Why Some Students Succeed Against the Odds Academically?

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Abstract

While there is a well-documented correlation in the literature between a student's socioeconomic background and their academic performance, some students stand out from this pattern. Despite coming from socioeconomically disadvantaged families, some students are able to succeed academically during their schooling, and transition successfully into tertiary education. These students represent a minority in the general population. However, an even smaller subset within this group comprises those who, in addition to coming from disadvantaged families, also begin school with low academic performance yet manage to make remarkable progress, complete their schooling with high achievement, and ultimately gain access to tertiary education. This study focuses on these students, often regarded as outliers due to their exceptional academic journeys, labelling them as the 'Success Against the Odds' (SAO) group.

The central question of this study is:

> *What skills, supports, and circumstances enable students from disadvantaged backgrounds, who initially struggled academically, to make significant improvements during their school years and succeed against the odds?*

The study's first stage involved a secondary analysis of a rich Chilean national longitudinal dataset, tracking students from the age of 10 through to higher education (n = 95,156), covering socioeconomic, socioemotional, attitudinal, and academic variables. The analysis revealed that disadvantaged students who believe their intelligence is adaptable and capable of improvement were more than three times as likely to belong to the SAO group, demonstrating largely above-average academic progress from the beginning to the end of their schooling. Additionally, disadvantaged students attending selective Bicentennial Schools had more than four times the likelihood of being part of the SAO group.

These correlations prompted further investigation in stages 2 and 3 of this thesis. Stage 2 utilised a structured literature review of prior evidence to assess whether a causal relationship exists between a growth mindset and academic performance. This involved a review and analysis of the selected 26 Randomised Control Trials (RCTs), screened for quality assessment

using the Sieve methodology (Gorard, 2021) to evaluate trustworthiness. It revealed that the most robust studies showed minimal or negligible effect sizes (ranging from -0.008 to +0.054), suggesting that growth mindset interventions are unlikely to help disadvantaged students succeed against the odds. No substantial evidence of causality could be established.

Stage 3 examined the impact of Bicentennial Schools, a group of highly selective institutions in Chile. Secondary data was analysed in light of regulatory changes restricting selective admissions, allowing for adequate control of selection effects. This novel analysis, leveraging the 2016 regulation that gradually limited schools' selective admissions, demonstrates that students in cohorts where schools could select applicants outperformed their peers from non-selective schools, with attending a selective school accounting for up to 0.9% of variance in language and 2.3% of variance in mathematics. Conversely, when selection was reduced, the apparent impact diminished, approaching zero (0.1% in language and 0.3% in mathematics). This suggests that the positive outcomes associated with Bicentennial Schools primarily reflect the pre-existing academic abilities of the enrolled students rather than any superior educational quality of the schools. These findings indicate that attending a Bicentennial School does not directly enhance the academic performance of SAO students; rather, these schools tend to enrol SAO students at disproportionately high rates, possibly explaining why disadvantaged students attending Bicentennial Schools are 450% more likely to be part of the SAO group.

In the final research phase, as the factors most strongly correlated with SAO students were not causally related to their success, the study revisited the central question from an exploratory perspective. This stage encompassed 36 semi-structured interviews with disadvantaged students, including pupils who were and were not part of the SAO group, allowing them to tell their individual stories. The interviews explored a range of perceived influences, including family background, school experiences, personal characteristics, influential individuals, and topics raised by the students themselves.

Findings from this stage suggest, unsurprisingly, that no single factor explains why a small number of disadvantaged students with initially low academic performance are able to improve so considerably. Instead, various circumstances could lead to a shift in their attitude towards learning. Influential individuals may enter their lives at pivotal moments, such as a supportive stepparent, a concerned grandparent, or a dedicated teacher. These played a key role, as may

school interventions like grade retention, which pushed students to apply themselves with greater effort, or, in some cases, psychological support that helped students with out-of-school issues. For other students, internal psychological growth led to a newfound focus on school.

