Lost talent? The occupational ambitions and attainments of young Australians

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Longitudinal
Surveys of
Australian Youth

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Publisher's note

Additional information relating to this research is available in *Concern about lost talent: support document*. It can be accessed from NCVER's website <http://www.ncver.edu.au/publications/2313.html>.

To find other material of interest, search VOCED (the UNESCO/NCVER international database <http://www.voced.edu.au>) using the following keywords: career goal; career planning; decision making; educational level; educational opportunity; employment; gender; higher education; socioeconomic background; students; vocational education and training; youth.

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About the research

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Lost talent? The occupational ambitions and attainments of young Australians

Joanna Sikora and Lawrence J. Saha

Given ongoing interest in increasing productivity and participation in the workforce, understanding when talent is lost is a useful exercise. The term 'lost talent' describes the underutilisation or wastage of human potential. Focusing on young people, Sikora and Saha define lost talent as occurring when students in the top 50% of academic achievement lower their educational or occupational expectations or fail to achieve their educational or occupational plans.

Using data spanning a ten-year period from the 1998 cohort of the Longitudinal Surveys of Australian Youth (LSAY98), the authors examine academic achievement in Year 9, educational and occupational expectations while at school, and educational and occupational attainment by age 25 years to determine the extent to which talent loss is occurring. The general relationships between occupational expectations and attainment are also examined to see whether ambitious career plans lead to higher-status employment.

Key messages

✧ The proportion of high-achieving individuals who represent talent loss is low but not negligible, with approximately 15% lowering their educational and occupational expectations. Factors associated with decreasing expectations included low socioeconomic status, being male, having low personal assessment of academic ability and low satisfaction with school.

✧ Having ambitious occupational plans is important, with a strong relationship found between holding these plans and having a professional or managerial job by the age of 25 years. Not having a career plan can be detrimental to later occupational attainment— more so for young women.

✧ Students' occupational expectations are significantly less gender-segregated than the labour market they eventually enter.

Tom Karmel
Managing Director, NCVER

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The definition of lost talent

'Lost talent' is a long-established term which describes the concept of the underutilisation or 'wastage' of human potential. Over time, however, the concept has been used to describe—at least empirically—four different processes in the transition of youth to adulthood, and specifically those related to educational and occupational attainments.

In this report, we follow Hanson (1994), and make use of the term 'lost talent' to refer to high-achieving students who, over time, do not maintain their high level of educational and occupational expectations and attainments. Prior literature assumed that talent loss occurs when students in the top 50% of the academic achievement distribution: lower their educational expectations; lower their occupational expectations; fail to realise their educational plans; or fail to realise their occupational plans. This study focuses specifically on the lowering of occupational expectations during secondary school. Our main interest is to establish whether ambitious occupational career plans help an early entry to high-status employment. We have chosen to focus on this area because of the shortage of Australian studies assessing the impact of occupational expectations on labour market outcomes.

Data

This report uses data from the 1998 cohort of the Longitudinal Surveys of Australian Youth (LSAY). A representative sample of secondary education students, nationally stratified by state and sector of schooling, was first surveyed in 1998 when they were 14 years old. The students completed a numeracy and literacy test, as well as a survey with questions about their families, experiences, attitudes to school and expectations. They were then surveyed each year until 2008.

Findings

The extent and determinants of lost talent

The proportion of LSAY respondents who represent 'talent loss' is low, although not negligible.

✧ About 15% of the top students changed their occupational expectations from highly skilled destinations to careers which required on-the-job training and less formal training. In this report highly skilled employment is defined as falling into major group 1 or 2 of the second edition of the Australian Standard Classification of Occupations (ASCO 2; ABS 1997b).

✧ Approximately 15% of students who 'showed early signs of talent'; that is, who were in the top 50% of academic achievers in their age group, abandoned their initial plans to complete university.

✧ All else being equal, students who came from lower socioeconomic backgrounds were significantly more likely to lower their educational and occupational expectations.

✧ Male students, as well as those with a low assessment of their academic ability, were more likely to lower their occupational expectations.

◇ Students whose satisfaction with their school environment was low, even if their academic performance placed them in the top 50% of the distribution, were also prone to lower their educational and occupational expectations.

◇ Students' perceptions of their teachers' expectations of their going onto university and peers' plans for university were also positively associated with maintaining ambitious occupational plans.

The stability of occupational plans

Australian adolescents born around 1984 expected to work predominantly in professional occupations. These expectations were fairly stable, but with some variation.

◇ In 1999, 58% of students who could name their intended career hoped to enter some form of highly skilled professional employment. By 2001, 53% of the cohort had retained these or similar preferences.

◇ Of the top 50% students who in 1999 had planned to achieve a high-status job soon after completing their education, 83% retained their plans in 2001. A high-status job was defined as professional or managerial, falling into major group 1 or 2 of ASCO 2.

◇ However, within the professional categories, students' preferences for particular jobs were likely to change between Year 10 and 12, or between 1999 and 2001.

◇ About one-third of students planned to work in a professional job of a comparable status in 1999 and 2001, whereas another 33% switched their occupational plans to professional employment of somewhat lower status. Finally, the remaining 33% expected even higher-status employment.

This strong preference for professional employment is similar to the patterns found in the United States (Rindfuss, Cooksey & Sutterlin 1999), the United Kingdom (Croll 2008) and countries participating in the Programme of International Student Assessment (PISA; Sikora & Saha 2009). Therefore the causes for professional expectations are more likely to be of a global and macro-cultural nature, rather than a local and time-specific one. While the accommodation rates for professional employment have been on the rise, a discrepancy between students' plans and labour market composition remains.

Gender differences

We found that adolescent occupational plans and attainments are gender-typed. Girls' and boys' occupational expectations still vary greatly in high school, although the degree of segregation of student expectations is lower than the segregation of employment in the labour market.

◇ Males chose professional employment less frequently than females, but when they did, they opted for different professions.

◇ In Year 10, the top three choices among girls were: designers and illustrators, legal professionals, and childcare workers. Boys were most likely to expect to work as computing support technicians, motor mechanics, or computing professionals.

◇ Girls who performed well in mathematics and had confidence in their numeracy skills were more likely to plan working in occupations with a higher representation of men. Conversely, boys who performed well in reading and had confidence in their literacy were more likely to choose occupations less dominated by men. These associations, however, were not particularly strong.

The relevance of adolescent career expectations

The important finding of this report is that having a specific occupational plan in high school helps students to enter high-status employment, even after the differences in educational plans and rates of university completion are held constant.

✧ After we took into account students' academic achievement, the socioeconomic status (SES) of the family of origin, their university completion, as well as the number of children born to young respondents, we found that having ambitious career plans in high school was a good predictor of gaining higher-status employment. This was particularly the case when we only considered employment defined by respondents as their possible career.

✧ The absence of specific occupational plans was detrimental to young people's occupational attainment. This affected females more than males, since the attainments of the latter were more differentiated by early plans to attend university, rather than specific occupational plans.

✧ Up to 25% of all students reported schooling and career objectives which were inconsistent. We only considered inconsistencies in planning managerial and professional employment and in attending university, and found that the discrepancies between educational and occupational plans negatively affected the chances of securing high-status employment, even after we had taken a range of factors, such as university completion, into account.

Conclusions

Ambitious occupational plans formed in adolescence are consequential to young adults' attainment, particularly for an early entry into high-status employment. While students' socioeconomic background facilitates the formation of ambitious goals which help attainment, the effect of adolescent plans is independent of parents' background. This means that there is an element of choice in the formation of student career plans. Therefore, our findings add weight to the studies which stress the vital importance of comprehensive career guidance services targeted to the different needs of student subpopulations. Students with fewer economic and cultural resources might need more counselling support in pursuing careers that diverge from the educational and occupational background of their families, as they are at a greater risk of abandoning their initial expectations, despite having the academic potential to fulfil them. Moreover, there is a need to reflect on the meaning and consequences of gender segregation of students' occupational expectations and attainments. Students' career expectations are not as strongly segregated by gender as later attainments, and the question that arises is whether this should be perceived as a policy concern.

On the positive side, only 15% of high achievers in the study experienced talent loss by lowering their initial expectations. Most students had specific career objectives while in high school and many of those who wanted to pursue professional and managerial employment succeeded in realising their goals.

Introduction

Lost talent

> As societies become more complex they show an increasing concern with post-primary, with higher, and then with continued, in-service education and retraining, and the emphasis is then turned to the development of more advanced cognitive and social skills. Loss of talent, at whatever age, through misidentification, inadequate social policies, inept pedagogy, or differential educability becomes a foremost political and professional issue; and attention is called to defects in selective and grouping procedures, to the range and effectiveness of the curriculum, and to the extent and quality of staffing and teacher education.   (Craft 1974, p.47)

The effective use of human talent has been of concern to educational researchers and policy-makers for many years. In addition to the role played by the organisational structures and practices of schools in providing a supportive environment for talent development, there has been much attention devoted to the psychological role of student ambition and the motivation for talent utilisation. Student ambition must be seen in the context of the educational policy which has fostered the perception that a high level of educational and occupational attainment is within the reach of all students. It is well established that adolescent educational plans are influential antecedents of educational attainment (Feliciano & Rumbaut 2005; White 2007). Similarly, it is widely assumed that occupational plans are important for occupational attainment (Curtis & McMillan 2008). It is not clear, however, whether having a specific occupational plan in high school, independent of an educational plan, carries a further benefit for students in attaining their goals. Moreover, few studies conducted overseas, and none in Australia, have to date examined the relationship between adolescent occupational plans and later occupational attainments, despite the accepted view that youth ambitions are important. It is surprising that these issues have been relatively unexplored, since the disparities between plans and attainments represent potential losses and gains for individuals and for society. The lack of these types of studies can be attributed to a lack of longitudinal data on students' plans and subsequent attainments.

The Longitudinal Surveys of Australian Youth (LSAY) provide a unique opportunity to fill this knowledge gap and to establish the career importance of early occupational plans. The LSAY98 data in particular make it possible to examine the role of these plans in the lives of a recent cohort of young Australians; namely, those who were in Year 9 in 1998 and who had mostly finished their education by 2008.

International interest in educational and occupational plans and attainments among youth has risen in recent years. The continual worldwide educational expansion and the volatilities of the globalised labour market foster the perception that young people can no longer make long-term plans with the confidence displayed by earlier generations. In contrast to this tendency there is an expanding global culture encouraging the institutionalisation of high levels of expectations among students with regard to both educational and occupational success. The consistent evidence of high economic returns to managerial and professional employment reinforces the culture of high attainment ambitions amongst youth. These tendencies are well known and accepted by the wider research community. But the unanswered question is whether the differences in occupational plans among young people affect their attainments, and whether these ambitions are equally effective for students of varying social and economic backgrounds.

These considerations lead to another important question; namely, whether specific patterns in the changes to adolescent plans convey any implications for longer-term occupational attainments. In other words, what are the dynamics of occupational plans, and what are their consequences? Are there systematic differences between students who consistently maintain their ambitious goals, those whose plans become more ambitious over time, and those whose plans become more modest as they progress through their schooling?

In this project, we begin by considering the last group; namely, the students whose plans become less ambitious as they progress through high school. It is difficult to determine whether those students who do adjust their plans downwards do so because, as they mature, they recognise what they can realistically achieve. Another possibility is that those who lower their initially high expectations do so because of the lack of support in their social environment, or because they have unequal access to social, cultural and economic resources. One analytical approach used to deal with this problem, the one we adopt in this study, is to analyse the plans of high achievers only; that is, those students whose academic performance warrants expectations of high occupational achievement. If, among high-performing students, we find that those from lower socioeconomic backgrounds are more likely to adjust their original ambitious plans downwards than their more privileged peers, we conclude that talent loss has occurred. It is on this conception of talent loss, a social and politically important concept, that we focus our attention in this report.

The literature which informs this study, which we discuss in more detail in the support document accompanying this report, has produced at least four working definitions of lost talent. These definitions originate directly or indirectly from a seminal study on lost talent by Sandra Hanson (1994). She argued that lost talent occurred when students who showed early signs of ability, which she defined as above-average academic performance: had their expectations fall short of aspirations; had their expectations decline over time; or were not able to realise earlier expectations (Hanson 1994, p.159). With these distinctions in mind, we initially conceptualise lost talent as: lowered educational expectations; lowered occupational expectations; unrealised educational plans; or unrealised occupational plans.

Hanson also recognised the disparity between aspirations and expectations; that is, between less and more realistic plans, as another form of lost talent, which she included in her study. We are not considering this particular understanding of talent loss for two reasons. Firstly, the existing literature supports the view that expectations rather than aspirations are better predictors of young people's attainments (Goyette 2008; Saha & Sikora 2008; Saha 1997). Secondly, the LSAY98 data do not contain a variable which measures youth aspirations, understood to be related to a future job which is desired rather than expected in a realistic manner. In the next section of this report, we focus our attention specifically on the second in our list of four conditions defining talent loss— lowered occupational expectations.

In our study of issues related to talent utilisation and talent loss, it is important to keep in mind the two levels at which this phenomenon can be studied, namely, the individual and the structural. The following two sections provide a brief review of prior research which illustrates these different levels.

Individual characteristics that affect lost talent

Studies of lost talent focus on the ambitions and motivations of people at the individual level. Not all research on individual students' expectations can address talent loss, because, as a longitudinal concept, its analytical data requirements are more stringent than in studies that rely only on the information collected at one point of time.

Nevertheless, the key findings of the international literature on lost talent overlap to a significant extent with the conclusions reached by the broader-status attainment and vocational-development research. Gender, the socioeconomic status of a student's family, as well as race and ethnicity, are the key factors related to talent underutilisation. The first and most powerful factor affecting a student's propensity to experience talent loss is family environment. The socioeconomic status

denoted by the education and occupation of parents has been identified as the single most significant correlate of lowering the educational and occupational expectations of American students, above and beyond the influence of material possessions in students' homes (Hanson 1994; Trusty & Harris 1999). While students from lower socioeconomic status households benefited greatly from their parents' involvement in their daily lives, they also sought vocational guidance from school counsellors more often than the children of well-educated professional parents. In homes where parents were actively involved with their children's lives, the children were more successful in forming and maintaining ambitious plans. Thus a more fruitful collaboration between parents and schools in providing vocational counselling and support to students was seen as the best strategy for reducing the incidence of declining ambitions, or talent loss, particularly among youth from less-privileged backgrounds. It was found that career information programs which had little or no parent involvement were likely to be less successful than those which relied on parental collaboration.

Gender is also a key variable in the study of talent loss, but not perhaps in the way one might expect. In the 1990s, it became apparent that girls were less likely than boys to lower their quite ambitious educational and occupational plans. This was initially perceived as a 'surprising' finding (Trusty & Harris 1999). As in the case of ethnic and racial minorities, the result fitted the 'ambitious minority' hypothesis, which proposes that minority students need particularly high levels of individual motivation to offset the structural difficulties that impede their successful progression through higher stages of education. More recently, however, the gap in the expectations between genders has become associated more frequently with the gender gap in academic performance, as girls have surpassed boys both in academic achievement and the rates of participation in tertiary education (Buchmann & Dalton 2002; Sikora & Saha 2009).

Another factor which should be examined is that of race and ethnicity. The studies of lost talent conducted in Australia found that young men and students from lower socioeconomic backgrounds are particularly prone to experiencing talent loss. In the United States, by contrast, racial and ethnic minorities were found to be both ambitious and persistent in holding to their initial goals (Feliciano & Rumbaut 2005; Trusty & Harris 1999). In the LSAY98 data, however, there are too few migrant or Indigenous students to enable an independent analysis of the association between ethnicity and talent loss. Therefore, in drawing from the lost talent literature, we focus primarily on gender and socioeconomic status.

National and school level factors that affect lost talent

The study of the 'higher-order' effects on individual-level student expectations using multi-level or hierarchical linear models is not new. A commonly used higher-order variable has been the institutional variation within an educational system (for example, Buchmann & Dalton 2002). But other institutional factors also exert an important influence on the formation of educational and occupational plans. Typically, the features of schools as aggregated student and teacher characteristics, as well as the structural characteristics of schools, such as the selectivity of students, tracking of students, and school type (government or private), operate at a level above that of the individual student (Khattab 2005). In a comparative context, an average parental socioeconomic background has been shown to boost individual school students' educational and occupational ambitions beyond the level implied by their own unique social position and academic achievement levels (Sikora & Saha 2007). This finding is usually interpreted as reflecting the benefits conveyed by the different social and cultural capital of schools that, to a greater or lesser extent, succeed in attracting students from families with high levels of these forms of capital.

Consistent with this proposition, students in schools located in urban areas, and particularly in schools where performance-based streaming is in place, are more likely to aim for managerial and professional careers. Conversely, students in vocational schools, or in vocational tracks within schools, tend to have more modest plans. These recent research findings collectively indicate that school environments affect the initial formation and evolution of individual plans over and above the social and psychological characteristics of each student. Unfortunately, we cannot account for

school-level effects in our analyses. This is because the LSAY98 data can be accessed in a version which contains information either on student achievement or on the school sector, but not both. As academic achievement is essential for our analysis, we have elected to explore the version which does not allow us to account for the school sector. Moreover, LSAY98 did not collect school-level information in the comprehensive format available in the Organisation for Economic Co-operation and Development's (OECD) Programme for International Student Assessment (PISA) collections, so the prospect of exploring school-level effects in this dataset is limited, regardless of the choice of specific dataset versions.

A more comprehensive review of the literature devoted to talent loss studies and the affiliated literatures on status attainment in sociology and developmental psychology can be found in the support document. Having made these initial introductory observations about the study of talent loss in educational research, we now turn to the specific details of our own study.

Research questions: lost talent and expectations versus attainment

Our strategy is to analyse student occupational and educational plans in a manner that has not, as yet, been attempted in Australia. Because the LSAY dataset consists of repeated measures of some career variables between 1998 and 2008, it is possible to analyse the degree to which student expectations and attainments changed during this period. We are seeking to explore the incidence and possible consequences of talent loss, which we understand as the downward adjustment of initially ambitious occupational plans. That is, although we recognise various definitions of lost talent, our primary focus is upon high-achieving students who lowered their occupational expectations in the last years of secondary education.

