

Unpacking the career aspirations of Australian school students: towards an evidence base for university equity initiatives in schools

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ABSTRACT

Demand for higher education in Australia has doubled since 1989, increasing the number of students from diverse social, economic and academic backgrounds. Equity targets have seen a proliferation of programs and interventions aimed at encouraging school students, particularly those from low socio-economic status backgrounds, to participate in higher education. However, little is known about the specific occupational interests of school students upon which targeted strategies might effectively be designed and implemented. This paper examines school students' aspirations for specific careers that require a university education, in relation to student background and school-related variables. The analysis draws from a study of 6492 students from Years 3 to 12 in 64 New South Wales public schools. We found a complex array of factors relating to interest in different careers. Year level at school, gender and prior achievement were stronger predictors across many careers than factors such as SES, Indigenous status and school location. We argue that rather than taking a one-size-fits-all approach to encouraging participation in higher education, outreach activities should be targeted to take account of student diversity and inequalities that foster differing aspirations.

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Introduction

Participation in higher education in Australia has doubled since 1989, increasing the number of students from diverse social, economic and academic backgrounds (Department of Education and Training, 2015). Targeted participation rates for various equity groups have been accompanied by a substantial increase in programs and interventions designed to encourage school students to consider university as a post-school option (Bennett et al., 2015; Naylor, Baik, & James, 2013), especially students from low socio-economic status (SES) backgrounds. However, little is known about the specific

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occupational interests of school students upon which targeted strategies might effectively be designed and implemented. Our study contributes to filling this evidence void.

Students from low SES backgrounds are not only less likely to participate in higher education overall, but also less likely to participate in high-status degrees and enrol in the most prestigious universities (Gale & Parker, 2013; James, 2002). Indeed, it is argued that higher education is ‘underpinned by archaic and exclusionary practices’ (Morley, 2012, p. 353) ensuring that those from higher socio-economic backgrounds are advantaged. This pattern is consistent across national borders. For example, in the United States, students from low-income families and high-poverty schools continue to be less likely than more advantaged students to continue to university (Cahalan, 2013). In the UK, gains in the overall number of university places and the proportion of students from low SES backgrounds (*quantitative* gains) have not been evenly distributed across institutions and programs (*qualitative* gains) (Whitty, Hayton, & Tang, 2015).

Outreach activities have been widely recognised as a key mechanism by which universities can provide information, guidance and support for students who face barriers to higher education (Bennett et al., 2015; Naylor et al., 2013; Whitty et al., 2015). And yet, with no systematic evaluation mechanisms in place, little is known about their effectiveness (Naylor et al., 2013). While there have been calls for Australian universities to reconsider the way in which outreach programs are designed and delivered (Scull & Cuthill, 2010), there is insufficient evidence about the suitability or design of outreach activities in the first place. Indeed, most ‘program design ... is an act of faith’ (Naylor et al., 2013, p. 7). Mostly, outreach activities have focused on overcoming known barriers to the participation of students from low SES backgrounds, who mostly have been treated as an homogeneous group (Bennett et al., 2015).

This paper contributes to building the evidence base on aspirations for higher education, recognising both the variability within the category ‘low SES’ and the formation of aspirations throughout schooling, not just in the senior high school years (Gore, Holmes, Smith, Southgate, & Albright, 2015). Designing targeted and meaningful outreach activities with potential to impact on both qualitative and quantitative gains in equity requires fine-grained analysis that recognises differences among students and the disciplines to which they aspire.

Building the evidence base

This paper focuses on three issues in building an evidence base for university equity initiatives in schools. First, we focus on when, during schooling, aspirations take shape. There is growing recognition that the current major investment in careers education and outreach activities in the later secondary years may begin too late (Archer, DeWitt, & Wong, 2014; Gore et al., 2015; Whitty et al., 2015), particularly given the cumulative impacts of prior achievement and the influences of social and cultural capital. Statistics on who is enrolled in university are widely available, but we know much less about who aspires to a university education and when these ideas begin to shift or consolidate.

Second, we focus on the influence of SES on students’ career, and hence higher education, interests. Despite increases in the number of domestic students enrolling in universities overall and an increase in the proportion of students from low SES backgrounds (Naylor et al., 2013), these students remain underrepresented (Gale & Parker, 2013; James, 2002).

University outreach activity and government policy targeting students from low SES backgrounds (Bradley, Noonan, Nugent, & Scales, 2008) is often couched in terms of ‘raising’ students’ aspirations and premised on the assumption that low SES students have lower aspirations than their higher SES peers (Baker et al., 2014; Gore et al., 2015). We examine SES as a factor in student career aspirations overall and across different occupations.

Third, we focus on the specific occupational interests of school students and the demographic and school-related predictors of interest in different occupational categories. Much of the research on students’ higher education aspirations focuses on specific careers rather than looking across careers. For example, recent studies have focused on understanding and raising the aspirations of girls for science, technology, engineering and mathematics careers (Archer et al., 2012; Broadley, 2015; Cheryan, Master, & Meltzoff, 2015) and on the under-representation in medicine of students from low SES areas (Greenhalgh, Seyan, & Boynton, 2004; Mathers & Parry, 2009) and disadvantaged backgrounds (Griffin & Hu, 2015). In nursing and teaching, studies have focused on motivations (McLaughlin, Moutray, & Moore, 2010; Richardson & Watt, 2006) and other influences on the choice of career (Bullough & Hall-Kenyon, 2011; Mooney, Glacken, & O’Brien, 2008). For some careers, such as the arts, there is little research on students’ aspirations or factors that shape this interest.