In conclusion, it does not appear that there is a single characteristic or circumstance that enables these students to make substantial academic gains. Rather, a series of incidental life circumstances and influential figures could shape their academic journeys. This may explain why the traits explored in stages 1 and 2, which are strongly associated with SAO students, appear to be consequences rather than causal factors. However, most SAO students could identify important adults who entered their lives at a crucial point and to whom they attributed an influential role in their life and academic success.

As education systems strive to promote social mobility and equal opportunities for disadvantaged individuals, this thesis provides critical insights for policymakers aiming to support students from underprivileged backgrounds. The findings indicate that short, targeted interventions, such as growth mindset programmes, do not meaningfully enhance academic performance, and that enrolment in a selective school is not inherently beneficial. The beliefs of disadvantaged students about academic excellence and their ability to perform beyond expectations may actually be natural traits within a subgroup. Established interventions may not demonstrate any widespread impact on a larger disadvantaged population.

Instead, deep, supportive relationships with individuals like family members, teachers, social workers, and counsellors, who can provide ongoing support and guidance, may play an important role in enhancing academic success for disadvantaged students. The findings from student narratives reveal that stability and support from positive adult relationships can provide students with the emotional strength, support, and motivation needed to improve their academic performance.

The research findings emphasise that not all students who experience lifelong socioeconomic disadvantage are destined to fail in their academic journey. The existence of a group of students who, despite coming from highly economically disadvantaged backgrounds and beginning their schooling with low academic performance, manage to overcome their difficulties, catch up, and ultimately succeed—finishing school with strong academic outcomes and gaining

access to higher education—should serve as a source of hope for society. It should also serve as a powerful motivator for all those involved in education systems, from policymakers who design educational policies to practitioners who implement them in classrooms and parents who strive to support their children's learning. At the same time, this reality imposes a responsibility on education systems to better understand and foster the conditions that enable such success. Education systems must offer effective support to students living in economically disadvantaged situations, giving them a better chance to overcome adverse life circumstances and academic underachievement and to succeed against the odds.

Key words: Success Against the Odds, Disadvantage, growth mindset, selective schools.

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ATT	Average Treatment Effect on the Treated
CHAA	Consistently High Academic Achievers
CRUCH	Council of Deans of Chilean Universities (*Consejo de Rectores de las Universidades Chilenas*)
GPA	Grade Point Average
ITT	Intent to Treat
PRISMA	Preferred Reporting Items for Systematic Reviews and Meta-Analyses
SD	Standard Deviation
SLEPs	Local Public Education Services
OECD	Organisation for Economic Co-operation and Development
RCT	Randomised controlled trial
SES	Socioeconomic status
SIMCE	Education Quality Measurement System (*Sistema de Medición de la Calidad de la Educación*
SAO	Success Against the Odds

Declaration

I declare that this thesis is my own work and has not previously been submitted elsewhere for any other qualification or degree. Part of this thesis, the systematic review of growth mindset interventions has been published in peer-reviewed journal. Below is the reference of the publication:

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Section One: Background

Chapter 1 Introduction

1.1. Research Background

Education has long been viewed as a key avenue for promoting social mobility, with one of its fundamental goals being to create equal opportunities for individuals, regardless of their socioeconomic origins. This expectation is primarily grounded in the positive correlation between educational attainment and later socioeconomic status. Numerous studies have documented that higher levels of education are strongly associated with improved economic outcomes, including higher income, better job prospects, and increased social status (Ceci & Williams, 1997; Psacharopoulos, 1973; Murphy & Welch, 1989; Gunderson & Oreopolous, 2020). Such findings foster the belief that education can serve as a great equaliser, potentially narrowing the socioeconomic divide by providing children from disadvantaged backgrounds with the tools needed to improve their circumstances.

However, substantial evidence challenges this somewhat optimistic view. Students from wealthier backgrounds consistently academically outperform disadvantaged students, have lower dropout rates, and are more likely to complete tertiary education compared to their peers from low-income households. As a result, the potential for education to act as a driver of social mobility is limited. Research indicates that educational systems often reflect, and sometimes even reinforce, existing social inequalities rather than mitigate them (Anders, 2012; Haveman & Smeeding, 2006; Schmidt et al., 2015).