One important facet of the lost talent approach is its focus on the high achievers; that is, the youth who perform at or above the average academic achievement level in their age group. A more comprehensive study of the impact that adolescent plans have on attainments, however, requires the inclusion of all students, not only high achievers. To fully explore the consequences of youth plans on adult attainments, we move beyond the lost talent approach. In later analyses of this report we explore the occupational plans of all students and include all patterns of change: stability, rise and fall in ambitions, as well as the absence of occupational plans (that is, students' 'indecision'). Finally, we examine the consequences of these high school plans for adult attainment.

This report addresses the following research questions:
1   In what sense and to what extent can we identify 'lost talent' among the cohort of young Australians who were 15 years of age in 1998? Which students are more likely to experience talent loss?
2   How stable are the occupational plans of high school students?
3   To what extent are adolescent occupational plans and attainments for this cohort of students gender-typed? Is the degree of gender segregation of youth expectations comparable with the degree of gender segregation of employment held by young people?
4   How important are adolescent career plans for entry into high-status employment? Are ambitious adolescents more likely to secure higher-status jobs early?
5   Are there differences in later attainment between adolescents who were able to state their occupational expectations and those who were not?
6   Are early educational intentions consistent with the occupations that students expect to attain? If inconsistencies do exist, are they consequential to the likelihood of completing university and the status of obtained employment?

The first two questions are considered primarily within the lost talent paradigm, while the remaining four are also informed by the broader status-attainment approach, that is, the study of upward mobility.

Data and methods

This report is based on the Longitudinal Surveys of Australian Youth, which, between 1998 and 2008, followed a cohort of students, who in 1998 were in Year 9 (LSAY98). A major advantage of this collection is that it contains longitudinal data about a very recent cohort of young adults. Details about the study and the surveys can be accessed at <www.lsay.edu.au> and in appendix A. These surveys ask a wide range of questions about the educational and labour market experiences of young people as they progress from Year 9 through subsequent stages of their schooling and into the labour market.

Methods

In order to use the full range of information available in LSAY98, we employ ordinary least squares (OLS) regressions in addition to descriptive statistics; we also use regressions on person-year data when modelling occupational status (which is a continuous variable). Moreover, we use logistic regressions to model binary outcomes. In the regressions on person-year data, the information about each student is not limited to one point in time, but covers an 'observation window' spanning the period between 1998 and 2008, or a part of that period during which a student provided information. While the goal of the surveys was to interview all students in all years, sample attrition problems shortened the duration of observation periods for some respondents. Regardless of these problems, it is preferable to consider all observations; that is, those over longer and shorter periods of time, since using only the final wave data to assess the impact of expectations on attainments would lead to considerable selectivity bias.

The person-year data for all waves have been analysed using the *xtreg* procedure available in STATA10. This procedure estimates panel linear models with random effects suitable for the analysis of longitudinal surveys. All estimations presented here have been performed with the use of robust standard errors (option *vce[robust]*), which are less sensitive to deviations from the assumptions underpinning regression models for continuous dependent variables (Rabe-Hesketh & Skrondal 2005). To reduce the loss of information in multivariate models, missing data on predictor variables have been imputed with STATA's *ice* procedure for multiple imputations of missing data (Royston 2004). This procedure produces five versions of a dataset with five sets of imputed values. All multivariate analyses are then run five times and estimates are combined in accordance with the Rubin rules (Royston 2004). All the analyses in the sections on occupational plans and career entry, whether having a career plan in high school matters and the discrepancy between educational and occupational plans of this report have been performed on data imputed in this manner, although imputation models generated only around 10% of extra usable observations. As part of sensitivity analysis, all models have been also estimated with listwise deletion of missing data. No values have been imputed where the information on the dependent variable was missing.

Results

Prevalence and determinants of talent loss

Talent loss is a longitudinal variable for which at least two measurements at different points of time are required. In LSAY98, students were asked about their educational plans each year between 1999 and 2001, while occupational plans were probed only twice, in 1999 and 2001. This period was one of increasing economic growth in Australia. In 1999, when the students were first asked about occupational expectations, the unemployment rate was 8.1%, which at that time was the lowest since December 1990. From this level the unemployment rate declined to 6.6% in 2001, the second and final time the question about occupations was asked (ABS 2010).

We begin from an exploration of change in students' expectations to construct the talent loss variable (the details are in appendix B, part 2). We then consider the proportions of high school students who manifest talent underutilisation.

Figure 1 presents the proportions of students who 'lowered' or failed to realise their educational or occupational expectations. As each definition of talent loss implies a specific operationalisation,[1] we consider the four understandings of talent loss in turn. Firstly, 'lowered educational expectations', which illustrate the first definition, are in this study equivalent to the changes in students' initial expectations to attend university. It is important to recognise that any change in plans, where a capable student wants to complete less rather than more education, for example, replacing a plan to obtain a certificate IV with a plan to complete a certificate I etc., can be seen as talent loss. Since our main focus in this study is on students' occupational plans, which, as we have found, concentrate heavily on professional destinations, we limit our analysis of educational intentions to the changes in plans to attend university. As will be shown in later parts of this report, a very large proportion of high school students aim to work in professional or managerial occupations, a goal for which the completion of university is essential (ABS 1997b). A student is assumed to have experienced talent loss if initially, that is, in 1999, he or she reported an intention to go to university, but at some point between 1999 and 2001, that is, in the period in which the data about this variable were collected, the student made a permanent switch to obtaining a non-university qualification. According to this definition, 15% of students whose academic performance placed them in the top 50%, that is, who showed early signs of talent (Hanson 1994), lowered their educational expectations in high school (figure 1). The corresponding proportion for all students, regardless of their academic performance, is 18% and these figures match those found in the US studies of Alexander, Bozick and Entwisle (2008), Hanson (1994) and Trusty and Harris (1999).

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[1] Operationalisation is the process of identifying a set of valid and reliable measures of an abstract concept. This process involves providing clear rules which guide the coding of data from particular individuals.

Figure 1   Prevalence of talent loss according to four different definitions
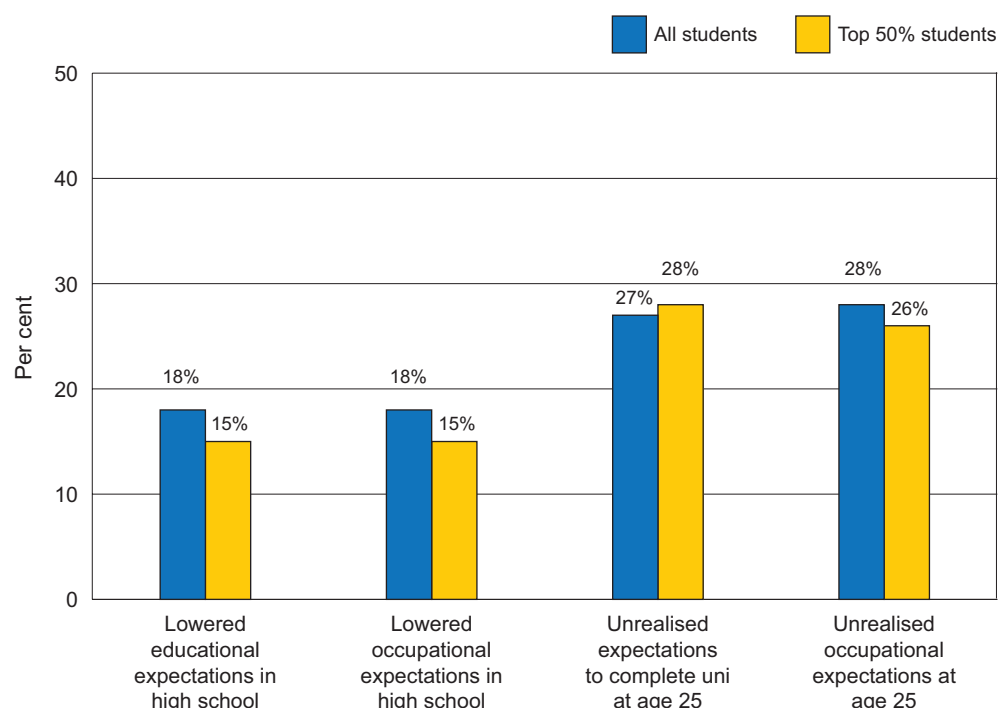
Source: LSAY98 weighted estimates.

The second definition of talent underutilisation depicts changing occupational expectations from highly skilled professional destinations to careers that require on-the-job training and less formal training. Students who initially, in 1999, planned to work in professional or managerial occupations (ASCO2 major group 1 or 2) and later, in 2001, reported other occupations as their expected destination are considered to have made a downward adjustment in terms of occupational status (ABS 1997a). Similarly, students who initially chose a destination in ASCO2 major group 3 and then indicated a job in groups 4, 5, 6 etc. as their future career are coded as students with underutilised talent. (The details of our occupational categorisation used to define lost talent are in table 3, where all students above the diagonal row, which is in bold type, were considered to have experienced talent loss.) Approximately 15% of students with early signs of strong academic performance moderate their initially more ambitious career plans. This figure closely corresponds to the rate of abandonment of earlier plans to enter university. Students who alter their educational expectations, however, are not necessarily the same students who change their occupational plans (the correlation coefficient for these two variables is $r = 0.21$), despite the fact that the proportions of students who change their initially very ambitious goals are identical in both cases.

Our third and fourth definitions of talent loss highlight the incidence of unrealised plans to complete university and to attain professional employment, respectively, by age 25. The determinations of educational and occupational thresholds applied here are, as previously defined, for the measurement of reduced expectations. In both instances, the proportion of students who failed to achieve their goals by age 25 exceeds 25%. While this figure is somewhat higher than figures reported in other countries, it is not necessarily a cause for concern, as most recent studies of the influence of early plans indicate that many young people who do not achieve their ambitious goals early plan to realise them later, even though they might experience significant hardships (Alexander, Bozick & Entwisle 2008).

The LSAY98 data are not yet well suited to the investigation of the unrealised educational and occupational expectations, because so far students have been surveyed only until they reached approximately 25 years of age. Many of them are likely to realise their early ambitions over the next several years, so classifying their ambitions as unrealised may be misleading. Moreover, the LSAY98 respondents were not asked about their educational and occupational plans past wave 4. It is likely

that some proportion of Australian youth who did plan to complete university by age 25 might continue with such plans later in life, due to the culture of lifelong learning which has been revolutionising the provision of and planning for education, particularly at a tertiary level. This culture facilitates a perception that educational qualifications can be obtained and careers successfully commenced at all stages of the life course. This is consistent with the perception of the labour market as globalised, flexible and no longer supportive of the single and continuous lifelong career, typical of earlier generations. Therefore, as an analysis of unrealised plans would be inconclusive in the context of our data, we focus instead on the analysis of plans lowered in high school.

We begin with an examination of lowered expectations by parents' socioeconomic status. The students whose parents are in the lowest quartile of the socioeconomic status distribution are much more likely to have their expectations decline over time (figure 2). These adjustments occur both among students whose academic performance locates them in the top 50%, as well as in the total cohort. The proportions of students who lower their expectations are almost identical, regardless of whether educational or occupational plans are considered (figures 2 and 3).

Figure 2   Lowered educational expectations by parents' socioeconomic status
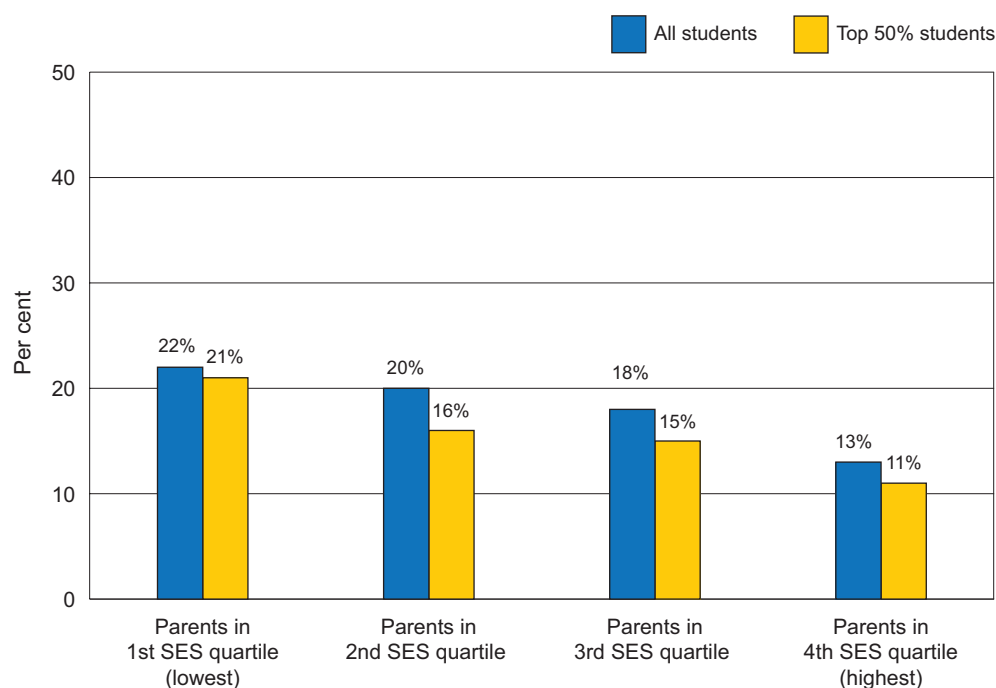
Note: lowered expectations = students who did, but no longer, plan to attend university.
Source: LSAY98 weighted estimates.

Figure 3   Lowered occupational expectations by parents' socioeconomic status
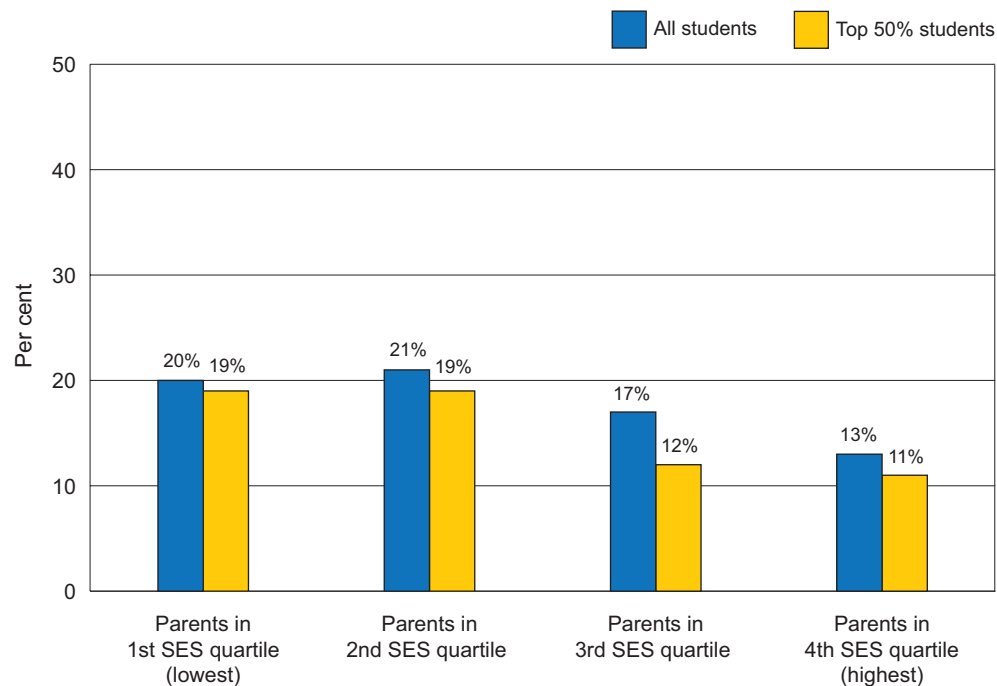
Source: LSAY98 weighted estimates.

There is little difference between the first and second quartiles of the SES distribution, where close to one-fifth of students moderate their once quite ambitious goals. Students whose parents are in the third or fourth quartiles, however, are less likely to alter their ambitious plans of high educational and occupational attainment. This pattern is consistent with the findings of studies in the US and the UK and contradicts conjectures that students' plans change in an entirely random fashion. This pattern also corresponds to rational action theory (Breen & Yaish 2006; Golthorpe 2007), which proposes that students with less social, cultural and economic capital recognise and react to the various structural constraints they perceive as likely to hinder their chances of success.

We next consider gender differences, since US studies have found that, after socioeconomic status, they are the second most significant predictor of talent loss.

In contrast to the findings of research in the US and the UK, where some gender differences were found, the rates of talent loss between Australian boys and girls are similar, at least in bivariate comparisons. In figures 4 and 5, we can see that young women are somewhat more likely to adhere to their plans, which are, in turn, more oriented towards university completion and professional employment. By contrast, young men are more likely to lower their initial expectations; that is, change their earlier plans to obtain qualifications necessary for professional employment to plans tailored towards different qualifications. Supplementary analyses, not shown here, revealed that gender variation in the status of expected jobs is mostly due to the differential interest of girls and boys in trades (for a similar finding see also Beavis, Curtis, & Curtis 2005).

Figure 4   Lowered educational expectations by gender
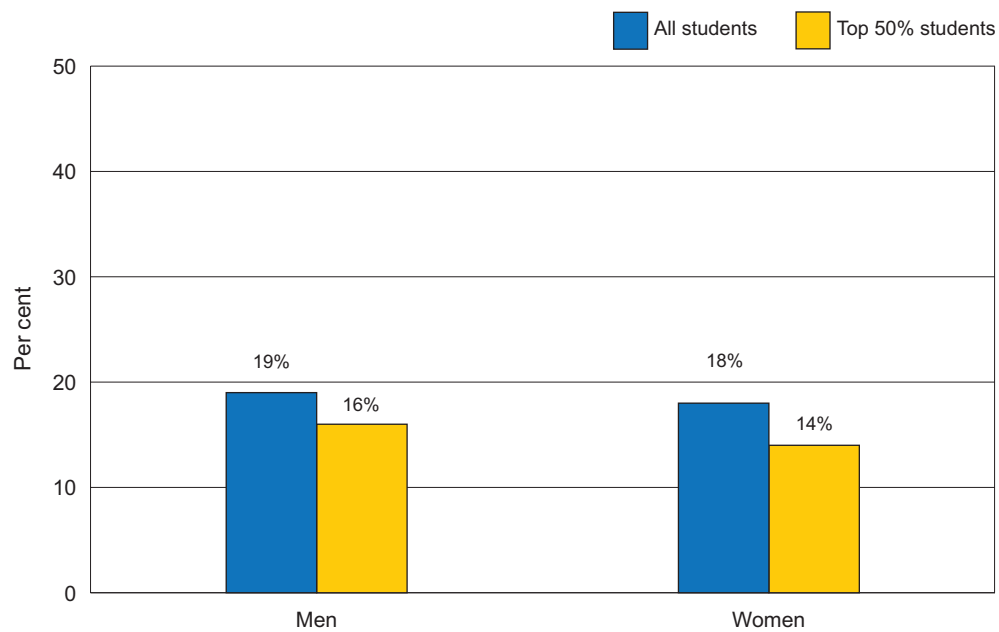
Note: Lowered expectations = students who did, but no longer, plan to attend university.
Source: LSAY98 weighted estimates.