Our study draws on a sample of students in Years 3–12 and examines a comprehensive range of student background and school-related variables for their relationship to aspirations for particular occupational categories. We address the key question: How do children’s aspirations for particular occupations vary by age, SES, gender, location, Indigenous status, and language background, and school-related variables such as school attended and prior achievement?

Method

Data were drawn from the *Aspirations Longitudinal Study* (Gore et al., 2015) to explore factors related to the occupational interests of students. This longitudinal cohort study was designed to examine factors shaping students’ career and educational aspirations. Students were from Years 3, 5, 7 and 9 cohorts at 64 schools in New South Wales, Australia.¹ The study had four survey waves conducted in consecutive years (2012–2015), administered online by classroom teachers. Informed consent from students and parents/carers was obtained, with 10,543 surveys completed by 6492 students in one or more waves. A total of 5925 students nominated at least one occupation of interest in any survey. Of these, 4184 students named at least one career that requires a university education.

Key variables

Student background variables and school-related variables of interest were identified as outlined in Table 1.

Sample

Table 2 details the sample by survey year in relation to the identified variables (note totals differ due to missing values). Similar numbers of surveys were completed by male ($n = 5087$) and female ($n = 4994$) students with more surveys from metropolitan

Table 1. Student background and school-related variables.

Variable	Source	Measure
Gender	School enrolment form	Categorised as male or female
Indigenous status	School enrolment form	Categorised as Indigenous or non-Indigenous
Student cohort	Survey	Cohorts (labelled according to year level at commencement in 2012): • Year 3 – Years 3–6 • Year 5 – Years 5–8 • Year 7 – Years 7–10 • Year 9 – Years 9–12 Measures differences between students of different ages
School location	Department of Education, NSW	Determined by school postcode and dichotomised as metropolitan or provincial
Language background	School enrolment form	Categorised as English-speaking background or language background other than English (LBOTE)
SES	School enrolment form	Calculated by combining the highest parental education and occupation levels for each student into an equally weighted proxy for student SES. Data for all NSW government schools were used to separate scores into quartiles
Cultural capital	Survey	Cultural capital measure calculated by student responses to survey items including: <i>How often do you do the following activities? (Listen to classical music; talk about music; go to the theatre to see a play, dance or opera performance; go to art galleries or museums; go to the cinema to watch a movie; go to a library; talk about books; play a musical instrument or sing; participate in dancing, gymnastics or yoga; talk about art)</i> This scale had a Cronbach's alpha of 0.8 indicating an acceptable level of reliability
Parental occupation	Survey	Responses to questions: <i>What is your parent's/carer's job?</i> <i>Please describe what your parent/carer does in this job</i>
Survey year	Survey	Survey participation year. Measures changes in student aspirations over time
Prior achievement	Department of Education, NSW	The most recent National Assessment Program for Literacy and Numeracy (NAPLAN) test scores for each student. Attainment was taken as the equally weighted composite of individual student Reading and Numeracy scores. Data for all NSW government schools within each year level were used to separate scores into quartiles
ICSEA	My School ^a	The ICSEA is a standardised school-level index summarising student background. Lower scores indicate relative disadvantage. This national measure was developed by ACARA ^b . ICSEA scores were categorised using cut-offs from national quartile values
Self-perception of relative academic performance	Survey	A self-assessed item: <i>How are your marks this year compared with other students? (Well below average; Below average; Average; Above average; or Well above average)</i>
Access to tutoring	Survey	Response to question: <i>Do you attend any out-of-school tutoring?</i>

^aSee <http://www.myschool.edu.au>.

^bAustralian Curriculum, Assessment and Reporting Authority.

($n = 6070$) than provincial areas ($n = 4472$). The sample is broadly representative of the Australian school student population, with minor exceptions. For example, more than 5% of responses were from Indigenous students, which is above the estimated 3% proportion of the Australian population (Australian Bureau of Statistics, 2013). The sample included approximately equal numbers of surveys from students in socio-economic,

