

report

# School Experiences, Career Guidance, and the University Participation of Young People from Three Equity Groups in Australia

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# Abstract

University participation is a strong predictor of labour market success, personal health and well-being, and positive familial and social outcomes. However, in contemporary Australia there remain large differences in university participation rates between young people from advantaged and disadvantaged backgrounds. In this report we leverage contemporary longitudinal data for a representative Australian sample of students and employ event-history regression models to examine the associations between equity group membership (coming from a low socio-economic background, non-English-speaking background or a regional/remote area), school factors (career guidance and school experiences), and students' likelihood to enrol into university. We find evidence that equity group membership reduces the likelihood of university participation (except for non-English-speaking backgrounds), whereas receipt of career advice and positive school experiences increase such likelihood. Importantly, school factors more strongly predict subsequent university participation amongst young people from equity groups. These findings are important and policy-relevant, as they suggest that policy initiatives aimed at improving school factors will result in expanded university enrolments, and smaller enrolment gaps between young people from advantaged and disadvantaged social strata.

## Keywords

University participation; equity groups; socio-economic background; non-English-speaking background; remote areas; disadvantage; event-history models; Australia.

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# Non-Technical Summary

University participation is a strong predictor of labour market success, personal health and well-being, and positive familial and social outcomes. However, in contemporary Australia large differences in university participation rates remain between young people from advantaged and disadvantaged backgrounds. We leverage longitudinal data for a representative Australian sample of students and state-of-the-art statistical techniques to examine how belonging to an equity group (coming from a low socio-economic background, non-English-speaking background or a regional/remote area), school factors (career guidance and school experiences), and students' likelihood to enrol into university are intertwined.

Our research yields three key findings. First, young people from low socio-economic backgrounds and from regional/remote areas within Australia are less likely to enrol into university than young people from higher socio-economic backgrounds and non-regional/remote areas within Australia. The picture is different for our third equity group of interest: students from non-English-speaking backgrounds are more likely to enrol at university. Second, our two sets of school factors were generally associated with an increasing probability to attend university: students who held positive attitudes towards school and reported having a positive relationship with their teachers, and who received certain forms of career guidance, were more likely to enrol at university, and did so at earlier ages. However, not all forms of career guidance were found to be equally associated with university enrolment. The strongest positive effects were found for talks by a TAFE or university representative and schools' career advisors, while negative effects were found for employer representative talks and group discussion about careers.

Third, we find some evidence that some school factors have stronger effects on university enrolment amongst students from equity groups. For example, positive student-teacher relations and talks by school career advisors were more conducive to subsequent university enrolment amongst young people from low socio-economic backgrounds, and positive student-teacher relations and career group discussions more strongly predicted subsequent university enrolment amongst young people from regional/remote areas within Australia.

While they cannot be considered causal, these findings are important and policy relevant. In particular, they provide evidence of the importance of in-school career advice and guidance and school experiences in shaping the chances of university participation among young people, particularly those from equity groups. Policy initiatives aimed at improving these school factors will result in expanded university enrolments, and smaller enrolment gaps between young people from advantaged and disadvantaged social strata. In addition, these factors are relatively easy to address through policy intervention (as they can be regulated by government through schools) and are 'preventive strategies' with fewer costs and greater returns to investment than 'remedial strategies' to compensate for social disadvantage due to poor education. Therefore, we argue that investments into these factors should be considered a priority.

# 1. Introduction

## 1.1 The changing educational landscape and access to university in Australia

As with other developed countries, Australia has undergone profound socio-economic transformations over the last few decades (Beck, 1992; Giddens, 1994). There have been substantial changes in the economic structure (e.g. collapse of manufacturing jobs, upsurge in service sector employment, the 'mining boom') (Connolly & Lewis, 2010), demographic behaviour (e.g. fertility declines, rise of de facto relationships, postponement of parenthood) (de Vaus, 2004), and the educational system (e.g. improved school completion rates and increasing participation in tertiary education) (Marks, Fleming, Long, & McMillan, 2000). Collectively, these structural changes have had immense impacts on the lives of young people.

Since Australia's shift into a post-industrial economy and a post-modern society, the early life-course trajectories of young Australians have become more diverse and less structured (Fullarton, 2001; Gale & Parker, 2013). The traditional pathways from secondary school to work on the one hand, or to university on the other, have become only two options within a growing set of available alternatives (Brzinsky-Fay, 2014). Particularly, from the early 1990s, the increasing availability and popularity of Vocational Education and Training (VET) programs and the expansion of low-skilled, entry-level service jobs (predominantly in the retail and hospitality sectors) have created attractive alternatives to university for many young people (Ferrier, Dumbrell, & Burke, 2008; Malley, Keating, Robinson, & Hawke, 2001).

However, these changes have not been randomly distributed across social strata. Instead, it has been documented that emerging options acting as alternatives to tertiary education have been disproportionately chosen by young people from disadvantaged backgrounds. For example, Australian research shows that students from low socio-economic backgrounds and regional or remote areas within Australia are over-represented in the VET sector (Foley, 2007). This is important, as another body of evidence indicates that VET is not an effective pathway to university for students from low socio-economic backgrounds (Wheelahan, 2009).

## 1.2 The benefits of university participation and Australian education policies

Participation in university and the attainment of tertiary-level educational qualifications are amongst the strongest predictors of subsequent success in the labour market, including the attainment of secure and continuous employment (ABS, 2015; OECD, 2006), high productivity and wage growth (Borland, 2002; Daly, Lewis, Corliss, & Heaslip, 2015), occupational standing (Hauser, Warren, Huang, & Carter, 2000; Pascarella & Terenzini, 2005), and job satisfaction (Ross & Reskin, 1992). As a result of their improved work prospects, university-educated individuals are also less likely to live in households which fall below the poverty line, be dependent on income-support from the government, and report financial difficulties (Connelly, Sullivan, & Jerrim, 2014; McLachlan, Gilfillan, & Gordon, 2013; Perales et al., 2014; Raffo et al., 2007). In a similar vein, university qualifications are known precursors of health and well-being. For example, individuals with degree-level education are less likely to be in poor physical health (Ross & Van Willigen, 1997; Ross & Wu, 1995), suffer from mental disorders (Anstey & Christensen, 2000), and adopt risky health behaviours, such as smoking, drinking and substance abuse (Hill, White, & Scollo, 1998). They also have higher life expectancy and greater overall quality of life (Edgerton & von Below, 2012). In addition, degree-level education is negatively related to the probability of family breakdown (Tzeng, 1992), and positively correlated with child development and child outcomes (Wolfe & Haveman, 2001). Hence, a social system that expands university participation is desirable, and so is a system which guarantees that the benefits of university participation are not restricted to individuals from advantaged social collectives.



These ideals are well engrained and enacted in contemporary Australian higher education policy, which has been marked by a strong focus on expansion and equity. A key landmark was the publication of a comprehensive national equity framework through the *A Fair Chance for All* report (DEET, 1990), which formally identified six equity groups on the basis of under-representation in higher education. Following this, a set of higher education equity performance indicators were developed (Martin, 1994). More recently, the *2008 Review of Australian Higher Education* (the 'Bradley Review') (Bradley, Noonan, Nugent, & Scales, 2008), and the response by the Australian Government, *Transforming Australia's Higher Education System* (Commonwealth of Australia, 2009), set out specific participation targets to be achieved by 2025. This resulted in the establishment of the Higher Education Participation Program (HEPP) with initiatives to promote university participation among equity group students funded at both the institutional and system levels.

Because of this policy focus, educational disadvantage in the context of university participation in Australia has been typically considered with reference to the six equity groups identified in the *A Fair Chance for All* report (DEET, 1990). The six equity groups are:

- Aboriginal and Torres Strait Islander Australians
- people from low socio-economic backgrounds
- people from non-English-speaking backgrounds (NESB)
- people from regional or remote areas
- people with disability
- women in non-traditional subject areas.

These groups have been the focus of policies aimed at improving university participation among people from disadvantaged backgrounds, and their performance is routinely monitored by the Australian Government using five indicators (CSHE, 2008):

- *Access* – measured as the proportion of equity group students out of all commencing domestic students.
- *Participation* – measured as the proportion of equity group students out of all domestic students overall.
- *Retention* – measured as the proportion of equity group students who re-enrol at an institution in the next year.
- *Success* – measured as the mean student progress rate for the previous year for students from the equity group.
- *Completion* – measured as the proportion of equity group students completing all the academic requirements of a course.

### **1.3 Closing gaps in university participation: how schools matter**

In this context, it is of paramount importance that we understand the complex choices that young people in Australia face when deciding whether or not to enrol in university, the factors influencing such decisions, and whether or not these mechanisms operate differently for young people from advantaged and disadvantaged social strata. Many of these factors, such as parental guidance and peer support (Dennis, Phinney, & Chuateco, 2005; Fass & Tubman, 2002), are embedded within families and social networks, which are difficult for policymakers to influence. However, other important factors operate through the institution of the school and its environment, and so they are more malleable and ripe for institutional intervention.

Two important school factors which are strongly associated with young people's chances of enrolling in university are career advice and guidance and school experiences. Career guidance refers to the support and advice students receive at school in planning their post-school educational and

professional pathways (Gore et al., 2015). School experiences capture a broad set of processes defining students' interactions with the education system (e.g. their emotional attachment to their schools, relationships with teachers, etc.), and manifest through students' engagement with school and the process of learning (Reeve, 2002; Skinner, Furrer, Marchand, & Kindermann, 2008).

These factors have been shown to have a substantial influence on young people's post-school outcomes, including their university participation (Alloway, Dalley, Patterson, Walker, & Lenoy, 2004; Gale & Parker, 2013; Gale, Parker, Rodd, Stratton, & Sealey, 2013). However, while the international evidence from countries such as the United States, the United Kingdom and Germany is rapidly growing, few studies have addressed this issue in the Australian context. This is an important omission, as the Australian educational system is internationally distinctive and not comparable to that in countries for which research exists. For example, one of its distinctive features is the extra layer of complexity brought about by its dual funding model. In this model, state governments are responsible for running public schools, and for the accountability, regulatory and registration frameworks for primary and secondary education, whereas the Commonwealth Government is responsible for the provision and allocation of funding for universities and also for significant financial support for non-government schools. Hence, the findings of studies in these other countries may not apply in the Australian context, and specific Australian evidence is urgently required.

In addition, there is a paucity of evidence on whether or not school factors such as career guidance and school experiences affect the outcomes of students from advantaged and disadvantaged groups equally. On the one hand, it is possible that students from disadvantaged backgrounds benefit more from career guidance and positive school experiences than students from advantaged backgrounds, as these school factors may compensate for shortcomings in other domains (such as a lack of role models, or family and peer support). On the other hand, it is possible that career guidance and positive school experiences are equally effective amongst students from advantaged and disadvantaged backgrounds, if the latter have little capacity to enact their decisions to attend university due to a lack of resources in other domains (e.g. financial resources to fund their university participation). Understanding which of these scenarios prevails is important to successfully shaping Australian educational policy, and efficiently allocating government resources to close gaps in access to university by equity group membership.

#### **1.4 Research questions, aims and scope of this report**

This report will address important gaps in knowledge in the Australian context concerning the issues discussed above. Specifically, we will answer the following research questions:

- (1) How is equity group membership associated with students' likelihood to enrol into university in contemporary Australia?
- (2) How are (secondary) school factors (i.e. career guidance and school experiences) associated with students' likelihood to enrol into university in contemporary Australia?
- (3) Are the impacts of school factors on university enrolment different for young people from equity and non-equity groups?