Extensive evidence underscores the relationship between family socioeconomic status (SES) and students' academic achievement and long-term success. An early and influential study, the Coleman Report (1968), highlighted a strong correlation between family SES and students' academic outcomes. White's (1982) meta-analysis of 200 studies found that the correlation between SES and academic achievement ranged from 0.22 to 0.73. Similarly, Sirin's (2005) meta-analysis reported correlations ranging from 0.25 to 0.47, depending on the method used to measure SES. Furthermore, Sirin noted that the strength of this relationship appeared to increase as students progressed from kindergarten to middle school.

Using UK data, Sullivan et al. (2013) analysed the Millennium Cohort Study and found that social class and parental education significantly contributed to inequalities in test scores by age seven. They also observed a widening achievement gap between ages five and seven. Crawford et al. (2014) corroborated these findings, reporting that less than 9% of children from disadvantaged backgrounds achieved level 3 in Key Stage 1 math and reading, compared with 27% of their more affluent peers. At Key Stage 2, only 7% of poor students (eligible for free school meals) reached level 5 in English and math, compared to 19% of other students. Gorard and See (2013) further confirmed that students eligible for free school meals were statistically less likely to attain a grade C or higher in English or math by age 16 in England.

A similar pattern is evident in Chile. Neilson (2013) documented an achievement gap of 0.36 standard deviations in mathematics and reading scores by age 12 between students from the lowest 40% of income households and those from the top 60%. This gap widened to 0.72 standard deviations when comparing students whose mothers had tertiary education with those whose mothers had not completed secondary school. These findings collectively demonstrate the pervasive influence of SES and family background on educational outcomes across diverse contexts, with persistent disparities that deepen over time.

Nonetheless, noteworthy exceptions do exist to this link between family SES and student achievement. Teachers often recall students who excel academically, complete their studies, and even graduate from university despite facing substantial socioeconomic and personal challenges. These students are frequently labelled “resilient” or as “beating the odds.” In educational research, resilience usually refers to a set of non-cognitive skills and attributes that allow certain students, despite their disadvantaged backgrounds, to achieve strong academic outcomes (Agasisti & Longobardi, 2017).

Gaining a clearer understanding of the skills, supports, and circumstances that enable these resilient students to succeed against the odds would be invaluable. Such insights could inform the development of programmes and policies aimed at fostering resilience among students from similar backgrounds, enhancing their academic outcomes, and creating a more level playing field. By identifying the specific factors that help disadvantaged students overcome the typical SES-achievement link, educators and policymakers could better rely on evidence-based

research to develop effective and targeted interventions to support broader social mobility through education.

Despite the potential impact of such insights, the knowledge about what enables these resilient students to succeed remains limited. Much of the existing research relies on interviews with successful students, often without a comparison group and based on small sample sizes, which limits the generalisability of findings. Other studies use secondary data analysis from international assessments, but these non-experimental designs can only identify correlations with resilience without establishing causation. Consequently, more rigorous research is needed to identify the precise mechanisms that drive resilience and academic success among disadvantaged students, laying the groundwork for evidence-based interventions that can more effectively promote social mobility. That is the purpose of the new research described here.

1.2. Research question

The following primary research question guides this study:

Primary Research Question:

> Which skills, support, and circumstances enable students from disadvantaged backgrounds who initially struggled academically but made substantial improvements during their school years to 'succeed against the odds' by excelling academically?

While this question could have been framed more broadly to include socioeconomically disadvantaged students who achieve high academic outcomes—a common definition of Success Against the Odds (SAO) in the literature—this thesis specifically focuses on students who not only come from socioeconomically disadvantaged backgrounds but also begin their schooling with low academic performance. Two main reasons drive this narrower focus.

First, national pupil data linked longitudinally for the identification of these students, tracking, and comparing their academic trajectories through all phases of education, was available. This presents a distinct advantage over much of the evidence on SAO literature, which often relies

on cross-sectional data and case study approaches of non-random and small-scale samples. Second, this focus aligns with the goal of identifying interventions that can help other socioeconomically disadvantaged students with low academic performance improve their outcomes and ultimately succeed against the odds.