Table 2. Sample by year and selected variables.^a

Characteristic	Survey year				Total (N = 10,543) n (%)
	2012 (n = 2572) n (%)	2013 (n = 3996) n (%)	2014 (n = 1908) n (%)	2015 (n = 2067) n (%)	
Sex					
Male	1315 (52.2)	1845 (50.1)	932 (49.1)	995 (50.1)	5087 (50.5)
Female	1203 (47.8)	1834 (49.9)	967 (50.9)	990 (49.9)	4994 (49.5)
Indigenous status					
Non-Indigenous	2395 (96.1)	3373 (92.7)	1753 (92.6)	1809 (92.0)	9330 (93.4)
Indigenous	98 (3.9)	265 (7.3)	141 (7.4)	157 (8.0)	661 (6.6)
Student year level at baseline					
Year 3	657 (25.5)	960 (24.4)	552 (29.0)	757 (36.7)	2926 (28.0)
Year 5	707 (27.5)	1075 (27.4)	572 (30.0)	554 (26.9)	2908 (27.8)
Year 7	694 (27.0)	1119 (28.5)	514 (27.0)	545 (26.4)	2872 (27.4)
Year 9	514 (20.0)	775 (19.7)	266 (14.0)	207 (10.0)	1762 (16.8)
School location					
Metropolitan	2347 (91.3)	1925 (48.2)	782 (41.0)	1016 (49.2)	6070 (57.6)
Provincial	224 (8.7)	2071 (51.8)	1126 (59.0)	1051 (50.8)	4472 (42.4)
Language					
English	2050 (81.4)	3270 (88.9)	1806 (95.1)	1862 (93.8)	8988 (89.2)
Other	468 (18.6)	409 (11.1)	93 (4.9)	123 (6.2)	1093 (10.8)
SES quartile					
1	451 (18.6)	819 (22.7)	440 (24.0)	531 (29.7)	2241 (23.2)
2	571 (23.6)	1007 (27.9)	576 (31.4)	507 (28.4)	2661 (27.6)
3	569 (23.5)	829 (22.9)	419 (22.8)	436 (24.4)	2253 (23.3)
4	829 (34.3)	960 (26.6)	401 (21.8)	311 (17.4)	2501 (25.9)
Cultural capital quartile					
1	661 (26.7)	899 (23.5)	462 (26.3)	473 (24.5)	2495 (25.0)
2	639 (25.8)	942 (24.7)	415 (23.6)	458 (23.7)	2454 (24.6)
3	583 (23.5)	1088 (28.5)	430 (24.5)	462 (23.9)	2563 (25.7)
4	595 (24.0)	891 (23.3)	451 (25.7)	538 (27.9)	2475 (24.8)
NAPLAN score quartile					
1	434 (17.5)	744 (20.7)	390 (21.1)	418 (21.6)	1986 (20.2)
2	559 (22.6)	885 (24.7)	521 (28.2)	513 (26.5)	2478 (25.2)
3	652 (26.3)	924 (25.7)	556 (30.1)	547 (28.3)	2679 (27.2)
4	833 (33.6)	1036 (28.9)	382 (20.7)	455 (23.5)	2706 (27.5)
ICSEA national quartile					
1	502 (19.5)	1191 (29.8)	310 (16.2)	575 (27.8)	2578 (24.5)
2	728 (28.3)	1297 (32.5)	1215 (63.7)	1039 (50.3)	4279 (40.6)
3	187 (7.3)	494 (12.4)	203 (10.6)	199 (9.6)	1083 (10.3)
4	1155 (44.9)	1014 (25.4)	180 (9.4)	254 (12.3)	2603 (24.7)
Self-perception of relative academic performance					
Well-above average	369 (16.9)	475 (14.1)	209 (12.1)	204 (11.3)	1257 (13.8)
Above average	763 (35.0)	1159 (34.4)	562 (32.5)	612 (33.8)	3096 (34.1)
Average	867 (39.8)	1478 (43.9)	771 (44.6)	818 (45.2)	3934 (43.3)
Below average	138 (6.3)	194 (5.8)	135 (7.8)	137 (7.6)	604 (6.6)
Well-below average	44 (2.0)	59 (1.8)	53 (3.1)	37 (2.0)	193 (2.1)
Tutoring					
Yes	564 (22.2)	602 (15.4)	266 (14.2)	284 (14.2)	1716 (16.6)
No	1976 (77.8)	3301 (84.6)	1602 (85.8)	1717 (85.8)	8596 (83.4)

^aTotals vary because demographic data were not available for all survey responses.

prior achievement and cultural capital quartiles; 11% of responses were from students from language backgrounds other than English (LBOTE) and 43% of students rated themselves as average compared with their peers.

Outcome variables

In an open-ended survey question, students were asked to nominate occupations to which they aspired and responses were coded using the Australian and New Zealand Standard Classification of Occupations. The primary outcomes for this analysis are binary variables

derived from the occupation codes indicating whether or not a student nominated a particular occupational category in the given survey year. In order to understand the influence of year level, SES, and other variables on aspirations for careers that require a university education, the 10 most frequently named occupational categories were selected for analysis (see Table 3). These categories, covering the major faculties and disciplines in universities, accounted for 55% of all named occupations including occupations not requiring university.

Arts Professional ($n = 1306$) was named more than any other occupational category. School Teachers ($n = 1029$), Veterinarians ($n = 622$), Architects ($n = 636$) and Science Professionals ($n = 552$) were included in the top five occupations requiring a university degree. The next most popular were Engineering Professionals ($n = 436$), Medical Professionals ($n = 381$), Social and Welfare Professionals ($n = 312$), Legal Professionals ($n = 270$) and Registered Nurses/Midwives ($n = 257$).

Statistical analysis

Univariate logistic regressions were undertaken for each of the occupation outcomes, reported as odds ratios and associated p -values. All student background variables and school-related variables were then included as potential predictors in a regression model for each occupation outcome, reported as adjusted odds ratios and adjusted p -values. The logistic regression models were fitted within a Generalised Estimating Equation (GEE) framework, a method robust against violations of normality and missing data assumptions, to adjust for the correlation of outcomes within students due to repeated measures. The GEE model was compared to an equivalent random-effects Generalised Linear Model employing the same data and variables, both of which produced similar estimates and p -values. Data were analysed using SAS software version 9.4. Statistical significance was set at 0.05.

Results

Occupational aspirations and year level

We investigated how interest in the most popular occupational categories varied across the school years. Figures 1 and 2, split for ease of reading, demonstrate trends associated with

Table 3. Number and percentage of survey responses by careers requiring a university education.

Occupational category	Student responses ($N = 10,543$)	
	n	%
Arts Professionals (includes actors, dancers, music professionals, photographers, and visual arts and crafts professionals)	1306	12.4
School Teachers	1029	9.8
Veterinarians	636	6.0
Architects/Designers (includes planners and surveyors)	622	5.9
Science Professionals (includes agricultural and forestry, food and wine, life, and environmental scientists; chemists, geologists, geophysicists and hydrogeologists)	552	5.2
Engineering Professionals (includes chemical and materials, civil, electrical, electronics, industrial, mechanical, production, and mining engineers)	436	4.1
Medical Practitioners (includes general practitioners and specialist physicians)	381	3.6
Social and Welfare Professionals (includes counsellors, ministers of religion, psychologists, social and welfare workers)	312	3.0
Legal Professionals (includes barristers and solicitors)	270	2.6
Registered Nurses/Midwives (includes nurse educators)	257	2.4

students' ages. Interest in some occupations – arts, architecture and veterinary science – declines in the later years of schooling, while interest in others – engineering, nursing, and social and welfare work – grows. Interest in teaching, medicine, legal and science careers is more stable across the school years.