To answer these research questions, we will leverage high-quality, nationally representative longitudinal data from the 2003 cohort of the *Longitudinal Study of Australian Youth*, and state-of-the-art event-history regression models. A note on the report scope is due here. Our focus is on three of the current equity groups:

- young people from low socio-economic backgrounds
- young people from non-English-speaking backgrounds
- young people from regional or remote areas within Australia.



We do not investigate the remaining three equity groups. This is because Aboriginal and Torres Strait Islander Australians constitute a very small fraction of LSAY respondents (which prevents robust analyses), disability status cannot be unambiguously ascertained in these data, and women in non-traditional subject areas only become an 'equity group' after university enrolment.

The remainder of this report is structured as follows. Section 2 discusses the existent theoretical and empirical knowledge on the relationships between equity group membership, school factors, and university enrolment. Section 3 introduces the LSAY data and outlines its properties, and describes our analytical sample and choice of variables. Section 4 outlines our methodological and analytical approach. Section 5 presents the results of bivariate analyses and multivariate event-history regression models. Section 6 concludes with a summary of findings, emphasising their implications for policy and practice in the contemporary Australian educational context.

## 2. Background

### 2.1 A life-course approach to university participation

When analysing pathways into university among advantaged and disadvantaged students, it is important to take a holistic approach. In particular, it is critical to move beyond simple assessments of young people's characteristics at a point in time (e.g. at the time of university enrolment) and consider these as part of long-term trajectories. The life-course approach is a useful theoretical lens to be used in this context. Within this perspective, people's life histories are understood as a series of events and transitions in parallel life domains, with early events and transitions having the potential to influence onward trajectories and future outcomes. One key life-course principle is the possibility for accumulation of (dis)advantage, which implies growing disparities between individuals from disadvantaged and advantaged backgrounds as they progress through their lives (Elder Jr, Johnson, & Crosnoe, 2003; Mayer, 2009). Another is the importance of context: people's life experiences, decisions and outcomes are intrinsically influenced by the social contexts in which they are embedded—including their families, schools, neighbourhoods, peer groups, and communities (Elder Jr et al., 2003; Mayer, 2009).

The life-course approach can be used to improve our understanding of how young people from different backgrounds progress through their school years and move onto post-school destinations (including university), and how different individual, family, school and policy factors influence this process. Using a life-course approach, the Australian Institute of Health and Welfare (AIHW, 2014) mapped out four key phases in the pathways into university for equity group students in Australia: (i) the decision about whether and where to apply to university (*pre-entry*), (ii) students' experiences navigating the admission process, including whether or not offers are made to students and students' decisions around acceptance (*enrolment*), (iii) how well young people from equity groups who decide to attend university cope with it (*university experience*), and (iv) the 'returns to education' after these students graduate (*graduate outcomes*). In this framework, young people's experiences and outcomes at earlier stages influence (or even determine) their outcomes at later stages, following the life-course principles of sensitive and critical periods. The pre-entry phase (when students form their decisions about applying to university) is fundamental, as it determines whether or not subsequent phases will be experienced at all. It is therefore important, from both research and policy perspectives, to understand the factors that influence young people's decision making processes at this key stage.

### 2.2 Social disadvantage and university participation

#### Theoretical mechanisms

A long-standing body of international research has demonstrated that, as for other educational outcomes, the decision to apply to university is strongly shaped by socio-economic background. For example, recent research findings from Britain reveal increasing under-representation of students from low socio-economic backgrounds at university, resulting in widening gaps in tertiary education attainment (Anders & Micklewright, 2013; Moore, Sanders, & Higham, 2013). Similar patterns have been found in the United States (Altbach, Reisberg, & Rumbley, 2009) and continental Europe (European Union, 2014).

Several mechanisms have been put forward to explain socio-economic differences in university participation. These can be grouped into two broad categories: one encompassing structural and material factors, and the other covering aspirational factors and socio-cultural capital. First, a number of structural factors associated with social disadvantage can hinder young people's chances of attending university. Such factors include the availability of material resources, e.g. income and wealth (Blanden & Gregg, 2004; Huang, Guo, Kim, & Sherraden, 2010; Marks, Cresswell, & Ainley,

2006; Orr, 2003), geographical location (Fleming & Grace, 2015), and accessibility barriers for people with disabilities (Gilson & Dymond, 2012; Ryan & Struhs, 2004). In particular, the cost of attending university – both real and perceived – has been identified as a major barrier for young people from low socio-economic backgrounds, and for those located in regional or remote areas who live far away from academic centres (Naylor, Baik, & James, 2013). Relatedly, there are important differences in the characteristics of and practices within the schools that young people from advantaged and disadvantaged backgrounds are selected into: advantaged students are more often able to afford and secure access to ‘advantaging’ schools that better prepare them for enrolment into university (Abbott-Chapman, 2011; Croll & Attwood, 2013; Gemici, Lim, & Karmel, 2013; HEFCE, 2015; Moore et al., 2013; Reay, Davies, David, & Ball, 2001). Schools in which young people from higher socio-economic backgrounds are over-represented feature ‘school cultures’ which assume university as the natural next step in the educational ladder, while schools in which young people from low socio-economic backgrounds are over-represented implicitly or explicitly ‘track’ students into vocational education (Foskett, Dyke, & Maringe, 2008). These school cultures are enacted through school curricula and subject availability (Fullarton & Ainley, 2000; Gore et al., 2015; Reay et al., 2001), the quality and quantity of career guidance provided to students (Reay et al., 2001), and the quality of the learning environment, including the qualifications and job experience of teachers (Abbott-Chapman & Easthope, 1998; Fredman & Doughney, 2012).

Second, in addition to falling behind due to structural and material factors, young people from disadvantaged backgrounds are also negatively affected by their limited socio-cultural capital (Bourdieu, 1996). They often face home environments which are not sufficiently intellectually stimulating, have parents who exert poorer parenting practices, and have only limited access to high-quality social networks (Aschaffenburg & Maas, 1997). Hence, young people from disadvantaged backgrounds are less able to use their cultural capital and social networks in decision-making processes concerning the choice of post-school destinations (Sellar, Gale, & Parker, 2011; Whitty, 2015). That is, they have lower ‘navigational capacity’ to access relevant information, and use it to their advantage (Gale et al., 2013). For example, young people from disadvantaged backgrounds may simply lack knowledge on the location of different universities, the requirements to enrol in different university programs, or how to overcome the complexities of the university enrolment process (Kenway & Hickey-Moody, 2011). Other research demonstrates that disadvantaged students struggle more with the application process and respond less efficiently to new information in that process (Cardak, Bowden, & Bahtsevanoglou, 2015). These issues are exacerbated if these young people are the first in their family or social circle to decide to attend university, as they would have a limited ability to rely on their networks to acquire the required knowledge (Ball & Vincent, 1998; Bryce & Anderson, 2008). These mechanisms often result in young people from disadvantaged backgrounds having lower and less developed academic aspirations than young people from advantaged backgrounds, with these socio-economic gaps being apparent from very early ages (Breen & Goldthorpe, 1997; Goldthorpe, 1996). For many of them, the perceived barriers to access and succeed in higher education would be sufficient to portray such a pathway as unrealistic (Gale et al., 2010). In addition, young people from disadvantaged backgrounds tend to perform worse at primary and secondary school, which limits their choices when it comes to continuing their education at university (Polidano, Hanel, & Buddelmeyer, 2013).

### **Australian evidence**

The three equity groups considered in this report face important barriers to university participation. In contemporary Australia, low socio-economic background is associated with a range of disadvantage indicators (Leigh, 2013; McLachlan et al., 2013; Saunders, 2011), so young people in this equity group are often exposed to a combination of risk factors. For example, compared to their more advantaged peers, young people from low socio-economic backgrounds in Australia live in lower-income and lower-wealth households, often within disadvantaged neighbourhoods, and have parents who are less educated, possess less social and cultural capital, have poorer physical and mental health,

and exert comparatively poor parenting practices (AIHW, 2014; Considine & Zappalà, 2002; James, 2001). Young people from low socio-economic backgrounds in Australia are also more likely to be low achievers in primary and secondary school, leading to lower school-completion rates (CSHE, 2008; James et al., 2008). In addition, the educational aspirations of these students are geared towards vocational education rather than university (AIHW, 2014; James, 2000). In the Australian context, this has been tied to a lack of confidence in achieving the academic results necessary to perform well in tertiary education, a desire to earn income immediately after secondary school, and holding less positive views about university education (James, 2002; Naylor et al., 2013).

Australia's geographical features make it a distinctive case within developed countries. Because of its large size and the large distances between its municipalities, young people in regional and remote areas in Australia may live far away from the closest university –particularly given that most Australian universities are located in metropolitan areas (AIHW, 2014). Even when there is a university in the vicinity, it may be the only university within commuting distance, and so university and program choices are limited. Hence, for many young people from regional or remote areas within Australia university attendance is often synonymous with long-distance relocations. It is therefore unsurprising that poor access to university campuses is seen as the main reason for the comparatively lower university participation rates among these young people (Edwards & Marks, 2008; James et al., 1999; Marks et al., 2000; Stevenson, Evans, Maclachlan, Karmel, & Blakers, 2001). Thus, young people who come from non-metropolitan Australian areas face considerable financial and logistical barriers to attending university (Godden, 2007; Richardson & Friedman, 2010; Stevenson et al., 2001). Furthermore, the quality of schools is generally lower in non-metropolitan than metropolitan areas within Australia, which results in poorer student retention rates past Year 12 (Cresswell & Underwood, 2004; Lamb, Walstab, Teese, Vickers, & Rumberger, 2004; Marks, 2007). Completing Year 12 is the most typical pathway into higher education in Australia, and students who do not complete it have limited ability to enrol in university (AIHW, 2014).<sup>1</sup>

Coming from a non-English-speaking background can also be associated with a number of barriers to university participation. These include relatively poor English language proficiency, different cultural standards and practices, and a lack of context-specific academic knowledge due to completing some schooling overseas (Mestan, 2016). For instance, poor English language proficiency may discourage young people from enrolling in university due to perceived or actual difficulties in understanding study material and not being able to communicate effectively (Coley, 1999). In some cases, the cultural norms amongst students from certain backgrounds may place lower value on university participation, and more value on quick post-school transitions into the labour market (Oliver, Vanderford, & Grote, 2012). In other cases, young women from certain backgrounds may be exposed to cultural or religious norms that prevent them from attending university (Mestan, 2016). Finally, lack of knowledge about enrolment processes and incompatibilities between qualifications obtained overseas and entry requirements of Australian universities can also create practical barriers (Oliver et al., 2012).