Figure 5   Lowered occupational expectations by gender
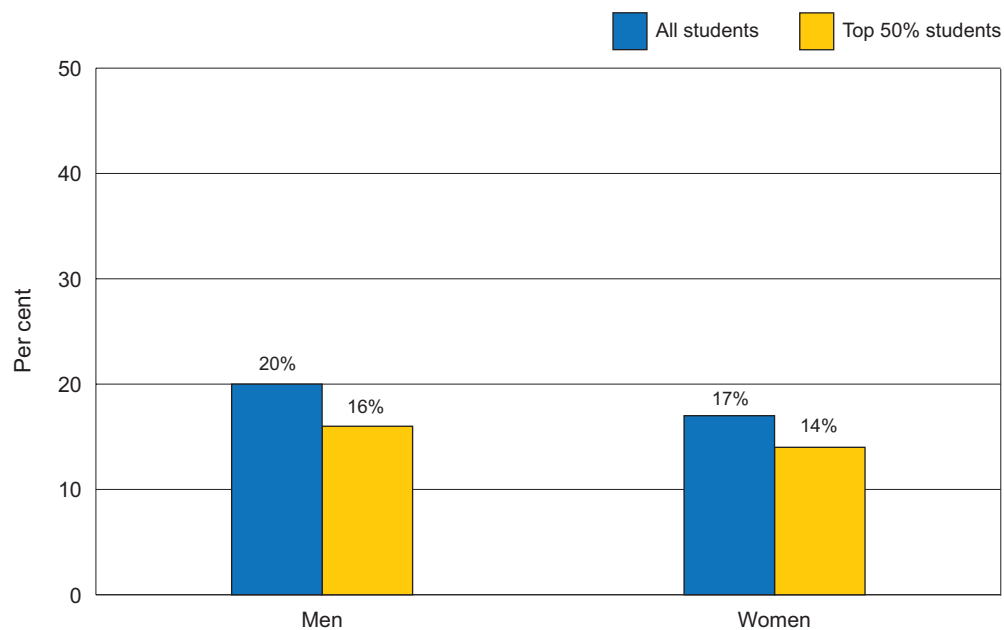
Source: LSAY98 weighted estimates.

The key question that arises from these bivariate comparisons is the extent to which these patterns enable the early identification of students whose academic performance warrants maintaining their very ambitious goals, but whose socioeconomic situation or gender might pose challenges in the realisation of these plans. In order to evaluate the larger number of factors associated with this definition of talent loss, as well as their relative importance as predictors, we now turn to multivariate analyses—a set of logistic regressions (table 1) which model the likelihood of lowering educational and occupational plans among two groups, namely, all the students, and high achievers only.

Determinants of talent loss

The logistic regression models highlight a number of relevant correlates in addition to those presented in figures 2 to 5. The details of the measurement of the predictor variables can be found in appendix B, part 2.

Overall, we find that the predictive power of the models in table 1 is modest and does not exceed 6% (Pseudo R2), suggesting that there is much unexplained variation in the occurrence of talent loss. Notwithstanding this, we can correctly recognise a number of factors which contribute to lowering expectations. Moreover, when the dependent variable is conceptualised as the occupational status of expected employment, the same set of predictors explains approximately 30% of variance in expectations (see appendix B, part 3 for an analysis of this alternative dependent variable).

The overall pattern of associations between the lost talent variables and predictors is informative, since it corroborates the findings of similar studies in the US and the UK, although the overall predictive power of these correlates as a group is limited, as they are closely related to one another. In table 1 we estimate two models for high-achieving students and a further two models in which all students have been included.

Adolescent males are significantly more likely than females to lower their educational and occupational expectations. This finding can be explained by the gendered nature of trade-oriented education and the presence of non-professional career paths that appeal more to young males than females. Therefore, a number of boys who initially consider university education later opt for other career goals, whereas this is less likely to happen among girls, who are consistently more focused on the professions. Parents' lower socioeconomic status remains a significant predictor of downward change in youth ambitions even after a number of other factors are taken into account. This emphasises the importance of recognising that, while parents' influence may be weaker overall during adolescence, family environments remain a strong influence on the educational and occupational orientations and ambitions of young people. These patterns do not only hold among higher achievers, but among all students in the LSAY sample.

The effects of academic performance, self-concept of numerical and literary ability, and satisfaction with the school environment are all negative, as expected. Thus, young people who are good or very good students, or who think they do well at school and feel good at school, are also less likely to give up on their ambitious plans. Consequently, it seems that academically able children from lower SES backgrounds who initially plan professional and managerial careers are more likely to lower their ambitions in the later years of high school. The model also indicates that inadequate access to career information at schools may be conducive to a lowering of career goals. While coefficients for accessing career development information are not significantly different from zero, they are negative in all models, suggesting a possibility that ambitious students who access vocational counselling find it helpful in maintaining their plans.

While these results highlight some factors that affect changes in students' goals, our focus on lowering expectations diverts attention from the stability of plans and an increase in ambition over time, which can be called 'talent gain'. In order to explore patterns other than talent loss, in the next section we consider the stability in students' plans. Our focus in this section however is solely on occupational ambitions.

Table 1 Logistic regression predicting talent loss: lowered occupational expectations and lowered educational expectations

| | Lowered occupational expectations | | | | | | Lowered educational expectations | | | | | |
| | Top 50% students | | | All students | | | Top 50% students | | | All students | | |
	Unstd coeff.	Std error	Odds ratio	Unstd coeff.	Std error	Odds ratio	Unstd coeff.	Std error	Odds ratio	Unstd coeff.	Std error	Odds ratio
Male	0.27*	0.13	1.31	0.19*	0.09	1.20	0.24*	0.12	1.27	0.13	0.08	1.14
Academic achievement	0.01	0.03	1.01	-0.04**	0.01	0.96	-0.07*	0.03	0.93	-0.06**	0.01	0.94
Parents' SES	-0.24**	0.07	0.79	-0.15**	0.06	0.86	-0.23**	0.07	0.80	-0.14**	0.05	0.87
Self-concept of ability in mathematics	-0.14	0.07	0.87	-0.07	0.05	0.94	-0.23**	0.07	0.80	-0.09	0.05	0.91
Self-concept of ability in reading	-0.16**	0.08	0.85	-0.11*	0.06	0.89	-0.10	0.07	0.90	-0.07	0.05	0.94
Accessed information about careers	-0.17	0.13	0.85	-0.09	0.09	0.91	-0.04	0.12	0.96	0.04	0.08	1.05
Integration with school environment	-0.46**	0.15	0.63	-0.15	0.10	0.86	-0.18	0.14	0.84	-0.04	0.10	0.96
Teachers expect me to go to uni	-0.18	0.13	0.83	-0.11	0.10	0.90	-0.09	0.12	0.92	-0.15	0.09	0.86
Friends are going to uni	-0.19	0.13	0.83	-0.26**	0.10	0.77	-0.35**	0.12	0.70	-0.19*	0.09	0.83
Constant	0.61	0.55	1.84	-0.04	0.30	0.96	1.09*	0.52	2.96	-0.15	0.28	0.86
Pseudo R^2	0.05			0.04			0.06			0.04		
N	2547			4155			2815			4480		

Notes: * significantly different from zero at p = 0.05.
        ** significantly different from zero at p = 0.01.
Source: LSAY98 weighted estimates.

Stability of occupational plans in high school

LSAY98 measured occupational expectations on two occasions. Students were asked for the first time in Year 10, or in 1999, what occupation they expected to have after the completion of their studies. This question was asked again in 2001, but not in 2000, 2002, or any of the subsequent years. Although, ideally, we would like to be able to analyse changes in occupational plans year after year, or at least during the period when most young people were at school, such information is not available, and therefore our conclusions have to be based on two points in time only.

We begin by considering the stability of occupational expectations of high school students over time. In the early days of research on adolescent occupational expectations, concerns were raised over the stability and significance of youth plans (Alexander & Cook 1979). On the one hand, young people were perceived as inclined to change their occupational expectations frequently and, to a large extent, randomly. On the other hand, it was accepted that at least some adolescents had a clear picture of what they aimed for in terms of vocational goals, and that their visions remained stable over time (Saha & Sikora 2008).

In LSAY98, students were asked to provide a verbatim description of the occupation they expected to have upon the completion of their studies. These occupational titles were then coded to the four-digit codes of ASCO 2.

Table 2   Expected occupations of students in 1999 and 2001 by ASCO 2 major group

		Top 50% students		All students		
	ASCO 2 major groups	1999	2001	1999	2001	Grouping used in table 3
1	Managers & administrators	2%	7%	2%	7%	Managers & professionals
2	Professionals	71%	66%	58%	53%	Managers & professionals
3	Associate professionals	12%	10%	13%	13%	Associate professionals
4	Tradespersons & related workers	8%	8%	15%	14%	Tradespersons & related workers
5	Advanced clerical & service workers	2%	1%	3%	2%	Other occupations
6	Intermediate clerical, sales & service workers	5%	7%	7%	9%	Other occupations
7	Intermediate production & transport workers	0%	0%	0%	1%	Other occupations
8	Elementary clerical, sales & service workers	1%	1%	1%	1%	Other occupations
9	Laborers & related workers	0%	0%	1%	1%	Other occupations
		100%	100%	100%	100%	
		3883	4402	7730	7329	

Source: LSAY98.

The most striking feature of table 2, which shows the tabulation of responses in the 1999 and the 2001 surveys at the single-digit level of ASCO 2, is that while in high school most students plan a professional career. This is the case for all students and particularly for those whose academic achievement in Year 9 was above average. This pattern is similar to those found in research on recent cohorts of 15-year-olds in other countries (Croll 2008; Goyette 2008).

In 1999, 58% of students who answered this question hoped to enter some form of professional career. In 2001, 53% of the cohort had corresponding preferences. Trades were in the second most expected occupational category, despite the fact that only 15% and 14% of students wished to pursue this type of career. The third most popular choice comprised associate professionals, with occupations in other groups attracting significantly fewer choices. The preferences of the top 50%

students are similar, except that the first choice of professional careers is even more pronounced, and associate professionals, not trades, is the second most popular choice.

Before proceeding to the examination of the stability of students' plans, it is important to consider that this strong preference for professional employment among high school students has been found across various countries (Sikora & Saha 2007), at various points of time (Reynolds et al. 2006; Rindfuss, Cooksey & Sutterlin 1999) and, in Australia, also among students who receive support from the Smith Family[2] (Beavis, Curtis & Curtis 2005). This ubiquity of pattern points to global and macro-cultural rather than local and time-specific causes. The worldwide penetration of values of globalised education proposed by neo-institutionalist theory explains this pattern well (Schofer & Meyer 2005). The emphasis on upward mobility and the equality of access to higher education and highly skilled employment are the core elements of the ideology that drives globalised education. Neo-institutionalism has received wide support in cross-national empirical studies, and thus any educational policies at a national and local level which are intended to influence students' career guidance should recognise the impact of the global cultural forces affecting students' perceptions. Nevertheless, as Hanson (1994) pointed out, universal expectations do not turn into universal attainments. To gain a better understanding of who is at risk of not realising their expectations, we begin by considering how these preferences change over time amongst students, particularly during the last years of secondary education.

In considering the information in table 2, it must be borne in mind that not all students who provided information in 2001 participated in the 1999 survey. After the initial survey in 1998, the 1999 collection of data was affected by high attrition rates and, subsequently, the sample was rebuilt. In 1999, 7730 students reported their occupational plans, while over 3000 failed to answer the question. There were 2000 students who did not describe their plans in 1999, but did so in 2001. In this group, over 1600 students did not participate in the 1999 survey. Conversely, over 2000 students interviewed in 1999 did not participate in the 2001 survey, which means that the figures above convey little information about attrition rates in LSAY98. Notwithstanding this, they are a good representation of the distribution of preferences at both points of time and clearly show the concentration of preferences on professions.

To what extent did students' preferences change between 1999 and 2001? Table 3 provides the relevant information for only those adolescents who gave a valid answer in 1999 and 2001, and whom we classified as high achievers. Because the distribution of choices is heavily concentrated in professional occupations, we have collapsed some major groups, as indicated in the right hand panel of table 2.

Table 3   Stability of occupational expectations over time, top 50% students

1999	2001					
	Managers and professionals (%)	Associate professionals (%)	Tradespersons (%)	Other occupations (%)	%	
Managers and professionals	*83*	8	4	5	100	2002
Associate professionals	65	*19*	8	8	100	320
Tradespersons	33	10	*47*	10	100	193
Other occupations	41	17	5	*37*	100	204
Total	74	10	8	8	100	2719

Source: LSAY98, 1999 and 2001 surveys, weighted estimates.

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[2] Early studies of student expectations asserted that youth affected by socioeconomic hardship had usually very modest aspirations. More recent studies, including the Beavis, Curtis and Curtis study mentioned here, demonstrate that ambition levels may be high among students who have very limited social and economic resources.

The strong focus on professional occupations seems to persist between Years 10 and 12. On the whole, students who in the earlier survey said that they expected to work in one of the professional or managerial occupations maintained their plans in Year 12. The pattern is very similar among the top 50% students, and when all students are considered (see table C1 in appendix C).

Fewer than one in five students adjusted their plans downwards. Eighty-three per cent of the group interviewed in 1999 who planned to achieve a high-status job after completion of their education did so also in 2001.

In general, high school students hold very ambitious occupational expectations, which, if anything, are more likely to be upgraded in the last couple of years of high school. This is indicated by higher proportions of students below the diagonal row in table 3 by comparison with the figures above the diagonal row. For instance, 65% of students who initially expected a career in one of the associate professional occupations upgraded their plans to professional careers over Years 11 and 12. Of those who indicated an inclination towards trades, only 47% retained the same preference in the 2001 survey. Similarly, many students whose initial preferences fell into one of the major occupational groups denoted by digits 4 through 8 in ASCO 2 (Others) were likely to upgrade their goals to professional or associate professional destinations. Overall, the correlation between expectations in 1999 and 2001 is r = 0.46, which is comparable with the correlation between the educational and occupational status of working adult Australians—a moderately strong correlation.

The occupational plans of students are more consistent over the last three years of high school than the most pessimistic predictions would assume. A comparison of major ASCO 2 groups, however, cannot reveal finer differences between occupations. Therefore, we next turn to AUSEI06, which captures more variation within the professional destinations (McMillan, Beavis & Jones 2009). To create AUSEI06, scores have been assigned to occupations, based on the 2006 census 'in such a way as to maximise the role of occupation as an intervening variable between education and income. Conceptually, occupations are viewed as the means of converting a person's human capital (education) into material rewards (income)' (McMillan, Beavis & Jones 2009, p.125).

The usefulness of the scale is best illustrated when we only consider the expectations of students who opted for managerial or professional occupations in both surveys and had above-average academic achievement in Year 9 (table 4). While coded to major ASCO 2 groups, students' preferences appear concentrated and stable; however, once they have been converted into AUSEI06, they reveal far more diversity. Table 4 shows the proportions of students whose expectations: were of identical status in 1999 and 2001; differed by up to ten points, which is only a small change; differed by between ten and 20 points; and, finally, differed substantially; that is, by more than 20 points on the two occasions.

Table 4   Changes in status of expected professional and managerial occupations between 1999 and 2001, top 50% of students

	Students with above average grades	Female students with above average grades	Male students with above average grades
Between 1999 and 2001 status was:			
Reduced by more than 20 AUSEI06 points	12%	12%	12%
Reduced by 10 to 20 AUSEI06 points	11%	13%	9%
Reduced by less than 10 AUSEI06 points	15%	13%	19%
Same score	33%	36%	29%
Increased by up to 10 AUSEI06 points	12%	11%	14%
Increased by 10 to 20 AUSEI06 points	8%	10%	7%
Increased by more than 20 AUSEI06 points	8%	6%	11%
Total	**1866**	**1045**	**818**

Source: LSAY98, 1999 and 2001.

In table 4, a difference of over 20 AUSEI06 points indicates a change from, for instance, planning to become a medical specialist (higher status) to planning on working as an illustrator and graphic designer (lower status).

Given this categorisation, 33% of high achievers planned to work in a professional job with exactly the same status in 1999 and 2001. About a third of students adjusted their plans downwards. In 2001, 15% of this group named an occupation which had a somewhat lower status, that is, fewer than ten AUSEI06 points lower than their initial plan in 1999, while 11% adjusted their plans downwards by between ten and 20 AUSEI06 points—a substantial shift. Another 12% expected to work in jobs with a status of over 20 points below their original plans.

These downward adjustments could be seen as significant and perceived as indicative of 'lost talent' when made by students whose early academic achievement situated them 'above average' in their age group. But it is notable that these downward adjustments are balanced out by the rise of ambition at the other end of the spectrum, where almost as many students hoped to attain even higher-status employment by Year 12. This is also the case when all students are considered (see table C2 in appendix C), not only the upper 50% with best academic results. Thus, status scores reveal that, although adolescents tend to change their plans, they mostly tend to swap one expected professional career for another professional career, and both genders are equally likely to make upward and downward adjustments (table 4). This is important, as there are no systematic tendencies for girls or boys to be more likely than the other gender to give up on early plans to enter professional careers. Changes in students' plans from one profession to another tend to balance out in terms of status at the aggregate level. Among students planning professional employment, talent loss is compensated by talent gain. For individuals, however, any downward changes heighten a risk of lower attainment, as we show later in this report.

