Relative influence of different markers of socioeconomic status on university participation

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This article is authored by Tomasz Zając and Wojtek Tomaszewski and has been contributed by the Life Course Centre. The Life Course Centre is a national research centre investigating the ways in which deep and persistent disadvantage endures within families and across generations.

This article contains empirical analysis completed by the authors. It draws on data from the Multi-Agency Data Integration Project to investigate the relative importance of various markers of socioeconomic status, captured at an individual and area level, for accessing university.

Key messages

This article analyses the relative influence of different markers of socioeconomic status (SES) on university participation captured at the age of 19. All SES measures included in the analysis (both individual-level and area-based measures) were found to be significantly associated with the probability of enrolling in a bachelor course at university.

In all cases, being a member of a more advantaged SES group is associated with a higher probability of enrolling in a bachelor course at university. The strength of the relationship varies, depending on the measure of socioeconomic status, with parental education being associated with the largest change in the chances of entering university.

Further, when other measures of SES are controlled for, the strength of the relationship between family income and the likelihood of enrolling in university falls noteably. On the other hand, the effect of parental education changes much less when other aspects of SES are controlled for. Low levels of parental education appear to have a particularly detrimental impact on the likelihood of university enrolment.

An area-based measure of SES – while less important once other SES measures were controlled for – was still found to be associated with the likelihood of enrolling at university. In other words, young people who live in low-SES areas are less likely than others to attend university even when family characteristics are taken into account.

This article leverages customised data from the Multi-Agency Data Integration Project (MADIP) to investigate the relative importance of various markers of SES, captured at an individual and area level, for accessing university.

The article starts with a brief overview of the relevant literature on measuring university participation among people from low-SES backgrounds. Discussion on individual-level versus area-level measures capturing low SES is particularly highlighted.

The article then presents new empirical evidence, leveraging robust and large-scale MADIP data. The core of the customised MADIP data used in the analyses include the 2016 Census of Population and Housing (Census) data linked to records exported from the Higher Education Information Management System. Empirical analyses focus on the cohort of young people aged 16 or 17 at the time of the 2016 Census, who typically still live with their parents. The young people's records are linked to the records of their parents to capture various social background characteristics, including parental education, occupation and family income, as well as an area-based measure of SES, based on the residential address. The data are used to predict subsequent university enrolment, based on higher education records linked to the Census data. The analyses also include investigating differences between males and females in the effects of different markers of SES on university enrolment.

The article makes 2 important contributions to the literature:

- First, it uses novel data on a much larger scale and with higher accuracy than data sources typically used to study the effects of SES on university enrolment in Australia.
- Second, it tackles an under-researched area. Specifically, while there is a wealth of literature on the effects of SES on university enrolment, comparatively few studies investigate the relative influences of the different facets of SES. It is particularly important to evaluate the net effect of an area-based measure of SES, over and above the individual-level SES indicators, as area-based indicators represent the main approach to measuring SES used for policy setting and monitoring in Australia.

Background

There is extensive empirical evidence demonstrating that, compared with their more socioeconomically advantaged peers, people from low-SES backgrounds have lower chances of enrolling in university (for example, Harvey et al. 2016; Tomaszewski et al. 2018; Tomaszewski et al. 2022); however, a number of important research gaps remain. These include the limited evidence on the relative influence of various facets of socioeconomic status (such as parental occupation, education or income) on the chances of participation in higher education. There are several specific areas where evidence is scarce that warrant further research:

- the relative influence of individual-level versus area-level markers of socioeconomic advantage or disadvantage

- any differences between males and females in respect to the influences of the various SES facets on university enrolment
- the lack of studies that include a measure of income as an indicator of SES at an individual level, with studies typically opting for indicators of parental occupation and education.

A consideration of income is important from an educational policy and practice perspective: in fact, recognising that it was a key barrier to participation in higher education participation provided the rationale for establishing the Higher Education Contribution Scheme (HECS). Income is also often used by universities as a main criterion for allocating student support, such as scholarships.

Measuring SES

SES is a broad concept, encompassing aspects that extend beyond material circumstances (APA 2017). While the notion of SES, including low SES, is commonly referred to in social science research and policy, there is no universal or widely agreed way to measure it. Individual studies approach the operationalisation of SES in different ways, with choices often limited by the data at hand, particularly in the case of studies relying on secondary data. Common approaches include capturing data on parental occupation and/or education, often at a point in time when the study objects are/were assumed to be living with their parents, such as at the age of about 14–17. While some studies rely on a single indicator of parental education or occupation, others combine the 2 into a single measure (see, for example, Houng and Justman 2014). Family income – or another measure of family resources, such as household possessions or wealth – is another way to proxy SES, which is considered different from measures of parental occupation or education.