However, the equity category of 'non-English-speaking background' has been heavily criticised for two reasons: (i) this category encompasses people with a very diverse set of backgrounds, aptitudes and experiences, and (ii) migration policy in Australia has remarkably shifted the composition of this group towards a highly skilled sub-population. Concerning subgroup heterogeneity, it is critical to distinguish between first and second generation migrants, by the length of time in Australia, and by the specific ethnic group that a person belongs to (DEET, 1990; Mestan, 2016; Scull & Cuthill, 2006). Because the non-English-speaking background category is so broad, it has been previously found that, at an aggregate level, it is not negatively associated with university participation in Australia, contrary to

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<sup>1</sup> *Young people living in regional/remote areas are often exposed to the same disadvantage factors as young people from a low socio-economic background, which makes it difficult to disentangle the effects that are purely due to geographical location (DEEWR, 2010; Richardson & Friedman, 2010).*

what is implied by its consideration as an equity group (Marks et al., 2000). A similar pattern has been found for school Year 12 completion (Lamb et al., 2004), which is known to be a strong predictor of subsequent university participation. Concerning over-time change in the composition of this sub-population, Australia's increasingly selective and skill-oriented migration policy means that highly-educated, occupationally successful and healthy migrants will be over-represented within new arrivals whose children fall into the non-English-speaking background equity group (ABS, 2012; Department of Immigration and Border Protection, 2014). Hence, the relevance of this category to understanding educational disadvantage in Australia may erode over time.

## **2.3 School factors and university participation**

### **Theoretical mechanisms**

A vast body of research has found strong links between school characteristics (including the quality of teachers and learning experience, the curriculum and services offered, and the classroom learning climate) and the subsequent university participation of students (see e.g. Bradley et al., 2008; Crawford, 2014; Gale et al., 2010). Here, we consider two key sets of factors through which schools can influence students' decisions about whether or not to enrol in university: (i) school experiences (encompassing student engagement and perceived learning climate); and (ii) career guidance (particularly, the provision of advice and information about aspects important to university participation).

These are critical factors to investigate because they are ripe for policy intervention. This is because, unlike other factors such as equity group membership, they can be regulated by government through schools relatively easily. In addition, investments into these factors can be seen as 'preventive strategies', with fewer costs and greater returns to investment than 'remedial strategies' to compensate for social disadvantage due to poor education. This resonates with claims that school experiences, measured by student engagement and attitudes to school, are more easily shaped by policy interventions than other drivers of university enrolment, such as academic achievement (Finn, 1993; Fredericks et al., 2004).

Positive school experiences, as captured by students' engagement with schools and perceived learning climate (including teaching quality and positive relationships at school), can have a profound effect on students' subsequent university enrolment (Abbott-Chapman et al., 2014; Ainley & Ainley, 2011; Appleton, Christenson, Kim, & Reschly, 2006). These experiences improve university enrolments by strengthening the affective (or emotional) binds between students and the education system. For instance, students who enjoy learning, have a positive emotional attachment with their schools, and feel that they have established positive relationships with teachers and peers may feel that they belong in the education system, and be more likely to consider continuing education at university (Hossler & Stage, 1992; Pekrun, Goetz, Titz, & Perry, 2002). Conversely, students whose interactions with the school system result in negative feelings and associations about going to school, are more likely to be disengaged from education at the secondary school level, and unlikely to consider attendance to university as a desirable post-school pathway (Hossler & Stage, 1992; Pekrun et al., 2002).

The provision of career advice and/or guidance at schools has been identified as another factor that can lead to university participation (Bradley et al., 2008; Gale et al., 2010; Moore et al., 2013). In contrast to positive school experiences, career guidance increases university enrolments by strengthening the cognitive component of the process. Detailed and encompassing advice can help students familiarise themselves with pragmatic aspects concerning the decision of whether or not to attend university, and the complex process of university enrolment (Aird, Miller, van Megen, & Buys, 2010). For example, students may require information on the benefits of university education for subsequent life outcomes, the breadth of programs available to them (e.g. content, duration, post-award career pathways), general and program-specific entry requirements (e.g. completion of



certain subjects, attainment of sufficient test-score grades), the bureaucracy of enrolment (e.g. contacts, deadlines, forms), and how to fund their studies (e.g. part-time work options, student loans, stipends available) (Craven et al., 2005; James & Devlin, 2006; Lamb et al., 2004). Career advice sessions are also a good opportunity for students to share and resolve their worries and insecurities with supportive mentors. Altogether, receipt of positive advice on university enrolment at school empowers young people to make a life-defining decision with less uncertainty and more self-confidence.

### **Australian evidence**

Despite the importance of the subject matter, evidence on the impact of school experiences and career guidance on university participation is very limited, particularly in the Australian context. In addition, the few studies available focus on the predictors rather than the consequences of student engagement (see e.g. Gemici & Lu, 2014). This research suggests that the decision to apply to university amongst young people in Australia hinges on the completion of Year 12, Australian Tertiary Admission Rank (ATAR) scores, place of residence, financial circumstances, family influences, social networks, personal aspirations, and knowledge of the admission process (AIHW, 2014). Importantly, four of these factors (completion of school Year 12, ATAR scores, personal aspirations, and knowledge of the admission process) are strongly shaped by the school environment, which stresses the importance of secondary school as an institution in shaping the chances of university participation among young people in Australia.<sup>2</sup>

However, little is known about the specific role of career advice and positive experiences within Australian schools in increasing young people's university enrolments. Previous Australian research has identified links between university aspirations and school experiences and student engagement (Abbott-Chapman et al., 2014; Gore et al., 2015). University participation in Australia has also been tied to understanding of admission processes and available options, as well as the receipt of career advice and information provided at school, including visits from university representatives, information sessions and discussion with school advisors (Alloway, Dalley, Patterson, Walker, & Lenoy, 2004; Alloway, Gilbert, Gilbert, & Muspratt, 2004; Anderson & Verboorn, 1983; Gale et al., 2010; Gale & Parker, 2013).

## **2.4 Equity group membership as a moderator of the impact of school factors on university participation**

An important limitation of national and international studies on school experiences and career advice as precursors of university enrolment is that they assume that the processes described before operate similarly amongst young people from advantaged and disadvantaged groups. That is, there is a paucity of research examining whether or not these sets of school factors affect the outcomes of students from advantaged and disadvantaged groups equally. However, there are theoretical reasons suggesting that group differences in such effects (i.e. 'moderation effects' in statistical jargon) may in fact exist.<sup>3</sup>

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<sup>2</sup> There are two main pathways into university for domestic students in Australia: application through centralised state tertiary admission centres (TACs) or direct application to a university. Around 80 per cent of domestic applications to university are made through TACs, of which 55 per cent are from Year 12 applicants (AIHW, 2014). Hence, applying immediately after school completion represents the most common pathway into university in Australia. For most programs admission is based on academic performance in Year 12, as reflected by the ATAR scores.

<sup>3</sup> This is an argument about the moderating effect of disadvantage, not to be confused with arguments about its potential mediative effect. Concerning the latter, previous research suggests that differences in students' background translate into different school experiences, including their treatment by peers and the ways in which they are evaluated by teachers (DiMaggio, 1982; Gunn, 2005). These different experiences can affect whether young people from disadvantaged backgrounds decide to enrol at university. However, there is also evidence that a good school environment may act as a catalyst for positive educational outcomes amongst young people from disadvantaged backgrounds. For example, high student engagement is a strong predictor of higher education attainment amongst students of both advantaged and disadvantaged backgrounds, which suggests that it may be a protective factor against the negative effects of low socio-economic backgrounds (Finn & Zimmer, 2012).



First, it is plausible that students from disadvantaged backgrounds benefit more from career guidance and positive school experiences than students from advantaged backgrounds. This may be the case if positive school experiences and high-quality career advice help compensate for deficits amongst these students in other important drivers of university participation. For example, compared to students from more advantaged backgrounds, students from disadvantaged backgrounds may have more limited access to information about educational options, including university, from out-of-school sources such as family and social networks (Alloway et al., 2004a; Alloway et al., 2004b; Anderson & Verboorn, 1983; Gale et al., 2010). These propositions resonate with research findings indicating that young people from disadvantaged backgrounds rely more on schools as a source of information and inspiration to make decisions about their future (Ball & Vincent, 1998; Bok, 2010), value their teachers' advice and encouragement more (Gore et al., 2015), place extra weight on the guidance provided by career advisors (James, 2000), and are more positive about their career advice experiences (Rothman & Hillman, 2008).

Seen from another perspective, there may be 'ceiling effects' in the degree to which school factors such as those described here can shift the outcomes of students from more advantaged groups. A large share of such students would enter secondary school and move through the education system with clearly formed aspirations and expectations of university participation –by virtue of their family and social networks. Hence, for many of these students, school inputs would be redundant in this regard. In contrast, the margin for expanding the educational aspirations and expectations of students from more disadvantaged backgrounds would be larger.

However, it is also possible that career advice and positive school experiences are equally effective amongst young people from advantaged and disadvantaged backgrounds. This would be the case if such school factors were successful in raising aspirations for university participation amongst young people from disadvantaged backgrounds, but other barriers still prevented these young people from enacting their newly acquired goals. An obvious example of such barriers would be difficulties in financing their university participation, or external pressures to move into income-generating activities. This is consistent with research evidence showing that young people from disadvantaged backgrounds who aspire to attend university are less likely to have their aspirations realised than comparable young people from more advantaged backgrounds (Bowden & Doughney, 2010).

As explained above, gaining a robust understanding of which of these perspectives applies within the Australian context has important implications for Australian educational policy aimed at redressing socio-economic inequalities in access to university. More specifically, if career advice and positive school experiences are more efficient in promoting university enrolment amongst young people from disadvantaged backgrounds, then promoting those factors would be an appropriate policy lever.

## 3. Data and Variables

### 3.1 The Longitudinal Study of Australian Youth

The main aim of this research report is to examine the intersections between equity group membership, school experiences, career guidance, and university enrolment amongst young people in Australia. To accomplish this, we use data from the *Longitudinal Surveys of Australian Youth* (LSAY).

LSAY is a series of large, longitudinal cohort studies which track young Australians from age 15, collecting annual data from them until they turn 25 years old. Data is collected through a combination of telephone interviews and online surveys. The information covers topics such as education and training, employment and social development. There are currently five instalments of LSAY, beginning in 1995, 1998, 2003, 2006 and 2009, respectively.

For the purposes of this research, we use LSAY 2003 (LSAY Y03). This is because this is the only complete LSAY survey that was integrated within the Organisation for Economic Co-operation and Development (OECD) Program for International Student Assessment (PISA) study. The fact that the cohort is complete is important because it enables us to track respondents' university enrolment up to age 25, hence picking up 'delayed' enrolments. The fact that this is a PISA-based cohort is also important, as it incorporates a range of high-quality, validated PISA measures (e.g. attitudes towards school and student-teacher relations), as well as student PISA achievement scores. As is the case for other LSAY instalments, the LSAY Y03 cohort sample is nationally representative. It was constructed by randomly selecting 50 students aged 15 years from a sample of schools representative of all states and sectors, for the purpose of participating in the 2003 PISA exercise. We use information from all eleven 2003 LSAY waves, spanning from 2003 to 2013.

The initial sample size comprises 71,385 observations from 10,370 individuals. We exclude observations from individuals who have missing data on the modelled variables (n=2,025 observations). Since we use event-history models (see details below), all observations after individuals first enrolled into university are also excluded from the analyses (n=19,102 observations). The resulting analytic sample size comprises 50,258 observations from 10,027 individuals.

Attrition rates in 2003 LSAY are shown in Table A1 in the Appendix. The percentage of wave one respondents who completed the wave two instrument was 90.4. Retention rates were 64.2 per cent by wave five, and 36.1 per cent by wave 11. This substantial rate of respondent attrition highlights the need to model the LSAY data using a technique which can accommodate loss to follow-up. As we will explain below, our event-history models are well-suited for this task.

