SMALL GRANTS RESEARCH PROGRAM REPORT

Investigating the relationships between First-in-Family status, equity groups, and university access

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Acknowledgement of Country

The Australian Centre for Student Equity and Success acknowledges Indigenous peoples across Australia as the Traditional Owners of the lands on which the nation's campuses are situated. With a history spanning more than 60,000 years as the original educators, Indigenous peoples hold a unique place in our nation. We recognise the importance of their knowledge and culture, and reflect the principles of participation, equity, and cultural respect in our work. We pay our respects to Elders past, present, and future, and consider it an honour to learn from our Indigenous colleagues, partners, and friends.

At a glance

What we did

The study involved analysis of data on two cohorts of young people from the Person Level Integrated Data Asset (PLIDA), a dataset linking administrative records from multiple public agencies, to compare the university enrolment patterns of First-in-Family (FiF) students, defined as students without university-educated parents, with that of non-FiF students. Data on individuals aged 16 or 17 years at the time of the 2016 Census, who lived with at least one parent, were used to capture their social background, including parental education. Using immigration records, the sample was narrowed to Australian citizens and permanent residents. Higher education records were then used to track their university enrolment status until 2019. The final analytic dataset comprised 443,609 individuals.

What we found

1) FiF students constitute over two-thirds of the student population but have not been recognised as an official equity group in Australian higher education equity policy.
2) FiF students have substantially lower rates of enrolment in university education than non-FiF students, by around 23 percentage points. The enrolment gap was larger than that observed for most of the official equity groups, with only students with disabilities observed to have a larger enrolment gap.
3) Beyond access issues, FiF students also face additional disadvantage in enrolment at selective universities (defined as those with higher entry requirements). Over half of non-FiF students attended selective universities, as compared to only 39% of FiF students.
4) There were also differences in the field of enrolment by FiF status, with FiF students more likely to enrol in education or health (excluding medicine) fields, and less likely to enrol in natural and physical sciences, engineering and related technologies, and medical studies.

What we recommend

1) The Australian Government and stakeholders should consider First-in-Family (FiF) status (or parental education) as another important factor affecting university enrolments, access to first-tier institutions, and certain fields of study.
2) The Australian Government and stakeholders should work together to build a data asset covering the full educational paths that would allow investigation of when and how the educational pathways of FiF individuals and their peers diverge.
3) The Australian Government should consider funding further research exploring why attitudes and aspirations of FiF young people differ from those of non-FiF youth and how they shape educational outcomes. This is needed to better understand the mechanisms leading to the divergence of educational pathways.
4) The Australian Government and stakeholders should invest in approaches to assist FiF individuals in gaining access to higher education, selective institutions, and fields in which they are underrepresented. They should also expand outreach and career counselling programs to equip FiF individuals with the knowledge necessary to navigate the higher education system as well as help them understand various career paths.

Acknowledgements

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The results of these studies are based, in part, on data supplied to the Australian Bureau of Statistics (ABS) under the Taxation Administration Act 1953, A New Tax System (Australian Business Number) Act 1999, Australian Border Force Act 2015, Social Security (Administration) Act 1999, A New Tax System (Family Assistance) (Administration) Act 1999, Paid Parental Leave Act 2010, and/or the Student Assistance Act 1973. Such data may only be used for the purpose of administering the Census and Statistics Act 1905 or performance of functions of the ABS as set out in section 6 of the Australian Bureau of Statistics Act 1975. No individual information collected under the Census and Statistics Act 1905 is provided back to custodians for administrative or regulatory purposes. Any discussion of data limitations or weaknesses is in the context of using the data for statistical purposes and is not related to the ability of the data to support the core operational requirements of the Australian Taxation Office, Australian Business Register, Department of Social Services, and/or Department of Home Affairs.

Legislative requirements to ensure privacy and secrecy of these data have been followed. For access to data from the Person Level Integrated Data Asset (PLIDA) and/or the Business Longitudinal Analysis Data Environment (BLADE) under Section 16A of the ABS Act 1975 or enabled by section 15 of the Census and Statistics (Information Release and Access) Determination 2018, source data are de-identified and so data about specific individuals has not been viewed in conducting this analysis. In accordance with the Census and Statistics Act 1905, results have been treated where necessary to ensure that they are not likely to enable identification of a particular person or organisation.

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Abbreviations

ABS	Australian Bureau of Statistics
ACSES	Australian Centre for Student Equity and Success
AME	Average marginal effect
ASGS	Australian Statistical Geography Standard
ATAR	Australian Tertiary Admission Rank
BLADE	Business Longitudinal Analysis Data Environment
DEEWR	Department of Education, Employment and Workplace Relations
DIICSRTE	Department of Industry, Innovation, Climate change, Science, Research and Tertiary Education
EG	Equity group
ESB	English Speaking Background
FGS	First-Generation Students
FiF	First-in-Family
HEI	Higher education institution
HEIMS	Higher Education Information Management System
NESB	Non-English Speaking Background
NSW	New South Wales
OR	Odds ratio
PLIDA	Person Level Integrated Data Asset
pp	Percentage points
RR	Regional and remote
SEIFA	Socio-Economic Indexes for Areas
SES	Socio-economic status
STEM	Science, technology, engineering, and mathematics
WINTA	Women in Non-Traditional Areas

1. Executive summary

Since the 1960s, successive Australian governments have focused on equity in the higher education sector where, for the most part, it is recognised that university education has a pivotal role to play in enhancing the socio-economic status (SES) and quality of life for disadvantaged individuals. Much of the debate on equity within Australian higher education has focused on six recognised equity groups: people from low SES backgrounds, people from Non-English Speaking Backgrounds (NESB), Aboriginal and Torres Strait Islander peoples, people from regional and remote (RR) areas, people with disability, and Women in Non-Traditional Areas (WINTA) of study. Critics of the Australian higher education equity framework have underscored the existence of other potential groups that experience disadvantage and are underrepresented in higher education and yet currently lack official recognition. First-in-Family (FiF) students, that is, people without university-educated parents, are one of the disadvantaged groups that are not included in the current equity framework.

There is rich theoretical and empirical literature linking social background to educational outcomes. One important marker of social background – parental education – has been identified as a key factor affecting educational trajectories. Studies focused on FiF students have provided ample evidence of their disadvantage in higher education. The lack of cultural capital, mentoring, and guidance are important factors hindering FiF students' success. Both in Australia and internationally, there is evidence that FiF students choose educational pathways differently from their peers. However, in Australia, the evidence on FiF students comes mostly from small-scale qualitative studies.

This study aimed to close the gap in existing literature by drawing on unique whole-of-population data to provide robust evidence on access to university for young people whose parents did not complete higher education. It involved analysis of data on two cohorts of young people from the Person Level Integrated Data Asset (PLIDA). Specifically, data on social background from the 2016 Census were linked with Higher Education Information Management System (HEIMS) records to compare the university enrolment patterns of FiF students with that of non-FiF students. Data on individuals aged 16 or 17 years at the time of the 2016 Census, who lived with at least one parent, were used to capture their social background, including parental education. Using immigration records, the sample was narrowed to Australian citizens and permanent residents. Higher education records were then used to track their university enrolment status until 2019. The final analytic dataset comprised 443,609 individuals.

The analysis documented significant overlaps between FiF status and four equity groups: people from low SES backgrounds, people from RR areas, Aboriginal and Torres Strait Islander peoples, and people with disability. The overlaps were particularly large for Indigenous people and people from low SES backgrounds, nearly 90% of whom belonged to the FiF category. However, over two-thirds of the sample were classified as FiF, compared to 18.0% who qualified as low SES and 3.9% as Indigenous, which meant that the vast majority of FiF individuals are not low SES or Indigenous.

Furthermore, the analysis provided evidence of the effects of FiF status on educational pathways. It revealed a wide gap associated with FiF status in chances of enrolling in an

undergraduate program. The adjusted enrolment rate among the FiF category was 35.7% compared to 58.6% among those with university-educated parents. Comparing the effect of FiF status to those of equity-group membership showed that only people with disability were more disadvantaged in terms of enrolment rate compared to their peers. The gap in adjusted proportions was 30.7 percentage points (pp) for that group.

Marked differences were also observed in the case of enrolments in selective institutions (that is, those that attract students with higher Australian Tertiary Admission Rank (ATAR) scores).[1] This analysis provided evidence that FiF individuals, who were already less likely to enter higher education, were also less likely to secure a spot at a first-tier university. While over half of non-FiF students were studying at a selective institution, the share among FiF students was only 39.3%.

The final stage of the analysis focused on representation of FiF individuals within fields of study. The results from multinomial logistic regression models suggested that a large proportion of fields were equally likely to be studied by FiF students and their peers with university-educated parents. However, FiF students were significantly more likely than their peers to enrol in education programs and health programs other than medical studies and less likely than their peers to study natural and physical sciences, engineering and related technologies, and medical studies.

Combined, the study outcomes emphasise that FiF status—and parental education more broadly—are very important factors affecting educational trajectories. There are some overlaps between students who belong to the officially identified equity groups and those identified as FiF. However, the latter is a much larger group, and as the results indicate, the disadvantage stemming from FiF status is distinct from that resulting from being a member of any of the designated equity groups.

[1] The definition of “selective institutions” in this study can be found in Section 5.2.1 of the section on methods.

2. Recommendations

Based on the findings, the following four recommendations are made:

Recommendation 1. The Australian Government and stakeholders at other levels should consider First-in-Family (FiF) status (or parental education) as another important factor affecting university enrolments, access to first-tier institutions, and certain fields of study.

Young people whose parents did not attend university were themselves significantly less likely to attend university and enrol in a selective institution. Furthermore, our results provide evidence that FiF status can affect the choice of field of study. It is also important to note that young people without university-educated parents were not a small minority. On the contrary, they constituted a majority of the cohort under study (two-thirds of the sample).

Recommendation 2. The different levels of the Australian Government and other stakeholders should work together to build a data asset covering the full educational paths that would allow investigation of when and how the educational pathways of FiF individuals and their peers diverge.

Recommendation 3. The Australian Government should consider funding further research exploring why attitudes and aspirations of FiF young people differ from those of non-FiF youth and how they shape educational outcomes. This is needed to better understand the mechanisms leading to the divergence of educational pathways.

These new data sources and research studies would significantly expand current understandings of how FiF status affects educational trajectories of young people and help to design policy interventions to address equity challenges across the educational lifecycle.

Recommendation 4. The Australian Government and other stakeholders should invest in approaches to assist FiF individuals in gaining access to higher education, selective institutions, and fields in which they are underrepresented and expand outreach and career counselling programs that would equip FiF individuals with the knowledge necessary to navigate the higher education system as well as help them understand various career paths.

Such programs could mitigate the effects of FiF status by reducing the disparities in the cultural capital and knowledge necessary to navigate the higher education system, which previous literature identified as important factors contributing to educational inequality.

3. Introduction

Since the 1960s, successive Australian governments have focused on equity in the higher education sector where, for the most part, it is recognised that university education has a pivotal role to play in enhancing the socio-economic status (SES) and quality of life for disadvantaged individuals. David (2021) noted that “how to make educational opportunities more equal or equitable for various groups” has been a policy theme “throughout the second half of the twentieth century” (xviii). The commitment to widening participation emerged from the acknowledgment that the underrepresentation of certain groups indicated a failure to fully utilise human potential. Increasing access for non-traditional populations remains a key priority.[2]

In 1988, the Federal Government demonstrated its commitment to enhancing equity in higher education through the Dawkins White Paper on Higher Education Policy (Dawkins, 1988), which highlighted barriers hindering access to and success in higher education for several disadvantaged groups. This document served as a cornerstone for subsequent discussions, notably the paper "*A fair chance for all: national and institutional planning for equity in higher education*" (DEET, 1990), which, along with "*Equity and general performance indicators in higher education*" by Martin (1994), laid the groundwork for the current equity framework. The aim of *A Fair Chance for All* was to radically change the student population and set the stage for success. It was “focused explicitly on access and representation, advocating the need for composition of the student population to reflect the broader population” (Harvey, Andrewartha, & Burnheim, 2016, p. 6). This framework identified six equity groups based on characteristics associated with barriers to higher education participation and success, including: 1) people from low SES backgrounds, 2) Aboriginal and Torres Strait Islander peoples, 3) people from regional and remote (RR) areas, 4) people from Non-English Speaking Backgrounds (NESB), 5) people with disability, and 6) Women in Non-Traditional Areas (WINTA) of study.[3]

Interrelated with the agenda to improve equity in higher education was the massification of the Australian higher education sector in 1989 (Dobson, 2001). This was followed by the development of a “demand-driven funding system” implemented between 2010 and 2017 with the aim of increasing domestic student numbers and providing greater access to higher education for underrepresented groups (Australian Government, 2009).

The outcomes of the demand-driven university system were “a mixed report card”, as reported by the Productivity Commission in its research paper (Productivity Commission, 2019). While the number of students from low SES backgrounds increased following the expansion of university places, this expansion did not lead to increased participation rates among Aboriginal and Torres Strait Islander peoples or young people from RR communities.

[2] While these efforts are to be applauded, it is also important to recognise that Australia’s investment in widening participation is influenced by global human capital theory where increasing the participation “is an essential component of the strategy to increase the nation’s competitiveness, growth and productivity in the global knowledge economy” (Luzeckyj et al., 2011, p. 95).

[3] The equity framework has undergone scrutiny in various significant reviews in recent years (for example, James et al., 2004; AIHW, 2014; Pitman & Koshy, 2014; Tomaszewski et al., 2018), reflecting ongoing efforts to assess and improve equity in higher education.

This conclusion was also supported by a range of empirical evidence from equity scholars (Chesters & Watson, 2013; Czarnecki, 2018).

Another result of the expansion in higher education is an increase in the number of First-in-Family (FiF) students. In this report, we foreground that the FiF status—in other words having parents who did not obtain a university/college degree[4]—should be considered as another important disadvantaging factor in the Australian equity framework. People with FiF status[5] have certain structural barriers that impact their chances of success in their education. International and domestic research suggests university students from this group are more likely to struggle in and drop out of higher education than their peers (see King et al., 2015; Luzeckyj et al., 2011; O'Shea, 2007; O'Shea et al., 2014; O'Shea, 2020; Patfield, Gore, & Fray, 2022; Spiegler & Bednarek, 2013). Furthermore, both theoretical and empirical sociological literature suggests that parental education is a key factor contributing to differences in young people's educational outcomes (for example, Blossfeld, 2019; Erikson, 2019; Jackson, 2013).

This study used unique whole-of-population data on two cohorts of young people from Person Level Integrated Data Asset (PLIDA) to address the gap in existing literature and provide robust evidence on the relationship between FiF status, equity group membership, and higher education. Specifically, information on social background from the 2016 Census was linked to Higher Education Information Management System (HEIMS) records to investigate differences in university enrolment patterns between FiF and non-FiF individuals. This provided evidence to better understand the disadvantage of FiF youth in terms of access to higher education, independent of the disadvantage observed in the case of the recognised equity groups. It also makes a substantial contribution to the Australian literature on the matter, which has mostly relied on relatively small-scale qualitative studies, to document the disadvantage of FiF students.

The report is organised into four main sections as follows: Section 4 reviews key aspects of the literature on FiF students as well as the broader sociological literature linking class and social background and educational outcomes; Section 5 discusses the methodology, including data, measures and analytical approach; Section 6 presents the findings drawing on the two whole-of-population data sources; Sections 7 and 8 contain the discussion and conclusion, respectively.

[4] A cautionary note on terminology is due here. In the international literature, the terms FiF and First-Generation Students (FGS) are often used interchangeably, though there are subtle differences between the two groups. FiF typically refers to individuals who are the first in their immediate family to pursue or complete higher education, emphasising the family context, including the role of siblings. FGS, on the other hand, generally highlights the lack of parental experience in higher education and is commonly used in studies and policies, particularly in the United States of America. Despite these nuances, both terms share a focus on students who may face unique challenges, such as limited access to guidance about navigating university systems or feelings of isolation. The Census data used in this study allows the identification of FGS only, as data on siblings cannot be reliably linked. However, we decided to use the term FiF as it is more commonly used in the Australian context (King et al., 2015).

[5] Who are also called prospective FiF/FGS students in the literature, that is, those who would be first in their families to enrol in higher education (Patfield et al., 2021; Patfield, Gore, & Weaver, 2022).

4. Background

Social background and educational outcomes

4.1.1 Theories of social class

The study of class differences and social mobility remain areas of interest for researchers interested in widening participation, and theories of social class are particularly relevant to understanding the experience of First-in-Family students as parental education is a key indicator of socio-economic status. Theories of social class and social mobility have evolved considerably since the structural approaches represented in the early seminal texts of Marx, Weber, and Durkheim. Influenced by these scholars, the last half of the twentieth century was witness to a move towards quantitative and positivist methodologies to explore class. These approaches, which primarily concerned the development of class schemas, mainly defined class in terms of employment and financial resources (Goldthorpe, 1996). Within these studies, which were typically large-scale, education was often in the background, and economics were often emphasised and there was a greater interest in developing rational-choice models (Goldthorpe, 1996) and studying intra-class differences (Bernstein, 1962).

Contemporary research on social class and mobility takes a much broader theoretical stance to incorporate the study of a wider range of practices. In taking such a stance, it begins to complicate how we understand social reproduction. Many of these approaches, which gained popularity over the late twentieth and early twenty-first centuries, were strongly influenced by Bourdieusian concepts, specifically the acquiring (and maintaining) of capitals, symbolic violence, and the internalisation of class (Reay, 2005; Loveday, 2016). Bourdieu conceived of education as an institutional structure for social separation, an “ideological and cultural site of socialization that…was often more likely to reproduce, rather than challenge, social inequality in the state” (Dillabough, 2004, p 490). Rendered simply, Bourdieu argues that within educational contexts, the cultural capital of the middle and upper classes is rewarded, while the capitals of the lower classes are systematically devalued. Within the social sciences, the ongoing “structure-agency” debate heavily influenced Bourdieu’s development of both his theory of practices and theoretical tools in his study of class-based power.