Using a composite index combining different markers into a single scale is another common way of capturing SES. One of the best known examples is the Organisation for Economic Co-operation and Development (OECD) Index of Economic, Social and Cultural Status (ESCS) used in the Programme for International Student Assessment (PISA). The ESCS combines into a single score distinct measures of the financial, social, cultural and human capital resources available to students, and is typically operationalised as a weighted average of 3 indexes: parental educational attainment (in years), parental occupational status on the 'International Socio-Economic Index' scale (Ganzeboom et al. 1992), and a measure of 'household possessions' (Avvisati 2020). Such indexes offer standardised and reliable proxies for SES, which can be used in comparative analyses (including across countries); however, they mask the relative influence of the different facets that are combined into an overall index, something that might be of interest from a policy and practice point of view. For instance, previous research (for example, Buis 2013) suggests that both parents' occupation and

education independently influence their children's educational outcomes, which makes a case for considering them as separate markers of SES.

Yet another way to capture SES is through area-level measures, which offers a convenient approach that can be used for policy monitoring, and place-based interventions, in the absence of detailed data on individual circumstances. In Australia, the most common area-based SES measures are the set of Socio-Economic Indexes for Areas (SEIFA) developed by the Australian Bureau of Statistics. The SEIFA comprises a set of 4 indexes that rank areas in Australia according to relative socioeconomic advantage and disadvantage (see Box 7.1 for more details). One of these indexes, the SEIFA Index of Education and Occupation (IEO) has been used by the Australian Government to monitor and set policy in higher education – as described in the following section.

SES measurement in the context of equity in higher education

People from low-SES backgrounds comprise one of the officially designated equity groups in higher education in Australia (DEET 1990; Tomaszewski et al. 2018). In official higher education equity reporting and policy monitoring, SES has been captured using an area-based indicator, specifically, by the SEIFA IEO score of the Statistical Area Level 1 (SA1) area of a student's permanent address (initially, postcode area was used instead of SA1). The SEIFA IEO uses Census data on the occupational and educational characteristics of communities to rank geographic areas. The 'low SES' equity group is defined as individuals living in the areas that fall in the bottom 25% of the distribution.

While useful for policy setting and monitoring, some limitations of area-based SES measures have been pointed out (see Tomaszewski et al. 2018), including that:

- a purely area-based measure that excludes information on individual-level socioeconomic circumstances may result in misclassification of people (for example, a high-income family living in a low-SES area would still be classified as low SES) (see Box 7.1)
- it assumes uniformity within the low-SES category, with the 25% (quartile) cut-off not being granular enough to identify different levels of disadvantage within the category (Harvey et al. 2016)
- the address information supplied at the time of higher education study may not accurately reflect where a student grew up (Dockery et al. 2016), which could be particularly the case for mature-age students (James et al. 2008)
- the current SEIFA-based measure may lead to under-reporting of low-SES students in Australian higher education because of the higher probability of people from higher SES backgrounds participating in higher education, irrespective of the SES classification of the area in which they reside (AIHW 2014).

Box 7.1: Challenges of using area-based measures

SEIFA ranks areas in Australia according to relative socioeconomic advantage and disadvantage, based on information from the Census. It consists of 4 indexes:

1. Index of Relative Socio-economic Disadvantage
2. Index of Relative Socio-economic Advantage and Disadvantage
3. Index of Education and Occupation (IEO) (used in this article)
4. Index of Economic Resources.

For more information, see 'Census of Population and Housing: Socio-Economic Indexes for Areas (SEIFA), Australia, 2016' at www.abs.gov.au/ausstats/abs@.nsf/mf/2033.0.55.001.

While area-based measures such as SEIFA are useful for policy monitoring, they have certain limitations. Chief among them is the fact that indexes like SEIFA represent an average of all households in an area. While representing the general level of socioeconomic disadvantage of all people in an area, they do not necessarily reflect individual circumstances, and the diversity of people or households based in that area.

As such, area-based measures can mask substantial variation within areas; making inferences about individuals who live in an area based on aggregate data for that area might result in ecological fallacy or measurement errors (AIHW 2014; Bok 2010; Dockery et al. 2016; James et al. 2008; NBEET 1996). For these reasons, it is often informative to consider both area-based and individual measures of inequality, including SES.

Given the above issues, the measurement of low SES in the context of higher education in Australia has attracted considerable attention from policy advisers over the years. For example, the Australian Government initiated 2 consultations in the HE sector about such a measure, resulting in 2 discussion papers: *Measuring the socio-economic status of HE students* (DEEWR 2009) and *Moving to an enhanced indicator of HE students' socio-economic status* (DIICSRTE 2013). The current measure of low SES based on the SA1 was also tested as part of these consultations. However, despite a handful of notable exceptions (Tomaszewski et al. 2018; Tomaszewski et al. 2022), the relative contributions of area-based and individual-level SES indicators to an understanding of disadvantage in the higher education context remain understudied.

This article presents the most comprehensive analysis of these issues to date, using more robust data, compared with those used in the previous studies.

Multi-faceted nature of SES

As outlined earlier, SES is commonly captured in empirical studies using a single measure – whether in the form of an individual characteristic (for example, family income, parental occupation or education), an individual-level index combining several of such characteristics (for example, the PISA ESCS measure), or as an area-level composite measure (for example, SEIFA indexes).