Another notable aspect of this analysis is the apparent paradox of the stability of these expectations, which under different measurement specifications may appear far more homogeneous than they actually are. On the other hand, there is no doubt that the concentration of hopes on professional occupations is strong, particularly among those students who continue schooling until Year 12. This is noteworthy because the actual accommodation rate for professionals in the group of workers aged between 25 and 34 was about 30% for females and only 20% for males, according to the 2006 census (ABS 2007), and about 35% for females and only 23% for males in LSAY98 (figure 6).

A contrast between students' plans and attainments can highlight the extent to which segregation in employment reflects the segregation already present in high schoolers' plans for their future careers. To explore this issue further, we turn our attention to the gender segregation of plans and employment.

Are plans and attainments gender-typed?

Although gender segregation in employment does not have to lead to gender inequality, the balance of empirical evidence indicates that the two phenomena are closely related (Loutfi 2001). Gender segregation refers to the concentration of men and women in different occupations. It is useful to distinguish vertical and horizontal components of segregation. The former refers to the concentration of genders in occupations of different statuses, for example, professional versus non-professional. The latter denotes unequal proportions of men and women in occupations of a similar status. The continuing gender segregation reflects and contributes to the stereotypes which construe men and women as 'naturally' suited for caring or analytically oriented occupations, respectively. Such stereotypes may affect the occupational preferences of young men and women and thus limit their potential. This can be harmful even if the economic consequences of segregation, that is, income differences, are negligible.

A comparison of gender segregation of students' occupational expectations and their actual attainments can shed light on the process of adjustment of expectations to the perceived labour market conditions. There are three possible scenarios: firstly, students' expectations can be segregated approximately to the same degree as attainments; secondly, students' vocational plans can be far more gender-specific than their employment is likely to be; and, finally, students may expect to work mostly in environments which are relatively gender-integrated, while the labour market is, in fact, more segregated.

In this section we consider which of the three scenarios is borne out in the LSAY98 survey data. The third scenario can be seen as a form of talent loss if young men and women are steered away from particular occupational destinations because of structural constraints and cultural gender stereotypes. Assuming that a high degree of gender integration is a desirable policy goal, it is essential to know the extent to which the gender specificity of young people's employment matches the gender segregation of their own preferences.

We examine the gender segregation of students' expectations in Year 10 and their attainments in the last wave of the survey, in 2008. Because patterns of gender typing are similar for the high-achieving students and for the total cohort, we do not limit our analyses in this section to high achievers only. We contrast the modal occupations expected by students of both genders and conduct an analysis of the factors which are related to the choices of more gender-integrated careers.

First, the vertical component of gender segregation is presented in figure 6, which contrasts students' expectations with the actual distribution of jobs among the working LSAY98 respondents who participated in the 2008 wave. While in Year 10, most students had a strong desire to work in professional occupations, a preference which was significantly stronger amongst girls than boys. It is also evident that many hopefuls missed out on realising their plans, although some students entered managerial occupations that did not feature prominently on the list of expected careers. Other hopefuls, however, worked as clerks and salespersons and their entry into the professions was, at least, delayed. Given that over time the proportion of professional jobs in the labour market has grown, it may be functional to have a large pool of young people aspiring to professional employment. But even when the expansion of professional employment is considered (table D3 in appendix 3), the demand for this type of career among youth appears high, particularly among young women.

Figure 6   Comparison between student expectations and labour market composition by gender

Occupational plans in
Year 10 (ANZSCO)

Occupations in LSAY 2008
(ANZSCO)

	Occupational plans in Year 10		Occupations in LSAY 2008	
	Males	Females	Males	Females
Managers	5%	3%	11%	9%
Professionals	56%	66%	23%	35%
Technicians and trades workers	26%	9%	27%	5%
Community and personal service workers	9%	16%	7%	15%
Clerical and administrative workers	1%	3%	9%	21%
Sales workers	1%	1%	7%	10%
Machinery operators and drivers	1%	0%	7%	0%
Labourers	2%	1%	10%	4%

Per cent

Per cent

■ Males
■ Females

Source: LSAY98, 1999, 2008; ABS (2006c).

Table 5 supplements the information in figure 6 with the breakdown of students' preferences in 2001, that is, when most students were in Year 12, and also includes the distribution of occupations held by young adults aged 25 to 34 years in the 2001 census. We used these figures to compute two indices of gender segregation. The first is the Duncan Index of Dissimilarity, which can be interpreted as the proportion of men or women who would have to be moved across to other occupations to achieve gender-balanced composition of the labour force (Duncan & Duncan 1955). The details of the computation for this index and its improved version by Karmel and McLachlan, our second index, are presented in appendix D.

Table 5   Gender segregation of expectations and attainments

ASCO 2 major group code and title	%		%		%	
	Expectations 1999		Expectations 2001		Workers aged 25–34 census 2001	
	Males	*Females*	*Males*	*Females*	*Males*	*Females*
1 Managers & administrators	2.2	1.0	8.4	5.2	9.0	5.6
2 Professionals	50.1	65.2	47.2	59.1	17.9	26.4
3 Associate professionals	17.8	9.5	13.9	11.9	13.0	13.2
4 Tradespersons & related workers	24.0	6.1	22.8	4.8	22.5	3.3
5 Advanced clerical & service workers	0.5	4.6	0.2	2.9	0.8	7.9
6 Intermediate clerical, sales & service workers	2.0	12.1	3.8	14.7	9.6	26.6
7 Intermediate production & transport workers	0.9	0.0	1.3	0.1	12.6	2.1
8 Elementary clerical, sales & service workers	0.9	1.3	1.0	1.4	4.9	9.7
9 Labourers & related workers	1.6	0.3	1.5	0.1	9.6	5.1
Duncan Index of Dissimilarity (9 categories)	30		26		38	
Duncan Index of Dissimilarity (44 categories)	42		40		46	
Karmel & MacLachlan's Index (9 categories)	15		13		19	
Karmel & MacLachlan's Index (44 categories)	21		20		23	
Total %	**100**	**100**	**100**	**100**	**100**	**100**
Total N	**3 724**	**3 976**	**3 583**	**3 725**	**1 055 476**	**879 504**

There is little doubt that by the time students are in Year 10, and two years later, their career expectations are gender-segregated. When we consider only nine one-digit level categories of ASCO 2 (table 5), 30% of girls and boys would have to move in the distribution in 1999, and 26% would have to move in 2001 for the genders to be perfectly balanced. But this is significantly lower than the 38% which will have to be redistributed in the labour market to achieve gender integration. The Karmel and MacLachlan Index, which makes corrections for the relative proportions of men and women involved in the computations, leads to essentially the same conclusions. Furthermore, the same conclusions are reached regardless of whether we compute indices of dissimilarity for only major occupational groups at the one-digit level, or whether we utilise finer distinctions by comparing 44 occupational groups at the two-digit level. (See Karmel & MacLachlan 1988 for an illustration of how values of indices change when more occupational categories are considered.) The expectations are also less gender-segregated than the actual attainments in the LSAY 2008 survey data, for which the index value is 36 at the one-digit level and 46 at the two-digit level (not shown in the table above). All these analyses reveal a disparity between what young people expect and what they are likely to encounter in the labour market in relation to gender integration. This disparity is as predicted by the third scenario described in the beginning of this section, which stipulated that youth plans are less gender-specific than actual employment.

The employment environments of young men and women are likely to fall short of their earlier expectations in terms of gender composition. This makes evident the challenges awaiting policies intended to encourage greater gender integration, as they would simultaneously need to address the issues relating to the structural composition in the labour market as well as deeply ingrained gender preferences, which by Year 10 seem internalised by adolescents planning their future employment paths.

The pattern we find in this analysis would be seen as a positive phenomenon if there were evidence of a decrease in gender segregation in the Australian labour market during the last four or five decades. Had this been the case, we could assume that the more gender-integrated outlook of younger workers over time fosters gender desegregation. Research consistently shows, however, that the degree of gender segregation in Australia has remained at 38 units of the Duncan Index of Dissimilarity, despite women's increasing participation (Karmel & MacLachlan 1988; Lee & Miller 2004). Thus, the disparity between what the youth expect and are likely to attain should be seen as

an incentive to develop more integration-oriented policies. Youth expectations alone are not a sign of a juggernaut-like future integration.

Gender segregation indices convey little information about the types of careers that students of both genders prefer. Therefore, the next section provides information about specific careers that appealed to young men and women in this cohort.

A closer look at gender segregation: what jobs for girls and what for boys?

In line with prior studies (Patton & Creed 2007a, 2007b), we find that most students tend to choose their career objectives from a relatively limited range of occupational titles. This is why, by showing only the 15 most popular occupational choices in Year 10, we are nevertheless able to summarise occupational plans for over 45% of male and female students (table 6).

As previously shown, most students have manifestly ambitious plans and intend to work in the highly skilled managerial or professional occupations. The ASCO codes beginning with the digit 2, denoting professional employment, dominate the choices of both boys and girls. As previously pointed out, this corresponds with findings in other countries and at other points in time.

Only three occupations, namely legal professionals, accountants and designers/illustrators feature on both lists of the 15 most frequently desired jobs, and they account for a small portion of total choices for each gender (table 6). The most popular choices among boys, such as computer technicians, engineers or motor mechanics, do not feature among careers coveted by girls. In contrast to boys, girls expect to work in childcare, psychology, tourism, journalism and nursing. The gender composition of particular occupations is captured by indicators of gender imbalance. They are computed using the information on gender composition of particular occupations from the 2006 census tables (ABS 2007), and show horizontal segregation only. We obtain scores for particular occupations by subtracting the proportion of females from the proportion of males in each of the four-digit level ASCO 2 occupational groups. This produces gender imbalance indicators ranging from -1 to +1, where -1 represents occupations entirely dominated by women, 0 denotes occupations with equal proportions of men and women, and +1 signifies occupations entirely dominated by men.

Boys strongly prefer jobs which are dominated by male workers (the mean gender imbalance value for their 15 most popular choices is 0.57). For instance, the value of the index for computing support technicians is 0.52, which indicates a moderate overrepresentation of men. The value of 0.98 for motor mechanics indicates that almost all mechanics in the 2006 census were males. Careers in law, accountancy or graphic design are equally attractive to both genders, and these are the only highly attractive occupations with equal proportions of men and women. For almost everything else, preferences of male and female students diverge.

Table 6   Modal expected occupations (ASCO 2) by gender

ASCO 2 code and title	%	Gender imbalance Indicators
Panel 1: Boys		
3294 Computing support technicians	5.5	0.52
4211 Motor mechanics	4.1	0.98
2231 Computing professionals	4.0	0.60
2129 Other building and engineering professionals	3.8	0.75
2541 Air transport professionals	3.5	0.87
2521 Legal professionals	3.1	0.16
3911 Police officers	3.0	0.52
2121 Architects and landscape architects	3.0	0.47
4411 Carpentry and joinery tradespersons	2.9	0.98
2211 Accountants	2.6	0.07
3322 Chefs	2.4	0.50
2533 Designers and illustrators	2.4	0.00
2125 Electrical and electronics engineers	2.3	0.82
4311 Electricians	2.2	0.98
3993 Sportspersons, coaches	1.8	0.36
Total %	**46.8**	**Mean:**
Total N	**3732**	**0.57**
Panel 2: Girls		
2533 Designers and illustrators	4.7	0.00
2521 Legal professionals	4.5	0.16
6312 Children's care workers	4.2	-0.92
2514 Psychologists	3.9	-0.51
5996 Travel attendants	3.3	-0.40
2323 Registered nurses	3.2	-0.84
2534 Journalists and related professionals	3.2	-0.04
2412 Primary school teachers	3.0	-0.69
2538 Actors, dancers and related professionals	2.9	0.01
2411 Pre-primary school teachers	2.7	-0.97
2392 Veterinarians	2.6	0.02
4931 Hairdressers	2.6	-0.71
2211 Accountants	2.5	0.07
2413 Secondary school teachers	2.3	-0.17
2410 School teachers	2.3	-0.39
Total %	**47.9**	**Mean:**
Total N	**3976**	**-0.36**

Source: LSAY98, 1999 survey, weighted estimates.

Most of the girls' choices have negative values of gender imbalance, as many girls want to work in moderately feminised occupations (the mean value for the 15 most popular choices is -0.36). The exceptions to this are the three occupations mentioned above, as well as veterinarians, actors and dancers, which are gender-neutral careers and quite popular amongst females. A corresponding table listing 15 most desired occupations in Year 12 by gender is provided in appendix D (table D2). The lists of expected occupations are virtually identical between Years 10 and 12.

When expectations are contrasted with attainments in the last wave of LSAY98 (see table D1 in appendix D), we note that, while many occupations aspired to in high school feature also on the list of respondents' most frequently held jobs, there are several, mostly retail sales and clerical work, which did not appear on the list of the most popular students' goals at all. Moreover, young women

are still most likely to work as teachers and nurses, which, although quite popular, were not the most sought after destinations in high school. This demonstrates both a degree of discrepancy and some correspondence between adolescent preferences and the demand in the labour market.

What factors facilitate non-traditional choices of occupations with respect to gender? Table 7 summarises a model which explores aspects of family background, academic performance in mathematics and reading, and perceptions of self-ability as indicators of a propensity to elect a more gender-integrated career. The analyses are conducted separately for males and females.

Our dependent variable in table 7 is gender imbalance, which ranges from +1 for occupations dominated entirely by men, to -1 denoting occupations dominated entirely by women, with zero signifying gender-balanced employment. The relative status of particular occupations is disregarded in this analysis.

Table 7   OLS regression predicting plans to enter a male-dominated or female-dominated occupation (indicators of gender imbalance[1])

	Females 1999			Males 1999		
	Unstd coeff.	Std error	Std coeff.	Unstd coeff.	Std error	Std coeff.
Maths achievement	0.012**	0.00	0.09	-0.002**	0.00	-0.02
Reading achievement	0.002**	0.00	0.02	-0.009	0.00	-0.08
Parents university-educated	0.031	0.03	0.02	-0.076*	0.03	-0.06
Parents' occupational status	0.001*	0.00	0.05	-0.002**	0.00	-0.07
Self-concept of ability in reading	0.012**	0.01	0.02	-0.045**	0.01	-0.08
Self-concept of ability in mathematics	0.027**	0.01	0.05	0.009**	0.01	0.02
Constant	-0.524	0.05		0.808	0.04	
Adjusted R2	0.03			0.04		
N	3476			3172		
	Females 2001			Males 2001		
	Unstd coeff.	Std error	Std coeff.	Unstd coeff.	Std error	Std coeff.
Maths achievement	0.010*	0.00	0.07	-0.010**	0.00	-0.08
Reading achievement	0.003*	0.00	0.02	-0.007**	0.00	-0.06
Parents university-educated	0.048**	0.03	0.04	-0.051	0.03	-0.04
Parents occupational status	0.001*	0.00	0.05	-0.001	0.00	-0.03
Self-concept of ability in reading	-0.003	0.01	0.00	-0.067**	0.01	-0.13
Self-concept of ability in mathematics	0.053**	0.01	0.10	0.035**	0.01	0.07
Constant	-0.558	0.05		0.780	0.04	
Adjusted R^2	0.03			0.04		
N	3275			3077		

Notes: ** statistically different from zero at p = 0.01
    * statistically different from zero at p = 0.05
    1 female-dominated jobs = - 1; male-dominated jobs = + 1
Source: LSAY98, 1999 and 2001 surveys, weighted estimates.

Although the models explain relatively little variance in occupational plans (R Square values do not exceed 0.05 or 5%), it is worth noting that performance in mathematics is the most important factor for females in facilitating a choice of a more gender-neutral occupation (standardised coefficient 0.09). By contrast, a better performance in reading facilitates a choice of a less gender-traditional career among male students (standardised coefficient -0.08). Children of parents from more advantaged socioeconomic backgrounds are slightly more likely to consider less gender-traditional career paths, as the coefficients for parents' university education and occupational status indicate, although not all of them are significant in all models.

These results are not surprising and they vindicate the significance of policy measures targeting greater involvement of both genders in all areas of academic achievement. Such policies clearly may have some implications, although moderate, for the gendered choice of a career path. In particular, the good performance of girls in mathematics accompanied by a positive perception of their own ability in this area encourages expectations of careers which are more gender-integrated. For boys, good performance in reading, combined with a positive self-perception of ability in this area, results in a similar outcome.

In this section we have found that occupational expectations are strongly gender-typed not only when boys and girls choose careers marked by a different occupational status, but also when they choose occupations with a similar status. To complement this analysis, the next section explores the relationship between the status of expectations and attainments for both genders.

Occupational plans and career entry

So far, we have examined the concept of lost talent and the characteristics of students who are more likely to experience talent loss. We have also considered a possible link between the concept of lost talent and the gender segregation of expectations and attainments.

All of these issues, however, could be considered of little significance if adolescent plans were to have no real impact on attainments in early adulthood. Thus the central question in this analysis concerns the role that occupational plans play in the actual occupational attainments of young Australians in this cohort. In order to gain an understanding of this process, we have analysed the data on plans and attainments of all students, not just the top 50%, using longitudinal data-modelling techniques (which are explained in appendix E).

In order to create our dependent variable, attainment, the information about respondents' actual occupations held at any time between 1999 and 2008 has been coded to the four-digit level of ASCO 2 or ANZSCO and then recoded to the values of the AUSEI06 occupational-status scale, which is our main dependent variable in this section. We consider two versions of our dependent variable. Firstly, we consider all employment, while also estimating models that include only those forms of employment which respondents deemed potentially 'career related'. Arguably, not all employment periods can be seen as relevant to the ultimate individual career objectives. For instance, some individuals, even if they showed early signs of talent, will not succeed in obtaining their goals because of limited opportunity structures. More importantly for young people, however, many students engage in part-time or even full-time employment, which they see as temporary and aimed at supporting them while in training or waiting for the 'real' job. Thus, it could be misleading to treat all employment experiences as indicators of achieved career goals, since the effect of early plans could be weak or altogether hard to establish. As a result of these considerations, in order to gain insight into these issues we have restricted our comparison in some analyses to only those forms of employment which respondents believed could become their 'possible career'.

To fully utilise the wealth of the information available in LSAY98 we conduct analyses on person-year observations. The transformations of longitudinal data described in appendix E resulted in about 45 151 person-year observations for over 8000 students, after cases with missing data, which could not be imputed, are removed. Descriptive statistics for the key variables, used as predictors in the multivariate analyses, are shown in table 8.