For many sociologists, Bourdieu’s theoretical contribution led to a deeper theorising of class, which emphasised the importance of emotions, stigma, history, and lived experience. Class is now theorised as formed *in* and *through* identities, agentic practices as well as historical discourses rather than a simple reflection of present financial capital and occupations. In understanding the role social class plays in identity formation, a range of theorists have documented how family socialisation practices reproduce social class differences across generations (Lareau, 2003; Vincent et al., 2013). For example, in contrast to working-class parents, middle-class parents have been documented as describing their children as “bright”, fostering certain dispositions toward academic attainment (Reay et al. 2011) while putting “a tremendous amount of effort into cultivating particular identities [and] stacking the deck in their child’s favor” (Weis & Cipallone, 2013, p. 710).

4.1.2 Relevance of parental education

There is a long history of research interest in the impact of young people's social origin or SES of their family on their education outcomes in the sociology of education (see Boudon, 1974; Bourdieu, 1973; Erikson, 2019; Jackson, 2013). Socio-economic characteristics of families and the social and cultural resources available to them have been shown to profoundly influence individual dispositions (for example, views, attitudes, and aspirations), capabilities (for example, cognitive and non-cognitive skills etc.), and behaviours (for example, post-school pathway and course selections) (Boudon, 1974; Bourne et al., 2018; Czarnecki, 2018; Erikson, 2019; Jackson, 2013; Palmisano et al., 2022).

Despite the ongoing debate in the field, there is an emerging consensus on the multidimensional nature of social origin, which suggests that parental education, income, as well as social status and class should be regarded as only one part of the equation. There are different indicators of socio-economic status that may affect individuals' educational and socio-economic outcomes via different mechanisms (Blossfeld, 2019, 2020; Bukodi et al., 2018; Erikson, 2016).

In considering social class and social mobility in reference to social change, Bukodi and Goldthorpe (2013) employed data from three cohorts born in the UK in 1946, 1958, and 1970 to explore the effects of parents' class, education, and status on their offspring's qualification attainment. They found that all three indicators have separate effects that are independent of each other. In a similar vein, Erikson (2016) in Sweden found that parental education, class, status, and income have independent effects on their children's educational attainment. This is because parental education, occupation, or social status have captured different family resources/capital, which impact an individual's education and labour market outcomes.

Furthermore, among the indicators of SES, parental education can be considered the most important indicator, not only because it largely lays the foundation for the parents' occupational prestige and is correlated with social class but also as it has been shown to have a greater association with offspring's educational attainment than other indicators (for example, Blossfeld, 2019; Erikson, 2019; Erola et al., 2016). Students with highly educated parents can gain exposure to more stimulating cultural, intellectual, and learning-focused environments at home, which can influence school performance as well as aspirations and decision-making (Bukodi & Goldthorpe, 2013; Gunn, 2005). In particular, parental education has been shown to be a major factor that exerts considerable influence on offspring's educational outcomes, including whether they enter higher education, the trajectories with higher education, studied subjects, etc. (Blossfeld, 2020; Buis, 2013; Chesters & Watson, 2013; Erola et al., 2016; Zając & Tomaszewski, 2023), which supports the claims around the relevance of FiF status for university attendance.

4.1.3 The role of cultural capital and habitus

There is a rich sociological literature theorising the links between various forms of parental SES and educational outcomes. The rational action theory (Breen & Goldthorpe, 1997; Breen et al., 2014; Goldthorpe, 2014) and effectively maintained inequality (Lucas, 2001) are two examples. Both theories are based on rational choice arguments and assume that socio-economic self-interests generate the motivation for parents to mobilise the resources they

can command. The rational action theory with its models of status maintenance posits that families aim, at a minimum, to maintain their status for their children when setting and pursuing educational occupational goals for their children. Therefore, according to the theory, families are assumed to be motivated to aim for different occupational statuses, and high SES families, in particular, are motivated to deploy their resource advantage to ensure high SES outcomes for their children (Breen & Goldthorpe, 1997). In turn, effectively maintained inequality posits that the advantaged will always act to ensure advantages for themselves and their children (Lucas, 2001) and will mobilise their socio-economic status to achieve this advantage. Specifically, the theory predicts that, as university education becomes more common, high SES parents will seek to differentiate their offspring from other university graduates through pursuing high-status options, including more enrolment in more prestigious fields of study (for example, medicine, law, engineering) and more selective institutions (for example, Australian Group of Eight institutions).

However, these theories do not consider parental education separately from other aspects of SES. In turn, the work of Bourdieu offers particularly useful insights on the mechanisms through which parental education, and consequently FiF status, impacts educational pathways. Bourdieu's concept of cultural capital has been extensively explored as a pivotal idea in understanding the reproduction of social inequalities through education (Barsegyan & Maas, 2024; Davies & Rizk, 2018; Dumais, 2002; Gunn, 2005; Jæger & Holm, 2007; Noble & Davies, 2009; O'Shea, 2016; Tramonte & Willms, 2010). Bourdieu (1984) defined cultural capital as the non-financial social assets that promote social mobility. These assets include education, intellect, style of speech, dress, and even physical appearance. Bourdieu identified three forms of cultural capital: embodied, objectified, and institutionalised. Embodied cultural capital refers to the knowledge, skills, and dispositions that individuals acquire over time, often unconsciously, through their upbringing and socialisation. Objectified cultural capital encompasses physical objects and media, such as books, artworks, and instruments, which can transmit cultural knowledge and skills. Institutionalised cultural capital is formal recognition, most notably through educational qualifications and credentials, which validate and legitimise an individual's cultural competence. All of these contribute to how class status is maintained.

Bourdieu (1984) posited that cultural capital is rarified and unequally distributed among social classes and that this disparity plays a significant role in maintaining social stratification. The dominant classes invest heavily in passing on substantial amounts of cultural capital to their offspring, thereby giving them a distinct advantage in educational settings and, ultimately, in their professional lives. In contrast, those from less privileged backgrounds often lack the same level of cultural capital, making it more challenging for them to succeed within the educational system and achieve upward social mobility. This concept is crucial for understanding how education can both perpetuate and challenge social inequalities.

Another key concept in this area is Bourdieu's notion of habitus, which refers to the dispositions, beliefs, and behaviours an individual acquires through subjective perceptions of structural constraints in their environment (Appadurai, 2004; Bourdieu, 1973; Walpole, 2003). Walpole (2003) further defines habitus as a person's network of perceptions regarding opportunities, which develops as individuals internalise aspects of the social structure and their class position, forming beliefs about what is possible in their lives (Dumais, 2002). These beliefs include aspirations and expectations aligned with their habitus

(Dumais, 2002). Research shows that students' educational decisions are made within the context of their habitus (Walpole, 2003). For example, in the area of FiF research, Reay et al. (2005) note that choices among working-class participants are influenced by their perceptions of "fit" with the institution. Similarly, Evans (2009) highlights the phenomenon of "self-limitation" (p. 348) in the context of working-class girls' decisions regarding higher education. For FiF students, this tendency toward self-restriction often leads them to "study less prestigious subjects at less prestigious universities" (Spiegler & Bednarek, 2013, p. 324). In contrast, in their study of school students in New South Wales (NSW), Patfield et al. (2021) used the lens of familial habitus to describe the ways in which family context can nurture aspirations for higher education among prospective FiF students. They discussed projected familial habitus in which higher education is associated with the opportunity to build a different, better life, meritocratic habitus, in which higher education is presented as a reward for hard work at school, and supportive habitus, which is about supporting children in their aspirations and decision-making as well as overcoming barriers.

First-in-Family students in Australia

The massification of the higher education sector resulted in a growing number of "non-traditional" students entering universities (Bowl, 2001). The term "non-traditional students" serves as an umbrella category that includes a wide range of individuals coming from underrepresented groups who do not fit the traditional student profile. Students from non-traditional backgrounds often "face unique, class-specific challenges, evident in higher levels of uncertainty" regarding their higher education choices, which can have implications for retention (Lehmann, 2009, p. 139). Their underrepresentation in higher education and increased likelihood of facing challenges in university life compared to their "traditional" peers attracted research and policy interest (Gale & Tranter, 2011; Reay et al., 2009). Among these "non-traditional" students, FiF students have been a major focus of research in higher education equity (for reviews, see King et al., 2015; Spiegler & Bednarek, 2013).

While international research is robust, empirical evidence from Australia is still somewhat limited and based largely on small-scale studies. A longitudinal study of educational aspirations of prospective FiF students NSW by Patfield, Gore, and Weaver (2022) is a notable exception. In the Australian literature, the term First-in-Family is often aligned with students from low-income households, who may face financial challenges that impact their educational experiences; students from minority ethnic or racial backgrounds, who may encounter systemic biases and cultural differences within the academic environment; and mature students, defined as those aged 21 or over at the time of university entry, who often juggle additional responsibilities such as work or family commitments (O'Shea, 2007; O'Shea et al., 2014; O'Shea, 2020; Wong, 2018). However, given the relatively lower educational attainment of older generations, a majority of young people in Australia nowadays do not have university-educated parents, meaning that a large proportion of FiF students come from middle or even high-income households.

What should be fundamental to how we understand the diversity in FiF experience is the social justice implications in what they are accessing. As Bennett and Southgate (2014) note, widening participation in Australia remains a fragmented picture, where there are different conversations at play under the term widening participation. They highlight "differential levels of access and participation by the type of institution (first tier/elite versus

other) and degree (prestigious degrees such as medicine versus lower status/social mobility degrees such as nursing or teaching)" (p. 23; see also Stahl & McDonald, 2023). This aligns with Chesters's (2015) findings suggesting that Australian young people are more likely to graduate from an elite university if at least one parent has a university degree; similarly, high-status degrees such as medicine and law are associated with parental university qualifications. These findings highlight how, despite the efforts to widen participation, Australian universities remain socially stratified (Bunn et al., 2022).

In Stahl and McDonald's (2022; 2023) *First-in-Family Project*, a qualitative study, they saw how FiF students maintained a strong identification with the "caring professions" (see also O'Shea & Stone, 2014; Thomas & Hovdhaugen, 2023). The attraction to caring work by FiF participants of both genders could be due to the familiarity with these professions and the idea that these are "employable" professions, whereas they saw very few participants aspiring to careers more aligned with competitive fields such as business or law.

Existing studies suggest that FiF students, while diverse, share common motivations and behaviours and face significant barriers similar to other non-traditional students from socially and economically disadvantaged backgrounds (McDonald, 2024; Stahl et al., 2021). In surveying both quantitative and qualitative analyses of FiF students' experiences at university, researchers continue to find that the underlying mechanisms or the barriers that FiF students encounter are their lack of cultural capital in negotiating the rules and norms of university as well as a lack of social capital through limited social assets (Collier & Morgan, 2008; King et al., 2015; Luzeckyj et al., 2011; Luzeckyj et al., 2017; Noble & Davies, 2009; Patfield et al., 2022; Simmons, 2011), or a "mismatch" between their habitus and the new field of university (King et al., 2015; Stephens et al., 2012).

4.1.4 Common barriers experienced by First-in-Family students

There are many common barriers referenced in international research on FiF students. Many of these barriers align with the key barriers of non-traditional students attending university, many of which come from backgrounds where there may be little to no experience with universities.

FiF students differ significantly from non-FiF students in terms of educational aspirations. Drawing on a large-scale survey of government school students in NSW, Patfield, Gore, and Weaver (2022) identified a substantial gap in the proportion of students *a*spiring to attend university between prospective FiF and non-FiF students. The difference was apparent across all stages of schooling covered by the research, that is, Grades 3 to 12.

Family resources are another key factor. For many FiF students, families "are often unable to provide the same level of financial, informational, mentoring, and/or identity support as middle-class families provide to their sons and daughters" (Rubin, Evans, & McGuffog, 2019, p. 2). Where their peers with university-educated parents often benefit from their parents' insights and experiences with tertiary education, FiF students remain uncertain of how to navigate the space, which has significant implications for their sense of belonging (Ostrove & Long, 2007; Read, Archer, & Leathwood, 2003; Southgate et al., 2014). Parental educational and cultural capital has been shown to play a role in the choice of educational paths, for example, choosing a selective university and the decision to pursue graduate studies (Barsegyan & Maas, 2024).

Financial resources and attitudes to financial risk are another factor. Enrolling in university often involves a significant financial investment, typically justified by the prospect of future economic benefits. For FiF students from low-income backgrounds, this financial undertaking is compounded by additional challenges related to their personal circumstances and limited access to resources. Research indicates that economically disadvantaged students frequently exhibit a generational reluctance to assume the student debt required to finance higher education (Rauscher & Elliott III, 2014). This hesitancy not only constrains their ability to pursue university studies but may shape their educational pathways and the quality of their learning experiences (Montacute, 2018).

Differences in access to schools are another factor. As Chesters and Watson (2014) note, the predominant means of accessing higher education for young people is through the completion of secondary school through to Year 12 where their results "are converted to an Australian Tertiary Admission Rank (ATAR) which enables students to be ranked against their peers Australia-wide" (p. 1635). Historically, and in the present day, low SES students are disproportionately likely to receive low ATARs, which is directly linked to the schools they attend (Chester, 2019; Tranter, 2011) and their socio-economic status (Cardak & Ryan, 2009). Adding a layer of complexity to how we understand access and choice of fields of study, students from less privileged backgrounds tend to be concentrated in government schools, which tend to have fewer resources as well as narrower curriculum offerings (Teese, 2006). Furthermore, schools' resources affect the quality of career counselling offered to students (Chester, 2019; McDonald et al., 2024).

Additionally, substantial research suggests that the higher education sector has not yet adapted to accommodate the needs of FiF students. As a result, FiF students often struggle with a sense of belonging and inhabiting the student role (Collier & Morgan, 2008) with many framing their understanding of their experience as "entering an unknown arena that triggered a range of emotional responses" (King et al. 2015). O'Shea, May, Stone, and Delahunty (2024) write that for "learners from diverse backgrounds who are entering university, the risk of incompatible identity positions can be increased" (p. 13), which has implications for how they navigate their academic journeys. The phenomenon of identity dislocation, where FiF students feel out of place or disconnected within the university environment, is a significant barrier. This sense of alienation can be so intense that it leads to higher dropout rates, sometimes occurring as early as the first two months of enrolment (see Lehmann, 2009). The persistent feeling of not belonging highlights the social and cultural adjustments FiF students must make, which can be overwhelming and contribute to their decision to leave university prematurely.

4.1.5 Motivations of First-in-Family students

While FIF students face a series of distinct challenges in their higher education journeys, previous literature suggests some common attitudes among them. FiF students are often characterised by their strong motivation and resilience (Gore, Holmes, Smith, Lyell, et al., 2015; Stahl & McDonald, 2023). In terms of motivation and resilience, a common thread among FiF students is their pursuit of an improved quality of life, viewing higher education as integral to achieving their aspirations (King et al., 2015).

For example, a substantial body of literature around FIF students (for example, King et al., 2015; Luzeckyj et al., 2011; Spiegler & Bednarek, 2013) investigated how they managed to

overcome barriers to getting into universities (O'Shea, 2020), how they made decisions on the choices of university and program (Luzeckyj et al., 2011), their experiences at university (King et al., 2015), their post-graduation outcomes and employment mobility (O'Shea, 2019; O'Shea et al., 2021). King et al. (2015) note that this drive for a better future is a powerful motivator that helps FiF students overcome additional academic and social hurdles, underscoring their determination to succeed.

Many studies have shown FiF students to be primarily motivated by pragmatic, job-related reasons for attending university. Their main goals include improving their job prospects and acquiring specific job training, reflecting a practical approach to higher education that prioritises immediate employment outcomes (Gore, Holmes, Smith, Lyell et al., 2015; Gore, Holmes, Smith, Southgate et al., 2015; Krause et al., 2005). For example, it could be argued that their sense of pragmatism informs their chosen discipline of study. Research shows they are more frequently enrolled in courses such as education and nursing, which they have some familiarity with and see as having a high likelihood of employability (Stahl & McDonald, 2023). This differs substantially from non-FiF students who often pursue degrees in fields like engineering, law, medicine, and health sciences, which are typically associated with higher cut-off scores and are considered more prestigious with greater earning potential after graduation (Simmons, 2011). Moreover, these choices remain highly gendered (McDonald & Stahl, 2024; Stahl & McDonald, 2023).

Research in Australia from King et al. (2015) and others found that FiF students are more likely to enrol in university for directly job-related motives, which are "improving my job prospects" and "getting training for a specific job" (Krause et al., 2005, p. 12; Stahl & McDonald, 2022). This pattern was further validated by following studies (Luzeckyj et al., 2011; Luzeckyj et al., 2017).

Furthermore, much of the scholarship on FiF students highlights how they are very committed to becoming socially mobile. While they recognise their path may be unconventional and risky, this can often inspire them to be persistent (Delahunty & O'Shea, 2024). Additionally, research continues to document how FiF students exhibit a strict work ethic and essential time-management skills, which are crucial for balancing university commitments with family obligations. Research by Aries and Seider (2005) and Byrd and MacDonald (2005) emphasises how these students effectively manage their time and develop disciplined study habits, demonstrating their commitment and adaptability. Research by McCafferty, Tomlinson, and Kirby (2024) documented that FiF students recognised the value of leveraging their capitals through activities like work experience and extracurriculars. However, their readiness to acquire capitals varied and appeared to depend heavily on formative experiences. Importantly, they found that students were unable to fully develop their employability capital during their studies, something others might take for granted. King et al. (2015) assert that many FiF students display a high level of autonomy, arriving at university with significant motivational strengths drawn from challenging life experiences, which help them thrive academically.

In summary, there is rich theoretical and empirical literature linking social background to educational outcomes. Parental education has been identified as a key factor affecting educational trajectories. Studies focused on FiF students have provided ample evidence of their disadvantage in higher education. FiF students are characterised by their different educational aspirations (Patfield, Gore, & Weaver, 2022), practical motivations for higher education, identity management, and the significant barriers they face in adapting to

university life (Gore, Holmes, Smith, Lyell, et al., 2015; Gore, Holmes, Smith, Southgate, et al., 2015). The lower level of cultural capital as well as reduced availability of mentoring and guidance compared to non-FiF students are important factors hindering FiF students' success. Both in Australia and internationally, there is evidence that FiF students choose educational pathways differently from their more advantaged peers. However, in Australia, the evidence on FiF students comes mostly from small-scale, mostly qualitative studies. This study aims to close that research gap by drawing on whole-of-population data to provide robust evidence on the disadvantage in university access of individuals whose parents did not complete higher education. The next section presents the methodology.