Occupational aspirations and SES

We also examined how interest in these occupations varied by student SES. Figures 3 and 4 show the percentage of survey responses by SES quartiles for the 10 most popular occupations. More students from the highest SES quartile (Quartile 4) chose the arts, architecture, science, medicine, engineering and law than students from SES Quartiles 1–3. SES was fairly stable across quartiles for those students who named teacher, social/welfare professional or veterinarian. Students who indicated an interest in nursing were less likely to be from the highest SES quartile. Figure 3 also shows that, for occupations other than arts, law and architecture, there were similar proportions of responses from each of the first three SES quartiles, indicating that students from low SES backgrounds have similar aspirations to those in the second and third SES quartiles.

Characteristics associated with specific occupational interests

We also investigated the ways in which student demographic and school-related variables predicted interest in different occupational categories. Table 4 displays the number and percentage of students expressing interest in the 10 most popular occupational categories. Data for these variables are presented as numbers of students and proportions (as row percentages) within groups determined by the occupation outcomes. The most popular occupations for females were arts (18%) and teaching (16%) while for males engineering was most popular (7.5%). Teaching (13%) was the most popular occupation for Indigenous students.

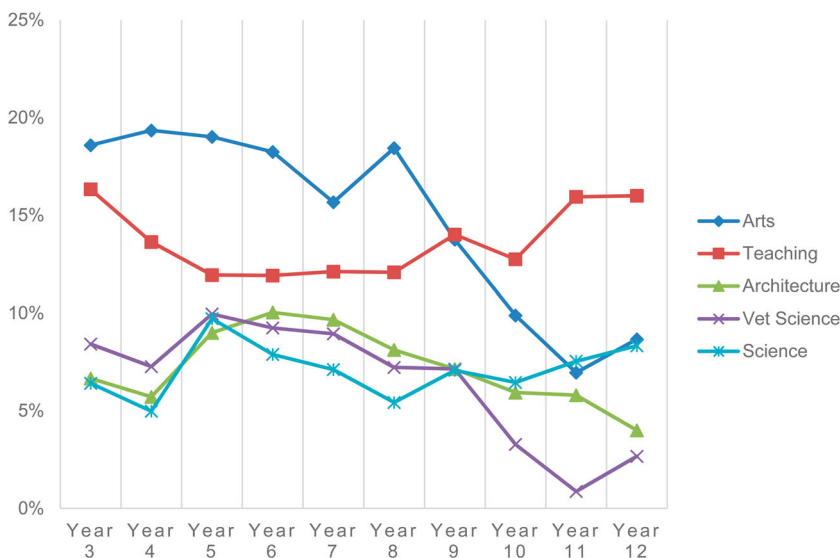


Figure 1. Percentage of student survey responses for occupations 1–5 by school year level.

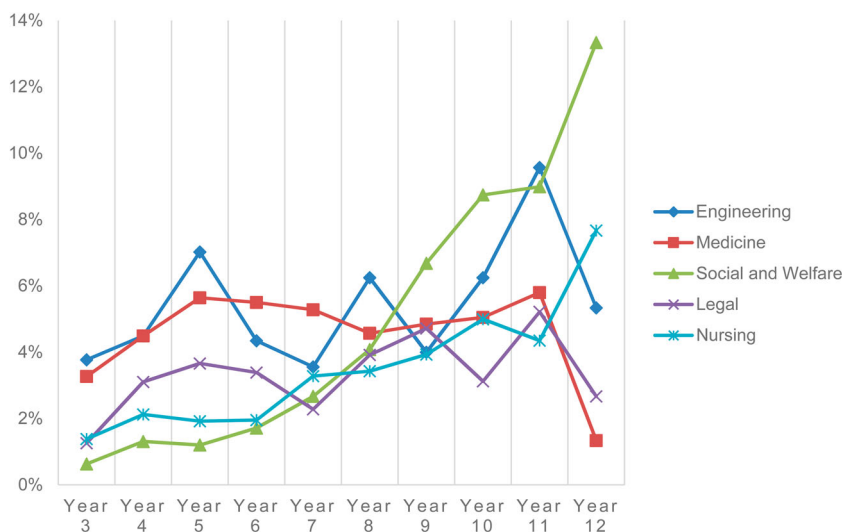


Figure 2. Percentage of student survey responses for occupations 6–10 by school year level.

Significant predictors of occupational interest

Table 5 presents the results of the logistic regression, highlighting significant variables for each occupational category.