By contrast, this article jointly examines the influence of a number of socioeconomic markers typically used as measures of SES on chances of participating in higher education. This is important because it enables an understanding of the relative influence of different facets of SES on the chance of university participation. Further, the approach employed in this article enables an examination of whether, and to what extent, individual-level characteristics still matter after taking account of area-level characteristics (and vice-versa) – which has important implications from a policy point of view.

The following section outlines the data that we use in the empirical part of the article, and operationalises the different facets of SES that are included in the analyses.

Data and methods

Data set and sample selection

This article leverages a customised MADIP extract. The extract comprises the 2016 Census records linked to, among others, higher education data on university enrolments and immigration records provided by the Department of Home Affairs. These rich data allow us to track university enrolments between 2016 and 2019 of the entire cohort of Australian citizens and permanent residents aged 16 or 17 at the time of the 2016 Census who lived with at least one parent. Non-citizens and non-permanent residents are excluded as they are not eligible for Commonwealth-funded places at universities and their enrolments are not recorded in the data. The analytic data set comprises 446,322 individuals, which offers markedly higher robustness to the analyses, compared with the data used in previous studies.

Measures

The outcome variable for our analyses is a binary measure capturing higher education participation in the years following the 2016 Census. We use higher education records on enrolments to identify individuals who enrolled in any bachelor's level course. We track the enrolment status of 16-year-olds up until 2019 and 17-year-olds only until 2018; that is, until they are 19, so that enrolment rates do not differ due to the age difference.

It is worth noting that our outcome captures transitioning to higher education straight after completing secondary school, or soon thereafter, rather than at more mature ages. Based on national data, in 2018, 63 per cent of first-year domestic students enrolled in undergraduate courses were aged 20 or younger, 14 per cent were aged between 21 and 24 and the remaining 22 per cent of students were aged 25 and older (Universities Australia 2020).

Our key independent variables capture 4 aspects of socioeconomic status: family income, parental education, parental occupation, and socioeconomic status of the area of residence.

- **Family income:** The sample was divided into 5 income brackets: $1,249 per week or less, $1,250–$1,999, $2,000–$2,999, $3,000 or more, and a partial or no information category.
- **Parental education:** Parental education captures the highest educational attainment among parents. The variable can have one of 3 values: 1) completed year 11 or less, 2) completed secondary education, certificate, or diploma and 3) completed bachelor's degree or higher.
- **Parental occupation:** The process is similar for parental occupation. We use Major Groups in the Australian and New Zealand Standard Classification of Occupations to group occupations in 3 categories according to their prestige:
  - first group (low-status category): comprises machinery operators, drivers and labourers as well as individuals who are either unemployed or not in the labour force
  - second group (middle category): consists of technicians and trades workers, community and personal service workers, clerical and administrative workers, and sales workers
  - third group (high-status category): includes high-status occupations, such as managerial or professional positions. Our measure of parental occupational status is the maximum of the values recorded for the parents.
- **Socioeconomic status of the area of residence:** We use the IEO, which is one of the SEIFA published by the Australian Bureau of Statistics, as our area-based measure of relative social advantage or disadvantage. Specifically, we use IEO quantiles.

Further, for comparative purposes, we derived binary variants of the above variables. These variables capture membership in the most disadvantaged category for each variable. For example, in the case of education, the binary variable distinguishes between individuals whose parents completed, at most, year 11 and the rest of the sample.

Finally, to test whether the relationships between socioeconomic status and accessing university differ between males and females, we include sex as a stratifying variable in the analyses.

Control variables

Our models control for an encompassing set of other relevant factors such as Indigenous status (yes/no), Non-English Speaking Background status (yes/no), coming from a regional area (yes/no), and living in a single-parent household (yes/no). Table 7.1 presents summary statistics of all variables included in the analyses.

Table 7.1: Descriptive statistics on analytical variables

	Per cent
Commencing higher education	43.4
Family income	
$1,249 or less	22.8
$1,250–$1,999	18.6
$2,000–$2,999	20.8
$3,000 or higher	23.3
Partial or no information	14.5
Parental occupation	
Machinery operators, drivers, labourers, unemployed	21.6
Technicians/ Trades, service, administrative, or sales workers	36.4
Managers/ professionals	42.0
Parental education	
Year 11 or less	17.8
HS/Certificate/Diploma	48.8
Bachelor or higher	33.4
SEIFA IEO	
IEO 1st quintile	18.1
IEO 2nd quintile	20.6
IEO 3rd quintile	21.3
IEO 4th quintile	21.1
IEO 5th quintile	18.9
Female	48.7
Indigenous	3.9
NESB	16.4
Remoteness area	
Major cities	70.9
Inner regional Australia	19.5
Outer regional Australia	8.3
Remote Australia	0.8
Very remote Australia	0.4
Single parent	24.2

NESB = non-English speaking background.