5. Methods

Data and sample selection

This study leveraged a PLIDA data extract comprising, among others, the 2016 Census data linked to immigration records provided by the Australian Government Department of Home Affairs and HEIMS records provided by the Australian Government Department of Education. Census data included information about family structures, which allowed us to link children to their parents. We used Census data on individuals aged 16 or 17 years at the time of the Census, that is, born in 1999 or 2000, who lived with at least one parent, to capture their social background, including parental education. By bringing in immigration records, the sample was narrowed to individuals eligible for government-supported places at Australian universities, that is, Australian citizens and permanent residents. Higher education records were used to track their university enrolment status until 2019. The final analytic dataset comprised 443,609 individuals.

Measures

5.1.1 Outcome variables

Enrolment in higher education and field of study were the primary outcome variables in this study. Enrolment in higher education was defined as commencing any bachelor's level course by the age of 19. That means that enrolments are tracked until 2018 for the cohort born in 1999 and until 2019 for the cohort born in 2000. By the age of 19, 44% of the sample were enrolled in higher education.

Fields of study were grouped using the highest level in the Australian Standard Classification of Education, that is, broad fields of study (2-digit code). There were ten broad fields in higher education: natural and physical sciences, information technology, engineering and related technologies, architecture and building, agriculture, environmental and related studies, health, education, management and commerce, society and culture, and creative arts. However, the standard classification was modified to distinguish two narrow fields—law and medical studies—which stand out from their broad fields, society and culture and health, respectively. These are prestigious fields with strong ties to high-earning career paths. Table B-1: Descriptive statistics of all variables included in the analyses 10.Appendix B presents the distribution of fields of study.

Selective institutions might be particularly inaccessible to individuals from underrepresented backgrounds. To allow investigation of the effects of the FiF status on access to the most selective universities, the analysis included a variable capturing enrolment in the selective institutions. The most selective institutions were chosen using the average tertiary entrance score of commencing students. The top one-third of institutions were classified as selective. Among those who enrolled in higher education, 46% enrolled in a selective institution.

5.1.2 First-in-Family status

The primary variable of interest was FiF status. This indicator was based on information about parental education from the Census. It identified individuals whose parents did not have a higher education degree. Within the sample, 67% of individuals belonged to the FiF category, which is a much larger group than any of the equity groups described in the next section.

5.1.3 Equity group membership

Census data were also used to approximate five of the officially designated equity groups in the Australian higher education system. The constructed variables followed the official definitions used by the Australian Government as closely as possible (Tomaszewski et al., 2020; Zając et al., 2021):

- *Non-English Speaking Background (NESB)* individuals were foreign-born individuals who reported speaking a language other than English at home.
- *Low socio-economic status (SES)* individuals were those who lived in the 20% of areas with the lowest values in the Socio-Economic Indexes for Areas (SEIFA) Index of Education and Occupation.[6]
- Individuals from *regional and remote (RR)* areas were those who lived in areas other than major cities, based on the Australian Statistical Geography Standard (ASGS) Remoteness Structure.
- *Indigenous* individuals were those who identified themselves as being Aboriginal and/or Torres Strait Islander in the Census.
- Individuals *with disability* were identified using the Census measure capturing the need for assistance with core activities, that is, requiring assistance in their day-to-day lives due to a long-term health condition (lasting six months or more) or a disability (lasting six months or more).[7]

The Women in Non-Traditional Areas (WINTA) group is not covered in this report. Membership in this group requires enrolling in specific fields of education. As such, WINTA could not be included in the analyses as it focuses on the access stage. However, the sex variable from the Census[8] was included among the independent variables.

Nearly one in five individuals (18.0% of the sample) qualified as low SES, 29.0% as RR, 3.4% as NESB, 3.0% as having disability, and 3.9% as Indigenous.

[6] These data come from PLIDA address histories compiled from multiple sources, including individuals' interactions with the Australian public service, Medicare and the income-support system, as well as from Census records.

[7] For more information about the Census "Core activity need for assistance" variable see: https://www.abs.gov.au/census/guide-census-data/census-dictionary/2021/variables-topic/disability-and-carers/core-activity-need-assistance-assnp.

[8] For more information about the Census sex variable see: https://www.abs.gov.au/census/guide-census-data/census-dictionary/2021/variables-topic/population/sex-sexp

5.1.4 Control variables

The models included a set of variables that may confound the relationships between socially disadvantaged backgrounds and entry into higher education. The control variables captured other aspects of young people's circumstances that may hinder or facilitate their access to higher education: living in a single-parent household (yes/no), family income (four income bands and partial/no information category), and having a parent working in managerial or professional positions (yes/no). Table B-1 in 10.Appendix B presents descriptive statistics of all variables included in the analyses.

Analytic approach

The main analysis was divided into three main stages. The first aimed at investigating the overlaps between FiF status and current equity groups. The second involved analysing the impact on educational outcomes of FiF status and equity group membership without controlling for each other and other background characteristics. The third stage focused on modelling the relationship between educational outcomes, FiF status, and equity group membership. This stage of the analysis was divided into three substages, each consisting of three steps:

- First, a series of logistic regression models were used to investigate the associations between FiF status and the probability of enrolling in higher education:
  - The first model investigated the relationship between FiF status and enrolment in higher education without controlling for equity group membership. This yielded a "baseline" model against which to compare more complex models.
  - The second model investigated the same relationship but while controlling for equity group membership to investigate whether the effects of FiF status were independent of those of equity group membership.
  - The third model included interaction terms between FiF status and equity group membership to investigate moderation of the effects of FIF status by equity group membership. In other words, this model investigated if the effects of FiF status differed for individuals who did and did not belong to equity groups.
- Second, a series of logistic regression models were used to investigate the associations between FiF status and the probability of enrolling in a selective institution. The sample was restricted only to individuals who enrolled in higher education. The analysis followed the same pattern as the first substage: the "baseline" model investigated the effects of FiF status without controlling for equity group membership, the second model controlling for equity group membership, and the third model with interaction terms to investigate the moderating effects of equity group membership.
- Third, a series of multinomial logistic regression models investigating the relationship between FiF status and the field of study. Again, the sample was restricted only to individuals who enrolled in higher education. The analysis was conducted in a similar manner as before, that is, with three models (baseline, controlling for equity group membership, with interactions between FiF and equity group membership).

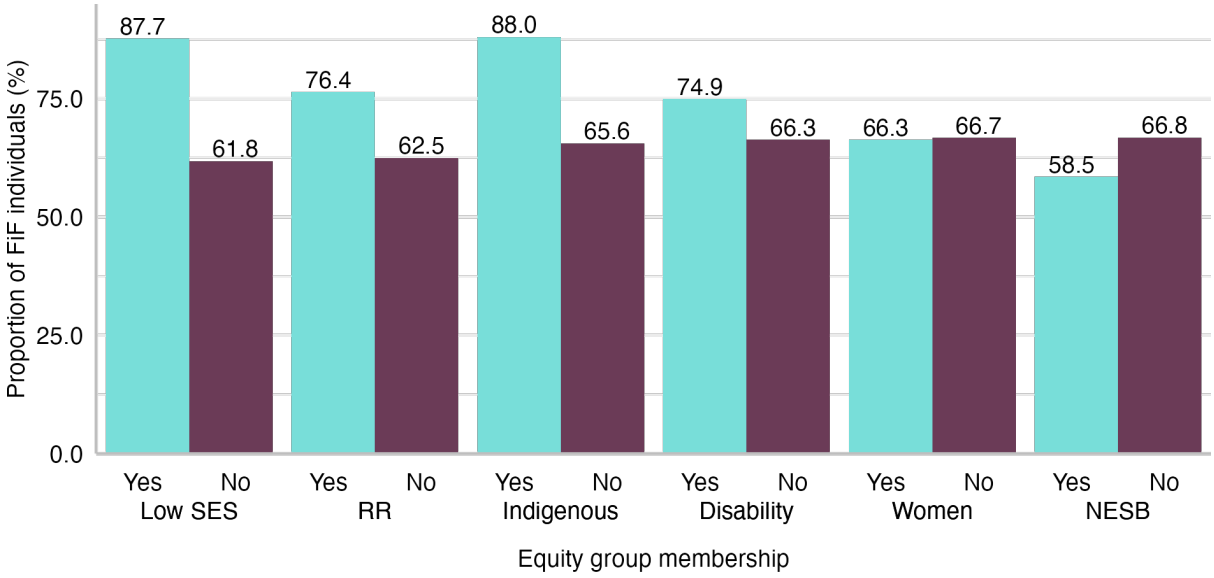
A more detailed exposition of the analytical approach, including the model specifications, is presented in Appendix A.

6. Findings

Overlaps between First-in-Family status and current equity groups

Figure 1 shows the proportion of individuals from different equity and non-equity groups identified as FiF. The share of men and women identified as FiF was almost the same—66.7% and 66.3%, respectively. Among the NESB group, the share of FiF individuals was smaller than among their English Speaking Background (ESB) peers, at 58.5% and 66.8%, respectively. This should not come as a surprise, given Australia's selective immigration process. At the same time, the FiF category was overrepresented among all other equity groups. The biggest difference between equity and non-equity individuals could be observed in the case of the low SES category. Among individuals from low SES areas, the share of those classified as FiF was 87.7% compared to 61.8% among those from other areas, resulting in a 26-percentage-point (pp) difference. The gap was 4 pp smaller for the Indigenous category, with 88.0% share of FiF among the Indigenous and 65.6% among non-Indigenous individuals. The differences were much smaller but still noticeable for the RR category (14 pp higher share of FiF among RR compared to people from major cities) and individuals with disability (9 pp higher share of FiF than among people without disability).

Figure 1: Proportion of individuals belonging to First-in-Family group, by equity-group membership



Notes: Data from PLIDA. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote.

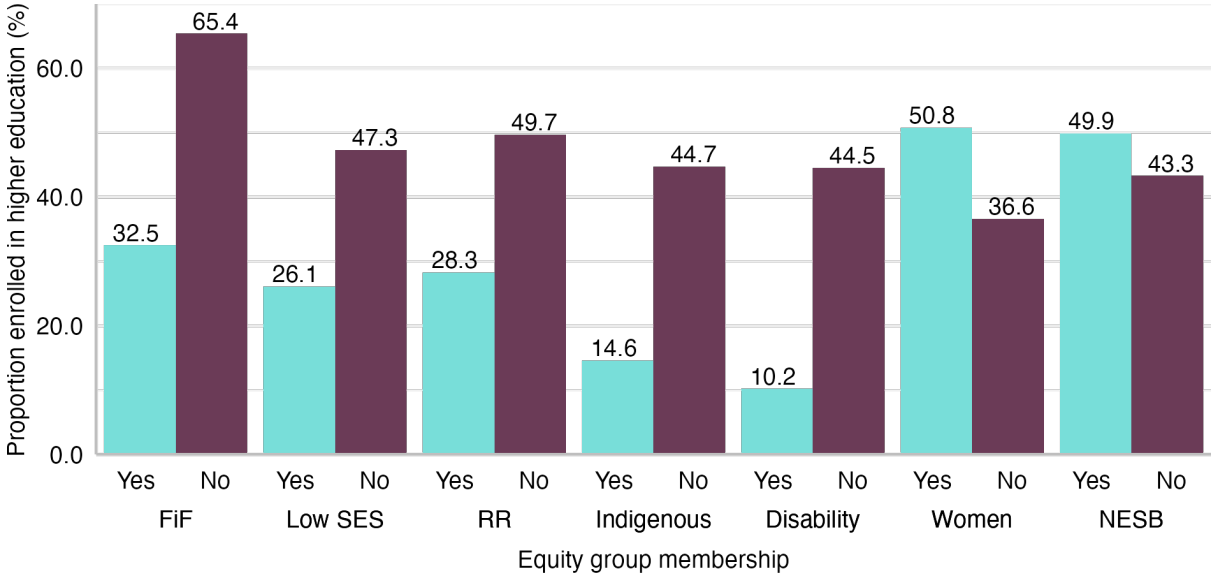
While the vast majority of Indigenous and low SES individuals belonged to the FiF category, it is worth noting that the FiF category was much larger. It means that a large proportion of FiF individuals did not come from a low SES background and were not Indigenous.

Access to higher education by First-in-Family status and current equity groups

6.1.1 Descriptive patterns

Figure 2 presents the proportion of individuals who enrolled in a bachelor's level course. Members of most of the studied groups accessed higher education at a much lower rate than their peers. Less than one-third of FiF individuals enrolled in a university course, which was less than half the rate for those with a university-educated parent. Large differences could also be observed for low SES (21.2 pp less than non-low SES), RR (21.4 pp less than major cities), and Indigenous individuals (30.1 pp less than non-Indigenous) as well as people with disability (34.3 pp less than people without disability). In contrast, women and NESB individuals were more likely to commence university studies than men and ESB individuals, respectively.

Figure 2: Proportion of individuals enrolling in higher education, by equity-group membership and First-in-Family status

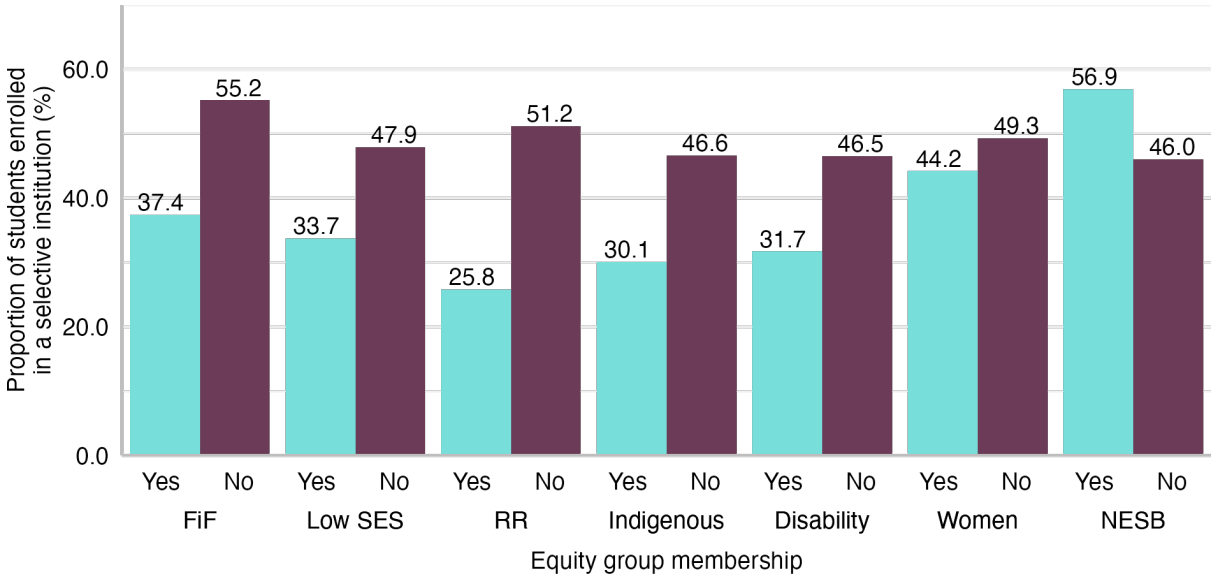


Notes: Data from PLIDA. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote.

The disadvantage was even greater once the selectivity of the universities was factored in. Young people from disadvantaged groups, who were already less likely to enrol in a bachelor's program, were also less likely to enter a selective institution. Figure 3 shows the proportion of those who commenced studies at a selective institution among those who entered higher education calculated for each studied group and their counterparts. Only 37% of FiF students studied at a selective institution, while the share among those with university-educated parents was 17.8 pp higher. Marked differences could be observed for most equity groups. In the case of RR students, the difference was even larger than among FiF students—25.4 pp. Interestingly, women, who were more likely than men to enter higher education, were less likely to enrol in a selective institution, albeit the difference was not as

large as in the case of other groups. In contrast to other groups, NESB individuals exhibited a 10.9 pp higher rate of enrolment in a selective institution than their ESB peers.

Figure 3: Proportion of students enrolling in a selective institution by equity-group membership and First-in-Family status



Notes: Data from PLIDA. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote.

Figure 4 presents the distribution of fields of study among those who enrolled in a bachelor's level course. It consists of seven panels, one per group. As in Figure 2 and Figure 3, the left column (light colour) represents individuals belonging to a given group, for example, FiF individuals, and the right column (dark colour) represents their counterparts.

FiF status and equity group membership were also associated with the field of study in which students enrolled, resulting in an underrepresentation of disadvantaged groups in some fields. However, there was no common pattern for all groups. However, the degree of under- or overrepresentation varied widely, and there were some exceptions. For example, the above FiF students were much less likely to enrol in medical studies than other students (0.3% compared to 1.3%, resulting in a relative risk of 0.23) and 70% more likely to choose education (8.2% compared to 4.8%, and relative risk = 1.7). In turn, in the case of Indigenous students, the underrepresentation was particularly large in the case of management and commerce (8.9% compared to 15.9%, relative risk = 0.56). At the same time, Indigenous students were more likely to study law than non-Indigenous students (2.8% compared to 2.0%, relative risk = 1.4).

Figure 4 shows, the NESB individuals were a distinct category, overrepresented in areas such as medical studies, science, technology, engineering, and mathematics (STEM) fields, and management and commerce, in which other groups tended to be underrepresented. Other groups were generally overrepresented in education and other health and underrepresented in architecture and building, management and commerce, engineering and related technologies, and natural and physical sciences.

Figure 4: Distribution of fields of study among those enrolled in a bachelor's level course by equity-group membership and First-in-Family status

Notes: Data from PLIDA. EG: equity group. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote. Data on the share of students with disability in some fields (for example, law) needed to be suppressed to meet ABS data clearance requirements.

