

# INEQUALITY AND TALENT LOSS: RECENT EVIDENCE FROM AUSTRALIA<sup>1</sup>

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## ABSTRACT

The concern about the unfulfilled potential of students is one of the perennial issues within the sociology of education. The modern ideals of equal access to education which levels out rather than exacerbates social inequalities have been dominating for years the efforts to understand why, even in egalitarian mass education systems, certain groups of students systematically underachieve. The extent to which this occurs is called "talent loss".

Within the sociology of education this concept has been associated with the situation where academically capable and strongly motivated youth encounter difficulties in maintaining or realising their educational and occupational expectations. We define talent loss as the lowering of educational and occupational expectations, which are initially ambitious but fall as students move through high school.

In this paper we use the data from the Longitudinal Survey of Australian Youth (LSAY) for the 1998 cohort. Students who were in Year 9 in 1998 were followed until 2008 and asked every year about their educational and occupational experiences. We found that while high school students are likely to change their minds about their occupational futures, those with lower levels of cultural, social and economic capital are more likely to experience talent loss. Other factors contributing to lowering ambitions are the perceptions of parents' and teachers' expectations, integration with the school environment and academic self-concept.

This talent loss is consequential for the later attainments of these young people. Students who lowered their educational and occupational

expectations at school are less likely to go to university and embark on a career path in a high status occupation.

## INTRODUCTION

Since the inception of the systematic study of educational institutions and students' experiences within them, the unrealized potential of youth has been one of the central foci of researchers' concerns. The earliest sociological studies of education were primarily concerned with the delivery and widespread access to basic education. During that time the view that youth should obtain high levels of education to meet the demand for skilled labour of the rapidly industrialising economies prevailed. In fact the difference between the actual levels of participation in education and the perceived potential for increased participation was referred to as "reserves of talent" (Yusuf 2007). Moreover, social psychologists such as Frank (1935a; 1935b) recognised early that strong motivational forces were contained in the aspirations that young people held about aspects of their future. It was assumed that these aspirations should be fostered both in and out of the school classroom to contribute to the improvement of the occupational workforce.

An important question which has not been addressed, due to lack of suitable longitudinal data, is whether specific patterns in the changes to adolescent plans have any implications for longer term educational and occupational attainments. We need to know more about the dynamics of educational and occupational plans, and their consequences. Furthermore, we need to know whether there are systematic differences between students who consistently maintain their ambitious goals, those who become more ambitious over time, and those whose plans decline as they progress through their schooling. These questions are relevant particularly in comprehensive education systems where high school students are not streamed early into programs and tracks which predetermine their vocational placement. Australia is a good example of such an open comprehensive educational system and thus it is a particularly good setting for the investigation of

the impact which changes in students' plans might have for their later career attainments.

Our goals are thus twofold. The first is to investigate the prevalence of talent loss among a recent cohort of Australian youth. The second is to ascertain whether lowering educational and occupational expectations in high school, which can be seen as a form of talent loss, has consequences for the attainments of young adults.

## THE CONCEPT OF TALENT LOSS AND ITS RELATIONSHIP TO SOCIAL INEQUALITY

The literature within sociology of education has produced a number of working definitions of talent loss. These definitions originate directly or indirectly from a seminal study on lost talent by Hanson (1994). She argued that lost talent occurred when students, who showed early signs of ability, which she defined as above-average academic performance: 1) had their expectations fall short of aspirations, 2) had their expectations decline over time, or 3) were not able to realise earlier expectations (Hanson 1994, p. 159).

Hanson also recognised the disparity between aspirations and expectations, that is, between more and less realistic plans, as a fourth 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 (Saha 1997; Goyette 2008; Saha and Sikora 2008). Secondly, the Longitudinal Survey of Australian Youth 98 (LSAY98) data, which we rely on, 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. With these caveats in mind, we have developed four operational definitions of talent loss for above average youth, who in the course of their schooling and entry into the workforce exhibit: 1) lowered educational expectations, 2) lowered occupational expectations, 3) unrealised educational plans, or 4) unrealised occupational plans.