Arts professionals

Arts was the only occupation in which belonging to the highest SES quartile was a significant predictor. Students who indicated an interest in the arts had greater odds of being

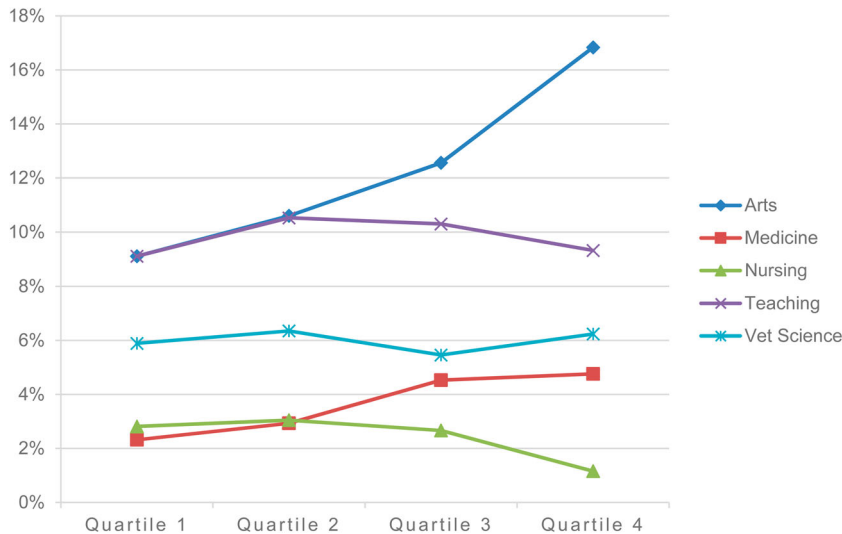


Figure 3. Percentage of student survey responses for occupations 1–5 by SES quartile.

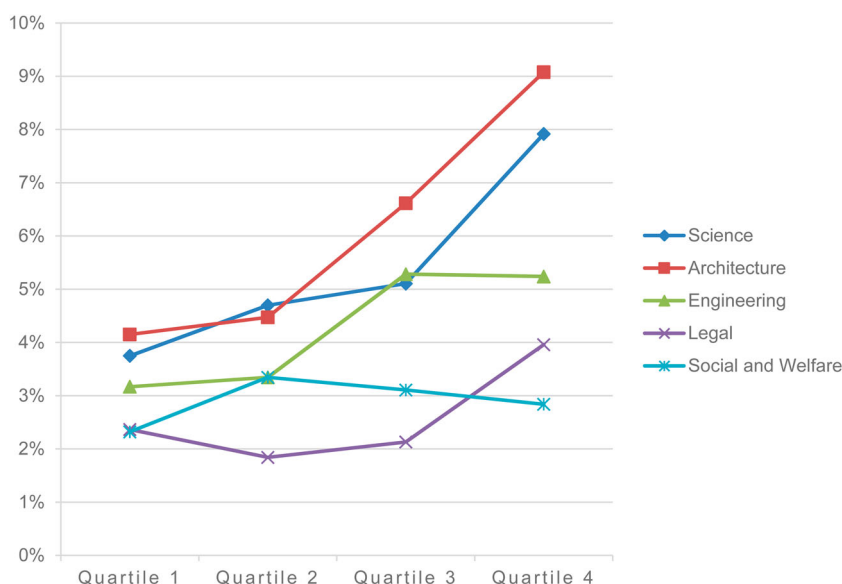


Figure 4. Percentage of student survey responses for occupations 6–10 by SES quartile.

female (OR = 2.38); in the Year 5 cohort (OR = 1.24); speaking English at home (OR = 1.81); belonging to the highest SES quartile (OR = 1.36) and having higher levels of cultural capital (Quartile 2, OR = 1.48; Quartile 3, OR = 2.16; Quartile 4, OR = 2.85) than the reference category for each variable. Those who named arts also had greater relative odds of having completed the survey in 2013 (OR = 1.25); attending a high Index of Community Socio-Educational Advantage (ICSEA) school (OR = 1.59); and belonging to higher NAPLAN quartiles (Quartile 2, OR = 1.36; Quartile 3, OR = 1.49; Quartile 4, OR = 1.58).

Teaching

Teaching was one of just three occupations (with science and medicine) in which self-perception of relative academic performance was a significant predictor. Females (OR = 5.08), Indigenous students (non-Indigenous OR = 0.66), and those who reported Average (OR = 1.48) or Above average (OR = 1.47) self-perception of academic performance had higher odds of expressing interest in teaching in comparison to the reference category. Students from the Year 5 cohort (OR = 0.72) had lower odds of expressing an interest in teaching than those in the other cohorts.

Veterinary science

Students who indicated an interest in being a vet had greater relative odds of being female (OR = 4.51) and from a non-Indigenous background (OR = 2.0). Those from the Year 9 (OR = 0.34) cohorts had lower odds of naming Veterinarian in comparison to those in the Year 3 cohort. Students who completed the survey in 2013 (OR = 0.64), 2014 (OR = 0.65) and 2015 (OR = 0.55) also had lower odds of specifying vet as a career, indicating a decline in interest as students mature.