Regression modelling

To verify the descriptive results, multivariable logistic and multinomial logistic regression models were used to examine the relationships between educational outcomes, FiF status, and equity-group membership while accounting for potential confounds, that is, parental occupation, family income, and number of parents in the household.

6.1.2 Enrolment in higher education

The first set of models (see Models I, II, and III in Table 1) aimed to verify the descriptive patterns shown in Figure 2. The models considered the effects of FiF status on university enrolments in three steps. The first model investigated the effects after introducing the control variables but without considering equity group membership. The second model investigated the effects then after introducing equity group membership. In other words, the model tested whether FiF status and equity group membership affected enrolment in higher education independently of each other. Finally, the last model explored the moderating effects of equity group membership on the relationship between FiF status and university enrolments, that is, whether FiF status affects the enrolment rates differently for members and non-members of equity groups.

Table 1: Selected model coefficients (odds ratios) from logistic regression models of enrolment in a bachelor's level course

Model number	**I**	**II**	**III**
Model title	**FiF**	**FiF+EG**	**FiFxEG**
FiF	0.33***	0.35***	0.33***
Low SES		0.67***	0.69***
RR		0.47***	0.47***
Indigenous		0.37***	0.37***
NESB		1.09***	1.13***
Women		1.95***	1.78***
Disability		0.15***	0.13***
FiF # Low SES			0.96
FiF # RR			0.99
FiF # Indigenous			0.99
FiF # NESB			0.95
FiF # Women			1.15***
FiF # Disability			1.39***
Controls	Yes	Yes	Yes
Observations	443609	443609	443609
Pseudo R^2	0.085	0.138	0.138

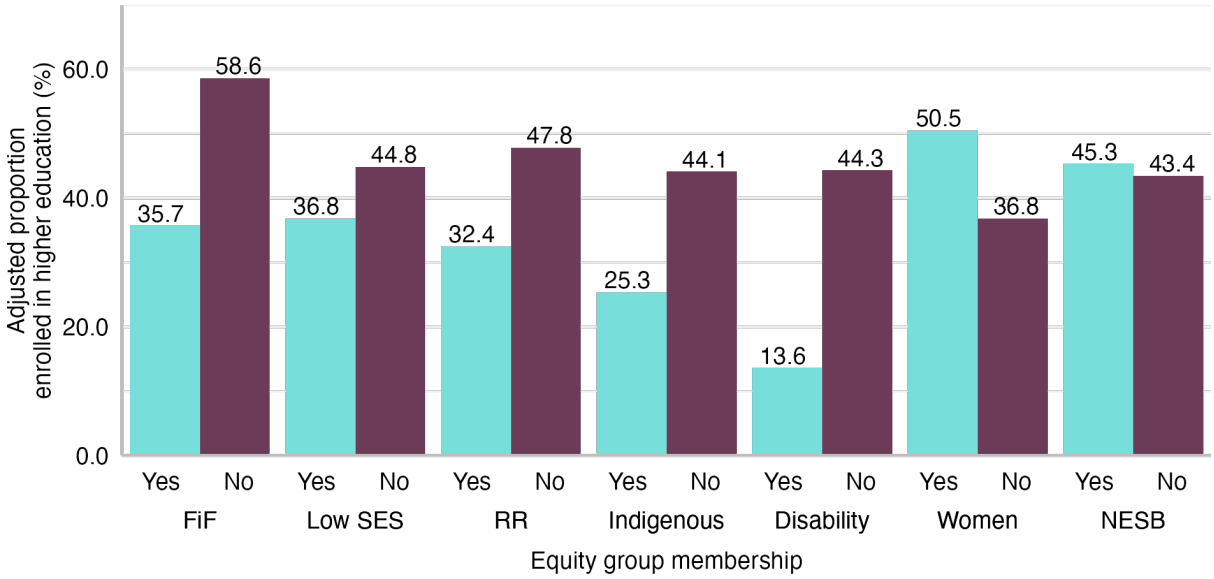
Notes: Data from PLIDA. EG: equity group. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote. Full sets of model results are available in Table B-2 in Appendix B. Statistical significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

The results from Model I suggest that FiF status had a significant effect on the chances of university enrolment even after controlling for family income, parental occupation, and household composition. The odds ratio (OR) of 0.33 was statistically significant at the 0.001 level.[9] The coefficient did not change substantially after introducing variables capturing equity group membership in Model II. Furthermore, the results from Model II provide evidence of the associations between membership in the current equity groups and lower rates of enrolment in higher education net of the effects of FiF status.

Marginal predictions were used to better compare the magnitude of the effects of equity group membership and FiF status on university enrolments. Figure 5 visualises the differences in adjusted enrolment rates (predicted probabilities/proportions of enrolled individuals) between the equity groups as well as FiF status. As expected, the magnitude of differences between students from disadvantaged backgrounds and their more advantaged counterparts shrunk compared to the unadjusted results. However, the gaps in enrolment rates remained large, suggesting that the effects of various social background characteristics are independent of each other. FiF status was associated with one of the largest gaps. The adjusted enrolment rate among the FiF category was 35.7%, which was over 23.0 pp less than among those with university-educated parents. Only for people with disability was the gap in adjusted proportions larger—30.7 pp. The gaps for Indigenous young people, those from RR and low SES areas, were smaller—18.8 pp, 15.4 pp, and 8.1 pp, respectively.

Furthermore, the model results show that after introducing various controls, the advantage in enrolment rates of NESB individuals was reduced to 1.8 pp. However, women with an adjusted enrolment rate of 50.5% retained their advantage over men whose adjusted enrolment rate stood at 36.8%.

Figure 5: Adjusted proportion of individuals enrolling in higher education by equity-group membership and First-in-Family status

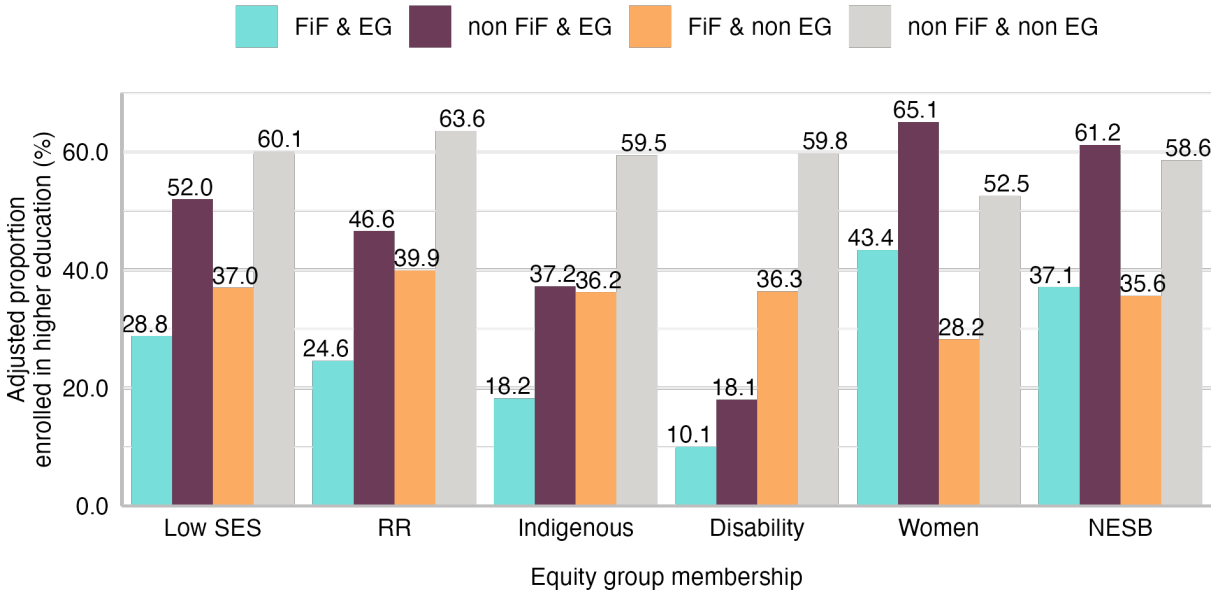


Notes: Data from PLIDA. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote. Predicted probabilities based on the model results presented in column II of Table B-2 in Appendix B

[9] See Appendix A for information about the interpretation of odds ratios.

The third model, presented in the last column in Table 1, included interaction terms between FiF status and equity group membership, which allowed us to investigate whether the effects of the FiF status on the enrolment rate varied between individuals belonging to equity groups and their counterparts. Figure 6 presents the predictions based on the model results calculated for categories resulting from intersecting FiF status and equity group membership. It shows that FiF status was always associated with lower chances of enrolling in higher education. As a result, individuals who belonged to a disadvantaged group and did not have university-educated parents were least likely to commence university studies. For example, the adjusted or predicted enrolment rate for FiF individuals from low SES areas was 28.8% compared to 52% for those from low SES areas who were not FiF, 37.0% for those who were FiF but lived in higher SES areas, and 60.1% for those who were not FiF and did not live in a low SES area.

Figure 6: Adjusted proportion of individuals enrolling in higher education by interacted equity-group membership and First-in-Family status



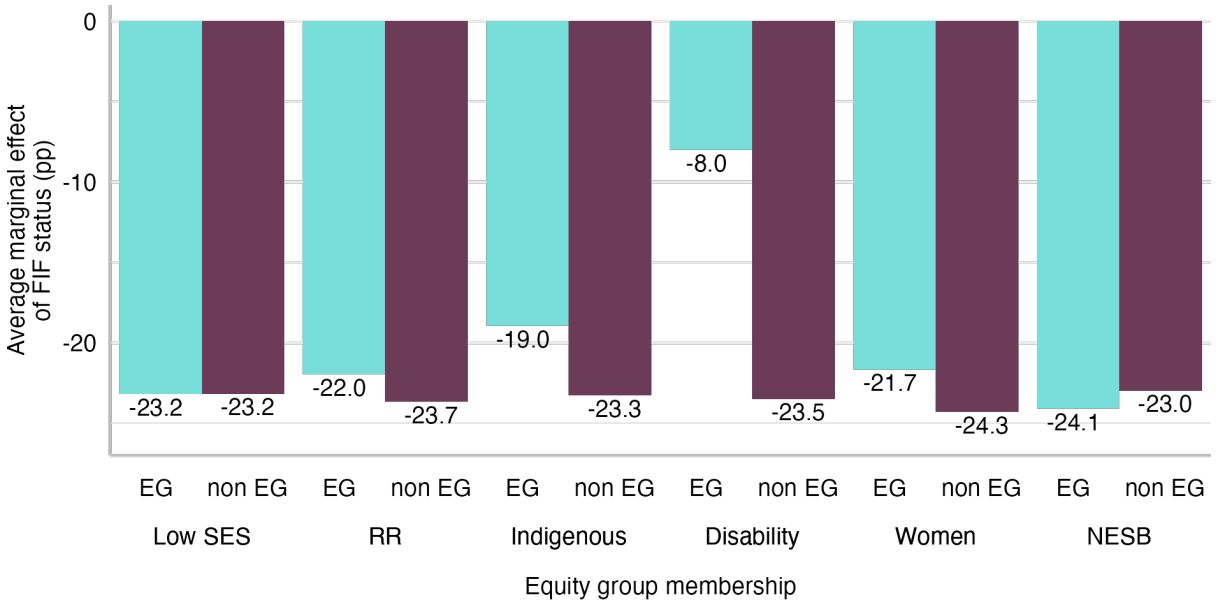
Notes: Data from PLIDA. EG: equity group. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote. Predicted probabilities based on the model results presented in column III in Table B-2 in Appendix B.

To facilitate the analysis of the moderating effects, average marginal effects (AMEs) were estimated using the results from the third model. Figure 7 represents the AMEs, which are the differences in enrolment rates associated with FiF status calculated for those who belong to an equity group and their non-equity group counterparts. For example, the first bar shows that FiF individuals from low SES areas had a 23.2 pp lower enrolment rate than non-FiF individuals from low SES areas. The second bar shows that the average change in the chance of enrolling in higher education associated with being FiF was also -23.2 pp. This suggests that there was no moderation of the effect of FiF status by low SES background. NESB individuals are the other group for which moderation effects are small and statistically non-significant.

There was some evidence of moderation in the case of RR, Indigenous background, and gender. However, the differences in AME, while statistically significant, were not very large in magnitude, up to -4.3 pp, compared to the actual AMEs. Disability was the only exception.

Among people with disability, FiF status had a much smaller effect on predicted enrolment rates than among people without disability.

Figure 7: Average marginal effects of First-in-Family status on enrolments in higher education by equity group membership



Notes: Data from PLIDA. EG: equity group. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote. Predicted probabilities based on the model results presented in column III in Table B-2 in Appendix B.

6.1.3 Enrolment in selective institutions

The next set of models, results from which are presented in Table 2, investigated how social background characteristics were related to enrolments in the most selective institutions. The steps in the analysis were like the analysis of university enrolments; however, the sample was restricted to those who enrolled in higher education. This allowed us to study the relationships separately from the effects that social background had on university enrolments in general. Results from Model IV suggest that FiF status was again significantly and strongly associated with the outcome variable with OR at 0.51 ($p<0.001$). As in the case of university enrolments, the effect of FiF status did not diminish by much after equity group membership was introduced to the model (Model V). Again, despite the overlaps between FiF and membership in some equity groups, all variables are significantly associated with the outcome variable.

Table 2: Selected model coefficients (odds ratios) from logistic regression models of enrolment in a selective institution

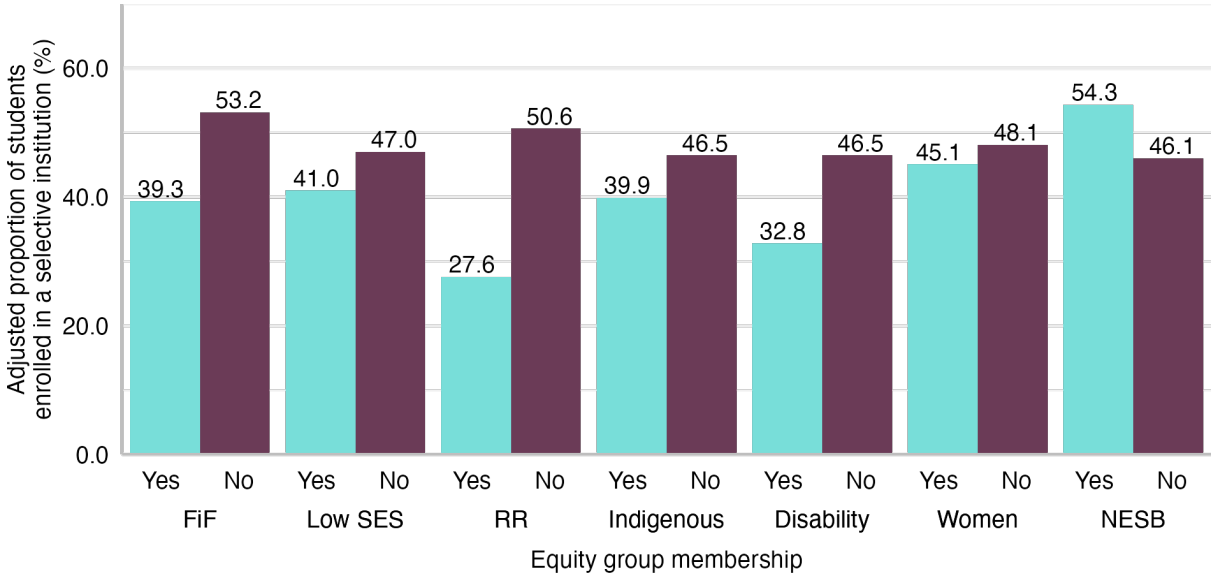
Model number	**IV**	**V**	**VI**
Model title	**FiF**	**FiF+EG**	**FiFxEG**
FiF	0.51***	0.56***	0.56***
Low SES		0.77***	0.66***
RR		0.36***	0.33***
Indigenous		0.75***	0.66***
NESB		1.43***	1.32***
Women		0.88***	0.92***
Disability		0.54***	0.50***
FiF # Low SES			1.24***
FiF # RR			1.18***
FiF # Indigenous			1.21*
FiF # NESB			1.19***
FiF # Women			0.90***
FiF # Disability			1.17
Controls	Yes	Yes	Yes
Observations	192995	192995	192995
Pseudo R2	0.027	0.056	0.057

Notes: Data from PLIDA. EG: equity group. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote. Full sets of model results are available in Table B-3 in Appendix B. Statistical significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Again, the results from the models were used to calculate predicted or adjusted proportions of students enrolled in a selective institution. Figure 8 presents such adjusted results based on Model V, which includes variables capturing equity group membership. It shows that FiF students, with a proportion of 39.3%, were markedly less likely to study at a selective institution than their counterparts with university-educated parents, of whom over half studied at a selective institution. The difference between the estimated proportions was 13.8 pp.

NESB students were the only group included in this study that had a higher proportion of students enrolled in selective institutions than their non-equity group counterparts—54.3% compared to 46.1%. Belonging to all other groups was associated with a lower chance of enrolling in a selective institution. The gap varied from a relatively small difference between women and men (3.0 pp) to a 23.0 pp difference between RR students and their peers from major cities.