Students who start school with high academic performance may differ considerably from those who begin with low performance, particularly regarding personal abilities, intellectual development, and family support. Therefore, this thesis explores how students who initially underperform in school overcome these challenges and achieve academic success later on. The factors enabling their improvement are more likely to be relevant and feasible for helping other low-performing students achieve better outcomes.

A secondary data analysis was conducted to explore this question, revealing two important correlations. First, students from disadvantaged backgrounds demonstrated a higher likelihood of succeeding academically if they possessed a growth mindset. Second, students were even more likely to succeed against the odds if they attended a particular group of selective high schools known as Bicentennial Schools. These findings lead to two secondary research questions:

Secondary Research Questions:

(1) Does the belief that intelligence is adaptable and capable of improvement positively influence students' academic achievement?

(2) Do selective schools (Bicentennial Schools) positively impact students' academic performance?

This research employs various research methods and designs to investigate these questions, providing rigorous evidence that may inform educational policies and interventions aimed at promoting academic resilience among disadvantaged students.

1.3. Overview

This thesis is organised to systematically explore the research questions, progressing from an analysis of existing national student data to an in-depth analysis of findings and their implications. Chapter 2 begins with an introduction to key concepts that are relevant to this research. Chapter 3 then reviews the current literature directly relevant to the research questions. Chapter 4 presents the Chilean Education System and its main reforms. Chapter 5 examines the significance of this research, discussing its potential contributions to academic and practical domains. Chapter 6 presents the research context and objectives in detail, providing a focused direction for the study and an overview of the structure and content of the subsequent chapters.

The second section of the thesis, comprising four chapters, outlines the research designs and methods. Each chapter focuses on a distinct methodological approach used to address the research questions, providing a comprehensive overview of the study's research designs.

The third section, consisting of four chapters, presents the results and findings derived from these methods.

Finally, the fourth section concludes the thesis by synthesising the findings and discussing their broader implications. Additionally, it addresses the challenges of identifying students who succeed against the odds. This section also examines the study's limitations and suggests directions for future research.

Throughout this thesis, attention will be drawn to the personal characteristics and specific circumstances that appear to set apart those socioeconomically disadvantaged students who, despite starting school with low academic performance, managed to improve over time and ultimately achieved outstanding academic outcomes. Simultaneously, the complexity of attributing their success to any single factor will be explored, underscoring the challenges of establishing causal links between these traits and the remarkable progress made in the face of adversity.

Chapter 2 Key Concepts

This chapter introduces key concepts fundamental to understanding this thesis: Success Against the Odds (SAO), Consistently High Academic Achievers (CHAA), Disadvantaged Students, Growth Mindset, Bicentennial Schools, and the Centralised Admission System. These terms are defined here to provide clarity, as some—such as Bicentennial Schools and the Centralised Admission System—are specific to the Chilean context, while others—like SAO, Disadvantaged Students, and Growth Mindset—are crucial for interpreting the analysis presented in the following chapters.

2.1. Success Against the Odds (SAO)

For the purposes of this research, Success Against the Odds refers to the academic and life experience of students from low socioeconomic backgrounds who start their school years with low academic performance but achieve substantial academic improvements throughout their education. These students are a minority within the population and are often seen as outliers, as their progress diverges notably from typical educational trajectories among disadvantaged students.

In the literature, a broader definition of success against the odds is commonly found, encompassing all disadvantaged students who achieve high academic outcomes, regardless of their initial academic performance. However, in this thesis, the primary interest is in disadvantaged students who achieve academic success at the end of their school journey, given that they started with low academic achievement. This focus answers the interest of identifying interventions that can help other socioeconomically disadvantaged students with low initial academic performance improve their outcomes and ultimately succeed against the odds.

2.2. Consistently High Academic Achievers (CHAA)

In the fourth stage of this thesis, a group of students from socially disadvantaged backgrounds who have consistently demonstrated high academic performance throughout their entire educational trajectory are identified as Consistently High Academic Achievers (CHAA). Although these students could also be considered as individuals who succeed against the odds, they have been distinguished as a separate group because, in terms of the support they require and the support they have received in their past, they exhibit significant differences from the group previously defined as Success Against the Odds (SAO). The latter group comprises students who, despite sharing a similar socio-economic background and ultimately achieving high academic performance, do not do so consistently; instead, they begin their schooling with low academic performance.