Analytic approach

Our analyses involve a series of logistic regression models. In the first phase, our analysis focuses on documenting the associations between each measure of SES and enrolling in a bachelor course (denoted hereafter as BA in this article), and demonstrating how the effects of each variable change after adjusting for other markers of SES. Because of that, and because we adjust for other disadvantaging factors (see the previous section headed 'Control variables'), our approach accounts for the fact that students can have multiple disadvantage – that is, belong to multiple disadvantaged groups.

The modelling proceeds in steps. We first fit models with just one SES measure at a time, followed by a model including all measures at once. The models take the following form:

$$\ln\left(\frac{p(E=1)}{1-p(E=1)}\right) = \alpha + \beta_1 SES + \beta_2 C + e$$

where

E is a binary variable capturing enrolment in a BA course

α is the model's intercept

SES represents one or all socioeconomic status measures

C is a set of control variables

the βs are vectors of coefficients to be estimated

e is the regression error.

For ease of interpretation, we present all model results as odds ratios (ORs) and average marginal effects (AMEs), which we calculated holding the other covariates at their observed values. As the focus of this study is on the association between social disadvantage and accessing university education, we chose the most privileged category for each variable as the reference group. Therefore, reported AMEs can be interpreted as a gap in the probability of enrolling in a BA course between the group of interest and the most privileged group.

In the next step, we compare the relative importance of the different facets of socioeconomic status for university enrolment. We do so by modifying the model with all SES measures. We replace multi-category measures of SES with their dichotomised and standardised versions, which allows us to directly compare regression coefficients across SES variables.

Finally, we investigate to what extent the observed patterns differ by sex. We achieve that by splitting the sample into 2 groups, and fitting the models for males and females separately.

Results

Approximately 43% of the sample accessed higher education by the age of 19. However, the enrolment rates vary depending on the social background. Table 7.2 presents abridged results from the first 2 steps of the analysis. The first column contains ORs and AMEs for variables of interest in models, including just one measure of SES (Box 7.2). The second column reports coefficients from the model that includes all the SES measures. The results in both columns account for the control variables. Full sets of results – that is, including coefficients for all the control variables – are available in tables 7.4 to 7.7 at the end of this article. The results in Table 7.2 suggest that all facets of SES investigated in this study are independently associated with the probability of starting BA-level studies.

Box 7.2: Odds ratios and average marginal effects

Odds ratios

ORs are exponentiated regression coefficients. ORs greater than 1 indicate that a one-unit increase in a given explanatory variable is associated with an increase in the odds of respondents taking the value 1 (starting university studies) in the outcome variable, all else being equal. Correspondingly, ORs smaller than 1 indicate that a one-unit increase in a given explanatory variable is associated with a decrease in the odds of respondents taking the value 1 in the outcome variable, all else being equal.

As our measures of SES are all coded as dichotomous or sets of dichotomous variables, the associated ORs represent the OR between a given group and the reference category. The ORs that equal 1 indicate no difference in odds between a given group and the reference category. An OR value greater than 1 indicates that the odds for a given group are higher than the odds for the reference category. Correspondingly, an OR value smaller than 1 indicates that the odds for a given group are lower than the odds for the reference category.

Average marginal effects

In the case of logistic regression, AMEs represent the average change in probability of respondents taking the value of 1 (starting university studies in this case) associated with a one-unit increase in a given explanatory variable, while holding other covariates at their observed values. As our measures of SES are all coded as dichotomous or sets of dichotomous variables, the associated AMEs can be interpreted as predicted differences between a given group and the reference category in the probability of starting university studies. These differences account for the control variables in the models.

Overall patterns

Across all measures, membership in a more advantaged group – that is, one with higher status – is associated with the highest probability of enrolling in a BA course. As expected, correlations between the SES measures result in smaller estimated effects of SES measures when we move from fitting models with a single SES measure to fitting the model comprising all measures at once. While introducing additional controls does not make any of the associations statistically non-significant, the reduction in the effect's magnitude varies between measures.

Family income

Controlling for other measures of SES affects the results for family income the most. In the model with family income as the single measure of SES, the OR for the most disadvantaged group (individuals coming from families with incomes below $1,249) is 0.38 ($p$<0.001), indicating that this group had odds of entering higher education 62% smaller than their counterparts from families with the highest incomes (the reference category). This translates into a 21 percentage points (pp) lower predicted probability of starting a BA course.

The estimated effects for other income groups were noticeably smaller but still substantial. Compared with the reference category, the probability of enrolment was 17 pp smaller (OR=0.47, p<0.001) for young people from families with incomes in the $1,250–$1,999 category, 12 pp smaller (OR=0.58, p<0.001) for people in the $2,000–$2,999 income category and 15 pp smaller (OR=0.51, p<0.001) for people with no information on family income. However, adding other measures of disadvantage as controls to the model changes these results considerably; it leads to an increase in ORs for all income groups, indicating a smaller difference between the odds of starting university studies for individuals in a given income group and individuals coming from the most affluent families (the reference group). For example, the estimated OR for the lowest income group grows from 0.38 (p<0.001) when income is the only SES measure in the model to 0.88 (p<0.001) when other measures are included. Hence, the estimated difference in probability of starting university studies shrinks to 2 pp. Moreover, differences between income groups other than the highest all but disappeared. Both ORs and AMEs for all income groups are similar after controlling for other measures of SES.