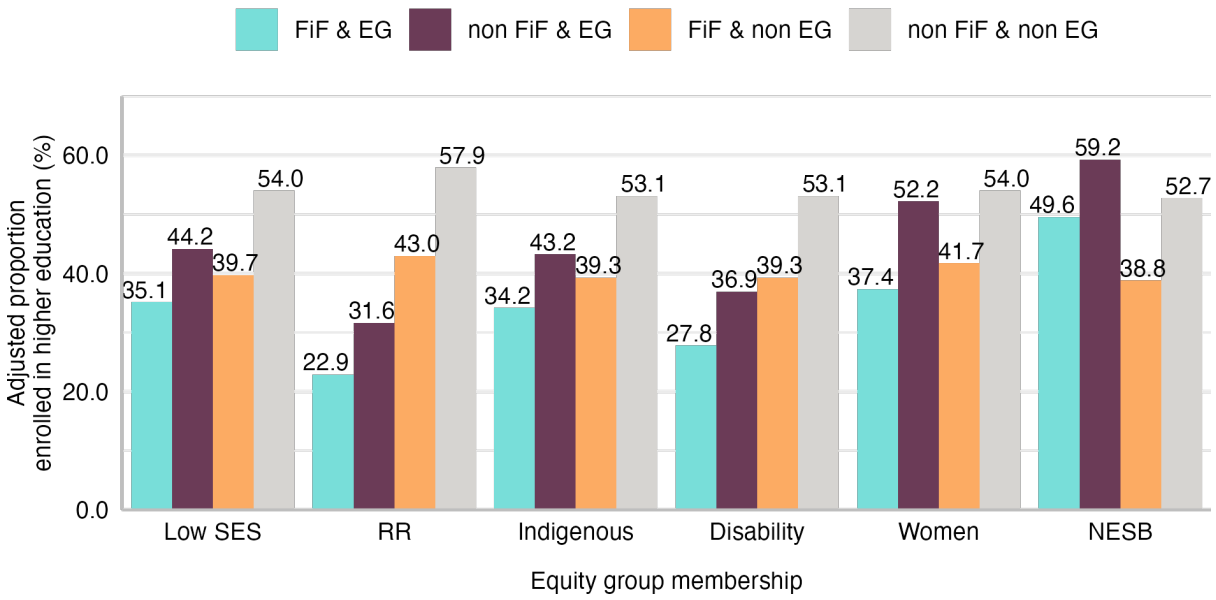
Figure 8: Adjusted proportion of students enrolled in a selective institution by equity group membership and First-in-Family status



Notes: Data from PLIDA. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote. Predicted probabilities based on the model results presented in Column II of Table B-3 in Appendix B.

Figure 9 presents the predicted proportions of students enrolled in a selective institution based on the results from Model VI, which includes interaction terms between FiF status and equity group membership. Similarly to enrolment in any higher education institution, the association between FiF status and lower chances of enrolment in a selective institution could be observed across all groups. This led to the lowest adjusted proportions of students enrolled in selective institutions among those who belonged to a disadvantaged group and did not have university-educated parents. For example, only 22.9% of students who were FiF and lived in RR areas started studies at selective institutions, compared to 31.6% among people from RR areas who were not FiF. Similarly, among students coming from major cities and who were FiF, 43.0% studied at a selective institution, while the share among those who were not FiF was 57.9%.

Figure 9: Adjusted proportion of students enrolled in a selective institution by interacted equity group membership and First-in-Family status

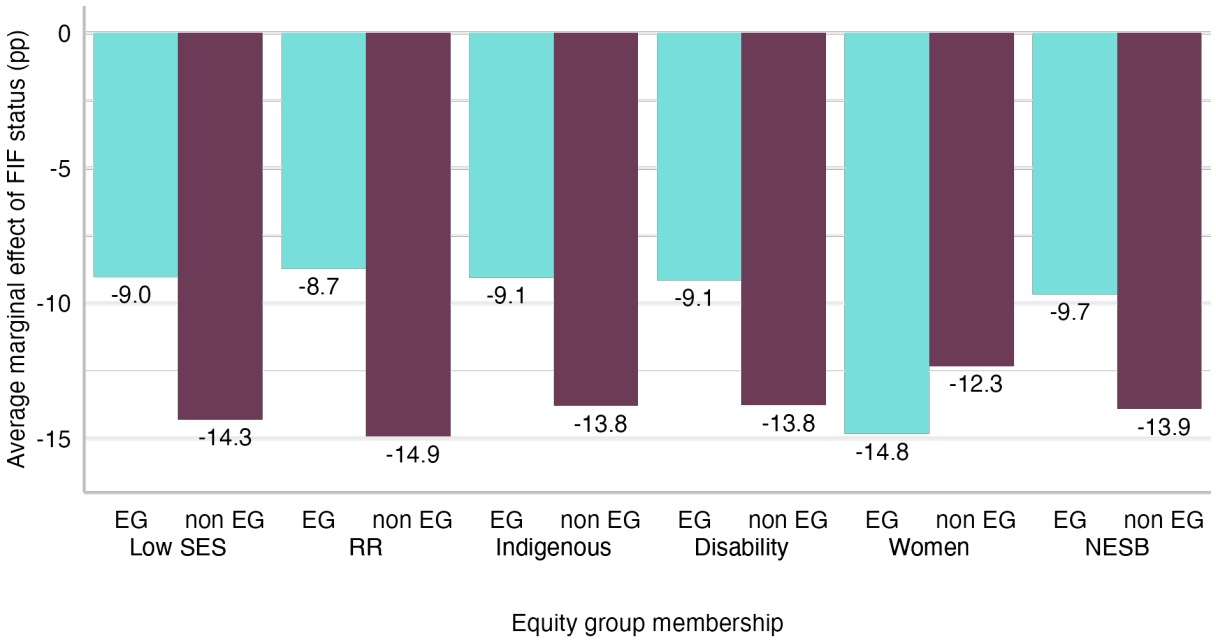


Notes: Data from PLIDA. EG: equity group. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote. Predicted probabilities based on the model results presented in Column III of Table B-3 in Appendix B.

Figure 10 presents the AMEs calculated using the results from Model VI that illustrate the differences in the magnitude of the effect of FiF status on enrolments in selective institutions across various groups. The results were similar for students from low SES and RR areas, those of Indigenous background, and those with disability. For those groups, the effects of FiF status were quite similar, with AMEs ranging from -8.7 pp to -9.1 pp. Furthermore, those effects were smaller than for their peers from more privileged backgrounds.

The results were different for women and NESB students. Women were the only group that was less likely to enrol in selective institutions and had a higher AME for FiF status than their counterparts. However, the moderating effect was not particularly strong, with the AME among women at -14.8 pp and -12.3 pp for men. In the case of NESB, the effects of FiF status were more pronounced among non-NESB students, that is, the group that was less likely to enter a selective institution.

Figure 10: Average marginal effects of First-in-Family status on enrolments in a selective institution by equity group membership



Notes: Data from PLIDA. EG: equity group. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote. Predicted probabilities based on the model results presented in Column III of Table B-3 in Appendix B.

6.1.4 Field of study choice

In the next step of the analysis, the effects of FiF status on field of study choices were explored using multinomial logistic regression models. Table 3 compares the coefficients (relative risk ratios)[10] for FiF status from Model VII, which included FiF status and control variables, and Model VIII, which also included variables capturing equity group membership. Full sets of results, including the coefficients for the equity group membership variables, are available in Table B-4 and Table B-5 in Appendix B. Comparing the results from both models suggests that introducing variables capturing equity group membership reduced some of the effects of FIF status (relative risk ratios were closer to 1) and resulted in some turning statistically nonsignificant (for example, architecture & building and management & commerce). However, the overall patterns were similar. Results from Model VII show that FiF status was associated with the likelihood of studying some fields of study. For example, the RR for education in Model VII stood at 1.70 ($p < 0.001$) and for medical studies at 0.28 ($p < 0.001$). The relative risk ratios for those fields from Model VIII were similar, 1.59 ($p < 0.001$) and 0.28 ($p < 0.001$).

[10] See Appendix A for information about the interpretation of relative risk ratios.

Table 3: Selected model coefficients (relative risk ratios) from multinomial logistic regression models of field of study

	Model	
Outcome (ref. Society & Culture)	**VII**	**VIII**
Natural & Physical Sciences	0.75***	0.79***
Information Technology	0.84***	0.93*
Engineering & Related Technology	0.69***	0.76***
Architecture & Building	0.93*	1.01
Agriculture Environmental & Rel. Studies	1.24***	1.13*
Other Health	1.20***	1.15***
Education	1.70***	1.59***
Management & Commerce	0.94***	1.00
Creative Arts	0.98	0.97
Medical Studies	0.28***	0.28***
Law	0.80***	0.80***
Equity group membership	No	Yes
Other controls	Yes	Yes

Notes: Data from PLIDA. Full sets of model results are available in Table B-4 and Table B-5 in Appendix B Statistical significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

To better illustrate the relationship between field of study and social background, adjusted or predicted probabilities were estimated using the results from Model VIII. Figure 11 presents the predicted probabilities of entering fields of study by FiF students, members of the equity groups, and their counterparts. Overall, the model-based predictions did not differ significantly from the unadjusted results presented in Section 6.1.1.

The first panel from the top shows the results for FiF students and their counterparts with university-educated parents. For many of the fields, the difference in enrolments between FiF and non-FiF students was very small. However, FiF students were more likely than their peers to choose other health and education, with the adjusted proportion at 18.4% compared to 16.0% and 7.9% compared to 5.0%. At the same time, FiF students were underrepresented in fields such as natural and physical sciences, engineering and related technologies, and medical studies. In the last case, the difference between predicted probabilities is small, only 0.9 pp, but the share of FiF students was nearly four times smaller than among non-FiF students. The results showed that while FiF students might be underrepresented among students of some fields opening lucrative career paths, they were not concentrated in fields leading to below-average earnings.

Coming from a low SES area seemed to have a smaller effect than FiF status on the field of study in which students enrolled. Students from low SES areas were also more likely than their peers to study education and other health subjects, but the differences were much smaller, 0.6 pp and 1.2 pp. The differences between equity group members and other students were much more pronounced in the case of other equity groups, but the patterns varied a lot.

Students from RR areas were similar to FiF students in their overrepresentation in education and programs belonging to the other health category, as well as underrepresentation in natural and physical sciences. For example, the adjusted proportion of those studying other

health subjects was 21.7% among the RR students compared to 16.1% among their counterparts from major cities. However, there were some noticeable differences compared to the FiF students. RR students were underrepresented in management and commerce (11.9% compared to 16.7% among students from major cities) and society and culture (17.1% compared to 20.6% among students from major cities). Furthermore, they were more likely to choose studies in agriculture, environmental and related studies, and medical studies. While the differences expressed in pp were not large, as both fields were not chosen by many students, the ratios of proportions were large. RR students were nearly three times more likely to study agriculture and nearly two times more likely to study medicine than students from major cities.

Indigenous students were most underrepresented in management and commerce. The adjusted proportion of Indigenous students enrolled in a study program in this field was only 10.5%, while the rate among non-Indigenous students stood at 15.9%. Indigenous students were also somewhat less likely to study STEM disciplines than their non-Indigenous counterparts. At the same time, they were overrepresented in the academic disciplines of humanities, arts, and social sciences, including education (8.6% compared to 6.4% among non-Indigenous students) and law (2.9% compared to 2.0% among non-Indigenous students).

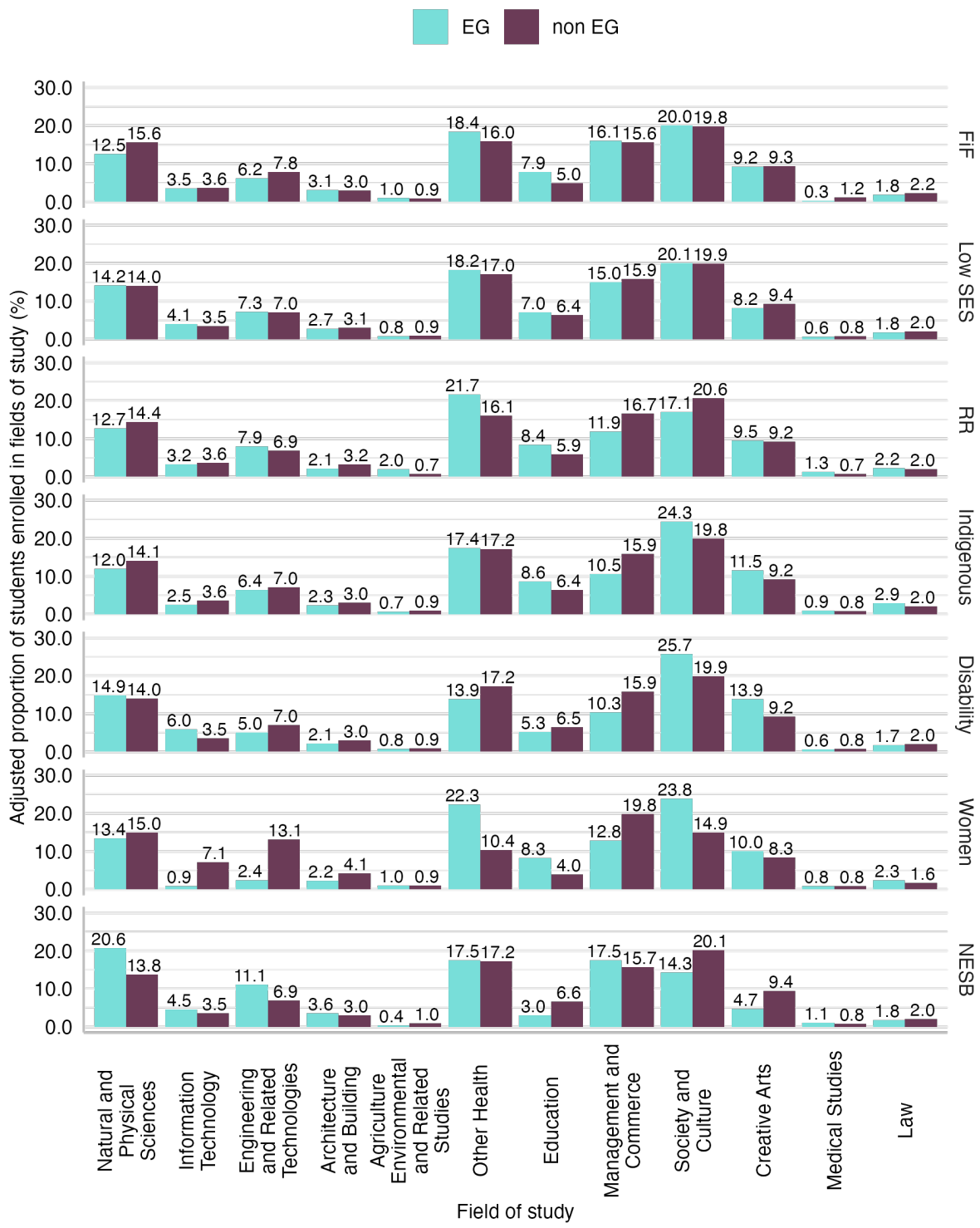
Students with disability were also more likely than their less disadvantaged counterparts to choose society and culture or creative arts programs. After adjusting the proportions, over a quarter of students with disability chose the former field compared to less than one in five among students without disability. In the case of creative arts, the adjusted proportions among students with and without disability stood at 13.9% and 9.2%, respectively. Students with disability were also overrepresented in programs in information technology, with the predicted proportion at 6.0% compared to 3.5% among students without disability. At the same time, students with disability were less likely than students without disability to choose most other fields. The gap was particularly noticeable in the case of management and commerce, for which the adjusted proportions stood at 10.3% for students with disability and 15.9% for students without disability.

Differences between men and women were much larger than for other groups. Men were more likely to study STEM subjects, particularly engineering and related technologies and information technologies, as well as management and commerce. For example, the adjusted proportion of female students enrolled in information technology programs was only 0.9%, while for men the rate was 7.1%. Similarly, the adjusted proportion of engineering students among women was 2.4% compared to 13.1% among men. At the same time, women were markedly more likely to choose other health, education, and society and culture. The adjusted proportion of other health students among women was 22.3%, which was more than twice the value for men (10.4%). The adjusted proportion of women in education (8.3%) was also over double the rate among men (4.0%). In the case of society and culture, the adjusted proportions for women and men were 23.8% and 14.9%, respectively.

The NESB students stood out as they tended to be overrepresented in fields in which previous groups were less likely to choose than their more privileged peers and underrepresented in fields in which members of other analysed groups were less likely to enrol. The former was best illustrated by natural and physical sciences with adjusted enrolment rates for NESB students at 20.6% and 11.1% compared to 13.8% and 6.9%, respectively, among ESB students. The latter could be seen in adjusted proportions of

students in society and culture (14.3% among NESB compared to 20.1% among ESB) and creative arts (4.7% among NESB compared to 9.4% among ESB).

Figure 11: Adjusted proportions of students enrolled in fields of study by First-in-Family status and equity group membership



Notes: Data from PLIDA. EG: equity group. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote. Predicted probabilities based on the model results presented in Table B-5 in Appendix B.