Table 8   Descriptive statistics: LSAY person-year data 1999–2008

Variable	No. of person-year observations	Mean	Std. dev.	Min	Max
Respondents' occupational status (all jobs)	45 151	36.5	18.8	0.0	100
Respondents' occupational status (career jobs)	15 227	46.4	22.4	0.0	100
Expected status of the first job	37 760	65.1	22.1	0.0	100
Male	45 053	0.48	0.50	0.0	1.0
Educational achievement in Year 9	45 000	0.13	0.96	-3.1	2.3
Parents' socioeconomic status	41 541	0.07	0.88	-1.3	2.7
Age	45 151	2.32	2.75	-3.0	8.5
Expected university degree	38 102	0.65	0.48	0.0	1.0
No answer to question about expected job	41 340	0.02	0.2	0.0	3.0

Source: LSAY98.

On average we have over five years of respondents' employment histories (table 8). The information on student employment (occupational status) is provided in the AUSEI06 scores and the average value is 36.5 for all employment years. The average value of occupational status for career-related employment is 46.4.

The students' occupational expectations are also coded to the AUSEI06 scale and their average value is 65.1. To ensure that intercepts in the estimated models are of interpretable magnitude, the age of students has been centred at 18 years, so the minimum value of -3 is indicative of 15 years of age. The sample comprises equal numbers of person-year observations from men and women (the mean value for males is 0.48). Educational achievement, as well as the measure of parents' SES, has the means close to zero and the standard deviation close to 1, after standardisation. More detail on the measurement of variables is in appendix E.

It is important to note that, due to data limitations, some variables in these analyses are treated as time-invariant, although changes to these variables over time are possible and likely. We treat parents' education and occupation as time-invariant, although LSAY collected information about parents on at least two separate occasions. Any gains from accounting for the change of educational and occupational status amongst parents during the intervening decade are negligible, however, and thus we use the information on parents' SES collected in 1998.

Moreover, we treat academic achievement as time-invariant, which, again, is problematic, but enforced by a lack of information in subsequent years. We do, however, have information on students' intentions to attend university, collected each year between 1998 and 2001.

By contrast, information about occupational expectations is treated as time-varying, although available only for 1999 and 2001. We therefore assume that expectations were identical in the person-year file between 1999 and 2000. Moreover, we assume that they remained identical between 2001 and the years that followed. Students who gave information on only one occasion were selected out of the analyses to make sure that we create no bias by introducing 'artificial stability' to occupational plans.

With this information in hand, we first focus on the influence of occupational expectations on attainment. All analyses are conducted separately for men and women because they are known to experience different trajectories in their transitions from education to work.

Table 9   Influence of occupational expectations on attainment: 1999–2008, all employment

| | Model 1 | | | | Model 2 | | | | Model 3 | | | |
| | Women | | Men | | Women | | Men | | Women | | Men | |
	Unstd coeff.	Std error	Unstd coeff.	Std error	Unstd coeff.	Std error	Unstd coeff.	Std error	Unstd coeff.	Std error	Unstd coeff.	Std error
Fixed effects												
Time-varying variables												
Age	3.50**	0.04	3.01**	0.04	3.47**	0.04	2.99**	0.04	2.59**	0.04	2.34**	0.05
Expected status of the first job	0.06**	0.01	0.06**	0.01	0.04**	0.01	0.04**	0.01	0.02*	0.01	0.03**	0.01
Expected university degree	1.51**	0.27	3.04**	0.38	0.63*	0.27	2.00**	0.39	-0.56	0.29	1.19**	0.42
Respondent completed university	-		-		-		-		19.14**	0.46	20.3**	0.59
Number of respondent's children	-		-		-		-		-3.61**	0.49	-0.34	0.74
Time-invariant variables												
Academic performance in Year 9	-		-		1.51**	0.15	1.76**	0.19	1.24**	0.15	1.37**	0.19
Parents' socioeconomic status	-		-		1.00**	0.17	1.04**	0.20	0.65**	0.16	0.78**	0.21
(constant)	24.65**	0.35	22.83**	0.42	26.08**	0.37	24.34**	0.44	27.69**	0.38	25.38**	0.47
Random effects												
Variance between students	30.8	15%	80.6	29%	28.8	14%	78.0	28%	30.6	16%	83.5	31%
Variance of student-specific observations	180.9	85%	201.2	71%	180.9	86%	201.5	72%	159.9	84%	185.9	69%
Total R Squared		29%		21%		30%		22%		40%		28%
Number of students	4 626		4 428		4 613		4 398		4 285		4 149	
Number of observations	23 370		21 772		23 326		21 674		21 522		20 320	

Notes: ** statistically different from zero at p = 0.01.
         * statistically different from zero at p = 0.05.

Table 10 Influence of occupational expectations on attainment: 1999–2008, career employment

	Model 1				Model 2				Model 3			
	Women		Men		Women		Men		Women		Men	
	Unstd coeff.	Std error	Unstd coeff.	Std error	Unstd coeff.	Std error	Unstd coeff.	Std error	Unstd coeff.	Std error	Unstd coeff.	Std error
Fixed effects												
Time-varying variables												
Age	3.86**	0.05	2.77**	0.06	3.83**	0.05	2.72**	0.06	2.21**	0.09	1.35**	0.08
Expected status of the first job	0.12**	0.01	0.14**	0.01	0.09**	0.01	0.11**	0.01	0.08**	0.01	0.11**	0.02
Expected university degree	5.11**	0.49	6.23**	0.50	3.77**	0.49	4.63**	0.51	2.22**	0.60	3.66**	0.57
Respondent completed university									20.29**	0.69	17.78**	0.83
Number of respondent's children									-3.00**	0.65	-1.55	0.84
Time-invariant variables												
Academic performance in Year 9					2.63**	0.25	3.15**	0.28	2.26**	0.30	3.35**	0.33
Parents' socioeconomic status					1.85**	0.29	1.82**	0.36	1.55**	0.34	1.73**	0.41
(constant)	25.11**	0.62	23.08**	0.68	27.78**	0.64	26.01**	0.72	29.85**	0.75	29.07**	0.95
Random effects												
Variance between students	83.0	35%	134.4	46%	78.2	33%	129.8	45%	99.2	42%	159.5	54%
Variance of student-specific observations	157.4	65%	159.1	54%	157.0	67%	159.2	55%	135.6	58%	136.2	46%
Total R Squared		44%		33%		46%		35%		52%		41%
Number of students	3519		3483		3507		3462		2627		2851	
Number of observations	8566		9834		8537		9777		6733		8423	

Notes: ** statistically different from zero at p = 0.01.
  * statistically different from zero at p = 0.05.

Our first model focuses on the effect of occupational plans with the only controls being students' age and the expectation to attend university (model 1 in table 9). When no other factors are considered, a high school plan to attend university or to have a high-status job is positively associated with attaining such a job. This is the case for men and women, for whom coefficients are similar, except that an early plan to attend university is significantly more beneficial for young men than for women (table 9: 3.04 versus 1.51 in model 1). Nevertheless, the advantage conveyed by concrete career plans is identical for both sexes.

This advantage persists in model 2, where we introduce parents' socioeconomic background and students' academic performance as controls. Students' families play a crucial role in fostering specific occupational goals. Students' ambitious plans, however, boost attainments independently of family environment and academic record. Most importantly, the plan to work in a high-status job conveys an additional advantage to the plan of attending university. These plans are likely to be affected by peers and teachers. (We show how support for obtaining particular educational qualifications affects students' occupational plans in appendix B, part 3). Unfortunately, we have no measure of peer and teacher support for students' particular career plans, meaning that we must allow for the 'pure' individual motivation depicted in our model to also convey some influence of peer group and school environment, including teachers.

Next, in model 3, we control for university completion, which is, not surprisingly, very strongly related to high-status attainment. We also control for early parenthood, which hinders the status of employment of young women but does not negatively affect young men.

The direction of strength of these associations is as expected and documented by prior research on related topics. However, it is notable that students' occupational plans formed in high school have a positive and significant impact on later attainments, even after all the controls have been introduced. This finding is of crucial importance, as it vindicates all the policy measures which strive to provide informed and individually tailored vocational counselling to students in various high school programs. It also illustrates that, while much of the benefit associated with students' ambitious goals formed in high school is due to student academic performance and family background, ambitious plans have positive effects entirely independent of these influences.

These same patterns emerge in table 10, in which we only model career-related employment. As many respondents had not had an opportunity to be in their career-related job for more than a couple of years by the time the last LSAY98 survey was conducted, we have fewer observations related to careers. Nevertheless, the effect of occupational expectations is positive and remains significant for both men and women in all three models shown in table 10.

The relationship between expectations and the status of 'career jobs' is stronger than the corresponding associations depicted in table 9. This shows that respondents who make ambitious plans early on stand a better chance of early entry into jobs that appeal to them as possible careers. Given that entry-level jobs are consequential for later employment trajectories (Lee & Miller 2004), this may be a form of distinct advantage. This strong relationship between adolescent plans and high-status employment holds above and beyond the controls discussed in the context of table 9. Some effects, such as academic performance of boys, have significantly stronger relationships with high-status 'career' jobs.

It is important to note that, in the following sections we do not report separate estimates for the top 50% students, since patterns for high achievers were found to be no different from the patterns for the whole cohort.

Does 'not having' career plans in high school matter?

The question about occupational plans is difficult for some students in Year 10 to answer. For instance, White (2007), in his qualitative study of students' plans in the UK, found that about a third of students had devoted little thought to their occupational plans, although many had clear educational objectives. International comparisons also show that many students find it difficult to formulate a valid answer to a question about their future career when asked about it in Year 9 or 10 (Sikora & Saha 2009).

The absence of occupational plans as such can constitute a disadvantage, as students who do not know what jobs they would like to have after finishing their study are unlikely to make optimal educational choices. Although less than 17% of students interviewed for LSAY98 in 1999 and 2001 did not answer the question about occupational plans, that percentage may be at a disadvantage, if indeed the absence of concrete occupational goals in high school is detrimental to later occupational attainment.

Our models in this section are analogous to those presented previously; however, in place of the occupational status score for expected employment, we have employed a dummy variable to indicate no valid answer to this question. For the purpose of comparison, we performed a separate estimation of the effects of 'indecision' relating to occupational status of all employment years and of employment that was only considered to be related to a potential career (tables 11 and 12).

All coefficients denoting missing occupational expectations are negative, suggesting that the absence of early career goals is detrimental. The results, however, differ by gender. While young women seem to be adversely affected by an absence of ambitious career plans, for young men the effect of missing occupational plans is not statistically different from zero. For men, early plans to complete university are particularly important to gaining high-status employment, which is different from a much weaker corresponding effect for females. However, having some occupational plan in high school seems to matter less for males because, even before plans to attend university are taken into account, the negative coefficient for the 'indecision' of young men does not reach conventional significance levels (not shown in table 11). The greater importance of a plan to go to university for men can be interpreted in the context of gender differences in adolescent expectations and adult employment opportunities. Young men have a choice between at least two relatively attractive career trajectories which are aligned with specific educational pathways. Managerial or professional careers usually require a university degree, while careers in the trades do not. In contrast, women's prospects in trades have historically been limited (Teese & Polesel 2003, p.158), and thus most adolescent women expect to enter the professions. As most professions require a university degree, having a concrete occupational plan adds explanatory power to the model for women. However, for men, because they also regard the trades as a career option, the career preferences are more clearly aligned with the choice to complete or not to complete university. The same patterns emerge when career employment (as contrasted with all employment) is considered as the dependent variable (table 12).

While we must treat the results in table 12 with caution due to the relatively small numbers of employment years with relevant information, it appears that lack of occupational plans in high school may hinder young people's, and particularly women's, chances of earlier entry to higher-status employment of the type they consider desirable, that is, as a potential career. The key finding, given our research question, is that some form of an early occupational goal is beneficial, particularly for young women, if success is to be measured by securing high-status employment at early stages of post-school labour market participation. Young men are less in need of knowing their specific career preferences, but if they are to work as managers or professionals, planning early on going to university is essential.

Table 11   Lack of occupational expectations in adolescence and its effect on occupational attainment, all employment

	Model 1				Model 2			
	Women		Men		Women		Men	
	Unstd coeff.	*Std error*	*Unstd coeff.*	*Std error*	*Unstd coeff.*	*Std error*	*Unstd coeff.*	*Std error*
Fixed effects								
Time varying variables								
Age	3.50**	0.04	3.02**	0.04	2.58**	0.04	2.33**	0.05
No expected occupation	**-0.87**	**0.28**	**-0.42**	**0.35**	**-0.66***	**0.28**	**-0.53**	**0.36**
Expected university degree	2.79**	0.23	4.30**	0.34	-0.24	0.25	1.65**	0.37
Respondent completed university					19.20**	0.46	20.38**	0.59
Number of respondent's children					-3.63**	0.49	-0.36	0.74
Time invariant variables								
Academic performance in Year 9					1.30**	0.15	1.48**	0.19
Parents' socioeconomic status					0.69**	0.16	0.85**	0.20
(constant)	27.96**	0.18	26.08**	0.24	28.78**	0.20	26.94**	0.27
Random effects								
Variance between students	32.0	15%	82.8	29%	30.7	16%	84.1	31%
Variance of student-specific observations	180.9	85%	201.2	71%	159.9	84%	185.9	69%
Total R squared		28%		20%		40%		28%
Number of students	4 626		4 428		4 285		4 149	
Number of observations	23 370		21 781		21 522		20 320	

Notes: ** Statistically different from zero at p = 0.01.
* Statistically different from zero at p = 0.05.

Table 12   Lack of occupational expectations in adolescence and its effect on occupational attainment, career employment

| | Model 1 | | | | Model 2 | | | |
| | Women | | Men | | Women | | Men | |
	Unstd coeff.	*Std error*	*Unstd coeff.*	*Std error*	*Unstd coeff.*	*Std error*	*Unstd coeff.*	*Std error*
Fixed effects								
Time varying variables								
Age	3.86**	0.05	2.78**	0.06	2.21**	0.09	1.36**	0.08
No expected occupation	**-1.45****	**0.54**	**-0.79**	**0.58**	**-1.81****	**0.65**	**-1.26**	**0.67**
Expected university degree	7.66**	0.40	8.98**	0.51	3.51**	0.53	5.29**	0.63
Respondent completed university					20.67**	0.69	18.27**	0.83
Number of respondent's children					-3.10**	0.66	-1.62*	0.84
Time invariant variables								
Academic performance in Year 9					2.49**	0.30	3.82**	0.32
Parents' socioeconomic status					1.69**	0.35	1.99**	0.40
(constant)	31.61**	0.30	30.41**	0.34	34.14**	0.45	35.03**	0.47
Random effects								
Variance between students	87.8	36%	144.2	48%	100.4	43%	166.6	55%
Variance of student-specific observations	157.3	64%	159.1	52%	135.5	57%	136.2	45%
Total R squared		42%		29%		51%		39%
Number of students	3519		3483		2627		2851	
Number of observations	8566		9834		6733		8423	

Notes: ** Statistically different from zero at $p = 0.01$.
         * Statistically different from zero at $p = 0.05$.

Discrepancy between educational and occupational plans

The last point of interest in this analysis is the discrepancy between what students report as their educational and occupational destinations.

This discrepancy raised interest both in Australia (Beavis, Curtis & Curtis 2005) and internationally (Feliciano & Rumbaut 2005; MacBrayne 1987). Prior research in Australia reported that, while some students showed confusion with regard to the level of educational qualifications required for their preferred career, most made plans which at worst did not prevent them from pursuing their desired vocational goals (Beavis, Curtis & Curtis 2005). Our goal in this section is not only to report the proportions of students in LSAY98 whose educational and occupational objectives were inconsistent, but also to estimate whether such discrepancy can be demonstrated to be detrimental to educational and occupation attainment. Given the focus of our analysis on professional occupations, here we only consider a discrepancy between a plan to work as either a manager or professional (ANZSCO major groups 1 and 2) and the intention to attend university. This is by no means an exhaustive analysis of all the possible discrepancies, but our analysis is supplementary in nature and thus we keep it relatively straightforward.

While as early as in Year 9 at least three-quarters of students who want to work in one of the managerial or professional occupations also plan studying for a bachelor degree (table 13), a small proportion report educational plans inconsistent with professional and managerial employment.

Table 13   Occupational expectations and intentions to study at university

Students' expectations of managerial and professional employment	University plans 1998	University plans 1999	University plans 2000	University plans 2001
Expectations of managerial and professional employment in 1999	74%	74%	78%	76%
Total	**4516**	**4109**	**3710**	**3412**
Expectations of managerial and professional employment in 2001	74%	72%	79%	81%
Total	**3934**	**3006**	**3913**	**3845**

Source: LSAY98.

We consider the influence of discrepancy in plans on three outcome variables: university completion; occupational status of all employment; and occupational status of career-oriented employment (see appendix E for the technical details on table 14). We constructed the measure of discrepancy by comparing the intention to study at university with the intention to work as a manager or professional in each year between 1998 and 2001, imputing occupational goals in years in which they were not asked, using the information in years in which these questions were included in the survey. This strategy in theory can contribute to inflating the negative effects of discrepancy and thus we need to treat the results with a certain degree of caution. Nevertheless, our findings support the broader knowledge underscoring the positive effects of coordinating educational and occupational objectives. In all three cases dissonance between educational and occupational goals reported at various points of time in high school has a detrimental effect on employment status.

To offer yet stronger evidence of the detrimental influence which uncoordinated educational and occupational plans may exert we would need data that have year-by-year measurement of students' occupational plans.

Table 14   Inconsistency between educational and occupational plans and its effect on the likelihood of university completion and occupational status

	Probability of completing		Occupational status			
	University		All jobs		Career jobs	
	Model 1		*Model 2*		*Model 3*	
	Unstd coeff.	*Std error*	*Unstd coeff.*	*Std error*	*Unstd coeff.*	*Std error*
Fixed effects						
Time-varying variables						
Age	1.21**	0.02	3.67**	0.04	4.16**	0.05
Male	-1.38**	0.08	-2.35**	0.24	-2.49**	0.35
Inconsistency between educational and occupational plans	**-2.17****	**0.11**	**-0.97****	**0.24**	**-0.77***	**0.36**
Time-invariant variables						
Academic performance in Year 9	0.88**	0.05	2.01**	0.14	3.10**	0.35
Parents' socioeconomic status	0.55**	0.04	1.15**	0.15	1.21**	0.20
(constant)	-7.72**	0.11	29.69**	0.15	27.64**	0.34
Random effects						
Variance between students			42.6	17%	61.1	21%
Variance of student-specific observations			205.6	83%	225.8	79%
Total R squared				27%		29%
Number of students	9 321		7 085		4 070	
Number of observations	68 202		32 390		20 112	

Notes: ** Statistically different from zero at p = 0.01.
             * Statistically different from zero at p = 0.05.

