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Submission to the Inquiry into the Factors Driving Educational Attainment

Ha Nguyen

Bruce Chapman

Huong Le

Heather Royer

Lorraine Dearden

Francis Mitrou

The Australian Research Council Centre of Excellence for Children and Families over the Life Course

Phone +61 7 3346 7477 **Email** lcc@uq.edu.au

lifecoursecentre.org.au

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Research Summary

Why was the research done?

Our team, comprising researchers from Australia, the United States, and the United Kingdom, welcomes this inquiry into the factors driving educational attainment. We submit this response outlining our research on gender differences in developmental and educational outcomes over the life course, the factors contributing to variation in educational attainment between boys and girls, and directions for future research, including ongoing research programs undertaken by our team.

What were the key findings?

Our studies using nationally representative and population-based administrative datasets show that males tend to perform better in numeracy-related subjects, while females outperform males in most non-numeracy subjects, with these gender gaps generally widening as students progress through school. We also find that females outperform males in overall academic attainment at the end of secondary school and in post-school educational outcomes. In addition, females outperform males at the lower end of the distribution for non-numeracy test scores and ATAR results, whereas the male advantage in numeracy appears to be driven primarily by higher-performing students.

Our research has also identified several factors contributing to variation in educational attainment between boys and girls, including early childhood characteristics, children's time use and school sector choice, and socioeconomic factors.

What does this mean for policy and practice?

While our studies identify a range of factors—some of which are novel in the international literature—that help explain gender gaps in educational attainment and improve understanding of gender-based developmental disparities, thereby providing evidence to inform interventions aimed at improving outcomes for both genders, several limitations remain and suggest directions for future research.

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The authors

Ha Nguyen
The Kids Research Institute Australia & The University of Western Australia
Email: ha.nguyen@thekids.org.au

Bruce Chapman
The Australian National University
Email: bruce.chapman@anu.edu.au

Huong Le
The Kids Research Institute Australia & The University of Western Australia
Email: huong.le@thekids.org.au

Heather Royer
University of California, Santa Barbara
Email: heather.royer@ucsb.edu

Lorraine Dearden
University College London
Email: l.dearden@ucl.ac.uk

Francis Mitrou
The Kids Research Institute Australia & The University of Western Australia
Email: francis.mitrou@thekids.org.au

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We acknowledge the Traditional Custodians of the lands on which we work and live across Australia.
We pay our respects to Elders past and present and recognise their continued connections
to land, sea and community.

Submission to the Inquiry into the Factors Driving Educational Attainment

Ha Nguyen[*, †] Bruce Chapman[‡] Huong Le[†] Heather Royer[§]
Lorraine Dearden[⁂] Francis Mitrou[†]

Our team, comprising researchers from Australia, the United States, and the United Kingdom, welcomes this inquiry into the factors driving educational attainment. We submit this response outlining our research on gender differences in developmental and educational outcomes over the life course, the factors contributing to variation in educational attainment between boys and girls, and directions for future research, including research programs currently being undertaken by our team.

This submission was lodged with the House of Representatives Standing Committee on Education in response to the Inquiry into the Factors Driving Educational Attainment, published as Submission No. 23, and is available at:

https://www.aph.gov.au/Parliamentary_Business/Committees/House/Education/Educationalattainment/Submissions

[*] **Corresponding author**: The Kids Research Institute Australia | Postal: GPO Box 855, Perth WA 6872, Australia | Email: ha.nguyen@thekids.org.au.
[†] The Kids Research Institute Australia & The University of Western Australia. [‡] The Australian National University. [§] University of California, Santa Barbara. [⁂] University College London.
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Dear The House of Representatives Standing Committee on Education,

Our team, comprising researchers from Australia, the United States, and the United Kingdom, welcomes the inquiry into the factors driving gender differences in educational attainment.

We wish to submit a response outlining our research on gender differences in developmental and educational outcomes over the life course, the factors contributing to variation in educational attainment between boys and girls, and directions for future research, including research programs currently being undertaken by our team.

1. Evidence on gender differences in developmental and educational outcomes over the life course

This section summarises evidence from our studies on gender differences in developmental and educational outcomes over the life course, highlighting three main patterns.

1.1. Males tend to perform better in numeracy-related subjects, while females outperform males in most non-numeracy subjects, with these gender gaps generally widening as students progress through school.

Using nationally representative data from the Longitudinal Study of Australian Children (LSAC), we document that males demonstrate stronger numeracy skills as early as ages 4–5, as measured by Matrix Reasoning assessments and National Assessment Program – Literacy and Numeracy (NAPLAN) Numeracy scores in Years 3, 5, 7, and 9. By contrast, females perform better in non-numeracy domains, as measured by the Peabody Picture Vocabulary Test (PPVT), the Who Am I? (WAI) assessment at ages 4–5, and NAPLAN Reading, Writing, Spelling, and Grammar scores (Le & Nguyen 2018; Nguyen *et al.* 2022).