### 3.2 Analytic variables

#### **Outcome variable: university enrolment**

Our outcome variable captures individuals' first enrolment into university, if such an event was observed to occur over the observation window. This is a dichotomous variable which takes the value one if the event was observed to have occurred, and the value zero if the event was not (yet) observed to have occurred. As denoted by Kaplan Meier estimates (see Section 4.1), about 58 per cent of sampled individuals were observed to enrol into university, whereas 42 per cent were never observed to do so (Table 1). As will be discussed later in the report, this constitutes a somewhat larger fraction of young people than that reported by other sources.

**Table 1***Descriptive statistics on analytic variables*

	Mean/%	SD	Min.	Max.
<b>Equity group membership</b>				
Low socio-economic background	24.7%		0	1
From a regional or remote area	17.0%		0	1
From non-English-speaking background	7.5%		0	1
<b>University enrolment</b>				
Student enrolled at university (by wave 11)	58.0%		0	1
<b>School experiences</b>				
Attitudes towards school index	0.27	1.05	-3.15	2.53
Student-teacher relations index	0.22	0.92	-3.09	2.86
<b>Career guidance</b>				
Ever listened to a talk by an employer representative	51.7%		0	1
Ever listened to a talk by a TAFE/university representative	53.4%		0	1
Ever listened to a talk by the school's career advisor	81.3%		0	1
Ever spoke individually to the school's career advisor	57.3%		0	1
Ever took part in a group discussion about careers	71.7%		0	1
Ever received hand-outs/written material about careers	90.2%		0	1
Ever looked online for career guidance	48.5%		0	1
<b>Control variables</b>				
Respondent is female	50.7%		0	1
Respondent's age (in years)	15.8	0.29	15.3	16.4
Respondent was born outside Australia	10.9%		0	1
Respondent is Aboriginal or Torres Strait Islander	5.6%		0	1
Respondent comes from a single-parent family	19.9%		0	1
Number of siblings respondent has	2.0	1.27	0	12.0
<b>Respondent's state/territory of residence</b>				
Canberra and the Australian Capital Territory	7.1%		0	1
New South Wales	22.8%		0	1
Victoria	19.3%		0	1
Queensland	15.7%		0	1
South Australia	10.0%		0	1
Western Australia	14.4%		0	1
Tasmania	6.6%		0	1
Northern Territory	4.1%		0	1
<b>School type</b>				
Government school	63.8%		0	1
Catholic school	20.6%		0	1
Independent school	15.6%		0	1
Plausible PISA math score	530.93	94.02	161.35	833.34

2003 LSAY. All descriptive statistics apply to study wave one, except for the variables capturing university enrolments (which is based on a Kaplan Meier function up to wave 11) and career guidance (which are cumulative measures spanning waves one to five).

### **Key explanatory variables: equity group membership**

We are interested in the relative rates of university enrolment amongst young people from three equity groups: low socio-economic background, non-English-speaking background, and regional or remote areas within Australia.

To operationalise low socio-economic background, we use a pre-existing survey indicator from study wave one (2003): the PISA index of Economic, Social and Cultural Status (ESCS). The ESCS is constructed by combining information from the following aspects: the International Socio-Economic Index of Occupational Status (ISEI); the highest level of education of the student's parents (in years of schooling); the PISA index of family wealth; the PISA index of home educational resources; and the PISA index of possessions related to classical culture in the family home (OECD, 2013, p.136). As recommended by the OECD, we use the ESCS to create a dichotomous variable capturing low socio-economic background: young people whose families were in the lowest quartile of the ESCS distribution were considered to come from low socio-economic backgrounds (value one), while young people whose families were not in the lowest quartile of the ESCS distribution were considered to come from higher socio-economic backgrounds (value zero). Using this definition, in our analytic sample 2,481 individuals (or 24.5 per cent) came from a low socio-economic background (Table 1).

To operationalise non-English-speaking background, we use information on the language spoken at young people's homes, obtained from study wave one. We code this information into a dichotomous variable. Young people who reported speaking a language other than English at home were identified as coming from a non-English-speaking background (NESB) (value one), while young people who reported speaking English at home were identified as coming from an English-speaking background (ESB) (value zero). In our analytic sample, 749 individuals (or 7.5 per cent) came from a non-English-speaking background (Table 1).

To identify young people coming from regional or remote areas within Australia we leveraged LSAY information on the location of the young person's home from study wave one. This information contained categories defined by the Ministerial Council on Education, Employment, Training and Youth Affairs (MCEETYA) (Jones, 2000). We recoded such categories into a dichotomous variable taking the value one if individuals fell into the categories "*remote zone: remote areas*", "*remote zone: very remote areas*", "*provincial zone: inner provincial areas*" and "*provincial zone: outer provincial areas*" (regional/remote area), and the value zero if they fell into categories "*metropolitan zone: mainland state capital city regions*", "*metropolitan zone: major urban statistical regions*" and "*provincial zone: city statistical districts*" (non-regional/remote area). In our analytic sample, 1,707 individuals (or 17 per cent) came from regional or remote areas within Australia (Table 1).

### **Key explanatory variables: school experiences**

We are interested in how young people experience their schools. To capture the multidimensional concept of school experiences, we use two indices constructed out of the PISA questions available in the 2003 LSAY data.<sup>4</sup>

First, we make use of a pre-existing PISA index capturing students' attitudes towards school. This index is calculated by combining information from four items tapping different dimensions of the concept. PISA respondents are asked, "*Thinking about what you have learned in school: to what extent do you agree with the following statements?*":

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<sup>4</sup> We also considered alternative measures of school experiences available in the LSAY data, such as emotional engagement and perceived teaching practice. However, after thorough tests for multi-collinearity, we decided in favour of including the PISA measures in our main analyses. The pattern of results was similar for the other LSAY school experiences measures.

- “School has done little to prepare me for adult life when I leave school”.
- “School has been a waste of time”.
- “School helped give me confidence to make decisions” (reverse coded).
- “School has taught me things which could be useful in a job” (reverse coded).

Response options were in a four-point Likert scale: “strongly agree”, “agree”, “disagree” and “strongly disagree”. Where necessary, items were reverse coded so that higher values denote more positive attitudes towards school, and lower values denote less positive attitudes. The items were then combined into an index through complex techniques, such as item response models and weighted likelihood estimation. The resulting index is standardised so that its overall mean score is zero and its standard deviation is one. For technical details about the index construction, see the PISA 2003 Technical Report (OECD, 2005). In the 2003 LSAY sample, the attitudes towards school index ranges from -3.15 to 2.53, with a mean of 0.27 and a standard deviation of 1.05.

Second, we use another pre-existing PISA index capturing student-teacher relations. This combines information from five relevant items. Specifically, young people participating in PISA are asked, “Thinking about the teachers at your school: To what extent do you agree with the following statements?”:

- “Students get along well with most teachers”.
- “Most teachers are interested in students’ well-being”.
- “Most of my teachers really listen to what I have to say”.
- “If I need extra help, I will receive it from my teachers”.
- “Most of my teachers treat me fairly”.

Response options were in a four-point Likert scale from “strongly agree” to “strongly disagree”. All items were inverted for scaling, so that higher values in this index denote more fulfilling student-teacher relations, whereas lower values denote less fulfilling student-teacher relations. In the 2003 LSAY sample, the attitudes towards school index ranges from -3.09 to 2.86, with a mean of 0.22 and a standard deviation of 0.92.

### **Key explanatory variables: career guidance received**

LSAY also contains rich information on whether young people received different forms of career guidance while at school. This information was collected for the initial five survey waves (2003-2007). The question wording read: “The next few questions are about careers advice at school. During (last year), have you done any of the following at your school?” with the following types of career guidance asked about:

- “Listened to a talk from the school’s career advisor”.
- “Received handouts or written material about careers”.
- “Taken part in a group discussion about careers”.
- “Spoken individually to the school’s career advisor”.
- “Looked online for career guidance or advice”.
- “Listened to a talk by an employer representative”.
- “Listened to a talk by someone from a TAFE or university”.

For each of these, young people were asked to answer either “yes” or “no”. We use this information to create seven dummy variables taking the value one if the young person answered “yes”, and the value zero if the young person answered “no”. We then created longitudinal indicators for each of these variables taking the value one if the young person had **ever** taken part in the activity, and the value zero otherwise. For example, an individual who spoke individually to the school’s career advisor in 2004 would score one on the associated variable for 2004 and also for all subsequent years, even if the same individual did not receive such advice again. These variables therefore



capture cumulative experience, with the length of 'exposure' related to the first instance of receiving guidance of a given kind.

As can be seen in Table 1, in our analytical sample, the most common form of school career guidance was hand-outs or written material about careers (received by 90.2 per cent of young people), followed by listening to a talk by the school's career advisor (81.3 per cent), and taking part in group discussions about careers (71.7 per cent). In contrast, individual conversations with the school's career advisor (57.3 per cent), talks by a TAFE or university representative (53.4 per cent) or employer representatives (51.7 per cent), and self-driven online searches for career guidance (48.5 per cent) were less common forms of school career guidance.

### Control variables

In addition to the key explanatory variables discussed so far, our multivariate analyses (consisting of event-history regression models) include a number of control variables. These control variables represent factors which may confound the associations between equity group membership, career guidance, school experiences and university enrolment, and were selected following theory and previous studies in the field.

Our list of control variables includes time-invariant controls measured at wave one for young people's:

- gender (male/female)
- age (expressed in years)
- country of birth (Australia/other country)
- Aboriginal or Torres Strait Islander background (non-Indigenous/Indigenous)
- single-parent family of origin (yes/no)
- total number of siblings
- state or territory of residence (New South Wales/Victoria/Queensland/South Australia/Northern Territory/Western Australia/Tasmania/Canberra and the Australian Capital Territory)
- school sector (Government/Catholic/Independent)
- plausible PISA math score (sample range: 161.35-833.34).<sup>5</sup>

The PISA score is a particularly important variable, as it reduces the risk of bias to the estimates on career guidance and school experiences due to reverse causation. That is, it is plausible that high-achieving students, who are more likely to subsequently enrol into university, find the school environment more rewarding and comfortable, get on better with teachers, and are also more likely to seek out career guidance. Controlling for students' initial ability through their PISA math scores goes a long way in minimizing this potential source of bias. We also tested additional controls for PISA reading scores as well as Year 12 & university aspirations, and obtained very similar results to those presented here.

Descriptive statistics for all control variables can be found in Table 1. About half of young people in our sample (50.7 per cent) are female, 5.6 per cent are Indigenous, 10.9 per cent were born outside Australia, and nearly one in five (or 19.9 per cent) come from single-parent families. In wave one of the 2003 LSAY data, young people were on average 15.8 years old, with a narrow age range spanning from 15.3 to 16.4 years. In this sample, young people have an average of two siblings, and all states and territories in Australia are adequately represented. 63.8 per cent of young people in our sample attended government schools, 20.6 per cent attended Catholic schools, and the remaining 15.6 per cent attended Independent schools. The average plausible PISA math score in the sample was 530.93.

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<sup>5</sup> In the PISA data, 'plausible values' refer to student test scores which have been corrected by the OECD for the measurement error arising from the fact that different students complete different sets of questions.