## LINKING SOCIAL INEQUALITY WITH TALENT LOSS

Within sociology the link between youth aspirations and social inequality has been recognized since the emergence, in the 1960s, of the influential Wisconsin study in the USA, which itself was based on the Blau-Duncan model of intergenerational occupational mobility. It was the Wisconsin model which, after controlling for family and peer effects, highlighted the independent effects of occupational and educational aspirations on future employment outcomes (Sewell, Haller and Portes 1969). Many empirical studies of student attainment followed the Wisconsin model in which family background was conceptualised as a key factor in shaping students' plans. The Coleman Report, also published in the USA about the time of the development of the Wisconsin model, was also used as evidence that family background, rather than school environment, was critical in shaping students' achievements (Coleman 1990). In other words, what could appear to some as individual preferences was seen within the Wisconsin tradition as an indirect influence of the socio-economic background of family of origin and peer groups.

Thus talent loss came to include the inability to realize one's individual potential as a result of structural barriers within social institutions. The individual potential, in its own turn, became equivalent to the adolescent aspirations and expectations which focussed on educational and occupational goals.

### Prior Research on the Determinants of Talent Loss

Most of the studies of talent loss from our conceptual perspective were published during or since the 1990s, and these were the first to provide some estimates of it among school students. Hanson's (1994) original study was based on the USA *High School and Beyond* data which were collected during the 1980s. She found that 16% of the youth had higher aspirations than expectations. In addition, 27% of the total sample had lowered their educational expectations after high school. In other words, they represented "talent loss". Interestingly this loss was more prevalent among students with lower economic, social and cultural capital. Furthermore, low socio-economic

status family background turned out to be the only significant predictor of talent loss, even after some differences in economic and cultural capital were taken into account. Moreover Hanson also argued that this lowering of expectations might have negative consequences for both the individual and society.

Following Hanson's results, Trusty and Harris (1999) also found in their study that the most powerful predictor of talent loss was the low socio-economic position of a student's family. However, much of this SES effect was mediated through the differential involvement of parents in the provision of resources to their adolescent children. But these effects exacerbated the risk of talent loss for young men and young women to varying degrees, with young women being at greater risk. These gender differentials were consistent with previous findings in the experiences of talent loss.

Hanson (1996) herself explored these gender differentials further regarding women in the specific branches of science. She found that gender contributed to talent loss indirectly through a large range of variables, for example socialisation within the family and the school, family resources, school characteristics, sex role attitudes, academic outcomes, course taking decisions, and attitudes towards particular subjects. In her sample, which consisted of several longitudinal USA surveys covering different time periods in the 1980s, almost half of all young women who showed promise, were out of the sciences by the final year of the six-year survey period (Hanson 1996: 177).

More recently, Alexander, Bozick and Entwisle (2008) analysed the 1990s data from a sample of Baltimore youth and found that declining expectations were common among those who were disadvantaged. Of almost 48% of youth who hoped to finish university in Year 12, 44 % abandoned their hopes by age 28, while 25% earned a BA degree. Of course there were some low-resourced individuals, even into their twenties, who persisted in their intention to finish university despite difficulties with enrolment and completion. But overall, the incidence of lowering the early high expectations was significant. Alexander and his colleagues identified three distinct patterns of change from initial educational plans, and

they named these as follows: "warming up", "holding steady" and "cooling out". "Cooling out" refers to the institutional process often experienced by disadvantaged youth who receive signals that their educational and occupational expectations are unrealistic, given their resources or academic ability. It is thus directly related to talent loss. Building on the findings from their study of Baltimore youth, Alexander and his colleagues argued for an extension of research on the relationship between plans and attainments not only in adolescence and early adulthood, but also for those at later stages of their life course.

Building on the above literature on talent loss, we now turn to our Australian data and investigate its incidence and consequences over a period of almost ten years. Our intention is twofold: 1) to document this important phenomenon for a sample of Australian youth, and 2) to further contribute to the literature on this important concept in the sociology of education.

## **DATA, MEASUREMENT AND METHODS**

This study is based on the Longitudinal Surveys of Australian Youth which, between 1998 and 2008, followed a cohort of students, who in 1998 were attending Year 9 (known as LSAY98). 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. They were then surveyed each year until 2008. A major advantage of this collection is that it contains longitudinal data about a very recent cohort of young Australians. The LSAY surveys ask a wide range of questions regarding 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.