In addition, our recent study using Australian Early Development Census (AEDC) data linked to the 2011 Census through the Person Level Integrated Data Asset (PLIDA), developed and maintained by the Australian Bureau of Statistics (ABS), finds that girls achieve higher scores across all five AEDC developmental domains measured at ages 5–6 (Nguyen *et al.* 2026a). These domains include emotional maturity, social competence, communication skills and general knowledge, physical health and wellbeing, and language and cognitive skills (school-based). Using NAPLAN test scores, we further document that gender gaps widen from Year 3 to Year 9 (Le & Nguyen 2018; Nguyen *et al.* 2022).

1.2. Females academically outperform males at the end of secondary school and in post-school educational attainment.

Using administrative data from the Higher Education Information Management System (HEIMS), we find that females achieve higher Australian Tertiary Admission Rank (ATAR) scores and are more likely to attain higher education qualifications (Nguyen *et al.* 2026a).

1.3. Females outperform males at the lower end of the distribution for non-numeracy test scores and ATAR results, whereas the gender gap favouring males in numeracy appears to be driven primarily by higher-performing students.

Specifically, our distributional analyses using quantile regression approaches show that the gender gap favouring females across all five AEDC developmental domains measured at ages 5–6, as well as in NAPLAN non-numeracy subjects and ATAR scores, is larger among lower-performing students (Le & Nguyen 2018; Nguyen *et al.* 2022; Nguyen *et al.* 2026a). By contrast, for NAPLAN Numeracy scores, the gender gap favouring males is concentrated among top-performing students (Le & Nguyen 2018; Nguyen *et al.* 2022).

2. Evidence on the factors contributing to variation in educational attainment between boys and girls

Our studies have also identified potential factors contributing to variation in educational attainment between boys and girls, including pre-school characteristics, children's time use and school sector choices, and socioeconomic factors, as detailed below.

2.1. Pre-school factors, including pre-school cognitive skills and birth weight

Our study shows that gender disparities in pre-school cognitive skills, measured using the PPVT and WAI assessments at ages 4–5 prior to school entry, explain a considerable proportion of the differences in later academic performance (Le & Nguyen 2018). In particular, female students demonstrate stronger pre-school cognitive skills, which contribute to their superior performance in non-numeracy subjects and help reduce their relative disadvantage in numeracy compared with male students.

Moreover, our recent study shows that males, on average, have higher birth weights (Nguyen *et al.* 2026a). This pattern, considered alongside the well-established positive effects of birth weight on later-life outcomes, including educational attainment, as documented in a seminal study by Professor Royer, a member of our team (Royer 2009), suggests that gender differences in birth weight favouring males may partly explain males' stronger performance in numeracy

test scores. However, it does not appear to account for males' relative disadvantage in non-numeracy subjects during schooling or in post-school educational attainment.

Overall, the results from this subsection suggest that gender differences in pre-school factors, including the role of "nature", broadly defined as inherent characteristics present at birth among boys and girls, such as birth weight as documented in our recent study (Nguyen *et al.* 2026a), or their parents' migration background, which may affect the developmental and educational outcomes of their Australian-born children, as found in our other related studies (Cobb-Clark & Nguyen 2012; Nguyen *et al.* 2020; Nguyen *et al.* 2025; Nguyen 2026), contribute to differences in later educational outcomes.

2.2. Children's time allocation and school sector choices

We also show that gender differences in time investment are quantitatively important in explaining females' advantage in most cognitive and non-cognitive skills (Nguyen *et al.* 2022). Particularly, using more than 50,000 time-use diaries from two cohorts of children in LSAC data, we document substantial gender differences in time allocation during the first 16 years of life. Relative to males, females spend more time on personal care, household chores, and educational activities, and less time on physical and media-related activities. These differences emerge at very young ages and widen over time.

We provide evidence that gender differences in time investment contribute substantially to females' advantage in most cognitive and non-cognitive skills. In particular, differences in educational time outside school are the most important factor contributing to gender gaps in test scores, with effects more pronounced among higher-performing students. By contrast, differences in media-related time use are the main factor explaining gender gaps in non-cognitive skills. As children age, time allocation plays an increasingly important role in explaining gender gaps in both cognitive and non-cognitive outcomes.

Our recent study also shows that, within siblings in the same family, daughters are more likely to attend non-government schools—including Catholic and independent schools—which generally charge substantial fees, enrol students from more socioeconomically advantaged families, and achieve higher average test scores than public schools (Nghiem *et al.* 2015; Nghiem *et al.* 2016; Le *et al.* 2025; Nguyen *et al.* 2026a). This gender difference in school sector choice between siblings may help explain the higher educational attainment of daughters relative to sons.

Overall, the results from this subsection suggest that gender differences in children's time allocation and school sector choices—likely reflecting parental investment and parenting behaviours—may help explain the observed educational gaps between boys and girls. These factors may be broadly characterised as "nurture" factors, encompassing both individual child effort and parental behaviours documented in this subsection, as well as the socioeconomic factors described below, which may affect the educational outcomes of boys and girls differently.