Summary and conclusions

The first goal of our project was to determine the extent of talent loss, which we defined as the lowering of occupational and educational expectations in high school, while the second goal was to determine whether career plans in high school were directly related to occupational attainments in early adulthood. For the first part of the report we focused on the top 50% of the student sample because a high level of academic achievement legitimates having high attainment expectations. In this context, we expected that the plans of these students would be more 'realistic' rather than 'unrealistic'. For the second of our research goals, we included the total cohort who turned 14 or 15 in 1998.

The international research on 'talent' over time has involved a wide range of conceptualisations and operationalisations.[3] However, due to the nature of information available in the 1998 LSAY cohort, we focused our study on the final years of secondary school, and in particular the lowering of occupational goals at this time, and its consequences for the beginning of career-oriented employment. In pursuing this strategy, our analysis employed an over-time change in student plans as an explanatory variable to better understand the social, psychological and structural aspects of the transition from school to work. This approach is unique because, while many research projects have focused on the school-to-work transition process, not one until now has explored the extent to which potential attainments among high-achieving students have been unfulfilled, resulting in some loss of potential talent.

Our report finds that Australian youth do experience a moderate, but by no means negligible, rate of talent loss. About 15 % of high-achieving Australian students lower their initially ambitious career plans, which then impacts adversely on their eventual attainments. It is notable that, all else being equal, youth from lower socioeconomic backgrounds are more likely to lower their ambitious plans. This is the case even when the variations in academic achievement, the influences of teachers and peers, and gender differences have been all taken into account.

Overall, we find that most high school students hold very ambitious occupational expectations, the large proportion of which is oriented to professional employment. It is debatable, however, whether these apparently overambitious expectations should be a cause for concern. On the one hand, unfulfilled expectations can lead to negative consequences for disappointed individuals and skill-hungry labour markets. On the other hand, if youth cope well with the reality of alternative employment trajectories, ambitious goals in high school may have a positive influence or at least be entirely harmless. The pattern of these very high ambition levels is similar to levels found in studies conducted in the US and the UK. The research from the US indicates that ambitious plans have a positive impact on students' attainments, both educational and occupational, with relatively few negative psychological implications for those who fail to achieve their early goals (Croll 2008; Goyette 2008; Reynolds & Baird 2010).

However, while students might not be adversely affected by a gap between plans and attainments in terms of psychological wellbeing, we have shown that students in the top 50% who lower their expectations are adversely affected because low levels of ambition lead to only modest occupational attainments. This could be a serious problem because above-average students who give up on their

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[3] See footnote 1.

goals are more likely to be from educationally and economically disadvantaged backgrounds. These students therefore might benefit from especially targeted programs which offer ongoing and structured support to help them maintain their initial plans. Given the importance of parental background, which we consistently found in our analysis, it seems that educational programs which encourage parental participation and support in the process of youth career planning may be particularly beneficial. Our findings also support school-level policies which develop student career knowledge in the early years of high school.

In relation to gender differences, we have found that young women are more likely than young men to expect professional careers. While women are also more likely to enter professional occupations, it is important to note that the professions preferred by women remain very different from those coveted by young men. Moreover, the gender segregation of youth expectations is significantly lower than the gender segregation of the niche of the labour market which is occupied by young people. Our analyses indicate a need for more policies which foster high achievement in maths among girls and high literacy among boys. Good performance and positive self-perception of ability in academic areas traditionally seen as the forte of the other sex have been shown in this study to encourage students to choose more gender-integrated careers. But while adolescents have a less gender-segregated vision of their future work environments than is likely to be the reality, this vision itself will not eradicate gender segregation of the labour force. More de-segregation policies which target labour force composition are needed to address both the gap between youth expectations and real possibilities, but also the extent to which adolescent plans are already strongly gender-typed by Year 10 of high school.

The central finding of our report is that occupational expectations which are formed in high school have a positive effect on the chances of securing high-status employment upon entry to the labour force. This finding holds even after academic performance, family background and plans to study at university are taken into account (tables 9 and 10). A particularly significant finding is that early occupational goals matter in their own right, even when educational plans and the likelihood of university completion are held constant. This finding vindicates the potential positive influence of vocational counselling programs which foster ambitious goals. Furthermore, it supports the theories which point to high aspirations as a potential buffer to the negative effects of disadvantaged family environments and other factors that may otherwise hinder possible higher attainments by students in these social-environmental conditions.

The success or failure to attain one's expectations does not occur randomly. Our analyses identify non-trivial differences in the chances of securing high-status employment even by ambitious students. These differences are due to gender, the higher socioeconomic status of parents, the perceived expectations of parents and teachers, the influence of educational plans held by peer groups, and a range of social, psychological, self-concept and school integration variables. Some students benefit from a whole range of supportive factors, while others must compensate for their disadvantage with more determination and perseverance in their ambitious occupational plans.

The final finding of our study is that students in the survey who do not report specific occupational plans while in high school, or whose educational and occupational objectives are inconsistent, are disadvantaged compared with the others in terms of occupational attainment. A lack of concrete occupational objectives seems to affect females more than males, while the discrepancy in plans seems disadvantageous for both sexes. Thus, while the ability to articulate future expectations in itself constitutes an advantage in eventual occupational attainment, the patterns do vary by gender.

Given the potential negative effects of the discrepancy between educational and occupational goals, students may benefit from programs which encourage early thinking about future careers, and in particular of how much education is required to attain a person's expected or desired career. Having clear educational and occupational expectations does determine the level of entry into the labour market and we have found that students who set their goals high early tend to fare better in the years after they finish school.

Although the 15% of respondents whom we found to experience declining ambition is a relatively low proportion of the total student population, this figure should not be dismissed as of little importance. This 15% of students is a cause for concern and it calls for the development of policy measures aimed at reducing the rate of lowering ambitions and thus raising the rate of talent utilisation among Australian youth.

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Support document details

Additional information relating to this research is available in *Concern about lost talent: support document*. It can be accessed from NCVER's website <http://www.ncver.edu.au/publications/2313.html>. This document contains:

✧ Recent conceptualisation of lost talent

✧ Prior studies of students' expectations.

Appendix A

The Longitudinal Survey of Australian Youth LSAY98

This study is based on the data from a cohort of young people who were 15 years old in 1998. A representative sample of secondary education students, nationally stratified by state and sector of schooling, was first surveyed in 1998. The students completed a numeracy and literacy test as well as a survey with questions about their families, experiences, attitudes to school and expectations. In 1999 the students completed a mail survey and were then interviewed each year by telephone about their study and work experiences and the transition from education to work. This report is based on the data from 1998 through 2008, for which numbers of respondents and attrition rates from wave 1 are shown below in table A1.

Table A1   Y98 Year 9 cohort: respondents by wave

Year Wave Age (mode) School year (mode)	1998 Wave 1 14 yrs Year 9	1999 Wave 2 15 yrs Year 10	2000 Wave 3 16 yrs Year 11	2001 Wave 4 17 yrs Year 12	2002 Wave 5 18 yrs	2003 Wave 6 19 yrs
Respondents	14 117	9 289	9 548	8 777	7 762	6 905
Attrition from: Wave 1	n.a.	34%	32%	38%	45%	51%

| Year Wave Age (mode)	2004 Wave 7 20 yrs	2005 Wave 8 21 yrs	2006 Wave 9 22 yrs	2007 Wave 10 23 yrs	2008 Wave 11 24 yrs
Respondents	5 979	5 356	4 729	4 210	3 859
Attrition from: Wave 1	58%	62%	67%	70%	73%

Source: LSAY98.

More information about the LSAY98 sample is available from Long and Fleming (2002).

Appendix B

Part 1: Expectations and academic achievement

In the educational literature there is little doubt that academic achievement is one of the key factors affecting students' plans for the future. Thus students whose academic performance does not warrant ambitious plans are usually excluded from the talent loss analyses and, if they lower their ambitions, are thought to be making realistic adjustment to their plans. The relationship between academic achievement and lowered plans is illustrated for all LSAY98 respondents in figures B1 and B2, where we show the proportions of students who adjusted their educational and occupational expectations downwards. Academic achievement scores are grouped in quartiles.

Figure B1 Lowered educational expectations by academic achievement
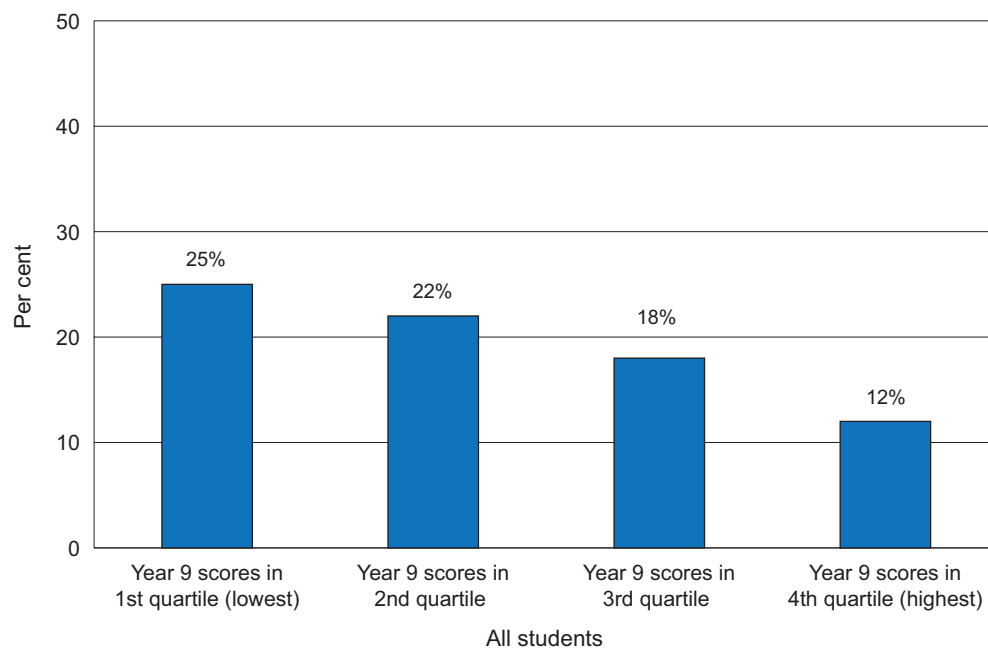
Source: LSAY98 weighted estimates.

The tradition of focusing on high achievers in 'talent loss' research stems from an understanding that educational institutions have a vital role in preparing young people for careers which they not only desire, but also are capable of pursuing. Therefore the downward adjustment of expectations over the course of high school can be seen as a process of successful 'cooling out' of those students whose unrealistic hopes are bound to be disappointed (Reynolds et al. 2006; Schneider & Stevenson 1999).

Figure B2 Lowered occupational expectations by academic achievement
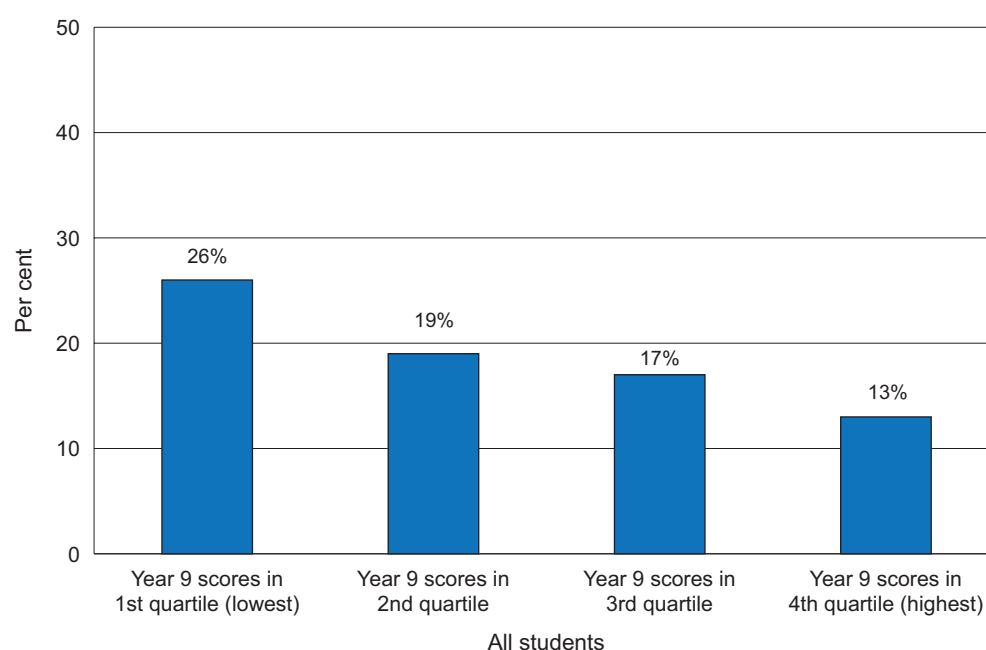
Source: LSAY98 weighted estimates.

Part 2: Methods and measurement of variables in section Prevalence and determinants of talent loss

In the multivariate analysis in this section we predict two types of talent loss understood as lowered expectations.

Lowered educational expectations

LSAY98 asked students about their intention to go to university in 1998, 1999, 2000 and, finally, in 2001. A student is considered to have lowered her or his educational ambitions if, over the period between 1998 and 2001, the student intended to go to university at some point but then abandoned this plan. If the pattern for a student who planned to go to university in all four years is (1,1,1,1) and (0,0,0,0) for a student who consistently did not plan to go to university, the following patterns were considered as lowered educational expectations: (1,1,1,0); (1,1,0,0); (1,0,0,0); (0,1,1,0); (0,1,0,0); (0,0,1,0). Students who did not provide the information on their plans in all years are excluded from this analysis. It is interesting to note that, of those who did, 39% reported a plan to attend university in all four years and 19% had no intention to study at university in any of the four years. Those defined as lowering their educational expectations accounted for 18%, whereas the plans of the remaining 24% can be described as rising educational ambitions with a small contribution of plans too volatile to meaningfully classify.

Lowered occupational expectations

Students were firstly considered to lower their occupational ambitions if, initially, that is, in 1999, they planned to work in professional or managerial occupations (ASCO 2 major group 1 or 2) and later, in 2001, the same students reported other occupations as their expected destination. Secondly, students who initially chose a destination in ASCO 2 major group 3 and later expected a job in group 4, 5, 6 etc. as their future career are coded as students with underutilised talent for the purpose of this analysis.

Logistic regression is suitable for modelling a binary response variable, which is a variable which can take on only two values. The models we utilise in table 1 are based on two equations of the following form:

$$\ln\left\{\frac{\Pr(y_i = 1/x_i)}{1 - \Pr(y_i = 1/x_i)}\right\} =$$

= *β1 + β2Male + β2Academic Achievement + β3Parents'SES*

+ β4Selfconcept of ability in mathematics + β5Selfconcept of ability in reading

+ β6Accessed information about careers + β7Integration with school environment

+ β8Teachers expect me to go to uni + β9Friends are going to uni

and where Y_{edexp} and Y_{occexp} are y_i, that is, the likelihoods of lowering educational and occupational expectations respectively.

Independent variables

Gender of the student is coded 1 for males and 0 for females.

A single measure of *academic achievement* has been constructed by averaging standardised scores in mathematics and reading tests completed by students in Year 9. Although there are two academic achievement variables, maths and reading, in LSAY98, we decided that a single achievement variable would be more desirable in our analysis, because the primary focus of our research is on the outcome variables, and not the relative merits of maths or reading.

Similarly, after performing a number of exploratory analyses, we have concluded that using one measure of parents' *socioeconomic status (SES)* leads to no loss of information and is a preferable method for avoiding collinearity problems. The single SES measure was created by standardising averaged parents' occupational status and the information about university completion and averaging these two standardised scores.

Moreover, following former research on talent loss which emphasises the role of the locus of self-control in the perceptions and decision-making of students, we employ the perception of individual ability in mathematics as a proxy (Trusty & Harris 1999). In addition, a student's integration with the school environment is measured by the school satisfaction variable.

School satisfaction was measured by an eight-item scale formed from the average of the following reverse coded items: 1) Learning is fun, 2) Excited about work, 3) I do extra work, 4) Like to go to school, 5) Like learning, 6) Enjoy being there, 7) Enjoy what I do, and 8) Interesting work. Code: Strongly agree = 4, Agree = 3, Disagree = 2, Strongly disagree = 1. Cronbach's Alpha = .88.

Teachers' expectations for a student to attend university and *friends' plans* were constructed by recoding answers to the questions which measured a student's perceptions of these expectations and plans. The codes were: 4 (University), 6 (Work and university), and 7 (University and other study or training) = 1. The rest = 0.

We also control for students' reported *access to vocational counselling*, because one of the key policy goals of 'lost talent' research is an assessment and improvement of career guidance services to help students from various backgrounds to achieve their full potential. This is why it is essential to establish whether students' experiences with the vocational information available in schools have consequences for the incidence of talent loss.

Part 3: Determinants of occupational expectations

This section provides an analysis of determinants of occupational expectations conceptualised as AUSEI06 scores (McMillan, Beavis, & Jones 2009). The AUSEI06 scale has been constructed with the use of the 2006 census data and involves, as its authors explain:

> assigning scores to occupations in such a way as to maximise the role of occupation as an
> intervening variable between education and income. Conceptually, occupations are viewed as
> the means of converting a person's human capital (education) into material rewards (income).
> This remains the state-of-the-art approach for the continuous scaling of occupations and has
> been used to generate national SEIs [socioeconomic indexes] in countries such as New
> Zealand as well.   (McMillan, Beavis & Jones 2009, p.125)

While in some ways this analysis can be seen as an alternative to the model predicting talent loss in the relevant section of the report, the dependent variable has a different form here. Instead of a dichotomous variable which denotes talent loss, we model each student's AUSEI06 score, which ranges from 0 to 100 and which indicates the occupational status of the student's intended job. (For details of the scale scores and occupational titles, see McMillan, Beavis and Jones 2009, pp.133–47.)