## 4. Methodological Approach

### 4.1 Kaplan-Meier hazard function

We examine and compare the pathways into university enrolment of young people from equity and non-equity groups dynamically through a series of statistical techniques that make the most of the longitudinal structure of the 2003 LSAY data.

We begin by describing the average trajectories into university enrolment for young people from different subgroups of interest through Kaplan-Meier hazard functions (Allison, 1984; Box-Steffensmeier & Jones, 2004; Kaplan & Meier, 1958). These functions estimate the 'hazard rate' for university enrolment at each wave of the survey; that is, the proportion of young people who enrol at university out of the total pool of young people who are 'at risk' of enrolling. If a young person eventually enrolls at university (or leaves the panel), the individual also leaves the pool of individuals who are 'at risk' of enrolling and no longer contributes to estimation. For ease of interpretation, we present the Kaplan-Meier hazard rates as graphs (numerical estimates are available in Table A2 in the Appendix).

We estimate separate Kaplan-Meier hazard rates for (i) young people from low socio-economic backgrounds (compared to young people from higher socio-economic backgrounds), (ii) young people from non-English-speaking backgrounds (compared to young people from English-speaking backgrounds), and (iii) young people from regional or remote areas in Australia (compared to young people from other locations within Australia).

### 4.2 Event-history models

After displaying the longitudinal pathways of young people from equity and non-equity groups through descriptive means, we estimate more robust multivariate models that adjust for a range of potential confounders. Specifically, we model the factors predicting whether (and when) young people enrol into university using multivariate Cox regression models (Cox, 1972). Cox regression models are semi-parametric regression techniques of the event-history family which are useful to determine how different factors influence the occurrence of an event (Allison, 1984; Box-Steffensmeier & Jones, 2004).

In the context of higher education research, event-history models are commonplace in studies of university student retention/dropout (Bahi, Higgins, & Staley, 2015; DesJardins, Ahlburg, & McCall, 1999; Groenvynck, Vandeveld, & Van Rossem, 2013; Gury, 2011; Moulin, Doray, Laplante, & Street, 2013; Murtaugh, Burns, & Schuster, 1999; Reisel & Brekke, 2010; Vallejos & Steel, 2016) and time to degree completion (Lassibille & Gómez, 2011; Yue & Fu, 2016; Wao, 2010). They have also been used to examine routes to university amongst non-traditional students (Brändle, 2016) and returns to university after intermissions (Johnson, 2006). Their application in the context of equity group membership and university enrolment is relatively novel –see Aina (2013) and Laplante et al. (2016) for exceptions. This is important given that, in this context, event-history models are preferable over traditional cross-sectional regression models (e.g. simple logit models) for several reasons. First, event-history models enable us to incorporate into the estimation the fact that young people from some backgrounds, e.g. disadvantaged backgrounds, experience more complex and heterogeneous pathways into university, resulting in 'delayed' enrolments outside the typical ages of 18-19 years. This is because such models consider the probability of event occurrence longitudinally, rather than at a single point in time. Second, event-history models can handle sample attrition. When estimating the effect of different covariates on the hazard, these models only consider observations from those individuals who remain in the sample (i.e. 'at risk' individuals).

Formally, the Cox regression models that we fit can be expressed as:

$$h_i(t) = h_o(t) * \exp(EGM_i\beta_1 + SE_i\beta_2 + CG_i\beta_3 + X_i\beta_4) \quad (1)$$

where subscripts  $i$  and  $t$  stand for individual time, respectively;  $h_o(t)$  is the baseline hazard function of university enrolment;  $EGM$  is a set of three dummy variables capturing equity group membership;  $SE$  is a set of two index variables capturing school experiences;  $CG$  is a set of seven dummy variables capturing school career guidance;  $X$  is a vector of control variables; and the  $\beta$ s are vectors of estimated model parameters (see Box-Steffensmeier & Jones, 2004, p.48).

We express model coefficients as hazard ratios. These can be interpreted in a similar way as traditional odds ratios, and give the expected change in the ratio of the odds of experiencing the 'hazard' (i.e. university enrolment) associated with a one-unit increase in the explanatory variables.

A note on causality is due here. Despite the improvement brought about by our longitudinal modelling technique, we do not claim that our results point towards causal relationships between school experiences, career advice and university participation. This is because we, as others before us, are unable to control for all potential sources of endogeneity, e.g. selection into career guidance activities. Hence, despite the use of terms such as 'effect/s', 'affect/s' or 'impact/s' for readability, we do not claim that the estimates represent causal relationships.

### 4.3 Analytical plan

We fit a series of nested Cox regression models including a different mix of explanatory and control variables. Our first model, Model 1, includes only the measures of equity group membership, and thus provides the raw over-time associations between these and university enrolment.

Model 2 adds to Model 1 the control variables; Model 3 adds to Model 2 the school experience indicators; and Model 4 adds to Model 3 the career guidance indicators. By inspecting the sign, magnitude and statistical significance of the estimated coefficients on equity group membership across these models, it is possible to determine whether and how different factors of interest confound or mediate the associations between equity group membership and university enrolment.<sup>6</sup>

A final model, Model 5, additionally includes interactions between the equity group membership variables and the variables capturing school experiences and school career guidance. The coefficients on the interaction terms are informative as to whether or not the estimated effects of school experiences and career guidance on young people's propensity to enrol into university differ by whether or not young people belong to different equity groups.

We use (i) nine variables to capture school experiences or career guidance, and (ii) three variables to capture equity group membership. Hence, the number of potential interaction terms between the variables in (i) and the variables in (ii) ( $n=27$ ) is too high to include them all simultaneously in a model. To simplify, we first estimated models including only interactions between the school experience variables and each of the equity groups, one group at a time. Second, we repeated the process for interactions involving the career guidance variables and each of the equity groups. Third, we estimated a model retaining all interaction terms which had a statistically significant coefficient in the first and second steps. Finally, we removed those interaction terms which lost statistical significance in the model estimated in the third step.

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<sup>6</sup> It must be noted that this is only a tentative test of mediation, as formal comparisons of coefficients across regression models of odds (including hazard ratios) are not possible due to the 'scaling problem' (Mood, 2010).

# 5. Results

## 5.1 Kaplan-Meier hazard rates

We begin our empirical analyses by examining Kaplan-Meier hazard rates showing the likelihood of enrolling into university for young people from low and higher socio-economic backgrounds, non-English-speaking and English-speaking backgrounds, and non-regional/remote vs. regional/remote areas within Australia (Figure 1).

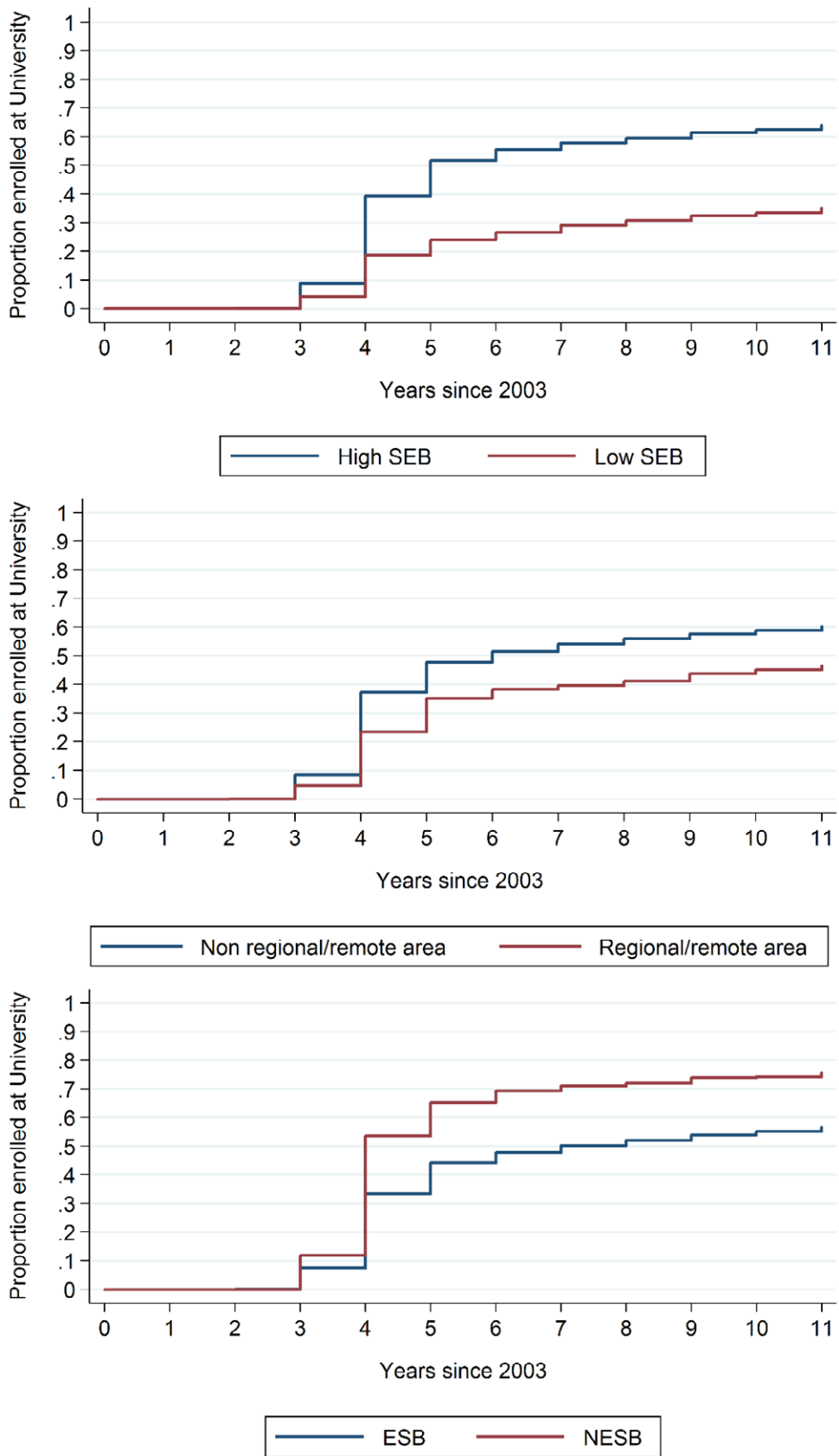
As seen in the top panel of Figure 1, a few young people enrol into university between study waves three and four. A slightly larger proportion of young people from higher socio-economic backgrounds than of young people from low socio-economic backgrounds do so. However, the socio-economic background gap in enrolment becomes larger by wave five, by when 51.6 per cent of young people from higher socio-economic backgrounds have already enrolled at university, compared to just 24.1 per cent of young people from low socio-economic backgrounds. This university enrolment gap remains fairly constant up to the end of the observation period (wave 11). At that point in time, 63.9 per cent of young people from higher socio-economic backgrounds and 35.1 per cent of young people from low socio-economic backgrounds were observed to have enrolled into university. Hence, we find a large gap in university enrolment by socio-economic background, one which emerges largely due to differential enrolment rates at a “typical” enrolment time, i.e. ages 18-19.