Parental occupation

The drop in the effect size due to the introduction of other SES measures is less pronounced in the case of parental occupation. The estimated gap between individuals whose parents work in occupations in the middle-status category (technicians/ trades, service, administrative, or sales workers) and individuals with parents in occupations

belonging to the high-status category (managers/ professionals) reduces from −17 pp (OR=0.45, p<0.001) when it was the only measure of SES in the model to −4 pp (OR=0.82, p<0.001) when other SES measures are introduced. For the low-status category, the AME changes from −26 pp (OR=0.29, p<0.001) to −9 pp (OR=0.63, p<0.001), which still represents a notable gap.

Parental education

The difference between effects estimates based on the adjusted and unadjusted models is smallest in the case of parental education. For individuals belonging to the middle category –that is, the group whose most educated parent finished secondary education or earned a certificate or diploma – the AME is −26 pp (OR=0.32, p<0.001) when the models includes just parental education and control variables. Adjusting for other measures of SES reduces the gap, but it remains substantial, at −18 pp (OR=0.44, p<0.001).

Individuals whose parents finished education in year 11 or earlier are even less likely to start BA-level studies. Using the first model, we estimate the gap in the probability of enrolling in a BA-level course to be −37 pp (OR=0.17, p<0.001). After including other SES variables in the model, the gap is still at −26 pp (OR=0.28, p<0.001). In other words, even after controlling for other measures of SES, the estimated effect of parental education is sizeable. This suggests that the bulk of the observed differences in the chances of entering higher education are driven by parental education, more so than by other facets of SES.

Area-based measure

The IEO index is another measure for which estimated effects on the probability of enrolling in a BA course remain substantial, even after controlling for other measures of SES. When IEO is the sole measure of SES in the model – which also includes the non-SES control variables – the AMEs range from −14 pp (OR=0.55, p<0.001) for individuals living in areas belonging to the 4th quintile (the second most advantaged group) to −34 pp (OR=0.21, p<0.001) for individuals living in areas in the 1st IEO quintile. Adding other measures of SES to the model reduces the estimated effects to −8 pp (OR=0.68, p<0.001) and −19 pp (OR=0.40, p<0.001), respectively.

Patterns among males and females

Columns 3 to 6 in Table 7.2 present the results from models fitted for males and females separately. We do not find any major differences between the 2 sub-samples. The observed patterns are very similar to those described above, suggesting a lack of marked differences between males and females in the effects of SES on university participation.

Table 7.2: Abridged results from logistic regression models of higher education participation using multi-categorical measures of SES

	Total				Males				Females			
	1		2		3		4		5		6	
	Models unadjusted for other SES measures		Model adjusted for other SES measures		Models unadjusted for other SES measures		Model adjusted for other SES measures		Models unadjusted for other SES measures		Model adjusted for other SES measures	
	OR	AME	OR	AME	OR	AME	OR	AME	OR	AME	OR	AME
Family income (ref. $3,000 or higher)												
$1,249 or less	0.38***	−0.21	0.88***	−0.02	0.38***	−0.21	0.92***	−0.02	0.38***	−0.22	0.85***	−0.03
$1,250–$1,999	0.47***	−0.17	0.85***	−0.03	0.45***	−0.17	0.85***	−0.03	0.48***	−0.17	0.85***	−0.03
$2,000–$2,999	0.58***	−0.12	0.87***	−0.03	0.56***	−0.13	0.86***	−0.03	0.60***	−0.11	0.88***	−0.03
Partial or no information	0.51***	−0.15	0.86***	−0.03	0.50***	−0.15	0.85***	−0.03	0.52***	−0.15	0.87***	−0.03
Parental occupation (ref. Managers/ professionals)												
Machinery operators, drivers, labourers, unemployed	0.29***	−0.26	0.63***	−0.09	0.29***	−0.25	0.65***	−0.08	0.30***	−0.27	0.62***	−0.10
Technicians/ Trades, service, administrative, or sales workers	0.45***	−0.17	0.82***	−0.04	0.43***	−0.18	0.80***	−0.04	0.48***	−0.17	0.83***	−0.04
Parental education (ref. BA or higher)												
Year 11 or less	0.17***	−0.37	0.28***	−0.26	0.16***	-0.37	0.26***	-0.27	0.19***	-0.37	0.31***	-0.26
SE/Certificate/Diploma	0.32***	−0.26	0.44***	−0.18	0.30***	-0.27	0.41***	-0.19	0.34***	-0.24	0.46***	-0.17
SEIFA IEO (ref. 5th quintile)												
IEO 1st quintile	0.21***	−0.34	0.40***	−0.19	0.19***	−0.34	0.37***	−0.19	0.23***	−0.33	0.43***	−0.18
IEO 2nd quintile	0.30***	−0.27	0.48***	−0.15	0.27***	−0.28	0.45***	−0.16	0.33***	−0.25	0.53***	−0.14
IEO 3rd quintile	0.39***	−0.21	0.56***	−0.12	0.37***	−0.23	0.54***	−0.13	0.42***	−0.20	0.60***	−0.11
IEO 4th quintile	0.55***	−0.14	0.68***	−0.08	0.52***	−0.15	0.66***	−0.09	0.58***	−0.12	0.73***	−0.07
Controls		Yes		Yes		Yes		Yes		Yes		Yes
Observations		446,322		446,322		229,180		229,180		217,142		217,142

Statistical significance: * p<0.05, ** p<0.01, *** p<0.001.