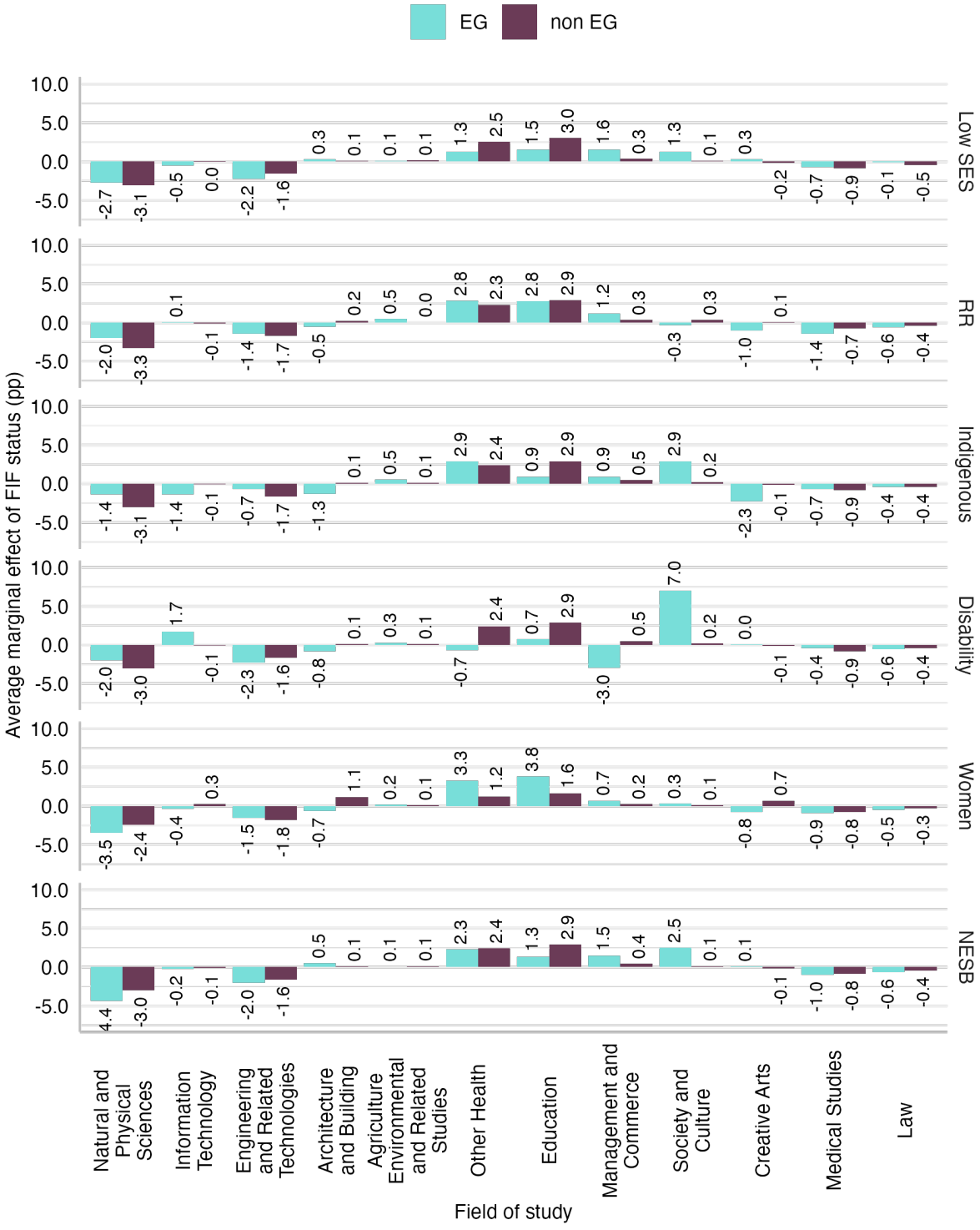
In the next step, the moderating effects of equity group membership were investigated. The results from Model IX (available in Table B-6 in Appendix B) were used to calculate predicted probabilities and average marginal effects for combinations of FiF status and equity group membership—for example, FiF students who also came from low SES areas and FiF students who did not come from low SES areas. Figure B-1 in Appendix B presents the predicted probabilities. The AMEs are shown below in Figure 12. The bars represent how much FiF status increased or decreased the average predicted probability of enrolling in a given field for members and non-members of the equity group listed on the right-hand side of the plot. For example, the first two values from the top left show the drop in predicted proportion associated with FiF status among low SES students (-2.7 pp) and non-low SES students (-3.1 pp), suggesting that the effect of FiF status is slightly larger among students who did not come from low SES backgrounds.

The moderating effects of Indigenous status, disability, NESB, and low SES background were not particularly strong. There were some exceptions—for example, education in the case of NESB and low SES students or society and culture in the case of students with disability. However, most of the time, the effects of FiF status did not differ significantly between equity group members and their non-equity group counterparts. The differences are small and mostly statistically non-significant.

The results looked different for RR and female students. In the case of RR students, the differences in AMEs were statistically significant for architecture and building, agriculture, environmental and related studies, natural and physical sciences, management and commerce, creative arts, and medical studies. FiF status had a negative effect on enrolments in architecture and building among RR students, who were already underrepresented, and positive among others. In the case of agriculture, environmental and related studies, the effect of FiF status was positive among RR, who were already overrepresented, and close to zero for others. In the case of other fields, FiF status had a stronger negative effect on groups that were overrepresented, for example, non-RR students' enrolments in natural and physical sciences, or a stronger positive effect among underrepresented groups.

In the case of female students, the differences in AMEs were statistically significant for six fields of study. The effects of FiF status on enrolments were more negative among women than men in the case of natural and physical sciences, information technology, and architecture and building, fields in which women were underrepresented. At the same, FiF status had a stronger positive effect among female than male students on proportions studying education and other health subjects, fields in which female students were overrepresented. In contrast, for enrolments in creative arts, FiF status had a negative effect among women, who were already underrepresented, and positive among men.

Figure 12: Average marginal effects of First-in-Family status on field of study by equity group membership



Notes: Data from PLIDA. EG: equity group. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote. Predicted probabilities based on the model results presented in Table B-6 in Appendix B.

Additional analyses explored the effects of FiF status and equity group membership on fields of study chosen at selective institutions. The distribution of fields among students of selective institutions was somewhat different from that among the student population in general. While there were some differences in the patterns of over and underrepresentation of students from various disadvantaged backgrounds compared to the results presented above, the overall conclusions were similar. The tables and figures with the results are available in Appendix C.

7. Discussion

This study presents robust empirical evidence on the educational disadvantage of young people whose parents did not attend university and confirms the relevance of FiF status to Australia's higher education equity framework. The analysis utilised novel and powerful linked administrative data to shed light on how FiF status impacts university enrolments.

The first part of the analysis focused on the link between equity groups and FiF status. It documented significant overlaps between FiF status and four equity groups: people from low SES backgrounds, people from RR areas, Indigenous people, and people with disability. The overlaps were particularly large for Indigenous and low SES, nearly 90% of whom belonged to the FiF category. However, over two-thirds of the sample were classified as FiF, compared to 18.0% who qualified as low SES and 3.9% as Indigenous, which meant that the vast majority of FiF individuals were not low SES or Indigenous.

The remainder of the analysis explored the relationships between FiF status, equity group membership, and access to higher education. Specifically, it investigated how FiF status affected enrolments in higher education in general, enrolments in selective institutions, and enrolments in specific fields of study. For each outcome, three regression models were fitted to evaluate the statistical effects of FiF status with and without controlling for equity group membership, as well as to assess if the effects of FiF status were moderated by equity group membership.

The first stage of the analysis revealed a wide gap associated with FiF status in chances of enrolling in a bachelor's degree. The adjusted enrolment rate among the FiF category was 35.7% compared to 58.6% among those with university-educated parents. These results were based on a model that controlled for equity-group membership, meaning that these effects were net of the effects of equity groups. Furthermore, the same model allowed the effect of FiF status to be compared to those of equity group membership. Only people with disability were more disadvantaged compared to their peers. The gap in adjusted proportions stood at 30.7 pp for that group. The results are consistent with theoretical perspectives and empirical studies linking social background and educational outcomes (for example, Boudon, 1974; Bourdieu, 1973; Bourne et al., 2018; Czarnecki, 2018; Erikson, 2019; Jackson, 2013) and especially those pointing to the significant role of parental education (for example, Blossfeld, 2020; Buis, 2013; Chesters & Watson, 2013; Erola et al., 2016).

The next stage of the analysis looked only at those who enrolled in higher education and explored the effects of FiF status on entering a selective institution. This analysis provided evidence that FiF individuals, who were already less likely to enter higher education, were also less likely to secure a spot at a first-tier university. While over half of non-FiF students studied at a selective institution, the share among FiF students was only 39.3%. The results echo observations of equity scholars highlighting differences in access and participation by the type of institution (Bennett & Southgate, 2014; Stahl & McDonald, 2022). This is important because it means elite spaces remain exclusive, where the critical mass of the student body comes from professional-class backgrounds "with intimate knowledge of the educational system, where the academic language of the home has prepared them for their

future educational pathways" (Thomsen, Munk, Eiberg-Madsen, & Hansen, 2011, pp. 469–470; see Smith et al. 2023)

The final stage of the analysis focused on the fields of study. The results from multinomial logistic regression models suggest that a large proportion of fields were equally likely to be studied by FiF students and their counterparts with university-educated parents. However, FiF students were significantly more likely than their peers to enrol in programs in education and other health (that is, health programs other than medical studies) and less likely than their peers to study natural and physical sciences, engineering and related technologies, and medical studies. That means that FiF students, while underrepresented in the fields that are often associated with high earning potential, were not overrepresented in the fields with the lowest earning potential. These results echo the findings of earlier studies reporting the underrepresentation of FiF students in more fields (Bennett & Southgate, 2014; Stahl & McDonald, 2022). Previous studies have reported FiF students' practical approach to higher education prioritising employment outcomes (Gore, Holmes, Smith, Lyell, et al., 2015; Gore, Holmes, Smith, Southgate, et al., 2015; Krause et al., 2005) as well as their strong identification with the "caring professions" (O'Shea & Stone, 2014; Stahl and McDonald's, 2022; 2023; Thomas & Hovdhaugen, 2023), which could explain the higher proportion of FiF students choosing education and programs in health other than medicine.

While the analysis focused primarily on FiF status, investigating how FiF status effects changed depending on whether equity group membership was taken into account was a key element of this study. Importantly, the effect of FiF status on university enrolment was largely independent of equity group membership. Adjusting the models for equity group membership did not meaningfully reduce the effects of FiF status. For example, the OR for FiF status in the model predicting university enrolment changed from 0.33 to 0.35 after introducing variables capturing equity group membership to the model.

Furthermore, the results showed that despite the significant overlaps between FiF status and some equity groups, the latter were important predictors of university enrolment. They had an effect on enrolments that was independent of FiF status. This is particularly relevant in the case of the area-based low SES indicator, which has attracted considerable attention. Soon after the six equity groups were defined, Western and collaborators (McMillan & Western, 2000; Western et al., 1998) argued that individual-level information on parental education and occupation serves as better indicators of low SES than area-based measures. In the following years, the area-based measure of low SES has received substantial criticism. For instance, an area-level measure that captures the average characteristics of households does not necessarily reflect individual circumstances, leading to measurement error (Bok, 2010; James et al., 2008). Furthermore, residential address information supplied at the time of higher education study may not accurately reflect where a student grew up (Dockery et al., 2016) and the 25% (quartile) cut-off is not granular enough to identify different levels of disadvantage (Harvey et al., 2016). By contrast, the results here strengthen the existing body of evidence suggesting that both the area-based indicator and parental education had a significant and independent impact on young people's likelihood to access higher education (Tomaszewski et al., 2018; Zajac & Tomaszewski, 2023).

Lastly, the analysis included models with interaction terms to examine whether the effects of FIF status differed between equity group members and others. The results differed depending on the outcome variable. There was no evidence of strong moderating effects of equity group membership on the relationship between FiF status and university enrolments,

with the exception of students with disability. In the case of enrolments in selective institutions, FiF status had a smaller effect among students from low SES, students from RR areas, Indigenous students, and students with disability than among their more privileged peers. The effects of FIF on the probability of studying most fields of study did not differ significantly between equity group and non-equity group students, with the exception of women. FiF status seems to exacerbate female disadvantage in some STEM fields and the overrepresentation of women in education and other health programs.

Notwithstanding the importance and robustness of the current findings, some study limitations must be acknowledged. First, although PLIDA includes information on family relationships that allowed children to be linked to their parents, Census data could not be used to reliably link individuals from the studied cohorts with their older siblings. Older siblings were likely to have left the household and be recorded as members of different households. While siblings are unlikely to provide financial support, they might be role models and provide assistance with navigating the higher education system.

In addition, the study was targeted in scope. It focused on just one stage of the student life course. To further understand the impact of FiF status, future research could examine its impact on later stages of the student life course, especially on the university-to-work transitions and longer-term labour market outcomes. PLIDA, with its large scale and expanding observation window, is well-suited for such research.

Finally, the study does not explore the mechanisms through which FiF status affects whether young people enter higher education, what type of institution they enrol in, and which field they study. The existing literature suggests a number of ways in which FiF status might affect educational pathways, including poorer school performance, limited financial resources, lack of support navigating the university system, or, more broadly, lack of cultural and social capital (Barsegyan & Maas, 2024; Ostrove & Long, 2007; Read, Archer, & Leathwood, 2003; Southgate et al., 2014). Unfortunately, with data at hand, factors that matter most could not be tested. Administrative data do not contain information on key variables necessary to evaluate each of those factors. However, further improvements to social science data infrastructure could open new research opportunities. Linking PLIDA to state-level educational data would enable, among others, large-scale research on how educational trajectories of FiF and non-FiF youth diverge over time and the possibility of investigating relative contributions of primary and secondary effects of parental education (Boudon, 1974).

8. Conclusion

The current study carries important lessons for policy and practice. This section briefly discusses the implications of the findings for the development of potential policy responses to increase equity in Australian higher education.

As noted in the previous section, not long after the six equity groups were defined, scholars argued for replacing the area-based measure of low SES with individual-level information, including parental education (McMillan & Western, 2000; Western et al., 1998). Partially to settle such debate, the Australian Government conducted two rounds of consultations in the higher education sector regarding how to capture the low SES background properly in the past decades. Specifically, in 2009, the Department of Education, Employment and Workplace Relations (DEEWR) initiated the first round of consultation in their discussion paper Measuring the Socio-economic Status of Higher Education Students (DEEWR, 2009). Four years later, the Department of Industry, Innovation, Climate change, Science, Research and Tertiary Education (DIICSRTE) collated and summarised sector responses to DEEWR (2009) and made a decision to continue with the area-based measure to capture low SES in their discussion paper *Moving to an Enhanced Indicator of HE Students' Socio-economic Status* (DIICSRTE, 2013). The area-based low SES proved to be an important predictor of education access in our analysis, so we would advise against abandoning it. However, FiF status had a greater impact on university enrolments, which leads us to issue the following recommendation:

Recommendation 1. The Australian Government and stakeholders at other levels should consider First-in-Family (FiF) status (or parental education) as another important factor affecting university enrolments, access to first-tier institutions, and certain fields of study.

As we noted describing the study's limitations, we could identify mechanisms that contribute most to the observed differences in educational pathways between FiF individuals and their peers. This was partly because of the nature of administrative data, which by definition do not capture attitudes and opinions, and partly because the different Australian data assets are still not being fully integrated. We therefore further recommend that:

Recommendation 2. The different levels of the Australian Government and other stakeholders should work together to build a data asset covering the full educational paths that would allow investigation of when and how the educational pathways of FiF individuals and their peers diverge.

And:

Recommendation 3. The Australian Government should consider funding further research exploring why attitudes and aspirations of FiF young people differ from those of non-FiF youth and how they shape educational outcomes. This is needed to better understand the mechanisms leading to the divergence of educational pathways.

While prior studies described attitudes and aspirations of FiF students and documented differences in aspirations between FiF and non-FiF students (Patfield, Gore, & Weaver, 2022), they did not explain how those differences had arisen, nor to what extent they impacted enrolment patterns. While further studies are needed to fully understand the

causes of the educational disadvantage of FiF students in Australia, the research will take time. Therefore, we should leverage existing literature to design policy interventions that might mitigate some of the effects of FiF status. The lack of cultural capital and the knowledge necessary to navigate the higher education system is a common thread in the literature. This leads us to our final recommendation:

Recommendation 4. The Australian Government and other stakeholders should invest in approaches to assist FiF individuals in gaining access to higher education, selective institutions, and fields in which they are underrepresented and expand outreach and career counselling programs that would equip FiF individuals with the knowledge necessary to navigate the higher education system as well as help them understand various career paths.

The programs should aim to engage young people early enough to give them time to choose a more university-oriented path in secondary education. While such programs will not solve the problem entirely, they are relatively easy to implement. They should not only benefit young people before the access stage but might also help those who enter higher education to stay on track.

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10. Appendices

Appendix A – Modelling approach

The models used to investigate the relationships between First-in-Family (FiF) and enrolment in higher education and enrolment in a selective institution had a similar form (the second variable was modelled only for those who enrolled in university studies). First, we fitted the baseline model of the following form:

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

Where *E* was a binary variable capturing, depending on the model, either university enrolment or enrolment in a selective institution; *FiF* represented First-in-Family status; C_1 was a set of control variables; α was the model's intercept; β_1 *and* β_2 were vectors of coefficients to be estimated.

In the next steps, we investigated whether the effects of FIF status were independent of equity group membership by introducing measures of the latter as model controls. In the model specification below, *EG* stands for a set of dummy variables capturing membership in the equity groups. We assessed the results by comparing the coefficients on FiF status across the models.

$$\ln\left(\frac{p(E=1)}{1-p(E=1)}\right) = \alpha + \beta_1 FiF + \beta_2 EG + \beta_3 C$$

In the final step, we tested whether equity group membership had a moderating effect on the relationship between FIF status and university enrolment/enrolment in a selective institution. We did so by introducing interaction terms as follows:

$$\ln\left(\frac{p(E=1)}{1-p(E=1)}\right) = \alpha + \beta_1 FiF + \beta_2 EG + \beta_3 (FiF \times EG) + \beta_4 C$$

For ease of interpretation, model results are expressed as odds ratios (ORs)—that is, exponentiated 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 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. Furthermore, we used model results to calculate marginal predictions—adjusted or predicted probabilities of enrolling in higher education/enrolling in a selective institution—as well as average marginal effects (AME). Both marginal predictions and effects were calculated while holding covariates at the observed values.

To analyse the relationship between FiF status and field of study, we fitted three multinomial logistic regression models. These models were in fact a series of logistic regression models exploring how the independent variables are related to the ratio of the probability of studying a specific field and the probability of the baseline category—studying society and culture. The analysis was conducted in a manner similar to the analysis of enrolments; that is, the

right-hand side of the equations changed in the same way as the logistic models discussed above. The models had the following forms:

$$\ln\left(\frac{p(F=j)}{p(F=S\&C)}\right) = \alpha_j + \beta_{1j}FiF + \beta_{2j}C$$

$$\ln\left(\frac{p(F=j)}{p(F=S\&C)}\right) = \alpha_j + \beta_{1j}FiF + \beta_{2j}EG + \beta_{3j}C$$

$$\ln\left(\frac{p(F=j)}{p(F=S\&C)}\right) = \alpha_j + \beta_{1j}FiF + \beta_{2j}EG + \beta_{3j}(FiF \times EG) + \beta_{4j}C$$

Where *F* was a categorical variable capturing the field of study; *j* represents a specific value of *F; FiF* represented First-in-Family status; *EG* stands for a set of dummy variables capturing membership in the equity groups*; C* was a set of control variables; α_j was the model's intercept and β_{1j} *to* β_{4j} were vectors of coefficients to be estimated for the specific *j-th* value of *F*.