The international and Australian literature on determinants of occupational expectations has identified a number of dimensions which affect the formation of young people's career plans. These include the family environment, school performance and school experience. For some time it has been recognised that the socialisation experiences of young people both within the family and then later in the school are highly influential in eventual educational and occupational attainment (Howell & Frese 1982). There are many possible family factors, including the socioeconomic status of the family itself, but another important variable is parental emphasis on their child's achievement. This usually takes the form of parents' own ambitions for their child, often manifested in parents' expectations of their child's educational and occupational attainments.

Similarly, when the child experiences schooling, another set of influences helps point the child to future possibilities through academic achievement: the teacher's and peer group's recognition of their ability—and the child's own recognition of their self-ability—form a set of perceived expectations about future attainments. Thus, through a series of 'career decision-making' stages, the young person eventually sets career goals and establishes strategies to attain those goals (Howell & Frese 1982, pp.10–20). Furthermore, Porter and his colleagues, working with Canadian data, found that these goals become firmer the closer the young person is to the completion of secondary school (Porter, Porter & Blishen 1982). This process of gradually developing career goals and using increasing levels of self-ability awareness constitutes a process of aligning their educational goals with their occupational goals. Unfortunately, not all young people are equally successful in this process (Schneider & Stevenson 1999). It is within this background of prior research and the availability of variables in the LSAY98 cohort that we next examine the impact of these dimensions as predictors of occupational expectations for the 1999 and the 2001 waves.

The purpose of this analysis is to identify the main contributors of occupational expectations in 1999 and 2001, excluding the other major determinants, and in particular to see whether the pattern of determinants changes between the two measurement points. In contrast to the model in table 1, we estimate the effect of parents' education and occupation separately and we do not use a single measure of occupational status for both parents. By comparing both analyses, this illustrates that no loss of information occurs when a single measure of SES is used.

The details regarding the variables can be found above. Here we only describe the specific variables in the model and how they represent the important determinants of expectation formation as discussed in the previous paragraph. Overall, there are two dependent variables and nine independent variables in our multivariate model. The independent variables are roughly divided between the family (including gender) and school. The first is the gender of the student, which as a dichotomy is coded as feminine. The second variable provides a single measure of parental

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educational attainments, which in effect indicates whether both, one or neither of the parents has university qualifications.

Next, there are four variables which measure the perceived expectations for after-school plans for the student, namely, the student himself or herself, the parents, teachers, and friends. These variables were recoded to separate university plans from the rest. Research has shown that the expectations of self and of others exercise an important influence on an individual's behaviour regarding future goals. These expectations are sometimes referred to as an environmental press (Marjoribanks 1990, 1997). We tested all four of these variables and in the end disregarded that concerning perceived friends' expectations, as it did not reach significance in any of the regressions.

In a similar manner, the experience of students in school does have an influence on perceptions of students' own ability and potential. Self-concept of ability was measured by a recode of self-concept of ability relative to other students into two categories: Above average = 1 and Average/below average = 0.

This set of variables is particularly important if future career plans are such as to require additional education, or especially what Schneider and Stevenson (1999) meant by 'alignment'. When a student likes school and their experiences there are positive, then the prospect of aiming for a high-status occupation, which will require more education, does not appear daunting. In fact, the experiences of the student may even help widen and lift the possible career choices that the student might consider. There are a large number of variables in the LSAY98 data which measure the student's perceived experience at school. These were reverse coded and, on the basis of a factor analysis with Varimax rotation, eight were found to form a dimension which measured aspects of the student's enjoyment and satisfaction with school. A single variable was constructed by adding the eight and taking the average so that the original metric was retained.

Table B1 displays the results of a multiple regression model which predicts occupational expectations (in ANU_4 status scores which are closely comparable to AUSEI06 scores) for students in 1999 and 2001. This differs from the lost talent analysis because the latter only considered students who made specific changes to their earlier plans. This model considers the occupational status of expected jobs, regardless of whether it went up, went down or stayed the same over time. The selection of these particular predictor variables was made with the assumption that the primary determinants of occupational expectations were a combination of family background and school achievement variables. The results of three analyses are reported. The first is with occupational expectations in 1999, the second is occupational expectations 2001, with the same set of predictor variables, and the third is for occupational expectations in 2001, with 1999 as an additional predictor variable. This latter strategy reveals the remaining effects of the original set of nine predictor variables, once the continuing effects of occupational expectations in 1999 are taken into account.

The best way to proceed is to discuss the outcomes of these analyses and to consider each dependent variable separately. This will be followed by an overall interpretation of the outcome.

Occupational expectations 1999

The predictor variables explained 33.6% of the variance in student expected occupations in 1999. All predictor variables in the model are statistically significant at either the p = 0.05 or p = 0.01 level, and each indicates the independent effect of any specified variable, excluding the influence of the other variables in the model. The variable with the strongest effect on student expected occupation is whether the student planned to attend university after school, with this event increasing occupational expectations by 14.33 increments. Given that the scale has a range from 0 to 100 and the increment is net of other variables, this is not trivial. This variable was followed in importance by academic performance, with one score increment resulting in a 0.94 score increment in occupational expectations.

With the exception of parental expectation of student university attendance, all other variables had an approximately equal impact. This pattern would seem to support the observation of Schneider and Stevenson (1999) that students do tend to align their educational expectations with their occupational expectations as their sense of self-ability and their knowledge of how to reach their goals increase. It is worth noting that, while the self-ability variable in the model is statistically significant, its importance relative to the other variables is low. Also worth noting is that gender, while significant, is relatively less important than other variables in explaining occupational expectations.

Occupational expectations 2001—model 1

Two years later and two years older, the expected occupations of the LSAY98 students, using the same model, produce slightly different outcomes. The model predicts considerably less total variance—26.8% compared with 33.6% two years earlier, a drop of 20%. This is in part reflected by the drop in the effect of the student's own plan to attend university and also the drop in the effect of parents' university credentials. On the other hand, the effect of students' self-concept of their own ability virtually doubled (2.18 to 4.29), as did academic performance (combined reading and maths score), and the effect of being female almost similarly increased. So, in effect, while all the variables continue to make a significant contribution to occupational expectations, the reduction in overall variance explained suggests that: other factors not in the model are starting to have an effect; self-concept of ability, academic performance, and being female, are also increasing in significance; while the impact of parents' socioeconomic background becomes weaker. This last result corresponds to the well-established finding of educational transitions studies, which usually show that as students grow older their parents have less influence on their children's choice of school, courses etc. (Blossfeld & Shavit 1993). Obviously there is a tendency for the parents to also lose some influence, initially quite strong influence, on the career expectations of their children. All of these are consistent with the Schneider and Stevenson argument, mentioned earlier.

Table B1   OLS regression predicting occupational expectations of students in 1999 and 2001

	Expected occupation 1999[a]			Expected occupation 2001[a]			Expected occupation 2001[a]		
				Model 1			Model 2		
	Unstd coeff.	Std error	Std coeff.	Unstd coeff.	Std error	Std coeff.	Unstd coeff.	Std error	Std coeff.
Male	-2.32**	0.58	0.05	-4.39**	0.65	0.10	-4.23**	0.68	0.10
Parents uni education	4.10**	0.94	0.07	0.98	1.05	0.02	-0.33	1.10	-0.06
Parents occupation	0.06*	0.02	0.05	0.11**	0.02	0.10	0.10**	0.02	0.09
Parents expect uni	4.94**	0.75	0.11	4.52**	0.83	0.10	2.83*	0.90	0.07
Student expect uni	14.33**	0.75	0.31	8.79**	0.82	0.20	6.10**	0.90	0.14
Teacher expect uni	2.96**	0.68	0.06	2.01*	0.75	0.05	1.56*	0.78	0.04
Academic achievement[b]	1.20**	0.10	0.16	1.31**	0.12	0.18	1.01**	0.13	0.14
Self-concept of ability	2.15*	0.64	0.05	4.25**	0.73	0.10	3.50**	0.77	0.08
Satisfied with school	2.37**	0.60	0.05	2.11*	0.67	0.05	1.86*	0.71	0.04
Expected occupation 1999	-	-	-	-	-	-	0.24**	0.02	0.25
Constant	26.91**			24.91**			21.87**		
Adjusted R^2	0.34			0.27			0.31		
N	4319			3472			3009		

Notes: a Weighted estimates
           b Average math and reading score.
           ** significantly different from zero at p = 0.01.
           * significantly different from zero at p = 0.05.
Source: LSAY98.

Occupational expectations 2001—model 2

Model 2 is the same as model 1, except that the occupational expectations variable of 1999 is included as an independent variable. The justification for this procedure is that one would expect some continuity between a student's articulation of occupational expectation at age 15 and at age 17. In fact, the correlation between the two variables measured in the ANU_4 scale is r = .47, which is not as strong as one might expect. This means that many young people do change their occupational expectations over time. By including the 1999 variable as an independent variable, it is possible to examine the extent to which the other variables continue to have an independent effect on these expectations.

The first observation that can be made from model 2 is that the variance explained (Adjusted R^2) increased from model 1 to 31%, which one would expect, given the correlation between the two. Furthermore, it should come as no surprise that the occupational expectations 1999 variable is the strongest determinant of occupational expectations 2001, which it clearly is in model 2, with a beta coefficient of .25 compared with a beta coefficient of .14 for both average maths and reading score and student intention to attend university. What is surprising is that parents' education (university degree) drops below the level of significance, and the remaining variables, such as maths and reading and self-concept, continue to have an impact, although somewhat diminished.

What these figures seem to suggest is that, even when assuming continuity between 1999 and 2001, it is clear that changes did occur during that two-year period, and although self-concept and academic achievement are clearly important factors, they were not the only determinants in the process.

Appendix C

Table C1 Stability of occupational expectations over time, all students

1999	2001					
	Managers and professionals	Associate professionals	Tradespersons	Others		
Managers and professionals	**78%**	9%	6%	8%	100%	3200
Associate professionals	51%	**28%**	13%	9%	100%	683
Tradespersons	25%	13%	**50%**	12%	100%	652
Others	35%	15%	8%	42%	100%	610
Total	62%	12%	12%	13%	100%	5145

Source: LSAY98, 1999 and 2001 surveys, weighted estimates.

More than 85% of LSAY98 respondents were still at school in 2001. This proportion of school goers is somewhat higher than national estimates of Year 12 completion (ABS 2006b). But even after accepting certain overrepresentation of those who stay at school until Year 12, the proportion of students who plan a professional or managerial career is nevertheless impressive.

Table C2 Changes in status of expected occupations between 1999 and 2001, all students

Only students who selected professional and managerial occupations in 1999 and 2001			
	All students	Female students	Male students
Between 1999 and 2001 status			
Reduced by more than 20 AUSEI06 points	9%	9%	10%
Reduced by 10 to 20 AUSEI06 points	11%	12%	10%
Reduced by fewer than 10 AUSEI06 points	16%	13%	20%
Same score	36%	38%	34%
Increased by up to 10 AUSEI06 points	14%	13%	16%
Increased by 10 to 20 AUSEI06 points	9%	10%	7%
Increased by more than 20 AUSEI06 points	4%	4%	4%
Total	**2615**	**1543**	**1072**

Source: LSAY98.

Appendix D

The first part of this appendix explains how gender segregation is measured in our analysis. The second provides details of our ordinary least squares (OLS) model.

We begin by explaining what we call gender imbalance indicators, which are used to present 15 modal expected occupations and contrasted with the 15 modal occupations in which young people work around their 24th birthday, according to LSAY data. Next we summarise the results of research on occupational segregation between genders in Australia by Lee and Miller (2004), who utilised the Duncan Index of Dissimilarity (Duncan & Duncan 1955) to investigate occupational segregation evident in the 2006 census. We use the Duncan index as well as its improved version developed by Karmel and MacLachlan (1988) to compare the gender segregation of students' occupational expectations with the segregation of young adults' employment. Finally, we explicate the measurement in the OLS model predicting gender-neutral career expectations, which is in table 7.

Gender imbalance indicators

The LSAY data on employment of young people collected in the last wave of LSAY98 in 2008 and the gender imbalance indicators are shown in table D1.

Table D1   Modal occupational attainments (ANZSCO) by gender

Men		Gender imbalance indicators
ANZSCO code and title	%	
3411 Electricians	3.2	0.98
3131 ICT support technicians	2.9	0.51
3622 Gardeners	2.5	0.75
3312 Carpenters and joiners	2.4	0.98
2211 Accountants	1.9	0.07
1421 Retail managers	1.9	0.32
3212 Motor mechanics	1.9	0.98
4413 Police	1.8	0.52
2613 Software and applications programmers	1.8	0.60
3341 Plumbers	1.8	0.98
2332 Civil engineering professionals	1.4	0.82
2412 Primary school teachers	1.4	-0.69
1499 Hospitality, retail and service managers	1.4	0.18
3223 Structural steel and welding trades workers	1.4	0.98
3513 Chefs	1.3	0.50
Total %	**29.0**	**Mean:**
Total N	**1214**	**0.57**

Women		Gender imbalance indicators
ANZSCO code and title	%	
2412 Primary school teachers	5.9	-0.69
2544 Registered nurses	5.5	-0.84
2414 Secondary school teachers	4.6	-0.17
4211 Child carers	4.6	-0.92
2211 Accountants	3.9	0.07
1421 Retail managers	2.9	0.32
5121 Office managers	2.0	0.12
5311 General clerks	2.0	-0.70
5511 Accounting clerks	1.9	-0.62
2231 Human resource professionals	1.8	-0.23
5111 Contract, program and project administrators	1.5	-0.08
5421 Receptionists	1.5	-0.92
2251 Advertising and marketing professionals	1.5	-0.21
4117 Welfare support workers	1.3	-0.58
6211 Sales assistants	1.3	-0.42
Total %	**42.3**	**Mean:**
Total N	**1022**	**-0.39**

Source: LSAY98, 2008, weighted estimates.

Gender imbalance indicators are computed using the information on gender composition of particular occupations from the 2006 census tables (ABS 2007). We obtain scores for particular occupations by subtracting the proportion of females from the proportion of males in each of the four-digit level occupational groups of ASCO 2. This produces gender imbalance indicators ranging from -1 to 1, where -1 represents occupations entirely dominated by women, 0 denotes occupations with equal proportions of men and women, and 1 signifies occupations entirely dominated by men.

The list of occupations in which the 2008 respondents were most likely to work contains many which have a stronger representation of one sex (table D1) compared with what transpired in student expectations. Moreover, we note that relatively high proportions of young women work as nurses, teachers and carers. Although the information about occupations held by LSAY respondents in 2008 is coded to the categories of ANZSCO, most occupational titles are the same and thus modal choices can be compared without the need to match numerical codes (ABS 2006a).

Segregation indices

Research on gender segregation and its various indicators is comprehensive. In Australia, Lee and Miller (2004) used the 1996 census data to investigate occupational segregation by gender in the Australian labour force. They used a measure of dissimilarity defined as D, where p_{im} is the proportion of males in the *ith* occupation and p_{if} is the proportion of females in the same occupation (Duncan & Duncan 1955). The index of dissimilarity can be understood and interpreted as the proportion of men or women who would 'have to move across occupations to be distributed the same way as female (male) workers. In other words the index of dissimilarity, which varies between 0 and 100, is a comparison between male and female workers that measures

$$D = 0.5 * \sum_{i=1}^{n} \left| p_{im} - p_{if} \right|$$

their relative separation (high dissimilarity) or integration (low dissimilarity) across all occupations' (Lee & Miller 2004, pp.357–8). It is interesting to note that the Duncan index was subject to many critiques. One of them, authored by Karmel and MacLachlan (1988), demonstrated that the Duncan index failed to reflect the changes to the overall structure of the labour market at various points in time, for example, the changing proportions of women in the labour force. As a result,

Karmel and MacLachlan developed an improved version of the Duncan index (1988, p.189), which we include in our analyses next to the original construct.

Using the Duncan Index of Dissimilarity, Lee and Miller investigated the distribution of men and women across major occupational groups in the 1986, 1991 and 1996 census data. The value of the index was close to 38 in all three datasets. This led them to conclude that occupational segregation by gender in Australia was remarkably stable. Our own calculations performed on the 2006 census data (ABS 2007), the details of which are available on request, showed that in the most recent census the index of dissimilarity was also around 38, and for the data in the last wave of LSAY98 the value was about 36. Thus about 36–38% of men (or women) would have to change their occupations for gender segregation to cease to exist. The figures obtained with the Karmel and MacLachlan improved index led to similar conclusions.

Lee and Miller argued that gender desegregation might not be in the best interests of women, because gender segregation protected women's earnings from falling even more below those of men. They stated that occupational segregation 'led to women having slightly higher earnings than would otherwise have been the case' (2004, p.359). But broader evidence compiled by the International Labour Organisation indicates that gender segregation has many negative implications for men and women, even if economic inequalities are not large (Loutfi 2001). In short, desegregation of employment is likely to lead to a more optimal utilisation of talent, as men and women would face fewer structural constraints when pursuing their preferred career paths.

Measurement in OLS model

Our model in table 7 is given by the following equation:

Gender imbalance indicator = constant +b_1 Math Achievement+ b_2 Reading Achievement+ b_3 Parents' University Education +b_4 Parents' Occupation+ b_5 Self-concept of ability in mathematics + b_6 Self-concept of ability in reading + error

Maths achievement: the student's achievement in mathematics and reading was measured by two 20-item tests. The score on each ranged from zero to 20. The details are in Marks (2008). For this analysis each test score was standardised to the mean of 0 and the standard deviation of 1. It is important to note that students were tested only once, in Year 9, and therefore educational achievement is not a time-varying variable in this analysis. Instead, it is assumed that each student's performance remains the same over time. This is the limitation of the available data.

Reading achievement: the student's achievement in mathematics and reading was measured by two 20-item tests. The score on each ranged from zero to 20. The details are in Marks (2008). For this analysis each test score was standardised to the mean of 0 and the standard deviation of 1. It is important to note that students were tested only once, in Year 9, and therefore educational achievement is not a time-varying variable in this analysis. Instead, it is assumed that each student's performance remains the same over time. This is the limitation of the available data.