For CHAA students, longitudinal data on their early life education shows a high academic performance from the beginning of their schooling years that continues during secondary school. By contrast, longitudinal data on SAO students show strong positive improvement in their academic performance from the early years of schooling to secondary school.

2.3. Disadvantaged Students

Disadvantaged students can face a range of challenges, including psychological, physical, mental, economic, and social disadvantages. However, for the purposes of this research, disadvantaged students will specifically refer to those who face socioeconomic disadvantages within their families. This definition pertains to students whose families have low incomes, parents with little school experience, or low educational qualifications.

2.4. Growth Mindset

The concept of a growth mindset was proposed by psychologist Carol Dweck, who describes two primary ways individuals perceive their abilities. Some students hold an entity theory, viewing their intelligence as fixed and striving to validate their innate ability. In contrast, those

with a growth mindset see intelligence as flexible and capable of improvement, motivating them to focus on developing their abilities (Dweck, 2000). Research shows that students with a growth mindset are more likely to persist through academic challenges, respond constructively to feedback, and achieve higher academic performance than those with a fixed mindset (Blackwell, Trzesniewski, & Dweck, 2007). Educational interventions designed to foster a growth mindset aim to reshape students' beliefs about their potential, highlighting that intelligence can be developed through effort and effective strategies (Yeager & Dweck, 2020).

Dweck (2000) extends the concept of people's beliefs about intelligence to encompass beliefs about other attributes, such as personality and social traits. However, for the purposes of this study, the focus will be solely on students' beliefs regarding the malleability of intelligence, not other attributes.

2.5. *Sistema de Medición de Calidad de la Educación* (SIMCE)

The *Sistema de Medición de Calidad de la Educación* (SIMCE) is Chile's national system for assessing educational outcomes. Established in 1988, this census-based assessment primarily evaluates learning in math and Spanish (reading and writing), with additional assessments in science and social studies in specific years. SIMCE assessments are conducted in grades 4, 6, 8, and 10, with grade 4 assessed annually, while grades 6, 8, and 10 are assessed in alternating years. From 2012 to 2018, however, grade 10 was evaluated continuously. In 2019, the SIMCE assessment for grade 10 was paused due to social unrest, and in 2020 and 2021, no SIMCE assessments were administered due to the COVID-19 pandemic.

The SIMCE evaluations are accompanied by comprehensive surveys for students, parents, and teachers, providing a wealth of supplementary data. The student survey includes questions on topics such as homework, study habits, reading practices, participation in extracurricular activities, substance use, self-perceptions, learning capacity, personal abilities, sense of belonging at school, educational aspirations, growth mindset, attitudes toward negative behaviours, and perceptions of the school environment. These perceptions cover aspects like respect among students and teachers, overall opinions about the school, health and nutrition, physical activity, bullying, discrimination, violence, extracurricular opportunities, and teacher

support. SMICE is available on request and is easily accessible for researchers and policy initiatives.

The parent survey gathers information about the family context, including the parents' age, relationship with the student, household composition, parental education level, monthly income range, number of books in the home, internet and computer access, ethnicity and language, and perceptions of the school environment. Parents are asked about issues such as school violence and bullying, quality of education and teaching staff, respect among students and teachers, parental involvement and support, overall opinions on the school, and school-related activities.

SIMCE does not carry individual student stakes, unlike other national educational assessment systems. Designed to evaluate the performance of classrooms, schools, municipalities, regions, and the Chilean educational system, SIMCE does not impact individual students directly. Students do not receive their scores individually, nor are schools provided with each student's performance. Instead, the results are presented to schools as aggregated scores by class.

Details of the historical development of SIMCE are given in Chapter 4.