Model results were expressed as relative risk ratios, which are similar in interpretation to ORs. A relative risk ratio greater than 1 indicates that a one-unit increase in a given explanatory variable is associated with increased odds of respondents taking the value *j* in the outcome variable compared to the reference category, all else being equal. Correspondingly, a relative risk ratio smaller than 1 indicates that a one-unit increase in a given explanatory variable is associated with a decrease in the odds of respondents taking the value j in the outcome variable compared to the reference category, all else being equal. Furthermore, we calculated adjusted probabilities of enrolling in specific fields of study and AME.

Appendix B – Additional tables

Table B-1: Descriptive statistics of all variables included in the analyses

	Summary
N	443,609
Enrolled in a bachelor's level programme	
0	56.5%
1	43.5%
Enrolled in a bachelor's level programme at selective HEI	
0	53.6%
1	46.4%
Field of study	
Natural and Physical Sciences	14.1%
Information Technology	3.6%
Engineering and Related Technologies	7.0%
Architecture and Building	3.0%
Agriculture Environmental and Related Studies	0.9%
Other Health	17.2%
Education	6.5%
Management and Commerce	15.8%
Society and Culture	19.9%
Creative Arts	9.2%
Medical Studies	0.8%
Law	2.0%
Field of study at selective HEI	
Natural and Physical Sciences	20.2%
Information Technology	3.4%
Engineering and Related Technologies	8.9%
Architecture and Building	3.4%
Agriculture Environmental and Related Studies	0.7%
Other Health	10.8%
Education	3.1%
Management and Commerce	17.9%
Society and Culture	21.9%
Creative Arts	7.1%
Medical Studies	1.0%
Law	1.6%
First-in-Family	
Not First-in-Family	33.5%
First-in-Family	66.5%
Low SES	
0	82.0%

1	18.0%
RR	
0	71.0%
1	29.0%
Indigenous	
0	96.1%
1	3.9%
NESB	
0	96.6%
1	3.4%
Female	
0	51.3%
1	48.7%
Disability	
0	97.0%
1	3.0%
Father: manager/professional	
0	72.4%
1	27.6%
Mother: manager/professional	
0	74.7%
1	25.3%
Single-parent family	
Couple	75.8%
Single parent	24.2%
Family income	
$1,249 or less	23.0%
$1,250-$1,999	18.8%
$2,000-$2,999	21.0%
$3,000 or more	23.4%
Partial or no information	13.8%

Notes: Data from PLIDA. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote.

Table B-2: Model coefficients (odds ratios) from logistic regression models of enrolment in a bachelor's level course.

Model number	**I**	**II**	**III**
Model title	**FiF**	**FiF+EG**	**FiFxEG**
FiF	0.33***	0.35***	0.33***
Father: not manager/professional	0.72***	0.73***	0.73***
Mother: not manager/professional	0.89***	0.86***	0.86***
Single parent	0.68***	0.68***	0.68***
Family income (ref. $3,000 or more)			
$1,249 or less	0.85***	0.98	0.98
$1,250-$1,999	0.85***	0.93***	0.93***
$2,000-$2,999	0.85***	0.90***	0.90***
Partial/no information	0.80***	0.89***	0.89***
Low SES		0.67***	0.69***
RR		0.47***	0.47***
Indigenous		0.37***	0.37***
NESB		1.09***	1.13***
Women		1.95***	1.78***
Disability		0.15***	0.13***
FiF # Low SES			0.96
FiF # RR			0.99
FiF # Indigenous			0.99
FiF # NESB			0.95
FiF # Women			1.15***
FiF # Disability			1.39***
Observations	443609	443609	443609
Pseudo R^2	0.085	0.138	0.138

Notes: Data from PLIDA. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote. Statistical significance: * p < 0.05, ** p < 0.01, *** p < 0.001.

Table B-3: Model coefficients (odds ratios) from logistic regression models of enrolment in a selective institution

Model number	**I**	**II**	**III**
Model title	**FiF**	**FiF+EG**	**FiFxEG**
FiF	0.51***	0.56***	0.56***
Father: not manager/professional	0.84***	0.83***	0.84***
Mother: not manager/professional	1.06***	0.99	0.99
Single parent	0.99	0.99	0.99
Family income (ref. $3,000 or more)			
$1,249 or less	1.05**	1.08***	1.09***
$1,250-$1,999	0.86***	0.90***	0.91***
$2,000-$2,999	0.79***	0.82***	0.83***
Partial/no information	0.92***	1.01	1.01
Low SES		0.77***	0.66***
RR		0.36***	0.33***
Indigenous		0.75***	0.66***
NESB		1.43***	1.32***
Women		0.88***	0.92***
Disability		0.54***	0.50***
FiF # Low SES			1.24***
FiF # RR			1.18***
FiF # Indigenous			1.21*
FiF # NESB			1.19***
FiF # Women			0.90***
FiF # Disability			1.17
Observations	192995	192995	192995
Pseudo R^2	0.027	0.056	0.057

Notes: Data from PLIDA. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote. Statistical significance: * p < 0.05, ** p < 0.01, *** p < 0.001.

Table B-4: Model coefficients (RR) from Model VII, multinomial logistic regression models of field of study

Outcome (ref. Society & Culture)	**Natural & Physical Sciences**	**Information Technology**	**Engineering & Related Technology**	**Architecture & Building**	**Agriculture Environmental & Rel. Studies**	**Other Health**	**Education**	**Management & Commerce**	**Creative Arts**	**Medical Studies**	**Law**
FiF	0.75***	0.84***	0.69***	0.93*	1.24***	1.20***	1.70***	0.94***	0.98	0.28***	0.80***
Father: not manager/professional	0.97	1.06	0.98	0.93*	0.71***	1.13***	1.14***	0.94**	0.91***	0.62***	0.86***
Mother: not manager/professional	1.11***	1.30***	1.13***	1.11**	0.73***	1.03	0.96	1.20***	0.98	0.82***	0.97
Single parent	0.75***	0.71***	0.66***	0.64***	0.93	0.73***	0.73***	0.82***	0.99	0.66***	1.04
Family income (ref. $3,000 or more)											
$1,249 or less	1.29***	1.51***	1.17***	1.14*	1.04	0.93*	0.90**	0.93**	1.00	1.38**	0.94
$1,250-$1,999	1.15***	1.38***	1.11**	1.04	1.37***	1.06*	1.13***	0.92**	1.09**	0.92	1.03
$2,000-$2,999	1.06*	1.24***	1.08*	0.93	1.48***	1.09***	1.22***	0.89***	1.11***	0.92	0.99
Partial/no information	1.11***	0.97	1.02	1.07	1.50***	1.02	0.94	0.89***	1.02	1.16	1.06
Observations	192995										
Pseudo R^2	0.005										

Notes: Data from PLIDA. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote. Statistical significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table B-5: Model coefficients (RR) from Model VIII, multinomial logistic regression models of field of study

Outcome (ref. Society & Culture)	Natural & Physical Sciences	Information Technology	Engineering & Related Technology	Architecture & Building	Agriculture Environmental & Rel. Studies	Other Health	Education	Management & Commerce	Creative Arts	Medical Studies	Law
FiF	0.79***	0.93*	0.76***	1.01	1.13*	1.15***	1.59***	1.00	0.97	0.28***	0.80***
Low SES	1.00	1.15***	1.03	0.88**	0.87	1.06*	1.10**	0.93**	0.87***	0.76*	0.88*
RR	1.06*	1.01	1.35***	0.75***	3.40***	1.64***	1.73***	0.84***	1.24***	2.29***	1.34***
Indigenous	0.68***	0.53***	0.70***	0.59***	0.59*	0.83**	1.10	0.53***	1.01	0.95	1.16
NESB	2.17***	2.00***	2.50***	1.79***	0.57**	1.41***	0.62***	1.63***	0.71***	1.93***	1.23*
Women	0.55***	0.08***	0.11***	0.33***	0.67***	1.35***	1.33***	0.40***	0.75***	0.65***	0.87***
Disability	0.81*	1.28*	0.54***	0.53**	0.62	0.63***	0.63***	0.50***	1.16	0.55	0.67
Father: not manager/professional	0.96	1.09*	1.00	0.94	0.75***	1.12***	1.14***	0.95*	0.92***	0.62***	0.87***
Mother: not manager/professional	1.10***	1.29***	1.14***	1.09**	0.81***	1.05**	0.99	1.19***	1.00	0.87*	0.98
Single parent	0.78***	0.75***	0.69***	0.66***	0.95	0.73***	0.72***	0.84***	0.98	0.68***	1.05
Family income (ref. $3,000 or more)											
$1,249 or less	1.22***	1.42***	1.10*	1.12*	1.01	0.90***	0.89**	0.92**	1.02	1.30**	0.93
$1,250-$1,999	1.11***	1.37***	1.09*	1.06	1.27**	1.02	1.10**	0.93**	1.10**	0.86	1.02
$2,000-$2,999	1.04	1.22***	1.05	0.94	1.38***	1.06*	1.19***	0.89***	1.11***	0.87	0.98
Partial/no information	1.09**	0.95	0.98	1.08	1.30**	0.96	0.89**	0.90***	1.01	1.06	1.03
Observations	192995										
Pseudo R^2	0.038										

Notes: Data from PLIDA. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote. Statistical significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

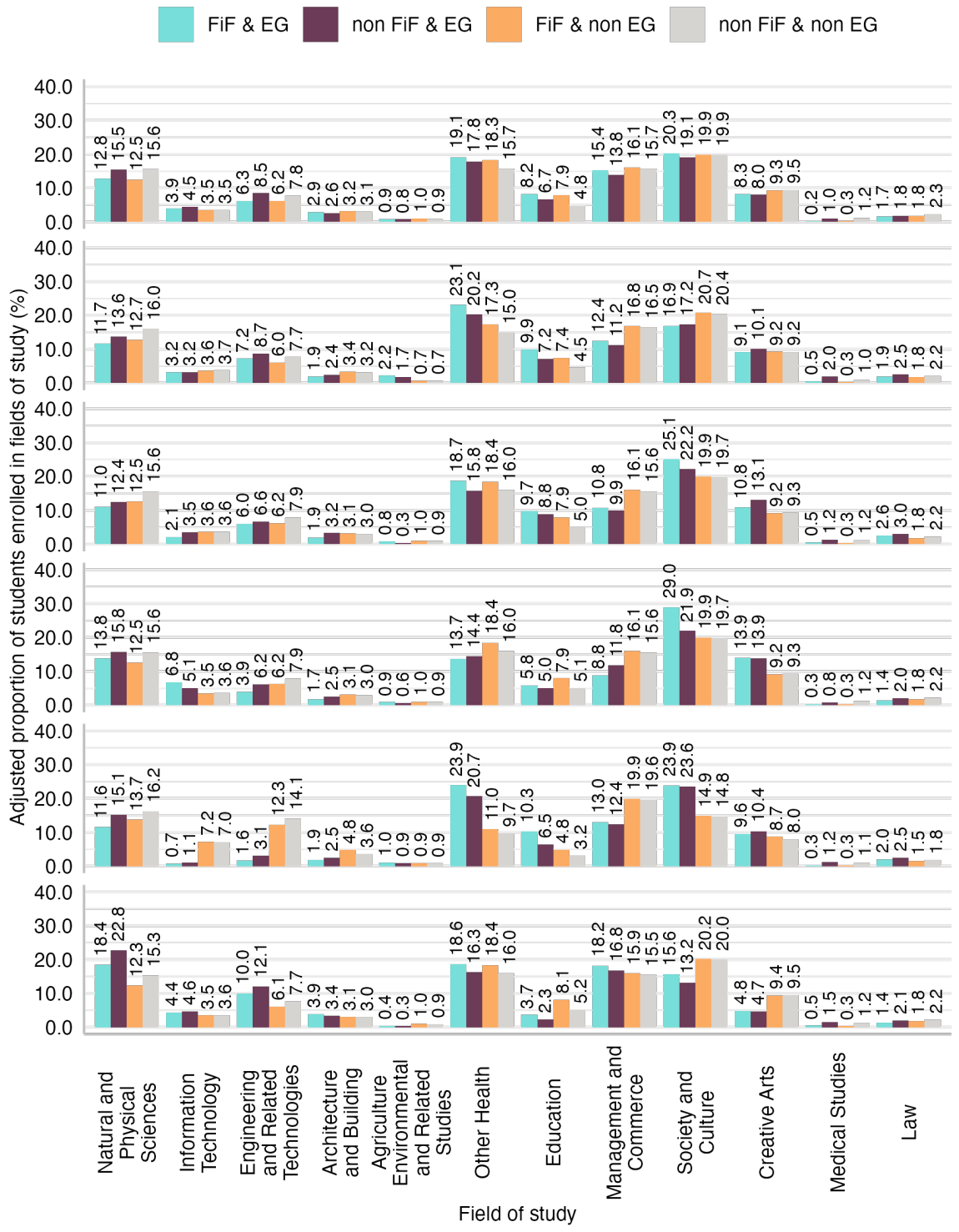
Table B-6: Model coefficients (RR) from Model IX, multinomial logistic regression models of field of study

Outcome (ref. Society & Culture)	Natural & Physical Sciences	Information Technology	Engineering & Related Technology	Architecture & Building	Agriculture Environmental & Rel. Studies	Other Health	Education	Management & Commerce	Creative Arts	Medical Studies	Law
FiF	0.83***	1.05	0.86***	1.36***	1.01	1.14***	1.67***	0.99	1.11**	0.30***	0.84**
Low SES	1.03	1.31***	1.14*	0.88	0.93	1.18***	1.44***	0.91	0.88*	0.84	0.83
RR	1.00	0.96	1.28***	0.88*	3.01***	1.61***	1.88***	0.79***	1.30***	2.29***	1.36***
Indigenous	0.69**	0.80	0.71	0.93	0.31*	0.89	1.58**	0.55***	1.25	0.90	1.21
NESB	2.33***	2.15***	2.59***	1.81***	0.60	1.53***	0.67***	1.72***	0.75***	1.98***	1.41**
Women	0.58***	0.10***	0.14***	0.43***	0.65***	1.33***	1.29***	0.39***	0.81***	0.68***	0.90*
Disability	0.91	1.24	0.69*	0.75	0.63	0.81	0.89	0.68**	1.34*	0.57	0.82
FiF # Low SES	0.97	0.84	0.87	1.01	0.91	0.87*	0.71***	1.02	0.99	0.84	1.10
FiF # RR	1.12*	1.09	1.10	0.74***	1.25*	1.02	0.87**	1.12**	0.93	0.96	0.97
FiF # Indigenous	0.98	0.54*	1.00	0.50*	2.15	0.92	0.62**	0.94	0.74	1.28	0.96
FiF # NESB	0.86	0.85	0.92	0.97	0.88	0.84*	0.86	0.90	0.89	1.05	0.72
FiF # Women	0.90**	0.64***	0.59***	0.56***	1.07	1.03	1.04	1.04	0.85***	0.93	0.95
FiF # Disability	0.83	1.06	0.61	0.49	0.97	0.63*	0.56*	0.55**	0.78	1.18	0.68
Father: not manager/professional	0.96	1.08*	0.99	0.94	0.75***	1.12***	1.13***	0.95*	0.92***	0.62***	0.86***
Mother: not manager/professional	1.09***	1.29***	1.13***	1.10**	0.80***	1.05**	1.00	1.19***	1.00	0.87*	0.98
Single parent	0.78***	0.75***	0.70***	0.67***	0.95	0.74***	0.72***	0.84***	0.98	0.68***	1.05
Family income (ref. $3,000 or more)											
$1,249 or less	1.22***	1.42***	1.10*	1.12*	1.01	0.89***	0.89**	0.92**	1.02	1.30**	0.93

$1,250-$1,999	1.11***	1.36***	1.08*	1.05	1.28**	1.01	1.09*	0.93**	1.10**	0.86	1.01
$2,000-$2,999	1.04	1.22***	1.05	0.93	1.38***	1.05*	1.18***	0.89***	1.10***	0.87	0.98
Partial/no information	1.09**	0.95	0.98	1.08	1.30***	0.96	0.89**	0.90***	1.00	1.06	1.03
Observations	192995										
Pseudo R^2	0.039										

Notes: Data from PLIDA. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote. Statistical significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

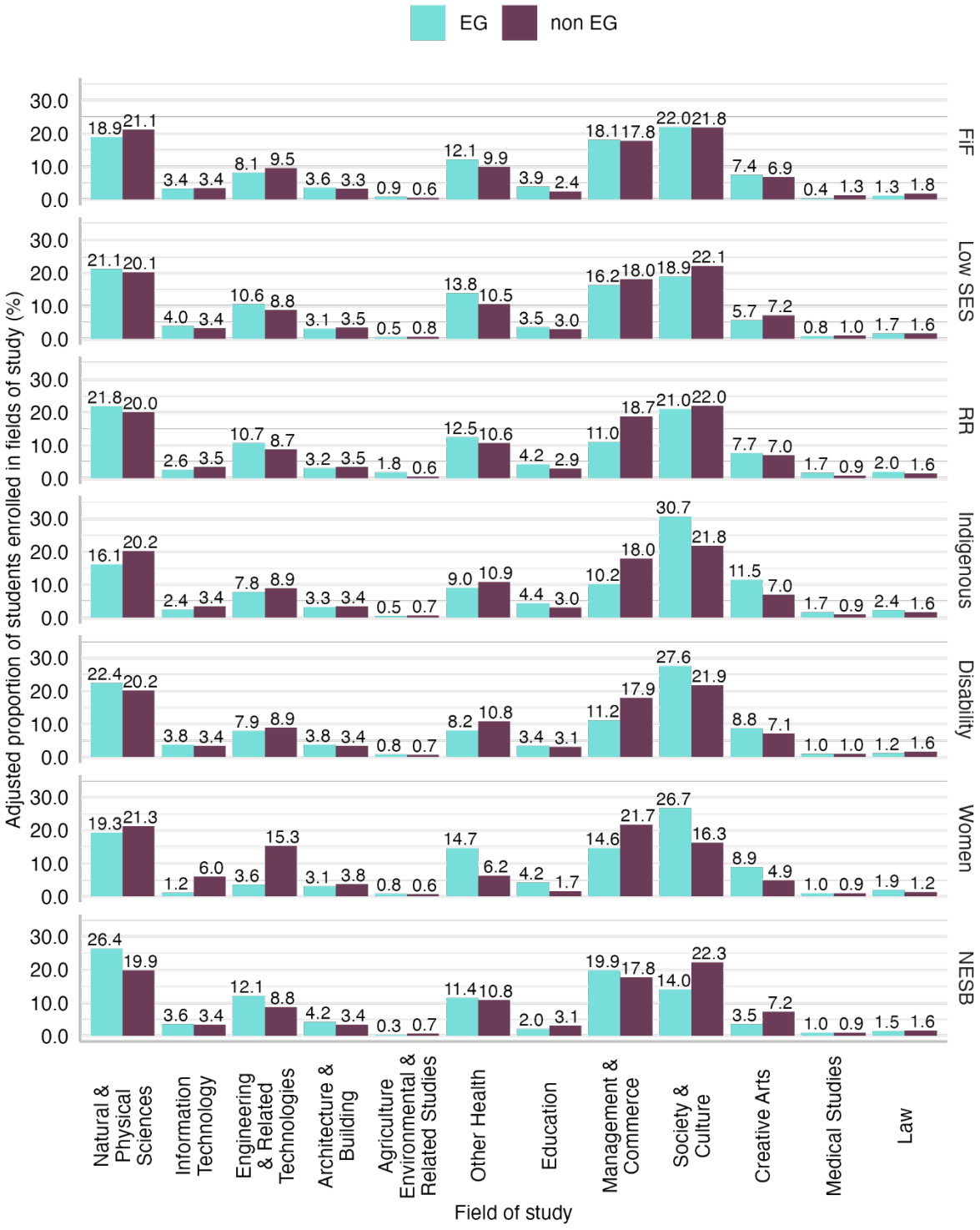
Figure B-1: Adjusted proportions of students enrolled in fields of study by First-in-Family status and equity group membership



Notes: Data from PLIDA. EG: equity group. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote. Predicted probabilities based on the model results presented in Table B-6 in Appendix B.