## **Measurement**

The key dependent variables in this study are lowered expectations, university completion and occupational status. The latter two have been conceptualised in a traditional manner and their details are in Appendix 1, while below we explain our measurement of lowered expectations.

### **Lowered educational expectations**

LSAY98 asked students about their intention to go to university in 1998, 1999, 2000 and finally, 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 intention. If the four-year 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 sequences 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 answered this question, 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 plan patterns too volatile to meaningfully classify.

In our models we use, as predictors, a wide range of variables stipulated by developmental psychology and status attainment theories. The details of their measurement are also in Appendix 1.

### **Lowered occupational expectations**

Students were considered to lower their occupational ambitions if they initially, that is in 1998, planned to work in

one of the professional or managerial occupations (Australian Standard Classification of Occupations 2<sup>nd</sup> Edition (ASCO2) major group 1 or 2) and later, in 2001, reported non-professional and non-managerial occupations as their expected destination (Australian Bureau of Statistics 1997). Moreover, students who initially chose a destination in ASCO2 major Group 3 and later expected a job in Groups 4 through 9<sup>2</sup>, as their future career, are also considered to have lowered their occupational ambitions.

## Methods

We fit two sets of multivariate models. The first comprises logistic regressions to model the binary outcomes of talent loss (Table 1). The second set comprises two-level logistic and ordinary regression models (Table 2). The second level of the analysis is the student, while the first are the occasions or consecutive years in which the information about a particular student was collected. In the former model the completion of university is the outcome variable (Table 2, Model 1). In the latter we predict the occupational status of young adults' employment. This second analysis is presented in two versions. The first considers the impact of lowered high school ambitions on all periods of employment (Table 2, Model 2); the second includes only jobs which respondents considered as "their potential career" (Table 2, Model 3).

In these regressions on person-year data, the information about each student covers an observation window spanning the period between 1998 and 2008, or such part of that period during which a student provided information. The person-year data for all waves have been analysed using the *xtreg* or *xtlogit* procedures available in Stata 10. These procedures estimate panel 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 and 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

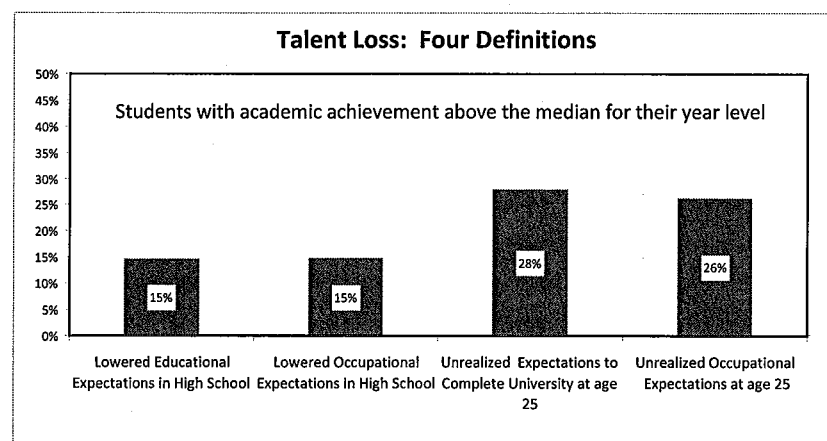
imputations of missing data (Royston 2004). This procedure produces five versions of a data set with five sets of imputed values. All multivariate analyses are then run five times and estimates are combined in accordance with the Rubin rules (Royston 2004).

## Prevalence 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 1998 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 expectations was asked (Australian Bureau of Statistics 2010).

We begin with a review of 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,<sup>3</sup> we consider the four understandings of talent loss in turn. Firstly, 'lowered educational expectations', that is the first definition, are in this study equivalent to the students' initial expectations to attend university which are later altered. 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 higher level vocational certificate with a plan to complete a lower level vocational certificate, can be seen as talent loss. However, we limit our analysis of educational intentions to the changes in plans to attend university. This is because 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 (Australian Bureau of Statistics 1997). 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, not shown here, is 18% and these figures match the proportions reported in the US studies of Alexander, Bozick and Entwisle (2008), Hanson (1994) and Trusty and Harris (1999).