Table 4. Sample by year and selected variables.^a

Characteristic	Arts (<i>n</i> = 1283) <i>n</i> (%)	Teaching (<i>n</i> = 1029) <i>n</i> (%)	Vet (<i>n</i> = 622) <i>n</i> (%)	Architect (<i>n</i> = 636) <i>n</i> (%)	Science (<i>n</i> = 552) <i>n</i> (%)	Engineer (<i>n</i> = 436) <i>n</i> (%)	Medicine (<i>n</i> = 381) <i>n</i> (%)	Social (<i>n</i> = 312) <i>n</i> (%)	Law (<i>n</i> = 270) <i>n</i> (%)	Nursing (<i>n</i> = 257) <i>n</i> (%)
Sex										
Male	367 (7.2)	191 (3.8)	106 (2.1)	246 (4.8)	277 (5.4)	380 (7.5)	127 (2.5)	77 (1.5)	94 (1.8)	10 (0.2)
Female	896 (17.9)	785 (15.7)	503 (10.1)	363 (7.3)	246 (4.9)	37 (0.7)	241 (4.8)	221 (4.4)	163 (3.3)	240 (4.8)
Indigenous status										
Indigenous	70 (10.6)	84 (12.7)	32 (4.8)	16 (2.4)	24 (3.6)	3 (0.5)	24 (3.6)	18 (2.7)	9 (1.4)	18 (2.7)
Non-Indigenous	1183 (12.7)	884 (9.5)	573 (6.1)	588 (6.3)	497 (5.3)	413 (4.4)	337 (3.6)	277 (3.0)	245 (2.6)	227 (2.4)
Student cohort										
Year 3	415 (14.2)	303 (10.4)	183 (6.3)	175 (6.0)	151 (5.2)	104 (3.6)	100 (3.4)	29 (1.0)	57 (1.9)	42 (1.4)
Year 5	435 (15.0)	251 (8.6)	230 (7.9)	204 (7.0)	173 (5.9)	123 (4.2)	106 (3.6)	53 (1.8)	73 (2.5)	66 (2.3)
Year 7	313 (10.9)	279 (9.7)	162 (5.6)	164 (5.7)	139 (4.8)	116 (4.0)	115 (4.0)	101 (3.5)	87 (3.0)	87 (3.0)
Year 9	140 (7.9)	187 (10.6)	44 (2.5)	90 (5.1)	83 (4.7)	92 (5.2)	56 (3.2)	126 (7.2)	53 (3.0)	62 (3.5)
School location										
Metropolitan	830 (13.7)	566 (9.3)	343 (5.7)	455 (7.5)	338 (5.6)	280 (4.6)	242 (4.0)	180 (3.0)	179 (2.9)	99 (1.6)
Provincial	476 (10.6)	463 (10.4)	278 (6.2)	181 (4.0)	214 (4.8)	156 (3.5)	139 (3.1)	132 (3.0)	91 (2.0)	158 (3.5)
Language										
English	1135 (12.6)	880 (9.8)	550 (6.1)	492 (5.5)	464 (5.2)	342 (3.8)	272 (3.0)	267 (3.0)	205 (2.3)	235 (2.6)
Other	128 (11.7)	96 (8.8)	59 (5.4)	117 (10.7)	59 (5.4)	75 (6.9)	96 (8.8)	31 (2.8)	52 (4.8)	15 (1.4)
SES quartile										
1	208 (9.3)	204 (9.1)	132 (5.9)	93 (4.1)	84 (3.7)	71 (3.2)	52 (2.3)	52 (2.3)	53 (2.4)	63 (2.8)
2	286 (10.7)	280 (10.5)	169 (6.4)	119 (4.5)	125 (4.7)	89 (3.3)	78 (2.9)	89 (3.3)	49 (1.8)	81 (3.0)
3	287 (12.7)	232 (10.3)	123 (5.5)	149 (6.6)	115 (5.1)	119 (5.3)	102 (4.5)	70 (3.1)	48 (2.1)	60 (2.7)
4	430 (17.2)	233 (9.3)	156 (6.2)	227 (9.1)	198 (7.9)	131 (5.2)	119 (4.8)	71 (2.8)	99 (4.0)	29 (1.2)
Cultural capital quartile										
1	123 (4.9)	182 (7.3)	105 (4.2)	90 (3.6)	78 (3.1)	121 (4.8)	49 (2.0)	36 (1.4)	45 (1.8)	51 (2.0)
2	225 (9.2)	233 (9.5)	125 (5.1)	142 (5.8)	111 (4.5)	102 (4.2)	84 (3.4)	64 (2.6)	65 (2.6)	72 (2.9)
3	388 (15.1)	275 (10.7)	197 (7.7)	170 (6.6)	166 (6.5)	118 (4.6)	103 (4.0)	98 (3.8)	67 (2.6)	61 (2.4)
4	525 (21.2)	306 (12.4)	173 (7.0)	204 (8.2)	177 (7.2)	78 (3.2)	133 (5.4)	103 (4.2)	90 (3.6)	61 (2.5)
NAPLAN score quartile										
1	154 (7.8)	167 (8.4)	105 (5.3)	52 (2.6)	40 (2.0)	22 (1.1)	38 (1.9)	27 (1.4)	14 (0.7)	43 (2.2)
2	298 (12.0)	238 (9.6)	163 (6.6)	105 (4.2)	85 (3.4)	57 (2.3)	57 (2.3)	68 (2.7)	43 (1.7)	93 (3.8)
3	365 (13.6)	284 (10.6)	184 (6.9)	181 (6.8)	159 (5.9)	108 (4.0)	94 (3.5)	83 (3.1)	83 (3.1)	82 (3.1)
4	426 (15.7)	269 (9.9)	140 (5.2)	257 (9.5)	236 (8.7)	221 (8.2)	177 (6.5)	111 (4.1)	114 (4.2)	21 (0.8)