The middle panel of Figure 1 shows the relative enrolment rates of young people from regional/remote and non-regional/remote areas within Australia. The picture is very similar to that drawn for socio-economic background: young people from non-regional/remote areas within Australia are more likely to enrol into university than young people from regional/remote areas within Australia. While this difference is already apparent amongst the few young people who enrol into university between waves three and four, it is particularly visible by wave five when the bulk of enrolments have taken place (47.8 per cent for young people in non-regional/remote areas compared to 35.2 per cent for young people in regional/remote areas). Thereafter, enrolment gaps by area of origin remain fairly constant. By the end of the observation period (wave 11), 60.1 per cent of young people from non-regional/remote areas within Australia were observed to have enrolled into university, compared to 46.5 per cent of young people from regional/remote areas within Australia. Hence, as for low socio-economic background, belonging to an equity group is associated with lower university enrolment chances, although the gap by area of origin is not as pronounced as the gap by socio-economic background.

Finally, the lower panel of Figure 1 shows analogous analyses comparing young people from non-English-speaking and English-speaking backgrounds. The results are inconsistent with the rationale behind equity group definitions, but not surprising given Australia’s selective migration policies: young people from non-English-speaking backgrounds enrol at university more often and faster than young people from English-speaking backgrounds. By wave five, 65.1 per cent of young people from non-English-speaking backgrounds had enrolled into university, compared to 44.2 per cent of young people from English-speaking backgrounds. By the end of the observation period, the analogous figures were 75.6 per cent and 56.6 per cent, respectively. Hence, when considering equity based on whether young people come from an English-speaking background, the picture is inconsistent with that presented for the other two equity groups.

**Figure 1.**

*Kaplan-Meier failure estimates, by equity group membership*



## 5.2 Career guidance and school experience by equity group membership

An important aim of our study is to determine whether and how school experiences and career guidance are distributed amongst young people who belong to the three equity groups under consideration, and young people who do not belong to such groups. Table 2 provides descriptive evidence in this regard; it shows the relative degree to which different subgroups of young people have different experiences with their schools and are exposed to different forms of school career guidance. Differences between group means are compared statistically through the use of *t*-tests.

Comparisons by socio-economic background indicate that attitudes towards school ( $p < 0.001$ ) and student-teacher relations ( $p < 0.001$ ) are more positive amongst young people from higher socio-economic backgrounds than young people from low socio-economic backgrounds. In addition, young people from higher socio-economic backgrounds are significantly more likely than young people from low socio-economic backgrounds to have received career guidance by means of a talk by an employer representative ( $p < 0.001$ ) or the school's career advisor ( $p < 0.001$ ), an individual conversation with the school's career advisor ( $p < 0.001$ ), a group discussion about careers ( $p < 0.01$ ), hand-outs or written material about careers ( $p < 0.001$ ), and online career guidance ( $p < 0.01$ ).

There are also important differences in school experiences and career guidance levels by young people's area of origin. Attitudes towards school ( $p < 0.001$ ) and student-teacher relations ( $p < 0.001$ ) are more positive amongst young people from non-regional/remote areas within Australia, compared to young people from regional/remote areas within Australia. Somewhat unexpectedly, compared to young people from non-regional/remote areas, young people from regional/remote areas more often receive career guidance via employer ( $p < 0.001$ ) or TAFE/university ( $p < 0.01$ ) representative talks, group discussions ( $p < 0.05$ ), hand-outs/written material ( $p < 0.05$ ), and self-driven online guidance ( $p < 0.1$ ). It is possible that the disproportionate exposure to school career guidance by students from regional/remote locations results from formal institutional approaches designed to counteract the known, negative effects of geographical remoteness on university participation.

Concerning language background, young people from non-English-speaking backgrounds have more positive attitudes towards school ( $p < 0.01$ ) and student-teacher relations ( $p < 0.01$ ) than young people from an English-speaking background. This is despite the fact that they are less likely to have received school career guidance in the form of a talk by an employer representative ( $p < 0.05$ ), a one-to-one conversation with the school's career advisor ( $p < 0.1$ ), a group discussion ( $p < 0.01$ ), or hand-outs/written materials ( $p < 0.05$ ).

Altogether, the results of these analyses reveal a mixed picture in relation to the degree to which equity group membership relates to school experiences and school career guidance. While students from low socio-economic backgrounds are clearly disadvantaged vis-a-vis students from higher socio-economic backgrounds, the picture is more mixed when equity is defined in terms of language and locational background.

**Table 2***Mean career guidance and school experiences by equity group membership*

	Socio-economic background			Regional or remote area			Language background		
	Higher	Low	Diff. (p)	No	Yes	Diff. (p)	ESB	NESB	Diff. (p)
<b>School experiences</b>									
Attitudes towards school index	0.34	0.06	***	0.29	0.20	***	0.26	0.38	**
Student-teacher relations index	0.27	0.06	***	0.24	0.10	***	0.21	0.31	**
<b>Career guidance (%)</b>									
Ever listened to a talk by an employer representative	52.9%	47.7%	***	50.8%	55.9%	***	52.0%	47.5%	*
Ever listened to a talk by a TAFE/university representative	53.6%	52.7%		52.7%	56.5%	**	53.6%	50.6%	
Ever listened to a talk by the school's career advisor	82.2%	78.6%	***	81.1%	82.4%		81.5%	79.6%	
Ever spoke individually to the school's career advisor	58.6%	53.6%	***	57.0%	59.0%		57.6%	54.3%	+
Ever took part in a group discussion about careers	72.4%	69.6%	**	71.3%	73.7%	*	72.1%	67.6%	**
Ever received hand-outs/written material about careers	90.9%	88.1%	***	90.0%	91.6%	*	90.4%	88.0%	*
Ever looked online for career guidance	49.3%	46.1%	**	48.1%	50.6%	+	48.6%	47.5%	

2003 LSAY. *p* values denote the statistical significance of group differences in means and are obtained from *t*-tests. Statistical significance: + *p*<0.10, \* *p*<0.05, \*\* *p*<0.01, \*\*\* *p*<0.001.

### 5.3 University enrolment by career guidance and school experiences

The third pillar of our inquiry is assessing whether and how school experiences and career guidance, two sets of factors deemed important in the international literature, are associated with young people's propensity to undertake university studies in the contemporary Australian context. Table 3 provides associated descriptive evidence. It contains information on the percentage of young people who enrolled at university by ages 19, 22 and 25, split by whether they received different forms of school career guidance, and by their school experiences.

Results indicate that attitudes towards school are related to university enrolment. For example, 76.8 per cent of students in the top quartile of the distribution of the attitudes-to-school index had enrolled into university by the end of our observation period, compared to 66.6 per cent of students in the two



middle quartiles, and 53.7 per cent of students in the lowest quartile. Similarly, we find evidence that student-teacher relations also relate to university enrolments: 75.8 per cent of students in the top quartile of this index's distribution had enrolled into university by the end of the observation period, compared to 67.6 per cent of students in the two middle quartiles, and 50.5 per cent of students in the lowest quartile. In both cases, these relationships were highly statistically significant, as denoted by the results of analysis of variance (ANOVA) tests.

Similarly, exposure to certain forms of school career guidance is also statistically significantly related to a higher incidence of university enrolments, as inferred from the results of *t*-tests. For example, by the end of the observation window, young people were more likely to have enrolled at university if they had ever received career guidance in the form of a talk by a TAFE/university representative ( $p < 0.001$ ), a talk by the school's career advisor ( $p < 0.001$ ), an individual conversation with the school's career advisor ( $p < 0.05$ ), a group discussion about careers ( $p < 0.05$ ), or hand-outs/written material about careers ( $p < 0.001$ ).

Taken together, the results of these analyses suggest that both school experiences and school career guidance are precursors of university participation in the contemporary Australian context.

**Table 3**

University enrolments, by career guidance and school experiences

	% enrolled, by age...		
	19	22	25
<b>School experiences</b>			
Attitudes towards school index			
Top quartile	59.3%	70.6%	76.8%
Middle two quartiles	48.2%	59.4%	66.6%
Bottom quartile	32.8%	45.6%	53.7%
Group difference ( <i>p</i> )	***	***	***
Student-teacher relations index			
Top quartile	59.4%	69.9%	75.8%
Middle two quartiles	49.4%	60.6%	67.6%
Bottom quartile 29.5%	42.5%	50.5%	
Group difference ( <i>p</i> )	***	***	***
<b>Career guidance</b>			
Ever listened to a talk by an employer representative			
Yes	47.2%	59.1%	66.4%
No	48.4%	60.0%	67.3%
Group difference ( <i>p</i> )			
Ever listened to a talk by a TAFE/university representative			
Yes	49.9%	61.8%	68.9%
No	30.6%	41.1%	49.5%
Group difference ( <i>p</i> )	***	***	***
Ever listened to a talk by the school's career advisor			
Yes	48.4%	60.1%	67.4%
No	30.4%	44.1%	50.0%
Group difference ( <i>p</i> )	***	***	***
Ever spoke individually to the school's career advisor			
Yes	48.7%	60.4%	67.4%
No	41.2%	53.7%	62.6%
Group difference ( <i>p</i> )	***	**	*
Ever took part in a group discussion about careers			
Yes	47.7%	59.6%	67.4%
No	45.8%	57.3%	62.3%
Group difference ( <i>p</i> )	*		
Ever received hand-outs/written material about careers			
Yes	47.7%	59.6%	66.9%
No	25.0%	33.9%	36.8%
Group difference ( <i>p</i> )	***	***	***
Ever looked online for career guidance			
Yes	50.2%	61.7%	68.8%
No	37.8%	50.3%	57.9%
Group difference ( <i>p</i> )	***	***	

2003 LSAY. Estimates based on a balanced panel of respondents who 'survived' up to a given wave; *p* values denote the statistical significance of group differences in means and are obtained from ANOVA tests (school experience measures) and *t*-tests (career guidance measures). Statistical significance: +  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

## 5.4 Event-history models of university enrolment

So far, our descriptive results point towards the existence of strong associations between equity group membership, school experiences, school career guidance, and enrolment into university in the 2003 LSAY data. We now turn our attention to estimating these relationships more robustly through the use of multivariate event-history models (Cox regression models). These models are particularly well-suited for our application because they enable us to incorporate into the estimation the fact that young people from some backgrounds (e.g. disadvantaged backgrounds), experience more complex and heterogeneous pathways into university, resulting in 'delayed' enrolments outside the typical ages of 18-19 years. Event-history models are also fitting because they can accommodate the relative high degree of attrition observed in the 2003 LSAY data.

We use multivariate Cox regression models to test whether the bivariate associations described before remain in the presence of confounding factors, and to test whether factors such as school experiences and school career guidance can be considered pathways linking equity group membership to university enrolment. Importantly, these models will also allow us to test whether those same factors (school experiences and career guidance) moderate the relationship between equity group membership and university enrolments.

The results of our Cox regression models are presented in Table 4. We begin by estimating a base model with the explanatory variables capturing equity group membership and no control variables (Model 1). We compare the hazard ratios (i.e. the relative odds of experiencing the 'hazard' of enrolling into university) of young people who belong and do not belong to different equity groups. Concerning socio-economic background, the hazard ratio of enrolling into university for young people from low socio-economic backgrounds is just 44 per cent of that for young people from higher socio-economic backgrounds. The difference is highly statistically significant ( $p < 0.001$ ). Similarly, the hazard ratio of enrolling into university for young people from regional/remote areas in Australia is just 76 per cent of that for young people from non-regional/remote areas in Australia. Again, this difference is highly statistically significant ( $p < 0.001$ ). As previously reported in descriptive analyses, enrolment into university is more prevalent amongst young people from non-English-speaking than English-speaking backgrounds. The hazard ratio for university enrolment for the former is 71 per cent greater than that for the latter, with the difference being highly statistically significant ( $p < 0.001$ ).