2.6. Bicentennial Schools: Selective Schools in Chile

The Bicentennial Program was launched in Chile between 2011 and 2012, expanding access to selective secondary education across the country. Previously, Chile had a limited number of highly selective secondary schools, primarily concentrated in certain areas of the capital city, referred to as Emblematic Schools due to their longstanding tradition. The Bicentennial Schools policy introduced 60 high schools across diverse regions, basing admission on academic performance. Following a call for applications in 2010, 195 schools applied, with 60 selected based on proposals outlining ambitious and comprehensive educational projects designed to improve performance on standardised tests (Ortiz, 2022). Of these selected schools, 20 were newly established, 38 were existing schools that adapted their programs to align with the Bicentennial Program's standards, and 2 were schools already meeting the program's objectives, expanding their capacity by joining the initiative (Araya & Dussaillant, 2020).

The selected schools received pedagogical support from the Ministry of Education, including a dedicated team to monitor, advise, and support their progress. The program set high performance goals, targeting the top 10% of schools in the national test (SIMCE) and the top 5% in the higher education entrance exam. Additionally, the schools could apply for substantial funding—up to $1.8 million for new schools and $0.9 million for existing ones (Araya & Dussaillant, 2020).

Between 2018 and 2022, additional schools joined the original cohort of Bicentennial Schools. However, this study will focus exclusively on the initial group of schools, as their longer track record enables detailed cohort comparisons and longitudinal data analysis.

Most of the Bicentennial Schools in this study initially required applicants to have a previous Grade Point Average (GPA) of 6 on a scale of 1 to 7, and additionally, the schools conducted admission tests as part of their selection criteria (Araya & Dussaillant, 2020). These selection processes are no longer in effect.

2.7. Centralised Admission System and End of Selection

In 2014, the Chilean government embarked on a new educational reform aimed at reducing segregation within the school system, responding to evidence indicating that Chile had one of the most segregated education systems among OECD countries (OECD, 2019). As part of this reform, a centralised admission system was gradually implemented. Under the new system, schools were prohibited from selecting their students. Instead, if spaces were available, each student was accepted into their preferred school. In cases of excess demand, student allocation followed four criteria: preference was given to siblings of current students, children of school staff, and former students, and a 15% quota was reserved for students from lower-income backgrounds. If places remained available, they were assigned randomly. Notably, the Chilean system lacked geographical restrictions, and proximity to the institution did not influence priority (Villar, 2020).

The new system was introduced to address the high level of segregation in Chile's school system. According to OECD data based on the PISA test, Chile has one of the highest levels

of socio-economic school segregation, as middle-class students leave public schools for socio-economically segregated institutions with admission requirements that often exclude lower-income students (OECD, 2019). Additionally, the system aimed to simplify the application process by replacing multiple, inconsistent admission procedures, each requiring different documentation, with a unified and more accessible system for parents.

The reform was implemented gradually, with one region initiating the centralised process in 2017, four additional regions in 2018, and nationwide implementation, except for the capital region, in 2019. Finally, in 2020, the entire country was included. However, the transition was more gradual for selective schools, including Bicentennial Schools. In the initial year of reform implementation, these schools were permitted to use selection exams for 85% of their students. This percentage decreased in subsequent years until reaching 30%, after which selection exams were prohibited, though schools could reserve 30% of vacancies for students from the top 20% of their previous school (Honey & Carrasco, 2019).

In the sample used to analyse the impact of Bicentennial Schools on the third stage of this research (detailed in Chapter 9), only the last cohort (Cohort 2022) was impacted by the new admission system. By 2019, when this cohort entered year 7, 80% of Bicentennial Schools were already subject to the Centralised Admission System, with only 10% of spaces reserved for academically elite students (estimated based on Ministry of Education data). The remaining 20% of Bicentennial Schools, located in the capital region, had not yet transitioned to the centralised admission system and continued to conduct localised admission processes with their own criteria. Although the exact percentage of academically selected students in these schools cannot be determined, reports indicate that schools' principals anticipated the reform by reducing the proportion of students selected based on academic criteria in preparation for randomised selection (La Tercera, 2019). Nevertheless, assuming 100% of spaces were subject to academic selection, it would imply that only 26% of students in the 2022 cohort were selected based on academic criteria. The details that led to this reform and the impacts that have been assessed are presented in Chapter 4.