Note: Data from customised MADIP data set.

Relative influence of different SES measures

While the models with multi-categorical SES variables are well suited to demonstrate the associations between SES facets and starting university studies – as well as the consequences of introducing additional controls – comparisons across explanatory variables require a degree of caution. Therefore, to compare the magnitude of the estimated effects, we turn to the results from the logistic regression model that includes dichotomised and standardised versions of SES measures.

Table 7.3 presents the results from the logistic regression model for the entire sample as well as for the male and female sub-samples. The results confirm our earlier observations that the effects of family income are relatively weak compared with other variables, among which parental education seems to affect the probability of enrolling in a BA course most. The ORs for these variables are 0.93 (p<0.001) and 0.74 (p<0.001), respectively. Again, we do not observe any major differences between the sub-samples, suggesting the effects of SES are similar among males and females.

Table 7.3: Abridged results from logistic regression models of higher education participation using standardised binary measures of SES

	Total	Males	Females
	OR	OR	OR
Low income	0.93***	0.94***	0.93***
Low parental educational attainment	0.74***	0.72***	0.76***
Low parental occupational status	0.81***	0.82***	0.81***
Lowest SEIFA IEO quintile	0.79***	0.78***	0.81***
Controls	Yes	Yes	Yes
Observations	446,322	229,180	217,142
Pseudo R^2	0.114	0.107	0.095

Statistical significance: * p<0.05, ** p<0.01, *** p<0.001.

Note: Data from customised MADIP data set.

Discussion

In this study, we leveraged unique linked administrative data on the entire cohort of 16- and 17-year-olds in Australia to provide comprehensive and robust evidence on associations between various facets of socioeconomic status and starting university education. Using the powerful MADIP data, we were able to demonstrate the differences in the probability of entering higher education by family income, parental occupation, parental education and an area-based IEO. Further, we compared results from models fitted for males and females separately to investigate whether the observed effects differed between the 2 sub-samples.

All SES measures included in the analyses proved to be significantly associated with the probability of enrolling in a BA course, suggesting that the different SES facets have independent influences on university participation. As expected, the individual effects of the different SES facets were reduced once other measures of SES were introduced to the model. However, the magnitude of the observed effects, as well as the impact of introducing additional controls, vary across the SES measures. Specifically, the disadvantage stemming from low levels of parental education appears to have a particularly detrimental effect on the chance of university enrolment. Even after controlling for all other measures of SES, the difference in the predicted probability of enrolling in a BA course between the most disadvantaged and the most advantaged groups is 26 pp. By contrast, the effects of family income are much less pronounced, even in the absence of the other SES variables, and drop even further once those variables are included. As a result, the predicted gap between the most privileged and least privileged groups is just 2 pp, when adjusting for the influences of the other SES facets.

Interestingly, despite its limitations, an area-based measure of SES was significantly associated with the outcome variable. Further, it remained so even after the other SES measures were introduced as model controls. The estimated difference in the probability of enrolling in a BA course between people residing in the areas belonging to the 1st and 5th IEO quintiles is 19 pp. That means that coming from a low-SES area is a disadvantaging factor, independent of family SES characteristics.

Overall, the results confirm that the respective individual-level, as well as area-based measures, present independent influences on university participation. While the relative strength of the association with university enrolment varied, each of the SES markers considered in this study showed an independent statistical effect. Parental education has emerged as a particularly relevant SES facet, which is consistent with previous studies (for example, Buis 2013). An area-level indicator also remained statistically significant, despite controlling for parental education, occupation and family income, suggesting that individual- and place-based dimensions are both relevant and should be independently considered. Finally, the observed patterns do not differ between the sexes, suggesting that SES has similar relevance for university participation for both males and females.