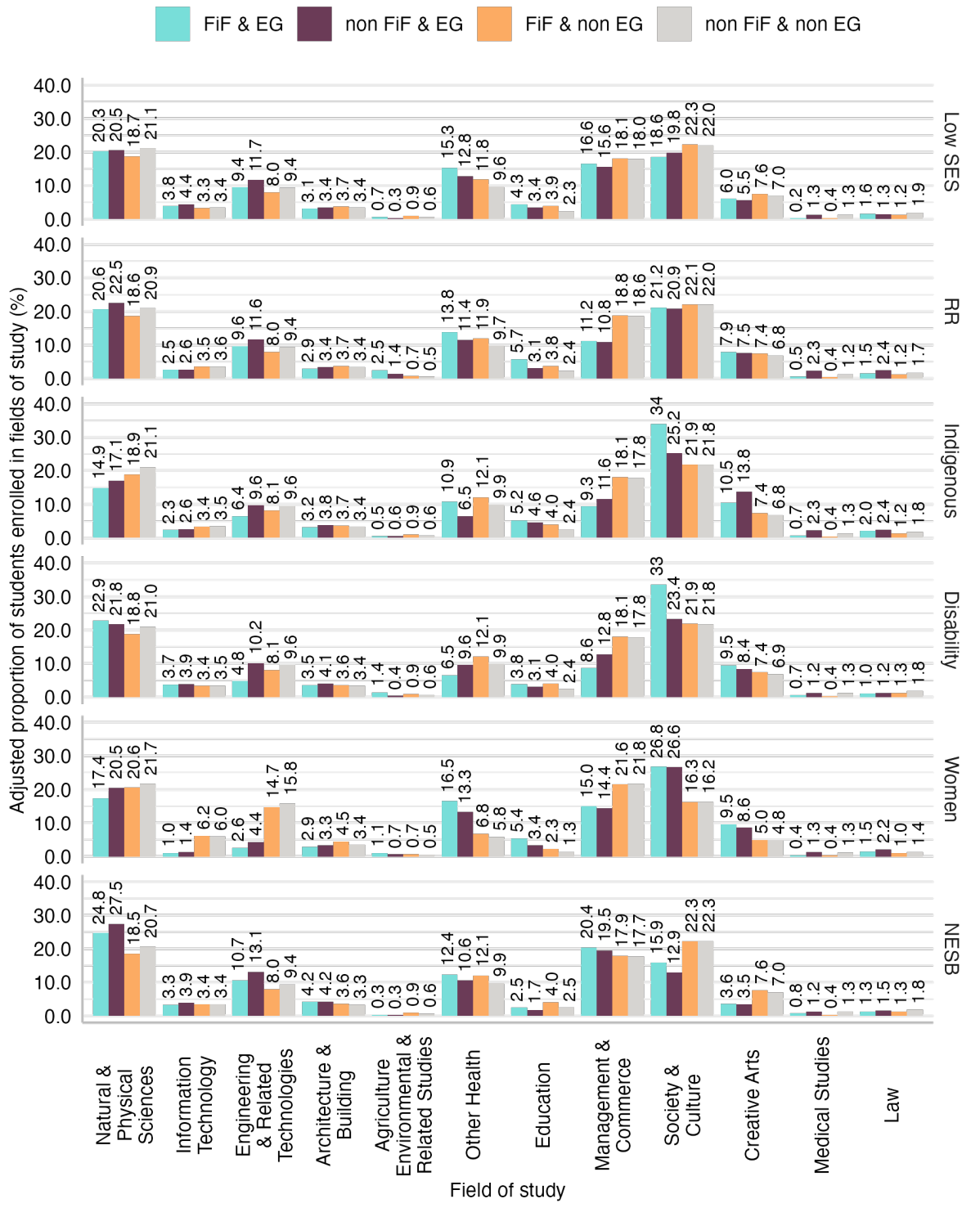
Appendix C – Field of study at selective institutions

Figure C-1: Adjusted proportions of students enrolled in fields of study at selective institutions by First-in-Family status and equity group membership



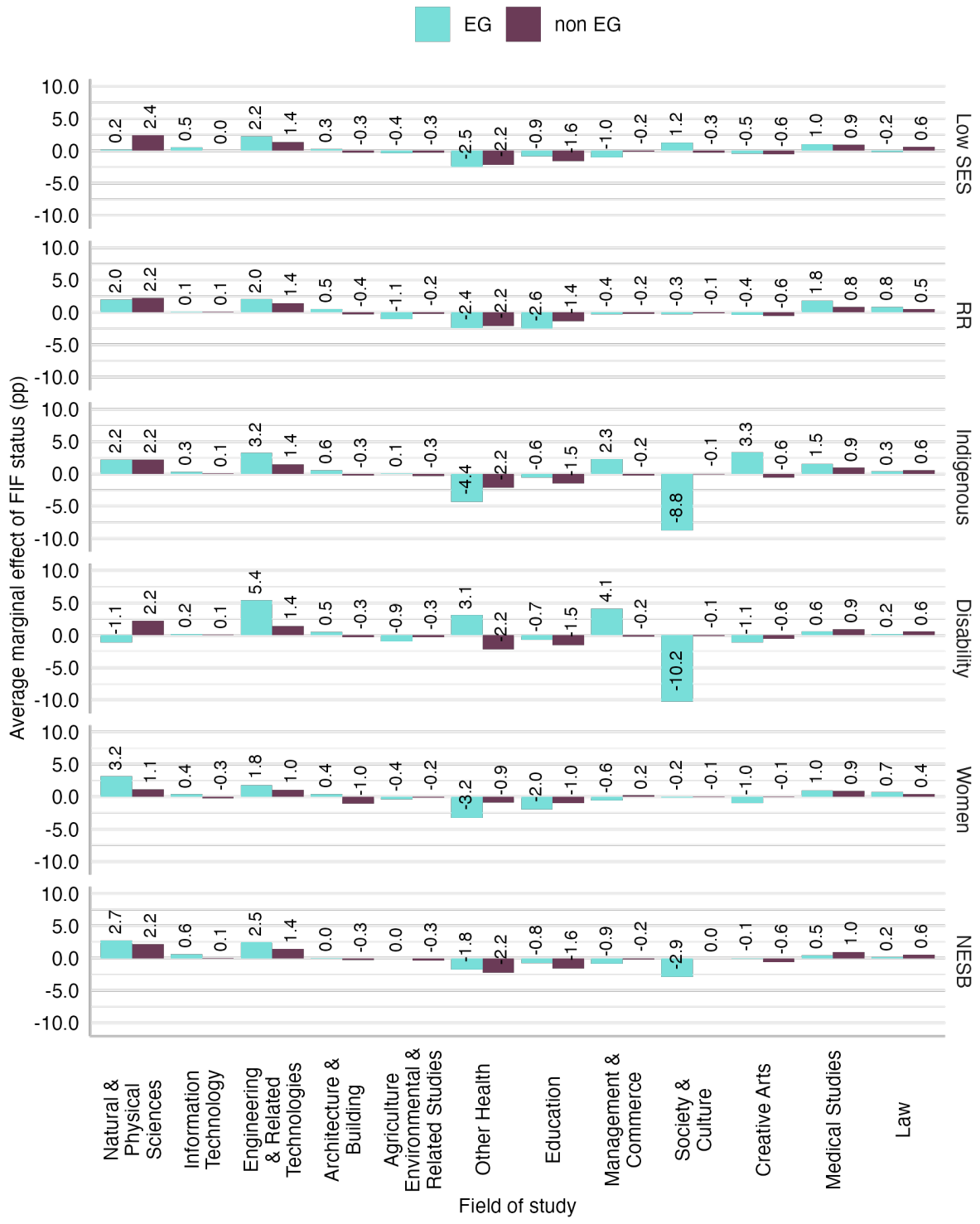
Notes: Data from PLIDA. EG: equity group. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote. Predicted probabilities based on the model results presented in Table C-2.

Figure C-2: Adjusted proportions of students enrolled in fields of study at selective institutions by First-in-Family status and equity group membership



Notes: Data from PLIDA. EG: equity group. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote. Predicted probabilities based on the model results presented in Table C-3.

Figure C-3: Average marginal effects of First-in-Family status on field of study at a selective institution by equity-group membership



Notes: Data from PLIDA. EG: equity group. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote. Predicted probabilities based on the model results presented in Table C-3.

Table C-1: Model coefficients (RR) from Model X, multinomial logistic regression models of field of study at selective institutions

Outcome (ref. Society & Culture)	**Natural & Physical Sciences**	**Information Technology**	**Engineering & Related Technology**	**Architecture & Building**	**Agriculture Environmental & Rel. Studies**	**Other Health**	**Education**	**Management & Commerce**	**Creative Arts**	**Medical Studies**	**Law**
FiF	0.86***	0.90*	0.80***	1.02	1.60***	1.25***	1.71***	0.94*	1.09*	0.28***	0.70***
Father: not manager/professional	1.04	1.15**	1.07*	0.97	0.76**	1.22***	1.24***	0.99	0.92*	0.69***	0.87*
Mother: not manager/professional	1.13***	1.44***	1.21***	1.09	0.87	1.15***	1.00	1.28***	1.00	0.88	1.03
Single parent	0.70***	0.66***	0.63***	0.65***	0.94	0.60***	0.71***	0.75***	0.94	0.52***	1.09
Family income (ref. $3,000 or more)											
$1,249 or less	1.44***	1.57***	1.34***	1.33***	0.89	1.36***	1.18*	1.08*	1.00	2.10***	1.21
$1,250-$1,999	1.25***	1.44***	1.24***	1.21**	1.21	1.32***	1.37***	0.98	1.09	1.23	1.20
$2,000-$2,999	1.11***	1.30***	1.12**	1.08	1.35**	1.23***	1.34***	0.87***	1.11*	1.15	1.05
Partial/no information	1.08*	0.96	1.02	1.17*	1.27	1.00	0.93	0.89**	0.99	1.22	1.20*
Observations	89522										
Pseudo R^2	0.005										

Notes: Data from PLIDA. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote. Statistical significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table C-2: Model coefficients (RR) from Model XI, multinomial logistic regression models of field of study at selective institutions

Outcome (ref. Society & Culture)	Natural & Physical Sciences	Information Technology	Engineering & Related Technology	Architecture & Building	Agriculture Environmental & Rel. Studies	Other Health	Education	Management & Commerce	Creative Arts	Medical Studies	Law
FiF	0.88***	0.94	0.82***	1.06	1.50***	1.22***	1.63***	0.99	1.08*	0.28***	0.69***
Low SES	1.23***	1.41***	1.42***	1.04	0.80	1.54***	1.38***	1.06	0.93	0.99	1.24*
RR	1.13***	0.75***	1.26***	0.94	3.11***	1.24***	1.53***	0.61***	1.15**	1.96***	1.37***
Indigenous	0.55***	0.47**	0.58***	0.66	0.48	0.59***	1.05	0.39***	1.17	1.27	1.05
NESB	2.16***	1.84***	2.35***	1.99***	0.67	1.66***	1.03	1.84***	0.76**	1.77***	1.44**
Women	0.55***	0.12***	0.14***	0.50***	0.83*	1.43***	1.49***	0.41***	1.12***	0.64***	0.93
Disability	0.87	0.86	0.68*	0.86	0.85	0.60**	0.87	0.49***	0.99	0.84	0.58
Father: not manager/professional	1.03	1.17**	1.08*	0.97	0.79*	1.18***	1.22***	1.00	0.92*	0.70***	0.87*
Mother: not manager/professional	1.12***	1.43***	1.22***	1.08	0.93	1.13***	1.00	1.25***	1.01	0.91	1.03
Single parent	0.72***	0.69***	0.65***	0.66***	0.94	0.61***	0.71***	0.77***	0.93	0.53***	1.10
Family income (ref. $3,000 or more)											
$1,249 or less	1.34***	1.48***	1.24***	1.27**	0.89	1.25***	1.14	1.04	1.01	1.99***	1.16
$1,250-$1,999	1.21***	1.44***	1.20***	1.18*	1.18	1.25***	1.33***	0.98	1.10	1.18	1.16
$2,000-$2,999	1.08*	1.30***	1.09*	1.07	1.30*	1.20***	1.31***	0.87***	1.11**	1.11	1.02
Partial/no information	1.05	0.95	0.98	1.16*	1.14	0.97	0.90	0.90**	0.99	1.15	1.17
Observations	89522										
Pseudo R^2	0.035										

Notes: Data from PLIDA. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote. Statistical significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Table C-3: Model coefficients (RR) from Model XII, multinomial logistic regression models of field of study at selective institutions

Outcome (ref. Society & Culture)	Natural & Physical Sciences	Information Technology	Engineering & Related Technology	Architecture & Building	Agriculture Environmental & Rel. Studies	Other Health	Education	Management & Commerce	Creative Arts	Medical Studies	Law
FiF	0.94	1.07	0.95	1.36***	1.28	1.16**	1.78***	0.99	1.03	0.29***	0.68***
Low SES	1.09	1.45**	1.40***	1.13	0.53	1.48***	1.63***	0.97	0.88	1.08	0.80
RR	1.13**	0.76**	1.28***	1.06	2.76***	1.24***	1.41***	0.61***	1.17*	2.05***	1.43***
Indigenous	0.69*	0.62	0.83	0.95	0.81	0.57*	1.65	0.54**	1.75**	1.52	1.14
NESB	2.34***	2.11***	2.57***	2.22***	0.83	1.85***	1.19	1.97***	0.85	1.62*	1.44*
Women	0.57***	0.14***	0.17***	0.58***	0.77*	1.37***	1.55***	0.40***	1.08*	0.65***	0.95
Disability	0.96	1.04	0.98	1.12	0.63	0.91	1.21	0.66	1.14	0.88	0.62
FiF # Low SES	1.21*	0.97	1.02	0.90	1.70	1.06	0.81	1.14	1.08	0.73	1.91**
FiF # RR	1.01	0.97	0.95	0.76*	1.26	0.98	1.13	1.01	0.96	0.78	0.91
FiF # Indigenous	0.71	0.64	0.56	0.57	0.44	1.03	0.52	0.58	0.52*	0.83	0.91
FiF # NESB	0.82	0.70	0.79	0.75	0.59	0.78*	0.72	0.84	0.77	1.89	1.05
FiF # Women	0.89**	0.70***	0.63***	0.68***	1.17	1.08	0.92	1.05	1.09	0.97	0.95
FiF # Disability	0.81	0.65	0.37*	0.55	1.53	0.39*	0.52	0.46*	0.73	1.31	0.86
Father: not manager/professional	1.03	1.16**	1.08*	0.97	0.80*	1.18***	1.22***	1.00	0.92*	0.70***	0.87*
Mother: not manager/professional	1.12***	1.42***	1.22***	1.08	0.92	1.13***	1.00	1.25***	1.01	0.91	1.03
Single parent	0.72***	0.69***	0.66***	0.67***	0.94	0.61***	0.71***	0.77***	0.93	0.53***	1.10
Family income (ref. $3,000 or more)											
$1,249 or less	1.34***	1.48***	1.23***	1.26**	0.90	1.25***	1.14	1.04	1.01	1.99***	1.16

$1,250-$1,999	1.21***	1.43***	1.20***	1.18*	1.19	1.25***	1.32***	0.98	1.09	1.18	1.17
$2,000-$2,999	1.08*	1.29***	1.08*	1.06	1.31*	1.20***	1.30***	0.87***	1.11*	1.11	1.03
Partial/no information	1.05	0.95	0.98	1.15*	1.14	0.97	0.90	0.90**	0.99	1.15	1.17
Observations	89522										
Pseudo R^2	0.035										

Notes: Data from PLIDA. FiF: First-in-Family status. SES: socio-economic status. NESB: Non-English Speaking Background. RR: regional or remote. Statistical significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.