Source: LSAY98 weighted estimates.

**Figure 1:** Prevalence of talent loss according to four different definitions

The second definition of talent wastage 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 (Australian Bureau of Statistics 1997).

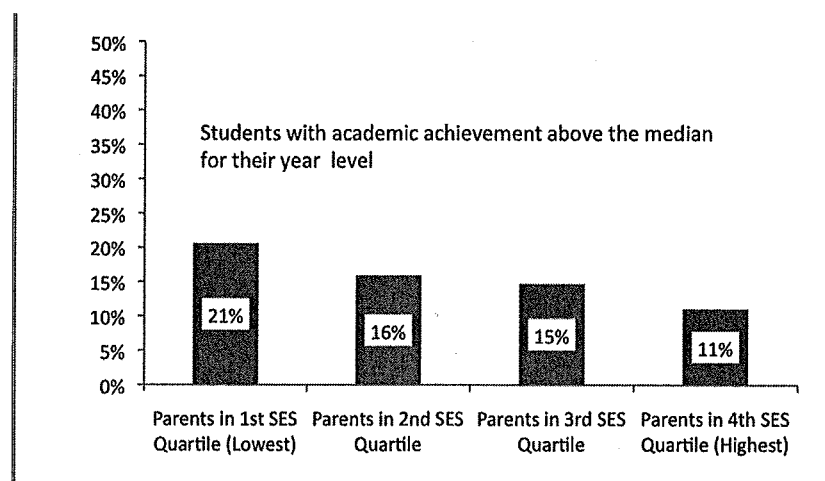
Similarly, students who initially chose a destination in ASCO2 major group 3 and then indicated a job in groups 4, 5, 6 etc. as their future career are coded as students with underutilised talent. Approximately 15% of students with early signs of strong academic performance moderate their initially more ambitious career plans. This figure closely corresponds to the rate of abandonment of early 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  $r = 0.21$ ).

Our third and fourth definitions of talent loss depict unrealised plans to complete university and to attain professional employment, respectively, by age 25. The definitions of educational and occupational destinations applied here are, as previously explained, 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 appears high, 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 et al. 2008).

Currently the LSAY98 data are not yet well suited to the investigation of the unrealised educational and occupational expectations, because the data are available for young people up to their 25th birthday. Many of them are likely to have realised their early ambitions only a little later, so classifying their ambitions as unrealised at that very point could 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, inspired by 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.

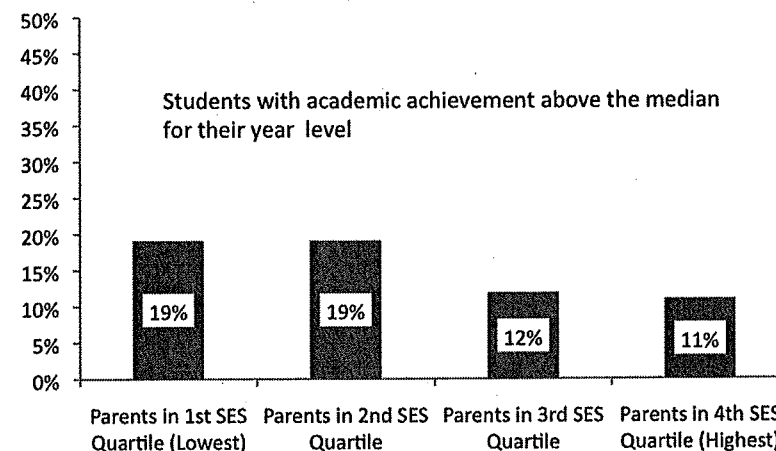
We begin with an examination of lowered expectations by parents' socioeconomic status. The students whose parents are in the lowest quartile of the socioeconomic status distribution are much more likely to have their expectations decline over time (Figure 2). The proportions of students who lower their expectations are almost identical, regardless of whether educational or occupational plans are considered (Figures 2 and 3).



Note: lowered expectations = students who did, but no longer plan to attend university.