Model 2 adds to Model 1 variables that may confound the associations of interest. Despite not being the focus of this report, the estimates on the control variables (which are presented in Table A3 in the Appendix) are briefly discussed below. Some of these findings might be of interest as they are suggestive of other disadvantaged categories and consequently potential new equity groups to be considered. The patterns are consistent with theoretical expectations. For example, estimates from Model 2 indicate that young people who are female (HR=1.61;  $p < 0.001$ ), older (HR=1.42;  $p < 0.001$ ) and have high PISA math scores (HR=1.01;  $p < 0.001$ ) are more likely to enrol into university, whereas young people who are Indigenous (HR=0.76;  $p < 0.05$ ), come from a single-parent family (HR=0.88;  $p < 0.01$ ), or have more siblings (HR=0.95;  $p < 0.001$ ) are less likely to enrol into university. Interestingly, the hazard ratios of university enrolment are greater amongst young people who were born outside Australia, compared to young people who were born in Australia (HR=1.18;  $p < 0.01$ ). Young people who attend Catholic (HR=1.28;  $p < 0.001$ ) or Independent (HR=1.41;  $p < 0.001$ ) schools are also significantly more likely than young people who attend government schools to enrol into university. Finally, there are some differences in university enrolment patterns across states and territories. Most importantly, the addition of these controls does little to change the estimated hazard ratios on the equity group membership variables. The estimated hazard ratios on the variables capturing low socio-economic background (0.68,  $p < 0.001$ ); coming from a regional/remote area within Australia (0.84,  $p < 0.001$ ), and non-English-speaking background (1.71,  $p < 0.001$ ) are similar in their magnitude, direction and statistical significance to those presented in Model 1. This constitutes evidence that

the relationships between equity group membership and university enrolment are robust to the introduction of confounding factors.

Model 3 adds to Model 2 the variables capturing school experiences. The coefficients on the new variables are consistent with earlier descriptive findings, and indicate that –holding all other variables in the model constant– having positive attitudes towards school (HR=1.11,  $p<0.001$ ) and experiencing positive student-teacher relationships at school (HR=1.12,  $p<0.001$ ) are both statistically significantly associated with a higher likelihood of subsequent university enrolment. However, the inclusion of these variables does not substantially alter the pattern of results pertaining to the equity group membership variables. Their estimated hazard ratios in this model are 0.70 ( $p<0.001$ ) for the low socio-economic background variable, 0.85 ( $p<0.01$ ) for the regional/remote area of origin variable, and 1.70 ( $p<0.001$ ) for the non-English-speaking background variable. This suggests that differences in university enrolment across young people from equity groups and other young people are **not** driven by differential school experiences across these sub-populations.

Model 4 adds to Model 3 the variables capturing school career guidance.<sup>7</sup> The estimated hazard ratios on these variables suggest heterogeneous effects on university enrolment of different forms of career guidance. All else being equal, several types of career guidance are positively associated with university enrolment. These include listening to a talk by a TAFE or university representative (HR=1.43;  $p<0.001$ ), listening to a talk by the school's career advisor (HR=1.26;  $p<0.05$ ) and looking online for career guidance (HR=1.17;  $p<0.001$ ). In contrast, other forms of guidance are negatively associated with university enrolment. This pattern of results is observed for listening to a talk by an employer representative (HR=0.90;  $p<0.01$ ) and taking part in a group discussion about careers (HR=0.89;  $p<0.01$ ).<sup>8</sup> The remaining career guidance variables, speaking individually to the school's career advisor (HR=0.95;  $p>0.1$ ) and receiving hand-outs or written material about careers (HR=1.24;  $p>0.1$ ), were not statistically significantly associated with the propensity of young people to enrol into university. Importantly, inclusion of the school career guidance variables in the model does not alter the magnitude, direction or statistical significance of the estimated hazard ratios on the variables capturing low socio-economic background (HR=0.71;  $p<0.001$ ), area of origin (HR=0.84;  $p<0.001$ ), and non-English-speaking background (HR=1.68;  $p<0.001$ ). This constitutes evidence that differences in the propensity to subsequently enrol at university between young people within and outside equity groups do not stem from differences in exposure to school career guidance.

Finally, Model 5 uses interaction terms to test whether the associations between equity group membership and university enrolments are moderated by school factors (i.e. school experiences and career guidance). These models examine whether the effects of school experiences and career guidance on university enrolments differ between young people from equity groups and other young people. We only retain in the models and show in the table interaction effects which were statistically significant, following the stepwise process described before. There are five statistically significant interaction effects in the models. The first and second interaction terms indicate that having positive student-teacher relationships (HR=1.12,  $p<0.05$ ) and listening to a talk by the school's career advisor (HR=2.95,  $p<0.01$ ) are more strongly conducive to subsequent university enrolment amongst young people from low socio-economic backgrounds, compared to young people from higher socio-economic backgrounds. The magnitude of the effect is particularly salient for the latter. The third and fourth

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<sup>7</sup> Sensitivity analyses indicate that the estimated coefficients on the school experience and career guidance variables remain consistent regardless of the order in which they are included in the models.

<sup>8</sup> The estimated hazard ratios on each of the career guidance dummy variables could be affected by multi-collinearity with the other career guidance variables. This would be the case if certain types of career guidance are typically offered in conjunction. To ensure this was not a problem to our estimates, we ran separate models including only each of the career guidance variables, one at a time. The estimates on the career guidance variables in those models were similar in magnitude, direction and statistical significance to those presented here, thus confirming that multi-collinearity is not an issue to our results.

interaction effects in the table reveal that positive student-teacher relations (HR=1.13,  $p<0.05$ ) and taking part in a group discussion about careers (HR=1.39,  $p<0.05$ ) more strongly predict subsequent university enrolment amongst young people from regional/remote areas within Australia, compared to young people from other locations. Finally, the fifth interaction effect in the model suggests that the effect of listening to a talk by a TAFE or university representative on university enrolment is weaker amongst young people from a non-English-speaking background, than young people from an English-speaking background (HR=0.69;  $p<0.05$ ).

**Table 4**

*Event-history models of university enrolment, hazard ratios*

	(i)	(ii)	(iii)	(iv)	(v)
<b>Equity group membership</b>					
Low socio-economic background	0.44***	0.68***	0.70***	0.71***	0.24***
From a regional or remote area	0.76***	0.84***	0.85**	0.84***	0.60**
From non-English-speaking background	1.71***	1.71***	1.70***	1.68***	2.34***
<b>School experiences</b>					
Attitudes towards school index			1.11***	1.11***	1.11***
Student-teacher relations index			1.12***	1.11***	1.08***
<b>Career guidance</b>					
Ever listened to a talk by an employer representative				0.90**	0.90*
Ever listened to a talk by a TAFE/university representative				1.43***	1.50***
Ever listened to a talk by the school's career advisor				1.26*	1.13
Ever spoke individually to the school's career advisor				0.95	0.95
Ever took part in a group discussion about careers				0.89*	0.86**
Ever received hand-outs/written material about careers				1.24	1.23
Ever looked online for career guidance				1.17***	1.17***
<b>Interaction effects</b>					
Low SES * Student-teacher relations index					1.12*
Low SES * Talk by the school's career advisor					2.95**
From a regional/remote area * Student-teacher relations index					1.13*
From a regional/remote area * Group discussion about careers					1.39*
NESB * Talk by TAFE/university representative					0.69*
<b>Controls</b>					
	<b>No</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>	<b>Yes</b>
N (observations)	50,258	50,258	50,258	50,258	50,258
N (individuals)	10,027	10,027	10,027	10,027	10,027
Pseudo R <sup>2</sup>	0.007	0.032	0.034	0.035	0.035

*2003 LSAY. Cox regression models; results presented as hazard ratios. Controls include young people's gender, age, place of birth, Indigenous background, single-parent family origin, number of siblings, state of residence, school type, and Plausible PISA value in math. Statistical significance: +  $p<0.10$ , \*  $p<0.05$ , \*\*  $p<0.01$ , \*\*\*  $p<0.001$ .*



# 6. Discussion and Conclusion

## 6.1 Report aims and scope

University attendance is an important precursor of labour market success, health and well-being, and quality of life in general. Given this, Australian educational policy over the last few decades has focused heavily on improving access to university across all population segments. A particular focus has been placed on facilitating university participation amongst young people from disadvantaged collectives, as they are known to be under-represented in higher education. A key initiative in this regard was the establishment of equity groups, whose performance has been routinely monitored.

In this report we have provided new, contemporary Australian evidence on the interrelations between equity group membership (focusing on low socio-economic background, non-English-speaking background and coming from a regional/remote area), school factors (specifically, career guidance and school experiences), and young people's propensity to enrol at university. We first examined the direct, separate effects of equity group membership and school factors on university enrolment, and then considered their interactive effects. To accomplish this, we used representative, longitudinal data from the 2003 cohort of the *Longitudinal Study of Australian Youth*, and state-of-the-art event-history models.

## 6.2 Summary of key findings

For two of our equity groups the results are consistent with expectations: young people from low socio-economic backgrounds and from regional/remote areas within Australia are less likely to enrol into university than young people from higher socio-economic backgrounds and non-regional/remote areas within Australia. They are also more likely to enrol at university at a later age. The picture is different for our third equity group of interest: students from non-English-speaking backgrounds are more likely to enrol at university and do so at earlier ages than students from English-speaking backgrounds. These results hold even when adjusted for a comprehensive set of confounding factors.

Our two sets of school factors were generally associated with an increasing probability of attending university, both in bivariate analyses and in multivariate analyses adjusting for confounders and equity group membership. That is, students who held positive attitudes towards school, who reported having a positive relationship with their teachers, and who received different forms of career guidance were more likely to enrol at university, and did so at earlier ages. However, not all forms of career guidance were found to be equally associated with the probability of university enrolment. The strongest positive associations were found for talks by a TAFE or university representatives, and schools' career advisors. In contrast, employer representative talks and group discussion about careers were negatively associated with the likelihood of university enrolment, all else being equal.

Finally, we find evidence that some forms of career advice have stronger effects on university enrolment amongst students from equity groups. Of particular interest were the findings that (i) positive student-teacher relations and talks by school career advisors were more conducive to subsequent university enrolment amongst young people from low socio-economic backgrounds than young people from higher socio-economic backgrounds, and (ii) positive student-teacher relations and career group discussions more strongly predicted subsequent university enrolment amongst young people from regional/remote areas within Australia than young people from other locations.

## 6.3 Implications for theory, policy and practice

The findings from this study have important implications for theory, policy and practice. First, we provide suggestive evidence in the Australian context of the importance of in-school career advice

and guidance and school experiences in shaping the chances of university participation among young people, particularly those from equity groups. This indicates that policy initiatives aimed at improving these school factors will result in expanded and more representative university enrolments.

Interventions to widen participation in higher education can be implemented at all phases of the student life course, including pre- and post-admission. Our study highlights the importance of early interventions that take place during secondary school, prior to students facing the decision of whether or not to attend university. Many such initiatives are already in place. These include campus visits, mentoring programs, and joint activities between schools and universities, with their effectiveness being confirmed by research and evaluation (e.g. Fleming & Grace, 2014; Gale et al., 2010; Reed, Karavias, & Smith, 2013). While undoubtedly relevant, these activities should complement rather than substitute other forms of help provided specifically to equity group students aimed at overcoming institutional and structural barriers, such as lack of resources or accessibility issues. One example is the available Higher Education Contribution Scheme (HECS) financial support program, and the income contingent loans that students can access through the Higher Education Loan Program (HELP).