Parents' university education: parents' education is indicated by a trichotomy which is an average of two dummy variables denoting mothers' and fathers' completion of a university degree. Hence, in cases where both parents were not university-educated, the students received a score of zero. In cases where one parent held a university degree, students were allocated 0.5, and in cases where both parents were university graduates, students were coded as 1.

Parents' occupational status: each student provided information about their mothers' and fathers' employment. This has been coded also to ANZSCO four-digit categories and then to the AUSEI06 scale of occupational status. To reduce the loss of observations due to missing data, which would have occurred as many students did not have the information about their mother's employment, an average of mothers' and fathers' status has been computed. Mothers' and fathers' occupations were equally weighted and where one was missing, the other was used.

Self-concept of ability in reading was measured by a single question about the student's self-assessment in this area. The answer categories were 5: 'Very good', 4: 'Better than average', 3: 'About average', 2: 'Not very well' and 1: 'Very poor'.

Self-concept of ability in mathematics was measured by a single question about the student's self-assessment in this area. The answer categories were 5: 'Very good', 4: 'Better than average', 3: 'About average', 2: 'Not very well' and 1: 'Very poor'.

In earlier stages of the analyses we considered the impact of mothers' and fathers' characteristics separately, in line with the gender socialisation argument (Marks 2008), which sees high levels of mothers' education or high occupational status as powerful predictors of daughters' but not sons' ambition, but we found no evidence that supports gender socialisation of either boys or girls. Therefore we combined the information on mothers' and fathers' education and mothers' and fathers' occupational status. To allow for the possibility of separate influences of parents' education and occupation we show their effects separately and not as one measure of SES. Furthermore, it was important to keep the influence of academic achievement in reading and mathematics as well as self-concept of ability in these two areas separate.

Table D2   Modal expected occupations in 2001 (ASCO 2) by gender

Boys		Gender imbalance indicators
ASCO 2 code and title	%	
2231 Computing professionals	10.1	0.60
4211 Motor mechanics	3.4	0.98
3993 Sportspersons, coaches	2.7	0.36
2533 Designers and illustrators	2.4	0.00
4411 Carpentry and joinery tradespersons	2.2	0.98
2537 Musicians and related professionals	2.1	0.41
3911 Police officers	2.1	0.52
4311 Electricians	2.0	0.98
4991 Defence force members not elsewhere included	2.0	0.83
2211 Accountants	2.0	0.07
2121 Architects and landscape architects	1.8	0.47
2412 Primary school teachers	1.8	-0.69
2521 Legal professionals	1.6	0.16
1100 Generalist managers	1.6	0.65
4410 Structural construction tradespersons	1.5	0.98
Total %	**39.2**	**Mean:**
Total N	**3583**	**0.49**

Table D2   Modal expected occupations in 2001 (ASCO 2) by gender (continued)

Girls		Gender imbalance indicators
ASCO 2 code and title	%	
2412 Primary school teachers	4.9	-0.69
2533 Designers and illustrators	4.4	0.00
2323 Registered nurses	3.7	-0.84
6312 Children's care workers	3.6	-0.92
2514 Psychologists	3.6	-0.51
2221 Marketing and advertising professionals	3.1	-0.21
2521 Legal professionals	2.8	0.16
2211 Accountants	2.5	0.07
2534 Journalists and related professionals	2.5	-0.04
4931 Hairdressers	2.4	-0.71
2410 School teachers	2.1	-0.39
2413 Secondary school teachers	2.0	-0.17
2538 Actors, dancers and related professionals	1.9	0.01
6300 Intermediate service workers	1.7	-0.58
2231 Computing professionals	1.7	0.60
Total %	**42.9**	**Mean:**
Total N	**3725**	**-0.28**

Source: LSAY98, 2001, weighted estimates.

Table D3   Expected occupations in 1999 and 'accommodation rates' in Australia for 25 to 35-year-olds in 1996 and 2006

	Occupations (ANZSCO major groups)				
	Managers and professionals % (ANZSCO 1 & 2)	Technicians and trades workers % (ANZSCO 3)	Other occupations % (ANZSCO 4, 5, 6, 7 & 8)	Total	No.
Expected occupation in 1999	67	16	17	100	7 745
Census 1996 (25 to 34-year-olds)	31	18	51	100	1 894 756
Census 2006 (25 to 34-year-olds)	37	16	47	100	1 916 388

Source: LSAY98; ABS (2007).

Appendix E

This section discusses the models utilised in the following sections of the report:

✧ Occupational plans and career entry

✧ Does 'not having' career plans in high school matter?

✧ Discrepancy between educational and occupational plans.

Even though the LSAY surveys are affected by attrition problems, as is the case with all longitudinal studies, the creation of a person-year dataset has the advantage of making use of all time-specific information. Instead of a wide file structure, as exemplified in table E1, we created a long file, as illustrated in table E2. Had we utilised only the data from the final wave we could have received results affected by a significant selectivity bias (Marks 2008).We thus employ all the data from all students who gave valid responses to relevant survey questions in particular years, even if they subsequently declined further participation in the surveys. Such a strategy is optimal to minimise the bias due to attrition.

Table E1   Example of a wide longitudinal data file

ID	Male	Occupation_2000	Occupation_2001	Occupation_2002
1	1	24	34	38
2	0	18	26	.

Table E2   Example of a long longitudinal data file

ID	Year	Male	Occupation
1	2000	1	24
1	2001	1	34
1	2002	1	38
2	2000	0	18
2	2001	0	26
2	2002	0	.

After the necessary transformations, the LSAY98 data in the long format, which is illustrated in table E2, were analysed in all multivariate analyses presented in this report using the *xtreg* procedure available in STATA10. *Xtreg* is suitable for dependent variables which are quantitative and continuous. It is also a regression procedure for clustered data and, as such, is equivalent to the two-level hierarchical random intercept models with fixed effects, in which observations for particular years are grouped within students, who are second-level units of analysis. Because our dependent variables depicting the status of occupational expectations and attainments are not strictly normally distributed (figure E1), all the estimations presented here have been performed with the use of Huber-White sandwich estimators or robust standard errors, which are less sensitive to deviations from the assumptions underpinning regression models for continuous dependent variables (Rabe-Hesketh & Skrondal 2005). We favoured this modelling strategy over grouping occupations into professionals and non-professionals because such a grouping would prevent us from gaining any insights into the relative differences between particular professional careers. The

use of the ANU_4/AUSEI06 scores allows for a differentiation between the professions associated with lower income and less education and the highest-paid professions.

We use a random intercept model (mixed model) of the following form:

$$y_{ij} = \beta_0 + \beta_{1ij}x_{1ij} \ldots + \beta_{pij}x_{pij} + \beta_{1j}x_{1j} \ldots + \beta_{rj}x_{rj} + \zeta_j + \varepsilon_{ij}$$

$$\xi = \zeta_j + \varepsilon_{ij}$$

where y_{ij} is the dependent variable, β_0 is the constant or the intercept, β_{1ij} through β_{pij} are regression coefficients for corresponding time-varying explanatory variables x_{1ij} through x_{pij} which vary between occasions, that is, survey waves. β_{1j} through β_{rj} are regression coefficients for corresponding time-invariant explanatory variables x_{1j} through x_{rj} which do not vary between occasions or survey waves. Finally, ξ is a residual error term or disturbance decomposed into error components. ζ_j is a time-constant or permanent error component which varies between students and ε_{ij} is a transitory error that varies over occasions (i.e. survey waves) and students (Rabe-Hesketh & Skrondal 2005, p.35).

Figure E1 Distributions of occupational attainments and expectations in ANU_4 or AuSEI06 scores
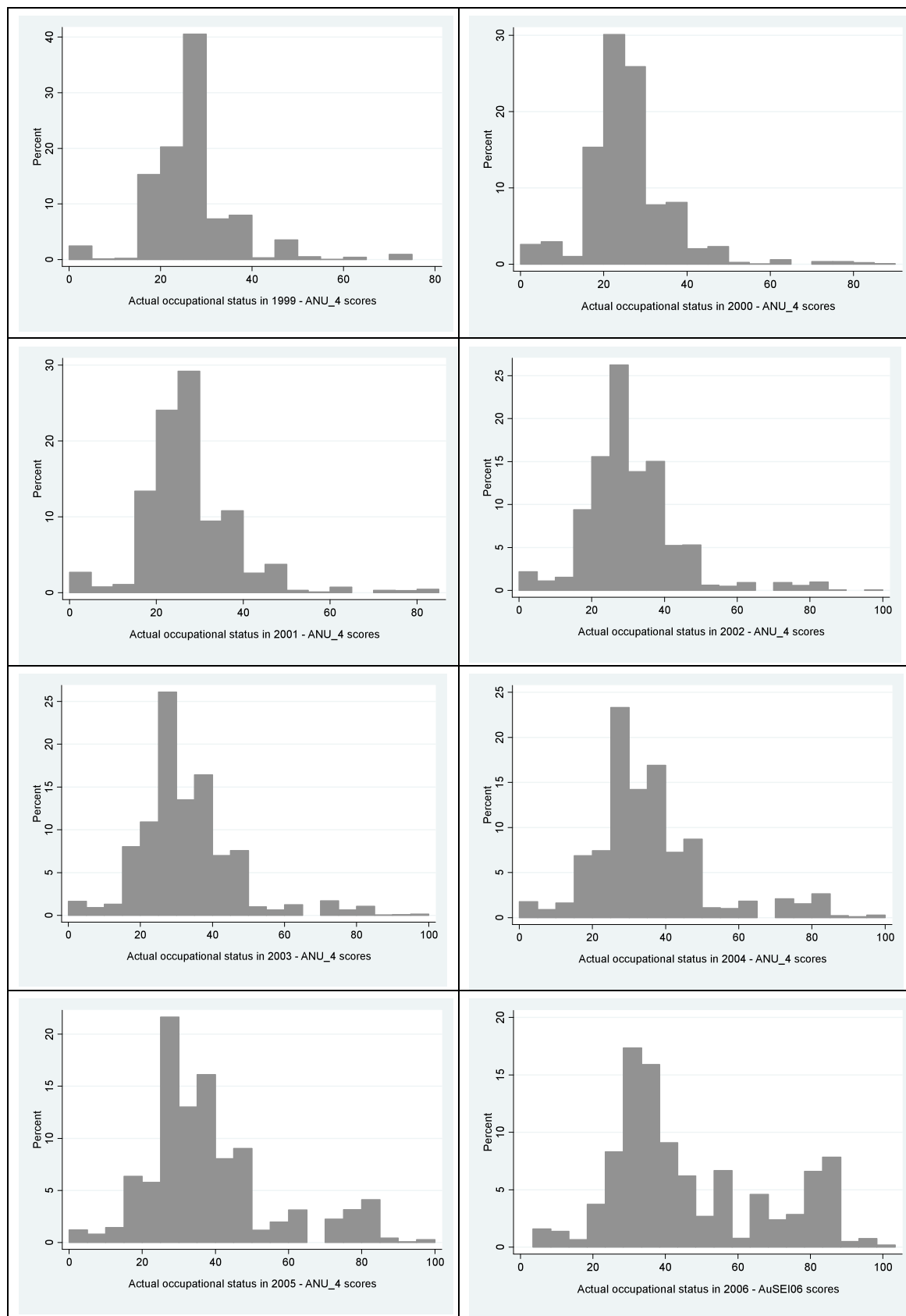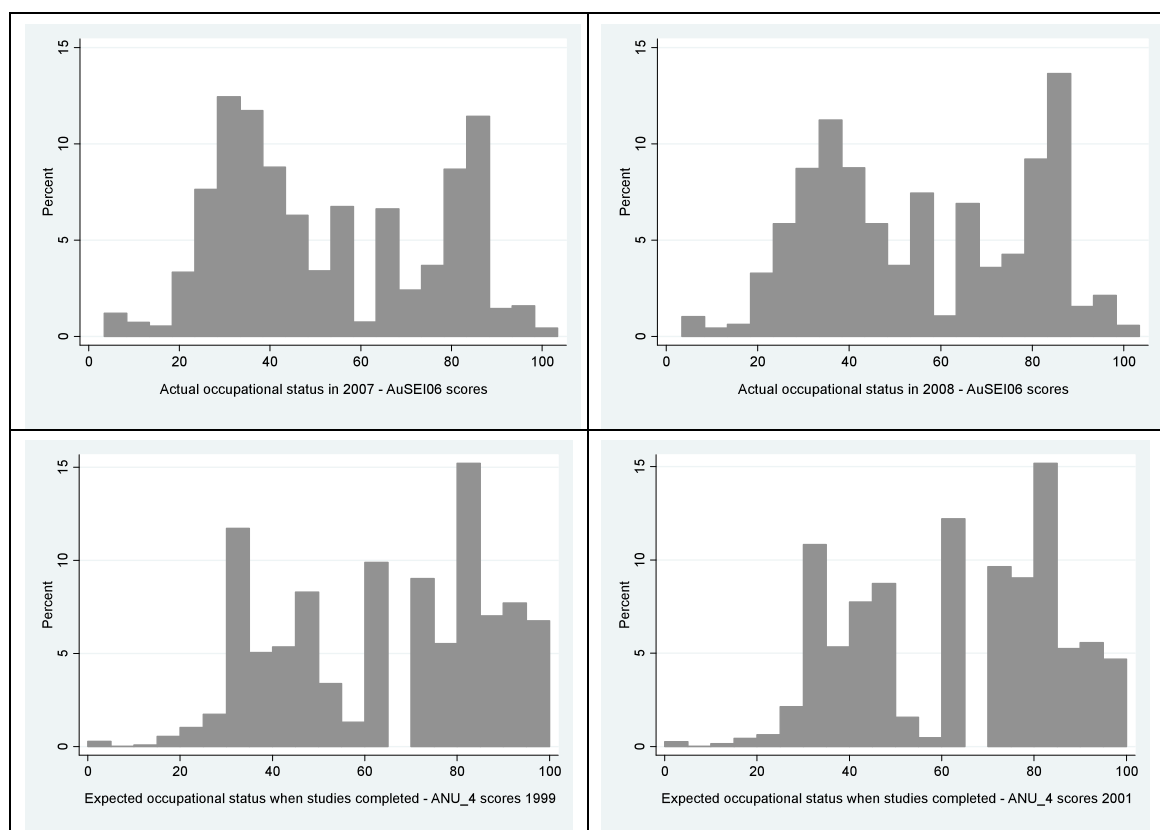
In the section relating to the discrepancy between educational and occupational plans the first model in table 13 was estimated with the use of *xtlogit* procedure for a dichotomous outcome. As figures corresponding to variance in such models are not directly comparable with figures reported for *xtreg* models for continuous variables, we report only coefficients for model 1. The *xtlogit* has a similar functional form as the random intercept model explained above, except that the dependent variable is binary and not continuous.

Measurement of variables

Actual occupation: students were asked every year about their employment: whether it was a part-time job while at school or any other form of paid work. This is the dependent variable in this study. To designate those jobs which respondents considered as 'proper', we occasionally used as a filter question one, which asked if respondents would like their current job as a career. Some analyses are restricted only to responses which deemed that the job held by the respondent at the time was definitely of the type they would consider as a career.

Age: age is expressed in years and months. Instead of year intervals, the actual year and month of birth of each student was used to calculate the age of each student on the assumption, for simplicity, that surveys were conducted each year on 1 January. Therefore a student who was 14 years old in January 1998 is treated as having exactly 15 years of age in January 1999, whereas a student who was 14 in March 1998 will be treated as having 14.76 years of age in January 1999. By analogy a student who turned 14 in June 1998 is assumed to be 14.5 years of age in January 1999. This coding schema reduces a possible bias that may be introduced by assuming a full year of age difference between, for example, a student born in December in one year and a student born in January in the following year.

Occupational expectations: our key variable of interest was measured by a single question:

> Your future job: What job do you plan to work in when you have finished your studies? (after leaving school, or after finishing your further study or training).

Verbatim responses to this question were coded first to ANZSCO, or for surveys earlier than 2006, to ASCO 2, and then to the AUSEI06 scale of occupational status (McMillan, Beavis, & Jones 2009). In some analyses we used ASCO 2 and ANZSCO categories. However, in others we needed a measure which would show the difference within the broad group of professionals, and the AUSEI06 status scale captures the differences in educational entry requirements and financial returns from different types of professional occupations. AUSEI06 ranges from a low of 0, which denotes unskilled occupations, such as farm hands, to a high of 100, which indicates employment as a medical specialist or a fully qualified lawyer.

Expectations of university completion: a student's intention to attend university is captured by a variable which is coded 0 if a student did not express the desire to study at university at a given year and 1 if he or she declared an intention to undertake university studies. This measure is time-varying between 1999 and 2001, and after 2001 each student was imputed with the 2001 value of this variable for all remaining years.

University completion is measured by a dummy variable, where 1 denotes university completion in the year when the respondent finished university and in all years that follow.

Number of children is measured by a question in which the respondent reported the number of their children, ranging from zero to three.

Academic performance in Year 9: students' achievement in mathematics and reading was measured by two 20-item tests. The score on each ranged from zero to 20. The details are in Marks (2008). For this analysis each test score was standardised to the mean of 0 and the standard deviation of 1 and then an average for each student on both tests was computed. The new composite variable highly correlates with its components (r = 0.85 for both composites). The two tests were combined to reduce the impact of interdependency between predictors in the model. It is important to note that students were tested only once, in Year 9, and therefore educational achievement is not a time-varying variable in this analysis. Instead, it is assumed that each student's performance remains the same over time. This is the limitation of the available data.

Parents' socioeconomic status is an average of parents' standardised occupational status and education. Each student provided information about their mother's and father's employment. This also was coded to ANZSCO four-digit categories and then to the AUSEI06 scale of occupational status. To reduce the loss of observations due to missing data, which would have occurred as many students did not have the information about their mother's employment, an average of mothers' and fathers' status has been computed. The occupations of the mother and the father were equally weighted and, where one was missing, the other was used. Parents' education is indicated by a trichotomy which is an average of two dummy variables denoting each parent's completion of a university degree. Hence, students where neither parent is university-educated received the score of zero; those where one parent holds a university degree were allocated 0.5 and those whose parents are both university graduates were coded as 1.

No information about occupational plans: a dummy variable has been created for students who participated in waves 2 and 4 of the LSAY survey but who did not give a valid answer to the question about the occupation in which they saw themselves upon the completion of their study.

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