Source: LSAY98 weighted estimates.

**Figure 2:** Lowered educational expectations by parents' socioeconomic status



Source: LSAY98 weighted estimates.

**Figure 3:** Lowered occupational expectations by parents' socioeconomic status

There is little difference between the first and second quartiles of parents' SES distribution where close to one-fifth of students moderate their previously 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 and Yaish 2006; Goldthorpe 2007), which proposes that students with less social, cultural and economic capital recognise the various structural constraints which are likely to hinder their chances of success, and adjust their plans accordingly.

In contrast to the studies in the US and the UK, where some gender differences were found, the rates of talent loss between Australian boys and girls are similar with 16% of boys and only 14% of girls lowering their educational and occupational plans. Although the proportions are the same for both types of plans, students who give up on the ambition to go

to the university are not necessarily the same as those who first aim for and then get cold feet about managerial and professional employment. There is some inconsistency in the matching of educational and occupational plans in this group of Australian adolescents as only 75% of students who want a highest status job plan to go university.

The key question that arises from these comparisons is about the scope for these patterns to enable the early identification of students whose academic performance warrants maintaining their initially ambitious goals, but whose socioeconomic situation or gender might pose challenges in maintaining these plans. In order to evaluate a 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 high achieving students.

### Determinants of talent loss

The logistic regression models highlight a number of relevant factors in addition to the socio-economic background in student's family of origin. The details of the measurement of the predictor variables can be found in Appendix 1.

Overall, we find that the predictive power of the models in Table 1 is modest and does not exceed 6% (Pseudo R<sup>2</sup>), 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.

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 present two models predicting the likelihood of talent loss among high-achieving students.

Table 1  
Logistic Regression Predicting Talent Loss Understood as 1) Lowered Occupational Expectations and 2) Lowered Educational Expectations

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

\*\* Statistically different from zero at  $p = 0.01$

\* Statistically different from zero at  $p = 0.05$



Adolescent boys are significantly more likely than girls 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 men than women. 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.

The effects of academic performance, self-concept of numerical and literary ability, and satisfaction with the school environment are all negative. 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 both models, suggesting a possibility that ambitious students who access vocational counselling find it helpful in maintaining their plans.

### Implication of talent loss for attainments

The analysis in Table 2 summarizes the effects which lowering educational and occupational expectations in high school has on the educational and occupational attainment of young adults. Departing from the previous assumption, here we show the results not just for the top 50% of achievers but for all

students, controlling for academic performance. It is worth noting, however, that the substantive results of analyses on data from all students and students in the top 50% of achievers are the same.

**Table 2**  
**The Effects of Lost Talent Defined as Lowering Educational and Occupational Plans on the Likelihood of University Completion and Occupational Status of Young Adults' Employment**

	Probability of completing University		Occupational status			
	Model 1		All jobs Model 2		Career jobs Model 3	
	Unstd coeff	Std error	Unstd coeff	Std error	Unstd coeff	Std error
<b>Fixed effects</b>						
<i>Time varying variables</i>						
Age	1.20**	0.03	2.43**	0.04	1.67**	0.08
Male	-1.32**	0.10	-1.24**	0.30	-2.19**	0.54
<b>Lost talent (lowered expectations)<sup>A</sup></b>	<b>-2.77**</b>	<b>0.17</b>	<b>-0.79*</b>	<b>0.35</b>	<b>-4.11**</b>	<b>0.67</b>
<i>Time invariant variables</i>						
Academic Performance in Year 9	0.92**	0.07	1.60**	0.16	4.35**	0.32
Parents' socio-economic status	0.02**	0.00	0.04**	0.00	0.10**	0.02
Completed university	—		20.04**	0.44	19.38**	0.66
(constant)	-8.53**	0.21	27.74**	0.39	37.15**	0.83
<b>Random effects</b>						
Variance between students	2.55	66%	63.3	26%	152.1	53%
Variance of student-specific observations			176.2	74%	225.8	47%
Total R Squared				35%		30%
Number of students	4748		4550		3003	
Number of student-year observations	52224		25975		8529	

\*\* Statistically different from zero at  $p = 0.01$

\* Statistically different from zero at  $p = 0.05$

<sup>A</sup> Lost talent in Model 1 is lowered educational expectations, whereas in Models 2 and 3 it is lowered occupational expectations

As the negative coefficients in bold show, talent loss is consequential. Those students whose plans were more ambitious earlier in high school but then dropped, are less

likely to complete university before their 25th birthday and less likely to secure a high status employment by that stage in their lives.