2.3. Socioeconomic factors

Our recent study, using linked census and administrative datasets, finds that socioeconomic advantage—measured by higher maternal or paternal education, home ownership, and attendance at schools with higher average AEDC test scores, but not household income or neighbourhood quality—improves educational outcomes for both males and females, but disproportionately benefits males, particularly those at the lower end of the test score distribution who exhibit lower developmental outcomes (Nguyen *et al.* 2026a). However, this pattern is observed only for developmental outcomes measured during early primary school. This result suggests that improvements in socioeconomic conditions, such as higher parental education, home ownership, and attendance at higher-quality schools, would benefit boys more than girls in terms of early primary school developmental outcomes. Moreover, we find that boys with poorer developmental outcomes in the early years of primary school benefit more from favourable socioeconomic conditions than boys with stronger developmental outcomes.

By contrast, for educational outcomes measured at the tertiary level, most indicators of socioeconomic advantage—particularly higher maternal education, higher household income, and home ownership—are associated with stronger benefits for females, especially those at the lower end of the educational attainment distribution, who have lower ATAR scores. Our finding of a reversal in the role of socioeconomic factors in contributing to gender gaps between the first year of primary school and the end of secondary school (i.e., ATAR) suggests that socioeconomic factors have different effects on educational achievement and attainment for boys and girls depending on the level of education. This reversal also suggests that other factors, including those identified in our studies such as birth weight, children's time allocation, and parental education, may interact with socioeconomic factors in shaping educational attainment and may have gender-differentiated effects, indicating a need for further research.

In summary, our studies show that gender differences in developmental outcomes observed prior to school entry (such as birth weight and pre-school cognitive skills) help to explain later-life differences in educational outcomes. We also find that additional factors—including children's time allocation, school sector choices, family socioeconomic characteristics (such as maternal and paternal education and home ownership), and school characteristics (as reflected in attendance at schools with more socioeconomically advantaged student populations)—partly explain the differences in educational outcomes documented above. However, our study also shows that the effects of these factors vary depending on the educational outcome considered, students' relative academic performance along the distribution, and the level of education attained. Taken together, the evidence suggests that both "nature" and "nurture" factors—and their potential interaction, which remains to be further explored—play a role in shaping gender differences in educational achievement and attainment.

3. Concluding remarks and suggestions for further studies

Our studies show that, in Australia, females tend to exhibit higher educational attainment and achievement than males across most educational and developmental outcomes, with mathematics being a notable exception. This gender difference is consistent with an emerging global trend in which women's educational attainment has risen relative to men, with females now achieving higher levels of educational attainment and achievement than males in many countries. Our research has also contributed to identifying factors that may help explain these gender differences in educational outcomes, including pre-school characteristics, time use, school sector choices, and socioeconomic factors.

While our studies have identified a range of factors—some of which are novel to the international literature—that contribute to gender gaps in educational attainment, thereby improving understanding of gender-based developmental disparities and providing evidence to inform interventions aimed at promoting better outcomes for both genders, several limitations remain and point to directions for future research. First, although our empirical methods are among the most rigorous currently feasible, the findings—particularly those relating to the role of socioeconomic factors—cannot be interpreted as causal. Further research using alternative datasets and more robust empirical methods would be valuable for examining educational and related outcomes not covered in our studies, and for identifying additional factors that may contribute to observed gender differences in educational attainment.

Second, despite females attaining higher levels of education, and notwithstanding the well-established broad benefits associated with higher education (Blundell *et al.* 1999; McCrary & Royer 2011; Clark & Royer 2013; Leigh 2025), our studies show that males in Australia continue to earn more than females (Chapman & Mulvey 1986; Nguyen *et al.* 2025), even after controlling for completed levels of education and fields of study. This persistent gender earnings gap in favour of males suggests that further research into broader educational outcomes not examined in prior studies, such as field of study, as well as the broader implications of gender differences in educational attainment for life outcomes—including family formation, fertility decisions, and labour market choices—would be worthwhile. Some of these ideas are the focus of an ongoing study by our team, which aims to explore the determinants and effects of education over the life course (Nguyen *et al.* 2026b).

Third, there is substantial scope for future research examining the effects of public policies on Australians' educational choices, as well as their potential impacts on gender differences in educational attainment, which remain underexplored in the Australian literature. One example is the Australian Government student loan scheme, which provides subsidised loans to students undertaking higher education and for which Professor Chapman, a member of our research team, is recognised as one of the principal architects (Chapman 1997; Chapman & Ryan 2005; Chapman & Dearden 2021). Another example is Minimum School Leaving Age policies, which determine the legally mandated age until which young Australians must remain in school and which are the subject of an ongoing study by our team (Nguyen *et al.* 2026b).

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