Table 7.4: Results (ORs) from logistic regression models of higher education participation, using multi-categorical measures of SES, complete set of model coefficients

	(1) Income	(2) Occupation	(3) Education	(4) IEO	(5) All SES measures
Family income (ref. $3,000 or higher)					
$1,249 or less	0.38***				0.88***
$1,250–$1,999	0.47***				0.85***
$2,000–$2,999	0.58***				0.87***
Partial or no information	0.51***				0.86***
Parental occupation (ref. Managers/ professionals)					
Machinery operators, drivers, labourers, unemployed		0.29***			0.63***
Technicians/ Trades, service, administrative, or sales workers		0.45***			0.82***
Parental education (ref. BA or higher)					
Year 11 or less			0.17***		0.28***
HS/Certificate/Diploma			0.32***		0.44***
SEIFA IEO (ref. 5th quintile)					
IEO 1st quintile				0.21***	0.40***
IEO 2nd quintile				0.30***	0.48***
IEO 3rd quintile				0.39***	0.56***
IEO 4th quintile				0.55***	0.68***
Female	1.90***	1.92***	1.98***	1.93***	2.01***
Indigenous	0.34***	0.37***	0.39***	0.39***	0.45***
NESB	2.46***	2.68***	2.30***	2.47***	2.80***
Remoteness class (ref. Major cities)					
Inner regional Australia	0.51***	0.50***	0.53***	0.65***	0.64***
Outer regional Australia	0.48***	0.46***	0.53***	0.64***	0.65***
Remote Australia	0.31***	0.31***	0.37***	0.41***	0.43***
Very remote Australia	0.15***	0.15***	0.19***	0.20***	0.22***
Single parent	0.69***	0.67***	0.67***	0.56***	0.77***
Observations	446,322	446,322	446,322	446,322	446,322
Pseudo R^2	0.095	0.113	0.140	0.116	0.158

NESB = non-English speaking background; statistical significance: * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Note: Data from customised MADIP data set.

Table 7.5: Results (ORs) from logistic regression models of higher education participation, using multi-categorical measures of SES, complete set of model coefficients for males

	(1) Income	(2) Occupation	(3) Education	(4) IEO	(5) All SES measures
Family income (ref. $3,000 or higher)					
$1,249 or less	0.38***				0.92***
$1,250–$1,999	0.45***				0.85***
$2,000–$2,999	0.56***				0.86***
Partial or no information	0.50***				0.85***
Parental occupation (ref. Managers/ professionals)					
Machinery operators, drivers, labourers, unemployed		0.29***			0.65***
Technicians/ Trades, service, administrative, or sales workers		0.43***			0.80***
Parental education (ref. BA or higher)					
Year 11 or less			0.16***		0.26***
HS/Certificate/Diploma			0.30***		0.41***
SEIFA IEO (ref. 5th quintile)					
IEO 1st quintile				0.19***	0.37***
IEO 2nd quintile				0.27***	0.45***
IEO 3rd quintile				0.37***	0.54***
IEO 4th quintile				0.52***	0.66***
Indigenous	0.30***	0.33***	0.35***	0.35***	0.41***
NESB	2.46***	2.69***	2.33***	2.52***	2.83***
Remoteness class (ref. Major cities)					
Inner regional Australia	0.47***	0.46***	0.49***	0.61***	0.60***
Outer regional Australia	0.41***	0.39***	0.44***	0.56***	0.56***
Remote Australia	0.25***	0.26***	0.30***	0.34***	0.35***
Very remote Australia	0.11***	0.11***	0.15***	0.16***	0.18***
Single parent	0.67***	0.66***	0.67***	0.55***	0.74***
Observations	229,180	229,180	229,180	229,180	229,180
Pseudo R^2	0.088	0.108	0.140	0.114	0.159

NESB = non-English speaking background; Statistical significance: * p<0.05, ** p<0.01, *** p<0.001.

Note: Data from customised MADIP data set.

Table 7.6: Results (ORs) from logistic regression models of higher education participation, using multi-categorical measures of SES, complete set of model coefficients for females

	(1) Income	(2) Occupation	(3) Education	(4) IEO	(5) All SES measures
Family income (ref. $3,000 or higher)					
$1,249 or less	0.38***				0.85***
$1,250–$1,999	0.48***				0.85***
$2,000–$2,999	0.60***				0.88***
Partial or no information	0.52***				0.87***
Parental occupation (ref. Managers/ professionals)					
Machinery operators, drivers, labourers, unemployed		0.30***			0.62***
Technicians/ Trades, service, administrative, or sales workers		0.48***			0.83***
Parental education (ref. BA or higher)					
Year 11 or less			0.19***		0.31***
HS/Certificate/Diploma			0.34***		0.46***
SEIFA IEO (ref. 5th quintile)					
IEO 1st quintile				0.23***	0.43***
IEO 2nd quintile				0.33***	0.53***
IEO 3rd quintile				0.42***	0.60***
IEO 4th quintile				0.58***	0.73***
Indigenous	0.36***	0.40***	0.41***	0.41***	0.47***
NESB	2.45***	2.66***	2.27***	2.43***	2.78***
Remoteness class (ref. Major cities)					
Inner regional Australia	0.55***	0.54***	0.57***	0.68***	0.67***
Outer regional Australia	0.55***	0.53***	0.60***	0.72***	0.73***
Remote Australia	0.36***	0.37***	0.43***	0.47***	0.49***
Very remote Australia	0.18***	0.18***	0.22***	0.24***	0.25***
Single parent	0.72***	0.69***	0.68***	0.57***	0.79***
Observations	217,142	217,142	217,142	217,142	217,142
Pseudo R^2	0.075	0.093	0.115	0.093	0.132

NESB = non-English speaking background; statistical significance: * $p<0.05$, ** $p<0.01$, *** $p<0.001$.