It is important to note that the lowered expectations used in the model predicting university completions are lowered educational expectations. In contrast, in the two other models, which predict occupational status, talent loss equates to lowered occupational expectations. The latter is important, particularly for those jobs which respondents see as their "potential career". While the negative coefficient for all employment is only -0.79 of an occupational status point, for career jobs the negative impact increases to over 4 status points on a scale ranging from 0 to 100. While this might seem to be a small effect, it is one fifth of the effect of university completion which increases occupational status by about 20 points. It is also noteworthy that in the models predicting occupational status, the negative effects of talent loss remain even after the benefits of university completion are taken into account.

## CONCLUSIONS

If talent loss is considered a negative phenomenon in modern society, then we have confirmed that it exists systematically in our sample of Australian students, and that its incidence is not trivial. Even for our Year 9 students, who were in the top half of the sample in academic performance, those who came from less privileged backgrounds were more likely between 1998 and 2001, that is their final years of high school, to lower their expectations to attend university, and by the time they were 25 (in 2008) they were also less likely to complete university. Furthermore, during their final years of high school, they were also more likely to lower their occupational expectations. Finally, when these students were 25, they were more likely to enter the job market in less prestigious positions than they had hoped earlier.

These figures make it clear that during the period of our analysis, the unrealised potential among Australian youth, both in terms of educational and occupational expectations, and in terms of university completion and entry into the workforce,

occurs primarily among those from lower socio-economic backgrounds. What is more important is that this decline in expectations among the less advantaged youth, during these important formative years, persists even when we take other factors into account. In addition to socioeconomic status, we find that males with low academic achievement, with poor self-concept in maths, and whose friends are not going to university, also lower their educational expectations. Concurrently, it is males from low socioeconomic status backgrounds, with poor self-concept in maths and those who are not engaged with schooling, who lower their occupational expectations. Thus the picture which emerges is of a clearly defined subgroup of the adolescent population, who during their crucial final years of high school, begin an attitudinal and motivational path which will destine them to a future of less prestigious jobs and careers. Yet, these very same people, during Year 9, were in the top 50% of their cohorts in academic achievement. They demonstrated the ability to continue aiming as high as their more advantaged counterparts, but did not do so. As a result, and as our data in Table 2 show, the consequences of these lowered expectations are that this subgroup was significantly less likely to complete university or to enter the workforce in their originally preferred career job by age 25, compared to those who retained their ambitions during this period.

We do not deny that some of these young people with declining ambitions and low attainments during this crucial period will enjoy a second chance at both more education and better jobs. However for the majority, we argue that their promising beginnings during Year 9 will have been lost forever, both to the individuals themselves, as well as for society. The fact that this turning point occurs so early in a person's life, before many responsibilities of adulthood are experienced, suggests a number of possible interventions which might "salvage" some of this talent loss. First of all, encouragement and positive feedback as early as Year 9 might help young people from disadvantaged backgrounds to maintain their original high ambitions. This source of positive reinforcement could come from parents themselves, or from teachers. Programs might be developed for them to recognise, and to

nurture the potential which these young students have, in spite of their lower social origins. In some respects, the positive reinforcement would also have to address the possibility that the stereotypes of masculinity (or being male), of high academic ability, and also of positive school integration with other highly motivated students, are themselves respectable achievements.

A second intervention might be the provision of resources to compensate for the low socioeconomic status backgrounds of high achieving, high ambitious young high school students. Material rewards for high levels of achievement, in the form of scholarships, bursaries, or school cost reduction, might provide the impetus for at least some of these vulnerable students to continue to aim high, and by so doing, to achieve at a level consistent with their early goals.