It is also important to note that some factors investigated in this study, such as visits from employer representatives, appear to be negatively associated with students' chances of subsequently attending university. This points to the possibility that, perhaps unsurprisingly, more and better information about other post-school options can sway some young people from university participation. While our study suggests that this scenario is as likely to happen for equity and non-equity students, the consequences for the policies aimed at widening participation should be carefully considered.

Finally, our study contributes to a growing body of evidence questioning the relevance of the currently identified equity groups. In particular, the findings presented in this report reinforce the view that the category of 'non-English-speaking background' is not an effective indicator of disadvantage in the contemporary Australian educational context. In our study, young people's chances to enrol into university were greater, not lower, if these young people came from non-English-speaking rather than English-speaking backgrounds. Previous research suggests that the failure of this equity group to represent disadvantage is due to its breadth, and the large degree of within-group heterogeneity concerning country of origin, ethnic group, migrant generation and year of arrival (AIHW, 2014; Marks et al., 2000). At the very least, a consistent definition that is relevant to the current circumstances in Australia should be agreed on and used consistently across academic and policy research. In addition, the results of our analyses point towards other social groups that could be potentially considered as equity groups in contemporary Australia, including young people from single-parent families and those living in large families – who are significantly less likely to enrol into university than other young people. Some of the literature reviewed would also suggest further groups, such as having no previous history of university attendance within one's family (Aina, 2013; Connelly et al., 2014; Hossler & Stage, 1992), and attending a less advantaged school (Connelly et al., 2014; Marks et al., 2000).

#### **6.4 Study limitations and further research**

Despite the importance and significance of our findings, our study has several limitations that must be acknowledged. These shortcomings point towards potential avenues for further enquiry.

First, despite our methodological innovation we are unable to establish whether or not the relationships between school experiences, career guidance, and university enrolment are of a causal nature. Hence, a degree of caution should be exerted when considering the ways in which our findings may translate into policy recommendations. More direct tests of causal relationships would likely require experimental rather than observational data, e.g. randomised control trials. Our results, nevertheless, go beyond those of most prior studies in accounting for potential sources of endogeneity.

Second, we were unable to cover the full breadth of equity groups of interest within the Australian education policy landscape. Women in non-traditional subject areas are arguably not in-scope, as this sort of disadvantage by definition materialises once young women enrol at university – although there could be a case for considering how school experiences and career guidance affect young women who aspire to enrol in a STEM university program. However, we also missed young people from two other equity groups which were clearly of interest: Aboriginal and Torres Strait Islander Australians and people with disabilities. These population groups are amongst the most disadvantaged collectives in Australia, concerning education as well as other life domains (such as health, employment, and social participation) (McLachlan et al., 2013). The absence of analyses on Aboriginal and Torres Strait Islander Australians was due to their small sample sizes and high attrition in the LSAY data. Similarly, the lack of focus on people with disabilities in our analyses was due to the absence of robust information on long-term illness and disability within LSAY. This outcome suggests that future iterations of the LSAY survey should consider further over-sampling young people from Indigenous backgrounds, and collecting more detailed and more regular information on long-term health conditions and disabilities.

Third, despite the uniqueness and richness of the LSAY data, this suffered from high rates of attrition. For example, in the 2003 cohort, only 36.1 per cent of young people who appeared in the first wave of the survey participated in the last wave. In addition, our preliminary analysis shows that such panel attrition is non-random, with young people from lower socio-economic backgrounds and having lower PISA scores being more likely to drop out of the study. One way in which this selective attrition rate visibly affected the LSAY data was in the percentage of youth who were eventually observed to enrol at university. While about 58 per cent of our sample did so by age 25 according to Kaplan-Meier estimates, the relevant population level figure is likely to be lower. While we did not find comparable information from other sources, the Australian Bureau of Statistics reports that 37.2 per cent of 25-34 year olds had a bachelor level qualification or higher by 2014 (ABS, 2014). This problem is exacerbated by the fact that there are few robust ways to correct for non-random attrition in longitudinal modelling. While the LSAY data provide longitudinal weights (NCVER, 2014), their use is questionable given that they can only be applied to a balanced panel (Lim, 2011) (i.e. the sub-sample of respondents who were found and agreed to participate across all 11 survey waves). However, such a sub-sample is unlikely to be a random segment of the initial population, and so the use of longitudinal weights introduces other sources of selection. Hence, our results are to be interpreted with a degree of caution.

Fourth, the measures of career guidance and school experiences available in LSAY are not perfect. Particularly, the LSAY information on career guidance does not capture its intensity (e.g. number and duration of sessions) or contents (e.g. the benefits of university, how to enrol at university, or how to finance one's studies), or students' perceptions of its importance in their subsequent decisions about whether or not to enrol at university. Importantly, we also lack information on whether the career guidance received by young people was school-initiated or student-initiated. This is important, as student-initiated career advice sessions may result in bias to our estimates due to self-selection. Similarly, the measures of student experiences available in LSAY are limited. For instance, they lack specific questions about the sense of belonging at school, effective engagement with the process of learning, and the value placed on education. There is also no available information on teaching strategies, which may be a source of omitted-variable bias.

In addition to accounting for these data-driven limitations, future studies in this area could expand on our analyses in several ways. One such avenue is to consider intersectionality in equity group membership, i.e. the accumulation of disadvantaged statuses (e.g. being an Indigenous student from a remote area, or a student with disability from a low socio-economic background family) may have a multiplicative effect on the likelihood of university enrolment. If so, we need to understand how different school factors could be part of interventions aimed at redressing the educational disadvantage experienced by these multiply disadvantaged young people.

It should also be noted that we only examine access to higher education, measured by enrolment. We do not consider enrolment at elite universities and fields of study, student retention or program completion. Future research in these areas is needed, as disadvantaged students are less likely to study at prestigious universities, enrol into highly competitive fields of study, and complete their degrees (AIHW, 2014; James et al., 2008).

Finally, our research highlights the importance of considering how equity group membership, school experiences and career guidance intersect to shape young people's chances of enrolling into university. Yet, analyses of this sort are not able to provide finely grained explanations for the underlying mechanisms. Hence, our study could be complemented by qualitative research that generates greater insights into which school factors make the biggest difference in improving their chances of participating in higher education, and through which channels. For instance, it is critical to understand what career guidance aspects (e.g. information on available scholarships, help in navigating the complex enrolment process, or simply encouragement to consider university studies as an option) are perceived as being most effective by young people from disadvantaged backgrounds themselves. Such knowledge would pave the way for more targeted and efficient evidence-based policies aimed at improving equity in the Australian higher education system.

## **6.5 Concluding remarks**

Participation in university is a life-lasting source of personal and familial well-being, and so it is critical that different stakeholders work together to increase participation and build a higher education system that is fair, inclusive and transparent. Doing so is consistent with universal social justice principles, and aligns with the distinctive Australian ethos of the 'fair go'. Evidence also points towards an economic imperative, whereby university education expansion is a demonstrated pathway to enhancing societal outputs through human capital maximisation, and reducing the costs of remedial policies associated with adult and intergenerational disadvantage.

The results of this research suggest that fostering inclusive and positive school environments in which students from less advantaged backgrounds feel engaged and integrated, and incentivising the provision of comprehensive in-school career guidance programs that empower these young people when making the life-defining decision of whether or not to enter higher education are likely to be important policy levers to improve the university participation of equity group students in contemporary Australia.

We are witnessing rapid transformations in the Australian higher education landscape, with uncertain prospects in areas as important as university, the pool of applicants, the fee structures and the value of educational credentials. Under these circumstances, we need to build the evidence base to be prepared for the plausible mid-term impacts that these changes may have on our most vulnerable students.

# Appendix

**Table A1**

*Attrition rates in 2003 LSAY*

Wave	n (respondents)	% of wave 1 sample
1	10,370	n/a
2	9,378	90.4
3	8,691	3.8
4	7,721	74.5
5	6,658	64.2
6	6,074	58.6
7	5,475	52.8
8	4,903	47.2
9	4,429	42.7
10	3,945	38.0
11	3,741	36.1

2003 LSAY.

**Table A2**

*Kaplan-Meier hazard rates by equity group membership, numerical estimates*

Wave	Socio-economic background		Regional/remote area		Language background	
	Higher	Low	No	Yes	ESB	NESB
2	1.0%	0.0%	1.0%	1.0%	1.0%	0.0%
3	8.8%	4.2%	8.4%	4.7%	7.5%	11.8%
4	39.4%	18.7%	37.1%	23.4%	33.4%	53.5%
5	51.6%	24.1%	47.8%	35.2%	44.2%	65.1%
6	55.4%	26.6%	51.5%	38.2%	47.7%	69.2%
7	57.8%	29.1%	54.1%	39.6%	50.2%	71.0%
8	59.5%	30.7%	55.9%	41.1%	52.0%	71.9%
9	61.4%	32.5%	57.6%	43.7%	53.9%	73.8%
10	62.5%	33.6%	58.7%	45.0%	55.1%	74.3%
11	63.9%	35.1%	60.1%	46.5%	56.6%	75.6%

2003 LSAY.



**Table A3***Full set of estimates from selected event-history models of university enrolment, hazard ratios*

	(ii)	(iv)
<b>Equity group membership</b>		
Low socio-economic background	0.68***	0.71***
From a regional or remote area	0.84***	0.84***
From non-English-speaking background	1.71***	1.68***
<b>School experiences</b>		
Attitudes towards school index		1.11***
Student-teacher relations index		1.11***
<b>Career guidance</b>		
Ever listened to a talk by an employer representative		0.90**
Ever listened to a talk by a TAFE/university representative		1.43***
Ever listened to a talk by the school's career advisor		1.26*
Ever spoke individually to the school's career advisor		0.95
Ever took part in a group discussion about careers		0.89*
Ever received hand-outs/written material about careers		1.24
Ever looked online for career guidance		1.17***
<b>Control variables</b>		
Respondent is female	1.61***	1.58***
Age of student	1.42***	1.48***
Respondent was born outside Australia	1.18**	1.17**
Respondent is Aboriginal or Torres Strait Islander	0.76*	0.75**
Respondent comes from a single-parent family	0.88**	0.91*
Total number of siblings	0.95***	0.95***
<b>Respondent's state/territory of residence (ref. New South Wales)</b>		
Canberra and the Australian Capital Territory	0.88+	0.88+
Victoria	1.22***	1.18***
Queensland	1.29***	1.29***
South Australia	1.10	1.09
Western Australia	1.18**	1.15*
Tasmania	0.99	0.94
Northern Territory	1.06	1.07
<b>School type (ref. Government school)</b>		
Catholic school	1.28***	1.23***
Independent school	1.41***	1.35***
Plausible PISA value in math	1.01***	1.01***
N (observations)	50,258	50,258
N (individuals)	10,027	10,027
Pseudo R <sup>2</sup>	0.032	0.035

2003 LSAY. Cox regression models; results presented as hazard ratios. Statistical significance: +  $p < 0.10$ , \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ .

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