Note: Data from customised MADIP data set.

Table 7.7 Results (ORs) from logistic regression models of higher education participation, using standardised binary measures of SES, complete set of model coefficients

	Total	Males	Females
Low income	0.93***	0.94***	0.93***
Low parental educational attainment	0.74***	0.72***	0.76***
Low parental occupational status	0.81***	0.82***	0.81***
Lowest SEIFA IEO quintile	0.79***	0.78***	0.81***
Indigenous	0.40***	0.36***	0.43***
NESB	2.73***	2.72***	2.74***
Remoteness class (ref. Major cities)			
Inner regional Australia	0.53***	0.49***	0.57***
Outer regional Australia	0.51***	0.43***	0.59***
Remote Australia	0.34***	0.27***	0.40***
Very remote Australia	0.17***	0.13***	0.20***
Single parent	0.73***	0.70***	0.75***
Female	1.92***		
Observations	446,322	229,180	217,142
Pseudo R^2	0.114	0.107	0.095

NESB = non-English speaking background; statistical significance: * p<0.05, ** p<0.01, *** p<0.001.

Note: Data from customised MADIP data set.

References

APA (American Psychological Association) (2017) *Education and socioeconomic status* [online fact sheet], accessed 6 March 2023. https://www.apa.org/pi/ses/resources/publications/factsheet-education.pdf

AIHW (Australian Institute of Health and Welfare) (2014) *Towards a performance measurement framework for equity in higher education*, AIHW, Canberra.

Avvisati F (2020) 'The measure of socio-economic status in PISA: a review and some suggested improvements', *Large-scale Assess in Education*, 8:8 (2020). https://www.apa.org/pi/ses/resources/publications/factsheet-education.pdf

Bok J (2010) 'The capacity to aspire to higher education: "It's like making them do a play without a script"', *Critical Studies in Education*, 51(2):163–178.

Buis ML (2013) 'The composition of family background: the influence of the economic and cultural resources of both parents on the offspring's educational attainment in the Netherlands between 1939 and 1991', *European Sociological Review*, 29(3):593–602.

DEET (Department of Employment Education and Training) (1990) *A fair chance for all: national and institutional planning for equity in higher education*, Australian Government Publishing Service, Canberra.

DEEWR (Department of Education, Employment and Workplace Relations) (2009) *Measuring the socio-economic status of higher education students: discussion paper*, DEEWR, Canberra.

DIICSRTE (Department of Industry, Innovation, Climate change, Science, Research and Tertiary Education) (2013) *Moving to an enhanced indicator of higher education students' socio-economic status*, DIICSRTE, Canberra.

Dockery AM, Seymour R and Koshy P (2016) 'Promoting low socio-economic participation in higher education: a comparison of area-based and individual measures', *Studies in Higher Education*, 41(9):1692–1714.

Ganzeboom H, De Graaf P and Treiman D (1992) 'A standard international socio-economic index of occupational status', *Social Science Research*, 21(1):1–56. doi:10.1016/0049-089X(92)90017-B Houng B and Justman M (2014), 'NAPLAN Scores as Predictors of Access to Higher Education in Victoria', Melbourne Institute Working Paper No. 22/14, dx.doi.org/10.2139/ssrn.2519864

Harvey A, Burnheim C and Brett M (eds) (2016) *Student equity in Australian higher education: twenty-five years of a fair chance for all*, Springer International Publishing, Singapore.

James R, Bexley E, Anderson A, Devlin M, Garnett R, Marginson S et al. (2008) *Participation and equity: a review of the participation in higher education of people from low socioeconomic backgrounds and indigenous people*, Centre for the Study of Higher Education, The University of Melbourne, Melbourne.

NBEET (National Board of Employment Education and Training) (1996). *Equality, diversity and excellence: advancing the national higher education equity framework*, Australian Government Publishing Service, Canberra.

Tomaszewski W, Kubler M, Perales F, Western M, Rampino T and Xiang N (2018) *Review of identified equity groups, Institute for Social Science Research* [research report], The University of Queensland, Brisbane. https://espace.library.uq.edu.au/view/UQ:bd8a044

Tomaszewski W, Perales F, Xiang N and Kubler M (2022) 'Differences in higher education access, participation and outcomes by socioeconomic background: a life course perspective', in Baxter J, Lam J, Povey J, Lee R and Zubrick SR (eds) *Family dynamics over the life course: foundations, turning points and outcomes*, Springer International Publishing, Cham, Switzerland:133–155. doi:10.1007/978-3-031-12224-8_7

Universities Australia (2020), *2020 higher education facts and figures*, Canberra, https://www.universitiesaustralia.edu.au/wp-content/uploads/2020/11/200917-HE-Facts-and-Figures-2020.pdf