We believe that, by focussing on a crucial period of late adolescence, we have documented the losses to individuals and to Australian society of potential talent. At a time when higher levels of human productivity will be required to maintain present standards and quality of life in an increasingly more populated and globalised world, the utilisation of talent among young people is essential. We think the concept of "talent loss", as we have operationalised it here, should be reinstated more centrally into the sociological literature and research activity on schools and school students. Our study has only scratched the surface of how this important concept can help us understand a major inefficiency in school processes. More needs to be done. But we think we have shown a way forward to better understand the phenomenon of "talent loss" and what can be done about it.

## NOTES

1. This research was funded by the Department of Education, Employment and Workplace Relations through the LSAY Research Innovation and Expansion Fund, and administered by the National Centre for Vocational Education Research.
2. ASCO 2 comprises the following major occupational groups: 1 Managers and Administrators, 2

Professionals, 3 Associate Professionals, 4 Tradespersons and Related Workers, 5 Advanced Clerical and Service Workers, 6 Intermediate Clerical, Sales and Service Workers, 7 Intermediate Production and Transport Workers, 8 Elementary Clerical, Sales and Service Workers, and 9 Labourers and Related Workers

3. 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.

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### Method and measurement details

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

$$\ln \{Pr(y_i=1/x_i)/(1 - Pr(y_i=1/x_i))\} = \beta_1 + \beta_2 \text{ Male} + \beta_3 \text{ Academic Achievement} + \beta_4 \text{ Parents' SES} + \beta_5 \text{ Self-concept of ability in mathematics} + \beta_6 \text{ Self-concept of ability in reading} + \beta_7 \text{ Accessed information about careers} + \beta_8 \text{ Integration with school environment} + \beta_9 \text{ Teachers expect me to go to uni} + \beta_{10} \text{ Friends are going to uni} + \text{error terms}$$

and where  $y_i$  is the likelihood of lowering educational expectations in the first model, and occupational expectations in the second model.

The independent variables in Table 1 are defined as follows:

**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' Socio-Economic 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

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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 and Harris 1999). Additionally a student's integration with the school environment is measured by the school satisfaction variable.

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

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

**Integration with school environment** 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' are going to university** were constructed by recoding answers to the questions which measured a student's perceptions of these expectations and plans. The codes were: (University), (Work and university), and (University and other study or training) = 1. The rest = 0.

We also control for students' reported **access to information about careers** 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.

In Table 2 to model occupational status we use a random intercept model (mixed model) of the following form:

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

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

where  $\beta_0$  is the constant or the intercept, and  $\beta_{1i}$  through  $\beta_{ri}$  are regression coefficients for corresponding time-invariant explanatory variables  $x_{1i}$  through  $x_{ri}$  which do not vary between occasions or survey waves.  $\beta_{1ij}$  through  $\beta_{rij}$  are regression coefficients for corresponding time-varying explanatory variables  $x_{1ij}$  through  $x_{rij}$  which vary between occasions, that is survey waves. Finally,  $\xi$  is a residual error term or disturbance decomposed into error components.  $\zeta$  is a time-constant or permanent error component which varies between students and  $\varepsilon_{ij}$  is a transitory error that varies over occasions (i.e. survey waves) and students.  $\zeta$  is the equation above is a 'random parameter' (Rabe-Hesketh and Skrondal 2005, p. 35). For university completion we use an analogous model but in the form appropriate for a binary dependent variable.

Variables in Table 2 which were not used in Table 1 and are not described in the Measurement section are as follows:

**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, and in which the respondent participated in LSAY.

**Occupational status:** Students were asked every year about their employment, be it a part-time job while at school or any other form of paid work. Their verbatim responses were coded first to the four digit level of the ASCO classification and then recoded to the AUSEI06, a recent Australian occupational status scale which ranges from 0 to 100. Lower scores denote manual unskilled occupations and high scores denote specialised professions and high level managerial employment. AUSEI06 has been created by assigning scores to occupations based on the 2006 Census "in such a way as to maximize 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, and Jones 2009, p. 125). To designate these jobs which respondents considered as "proper" we occasionally used as a filter question 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 1st January. Therefore a student who was 14 years old in January 1998 is treated as being exactly 15 years of age in January 1999, whereas a student who was 14 in March 1998 will be treated as being 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 of one year and a student born in January of the next year.