low performing students improved their standing, and the standing of a similar proportion of the high performing students declined.

This result corroborates the findings in the analysis of teacher judgments of student performance reported earlier, where the performances of substantial proportions of students varied considerably on testing occasions.

Taken together, these results challenge the impression arising from trend analyses where aggregate performances are reported as smooth progressions, a form of representation that appears also to validate the Matthew effect. Though trends in academic progression are often presented with box and whisker bands around the general trend-line, they do not reveal the ‘snakes and ladders’ pathways of individual students.

Some of the variation from testing occasion to testing occasion may be due to unreliability of the assessment instruments, and the subsequent misclassification of students into deciles. Nevertheless, the distribution of results within each decile is of considerable magnitude, and also outside the range of what could reasonably be expected to occur solely from measurement error. In the space of two years considerable movement up and down the performance ladder has occurred. The cases of individual students described more fully in Chapter 9 show that some students made exceptional progress, or conversely, suffered a sharp decline in their performance for reasons that their teachers were able to document convincingly.

**Trajectories of behaviour and academic performance**

The foregoing analyses in this chapter have shown that student behaviour and student performance vary considerably over a four year period.

Given that for a large proportion of students their behaviour changes from year to year, it follows that the membership of the four cluster groups – the productive, disengaged, low-level disruptive and uncooperative behaviour groups – will also change from year to year: a student may be classified in the disengaged behaviour group in one year and in the productively behaving group in another. To put the issue another way, student behaviour may positively influence academic performance in one year and negatively influence it during another.

It is possible to follow the performance of cluster groups based on the 2005 patterns of classroom behaviour and establish whether there is an initial difference among the groups and, if so, whether the difference is sustained over the following three years.

Figure 7.3 shows the pattern of results for the 2005 cluster group on the three testing occasions. It should be remembered that the WALNA and NAPLAN results are not calibrated on identical scales; this means that while any observed differences in 2008 are real differences measured in term of the 2008 NAPLAN scale, it is not possible to infer that the growth from 2006 to 2008 is on an equivalent scale to the growth from 2005 to 2006.

**Figure 7.3: Differences in reading performance among the behaviour groups, 2004, 2006 and 2008**

The differences in reading between the productively behaved group and each of the three unproductively behaved groups are statistically significant (p < .01). The same groupings of students produced a similar set of results in 2006 and 2008, though in 2008 the magnitude of the difference between the productive behaviour group and the low-level disruptive group was significant at a slightly lower level (p < .05). In neither 2004, 2006 nor 2008 were the differences among the unproductive behaviour groups statistically significant. In other words, over the 2004-2008 period, the productively behaved group members maintained their advantage.

The fact that the differences between the three unproductive behaviour groups were not found to be
statistically significant may be explained by the high level of inconsistency of student behaviour described earlier in this chapter. The analyses summarized in Figure 7.3 were based on the sorting of students into behaviour groups using the 2005 Student Behaviour Questionnaire data. Some of the students may have modified their behaviour after 2005, and properly been classified in another group.

**Conclusion**

There is a large core of students who are considered by their teachers to be productively behaved. About 40 per cent of each year level cohort did not exhibit any unproductive behaviours over a four year period. They exhibited what might be described as an ‘unblemished’ behaviour trajectory.

At the other extreme, there is a considerably smaller core of students, about 15 per cent of each year level cohort, who over a four-year period are reported under at least one unproductive behaviour category in each of the years. In many of these cases, however, teachers do not consider that the behaviour is having a considerable or severe impact on the students’ academic progress.

However, as shown in Table 7.7, a small core of about three per cent, each year behave in ways that seriously undermine their prospects of satisfactory progress. This ‘hard core’ contains students who exhibit a variety of behaviours; there is no simple stereotype, nor identifying characteristic. Students can seriously retard their academic progress by exhibiting any subset of unproductive behaviours, although the wider the range the more likely they are to be members of this core. None of these students appears to particularly like school or engage with their schoolwork.

In between these two core groups - the 40 per cent of productively behaved students and the 3 per cent of seriously unproductively behaved students - stretch over more than half of the student cohort who manage to behave satisfactorily in some years but not in others.

There are three main explanations for the dips and peaks in the behaviour trajectories of students. Some of the variation may be caused by changes in the out-of-school circumstances of children. Their classroom behaviour improves or deteriorates because the situation has changed for the better or worse at home. A second explanation is that a change of teacher (and promotion to a new year level) can improve or worsen the behaviour of a student. Errors of classification provide a third possible explanation. The study is not able to prioritise these explanations and it is possible that all explain some of the variation. However, what is not in dispute is that the behavioural trajectory of a large number of students shows dips and peaks.

The picture of academic progress over the four-year study seems to follow a similar pattern, marked by considerable variability.

An analysis of WALNA and NAPLAN results from 2004 to 2008 showed that of the students who were performing exceptionally well at the 9th decile in 2004, more than half slipped down the performance scale in 2006 and 2008, whereas of the students who were performing relatively poorly in 2004, more than half improved their standing, some by a considerable margin.

These results call into question the standard interpretation of the Matthew effect that implies there to be very little slippage or overtaking during schooling, that is, that the course is set early during formal education and is mostly unwavering.

Finally, in regard to the confluence of academic and behavioural trajectories, the strongest and most compelling generalisation that can be made is that students who consistently behave in a productive manner perform on average at a significantly higher level in reading and numeracy; further, over time they maintain their academic advantage. On the other hand, the students in the unproductive behaviour group mostly do not catch up, although the differences between the three groups – the disengaged, the low-level disruptive and the uncooperative behaviour groups – based on the behaviour of students in 2005, tend to flatten out.

This conclusion regarding behaviour and performance is, of course, based on average results. Within each group and in any year there are significant exceptions to the general rule. These exceptions are very important yet they are often lost sight of in quantitative studies.

Overall, these findings cast a positive light on the work of schools. Firstly, they challenge the myth of a large core of unproductively behaved students being set on a course of school failure. Second, much of the improvement in behaviour and academic performance is due to the persistent effort of teachers. However, not all students show a sustained improvement in behaviour or academic progress. The fact that some students regress highlights the constancy of the challenge. What might be done to redress the regression will be explored in Chapter 12.