ICSEA national quartile										
1	242 (9.4)	258 (10.0)	163 (6.3)	98 (3.8)	119 (4.6)	87 (3.4)	70 (2.7)	66 (2.6)	43 (1.7)	73 (2.8)
2	459 (10.7)	425 (9.9)	241 (5.6)	190 (4.4)	197 (4.6)	164 (3.8)	131 (3.1)	166 (3.9)	86 (2.0)	146 (3.4)
3	140 (12.9)	133 (12.3)	69 (6.4)	64 (5.9)	60 (5.5)	34 (3.1)	33 (3.0)	22 (2.0)	21 (1.9)	19 (1.8)
4	465 (17.9)	213 (8.2)	149 (5.7)	284 (10.9)	176 (6.8)	151 (5.8)	147 (5.6)	58 (2.2)	120 (4.6)	19 (0.7)
Self-perception of relative academic performance										
Well-below average	14 (7.3)	12 (6.2)	8 (4.1)	8 (4.1)	3 (1.6)	6 (3.1)	2 (1.0)	2 (1.0)	2 (1.0)	5 (2.6)
Below average	71 (11.8)	39 (6.5)	29 (4.8)	28 (4.6)	7 (1.2)	12 (2.0)	9 (1.5)	15 (2.5)	13 (2.2)	19 (3.1)
Average	480 (12.2)	422 (10.7)	235 (6.0)	210 (5.3)	143 (3.6)	100 (2.5)	86 (2.2)	114 (2.9)	67 (1.7)	130 (3.3)
Above average	393 (12.7)	343 (11.1)	207 (6.7)	239 (7.7)	238 (7.7)	196 (6.3)	144 (4.7)	112 (3.6)	116 (3.7)	66 (2.1)
Well-above average	183 (14.6)	112 (8.9)	61 (4.9)	96 (7.6)	112 (8.9)	95 (7.6)	107 (8.5)	37 (2.9)	54 (4.3)	11 (0.9)
Tutoring										
No	1066 (12.4)	860 (10.0)	522 (6.1)	504 (5.9)	458 (5.3)	355 (4.1)	297 (3.5)	262 (3.0)	216 (2.5)	223 (2.6)
Yes	234 (13.6)	166 (9.7)	96 (5.6)	126 (7.3)	90 (5.2)	79 (4.6)	81 (4.7)	46 (2.7)	52 (3.0)	31 (1.8)

^aIndividual jobs named by students are treated as individual cases in the data set.

Table 5. Logistic regression: top 10 careers requiring a university education.

Characteristic	Arts	Teaching	Vet	Architect	Science	Engineer	Medicine	Social	Law	Nursing
Sex										
Male ^a										
Female	2.38***	5.08***	4.51***	1.50***		0.10***	2.07***	2.41***	1.68**	24.70***
Indigenous status										
Indigenous ^a										
Non-Indigenous		0.66*	2.00*			9.20*		0.55*		
Student cohort										
Year 3 ^a										
Year 5	1.24*	0.72**		1.58**				3.47***		
Year 7				1.56**			1.68*	7.50***	2.00**	1.98*
Year 9	0.74*		0.34***	1.49*		1.65*		18.89***	2.00*	2.27*
School location										
Provincial ^a										
Metropolitan			0.76*	1.36*				1.47*		
Language										
Other ^a										
English	1.81***					0.61*	0.43***			
SES quartile										
1 ^a										
2										
3										
4	1.36*				1.51*					
Cultural capital quartile										
1 ^a										
2	1.48**									
3	2.16***				1.75***			2.37***		
4	2.85***			1.44*	1.90***		1.55*	3.21***		
Parent in occupation										
No, or unknown ^a										
Yes						3.12***			5.98***	2.17*
Survey year										
2012 ^a										
2013	1.25*		0.64***					2.19***		
2014			0.65**					3.02***		2.49***
2015			0.55***			1.62**		3.39***		2.87***
ICSEA national quartile										
1 ^a										
2										

3				1.57*			
4	1.59**			1.84**			2.27**
NAPLAN score quartile							
1 ^a							
2	1.36*				1.96*		
3	1.49**		1.91**	2.00**	3.04***	1.90*	2.72**
4	1.58**		1.99**	2.68***	5.33***	3.04***	2.68**
Self-perception of relative academic performance							
Below/Well-below average ^a							
Average		1.48*					
Above average	0.72*	1.47*		3.16**		2.67*	
Well-above average				3.18**		4.84***	
Tutoring							
No ^a							
Yes							

^aReference category.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Architecture

Females (OR = 1.50), students from the Year 5 (OR = 1.58), Year 7 (OR = 1.56) and Year 9 (OR = 1.49) cohorts, and students from metropolitan areas (OR = 1.36) and from the highest cultural capital quartile (OR = 1.44) had greater odds of expressing a career in architecture compared with the reference category. Students who named architecture also had greater odds of coming from schools in the two highest ICSEA quartiles (Quartile 3, OR = 1.57; Quartile 4, OR = 1.84) and from the top two NAPLAN quartiles (Quartile 3, OR = 1.91; Quartile 4, OR = 1.99).

Science

Science was the only occupation of the 10 examined in which gender was not a significant predictor. Students who expressed interest in science had greater odds of being in the top two cultural capital quartiles (Quartile 3, OR = 1.82; Quartile 4, OR = 2.02) and the top two NAPLAN quartiles (Quartile 3, OR = 1.98; Quartile 4, OR = 2.78), and rated themselves as Above average (OR = 3.02) or Well-above average (OR = 2.98) in comparison with their peers. SES was a significant predictor, with students in the top quartile (OR = 1.51) having greater odds of expressing an interest in science-related careers.

Engineering

Engineering was one of two careers in which students from a non-English-speaking background were more likely to express an interest; the other was medicine. Males (Female OR = 0.10), non-Indigenous students (OR = 9.20), and students from the Year 9 cohort (OR = 1.65), from LBOTE (English OR = 0.61), who had a parent in the same occupation (OR = 3.12) and who completed the survey in 2015, had greater odds of expressing an interest in engineering. Prior achievement as measured by NAPLAN was also a significant predictor, with an upward trend consistent with greater odds (Quartile 2, OR = 1.96; Quartile 3, OR = 3.04; Quartile 4, OR = 5.33).

Medicine

Students choosing medicine had greater odds of being female (OR = 2.07), from the Year 7 cohort (OR = 1.68), from LBOTE (English OR = 0.43), and with the highest level of cultural capital (OR = 1.55). Self-perception of relative academic performance (Above average OR = 2.67; Well-above average OR = 4.84) was also a significant predictor.

Social and welfare professions

Females (OR = 2.41), Indigenous students (non-Indigenous OR = 0.55), and those with higher levels of cultural capital (Quartile 3, OR = 2.37; Quartile 4, OR = 3.21) and higher NAPLAN scores (Quartile 3, OR = 1.90; Quartile 4, OR = 3.04) had greater odds of expressing an interest in social/welfare careers. Student cohort (Year 5, OR = 3.47; Year 7, OR = 7.50; Year 9, OR = 18.89) and survey year (2013, OR = 2.19; 2014, OR = 3.02; 2015, OR = 3.39) were also significant predictors. The upward trend for these variables indicates that older students have greater odds of naming social/welfare career interests.

Law

Students who named law had greater odds of being female (OR = 1.68) and from the Year 7 (OR = 2.0) or Year 9 (OR = 2.0) cohorts, having a parent in a similar occupation (OR = 5.98) and coming from high ICSEA schools (OR = 2.27). Having a higher NAPLAN score (Quartile 3, OR = 2.72; Quartile 4, OR = 2.68) was also a predictor of interest in law.

Nursing

Females had almost 25 times the odds of naming nursing (OR = 24.70) when compared with males, the highest odds ratio of any reported result from any occupational category. Students who named nursing also had greater odds of having a parent in the profession (OR = 2.17). In terms of age, they had greater odds of being in the Year 7 (OR = 1.98) or Year 9 (OR = 2.27) cohorts, and of completing the survey in either 2014 (OR = 2.49) or 2015 (OR = 2.87), indicating that interest in nursing increased as students aged.

Summary

Of the factors examined, gender, student cohort, survey year and prior achievement were the strongest predictors. It is noteworthy that SES was not a significant predictor in the presence of the other variables (except for students naming the arts or science). Perhaps predictably, engineering careers were preferred by males, while teaching, the arts, nursing, veterinary science and medical careers were more likely to be chosen by females. Students in the higher NAPLAN quartiles were more likely to express interest in the arts, architecture/design, science, engineering, social/welfare work and law than those in the lowest quartile, signalling the importance of prior academic achievement.

Discussion/conclusion

Our analysis of students' interest in particular occupational categories that require university education demonstrates considerable variation between occupations. While current policy emphasises SES, and university outreach activity focuses on the upper secondary school years, our data suggest that a more nuanced approach is needed. We found that SES was not the most powerful predictor, which is not to ignore the ongoing underrepresentation of students from low SES backgrounds. Rather, this finding highlights the need to consider how SES interacts with other variables. We found that student year level, gender and prior achievement were more powerful predictors of student interest in most of these occupations.

In Australia, the assumption that aspirations take shape around the middle high school years results in the provision of most careers education in Year 10 (e.g., Cardak & Ryan, 2009). However, in some occupational categories, interest appears to rise or fall towards the very end of high school. For example, students are less likely to aspire to be a vet or artist as they mature, but more likely to aspire to architecture, engineering, medicine, social work or law. Furthermore, significant interest in these careers is often expressed as early as Year 7, sometimes Year 5. In other careers, such as teaching and science, student interest is more consistent across year levels. Variation across year levels might relate to ongoing assessment by students of their abilities and achievement levels as they age or, indeed, to a more realistic understanding of what is involved in certain careers. Nonetheless, it appears that students are forming career interests at an early

stage of their schooling. These results reinforce the importance of earlier outreach (Bennett et al., 2015; Whitty et al., 2015).

The widening participation agenda has brought SES into focus for both government policy and university outreach activities. We found that students from low SES backgrounds have similar career aspirations to those from higher SES categories. The discursive emphasis on 'raising' aspirations may be missing the mark if the underrepresentation of low SES students in higher education is more about factors such as the financial implications of attending university, perceptions of longer term debt and potential constraints on capacity to navigate pathways to university (Appadurai, 2004; Bok, 2010). In this light, student outreach activities need to move towards a stronger focus on nurturing rather than 'raising' aspirations. The provision of more detailed and meaningful information (Gore et al., 2015) that provides students with tailored advice about what is needed for specific careers could lead to an improvement in the proportion of low SES students who attend university.

When naming their occupational interests, students maintained strongly gendered patterns. In particular, students expressing interest in engineering, teaching and nursing align with existing patterns of male and female higher education and workforce participation. These findings indicate that gendered societal norms, workforce patterns and discipline stereotypes are powerful influences on students' gender identity from a young age and not easily changed. However, careers education which explicitly addresses assumptions about 'male' and 'female' careers could go some way towards ensuring that traditional gender roles are questioned.

School achievement also plays a powerful predictive role in relation to careers such as the arts, architecture, science, engineering, social work and law. Notions that you need to be 'smart' to have certain careers, when weighed alongside standardised test scores and the entrance scores for some degrees, are clearly having an impact on student interests. Indeed, in teaching, science and medicine, students' perceptions of their relative academic performance was an important predictor of occupational interest.

Factors related to interest in careers are complex and differ by career type. However, some factors such as gender, student cohort, year level and prior achievement are more influential across many careers than other factors such as SES, Indigeneity and school location. A more nuanced approach to outreach, including designing programs that are meaningful and targeted and that take account of student diversity and specific career aspirations, will allow for both quantitative and qualitative gains in equity.

Note

1. While this research was conducted in Australia, it is likely that it will resonate with other nations with similar social structures.

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