Chapter 3 Conceptual Basis on Key Issues Explored in This Thesis

This chapter provides a conceptual basis and literature review outlining the current state of research relevant to the questions explored in this study. The first section summarises key findings from the literature on disadvantaged students who succeed against the odds, highlighting the factors that appear to contribute to their resilience and academic success. Next, sections two and three of this chapter review the existing literature on two specific topics: the role of a growth mindset in enhancing academic achievement and the academic impact of selective schools. The inclusion and discussion of these topics at this stage present an academic context as well as broader debates relevant to the findings of the first stage of the research, presented in Chapter 11. Given their importance, stages two and three of the thesis investigate these topics in greater depth. Accordingly, a comprehensive review and critique of the literature relating to each is provided here.

3.1. Theoretical Perspective on Students Who Succeed Against the Odds

Students who achieve strong academic results despite facing disadvantageous circumstances are known by various terms in the literature, including "resilient students," "students who beat the odds," or "students who succeed against the odds." Numerous studies have explored these students' experiences, often through interviews with those from disadvantaged backgrounds who have excelled academically or gained admission to prestigious universities. While these studies provide valuable insights into students' lived experiences and perspectives on the factors that supported their success, they frequently lack comparison groups, as they do not include students from similar backgrounds who did not achieve comparable outcomes. Additionally, these studies are often limited by small sample sizes and selection bias, which constrains the generalisability of their findings. Nonetheless, life histories can inform a detailed analysis and give context about the lives of these students.

Studies based on secondary data analysis can also be found in the literature, often drawing on large-scale international assessments such as PISA or TIMSS. By examining key characteristics, these studies identify resilient students and differentiate them from their "non-

resilient" peers. Typically, these studies utilise relevant samples and comparison groups, providing a broader context. However, because of their non-experimental design, they can only identify correlations between certain characteristics and resilience rather than establish relationships of causality.

Findings from the most rigorous studies can be organised into four categories: personal characteristics, family characteristics, school characteristics, and teacher-related factors.

a. Personal Characteristics

The personal characteristics of students who have succeeded against the odds have been widely examined in the literature. These include both demographic factors and psychological traits, such as motivation, self-perception, and persistence, as well as cognitive attributes.

a.1. Demographic

Gender has been extensively studied in relation to resilience, yielding inconsistent results (Ye et al., 2024). Some research suggests that female students exhibit higher resilience levels than their male counterparts (Yavuz & Kutlu, 2016; Hofmeyr, 2019), while others report no relevant gender differences (Miller et al., 2013; OECD, 2011).

Regarding ethnicity and home language, native students tend to be slightly overrepresented among resilient individuals compared to immigrant students or second-generation immigrant students (OECD, 2011). Speaking the language of instruction at home also offers a marginal advantage in the probability of showing academic resilience (OECD, 2011).

a.2. Motivation

Motivation is a fundamental component of academic resilience. Research indicates that disadvantaged students who succeed against the odds frequently demonstrate strong motivation and a keen interest in academic subjects (Borman & Overman, 2004; Thorsen et al., 2021; Waxman & Huang, 1996).

Furthermore, studies reveal that students who succeed against the odds tend to exhibit high levels of intrinsic motivation (Cui et al., 2022; King, 2014; Thorsen et al., 2021; Siraj-

Blatchford et al., 2013). Resilient students are also more likely to adopt a positive attitude towards their lessons and teachers. They dedicate more time and effort to studying than their peers, contributing significantly to their academic success (Özden & Atasoy, 2020).

This finding aligns with the results from interviews conducted in this investigation with disadvantaged students who succeed against the odds, as detailed in Chapter 14. In these interviews, one student remarked, "I motivate myself. I think my own enthusiasm and drive have helped me do well at school". Another student explained that achieving good grades has always been important to her; as a result, she has consistently committed herself to her studies, believing that this dedication has been the decisive factor in her strong academic performance.

a.3. Self-Efficacy and Self-Perception

Research consistently demonstrates that resilient students exhibit high levels of academic self-efficacy, hold positive perceptions of their cognitive abilities, and demonstrate greater self-esteem compared to their peers with lower academic performance (Borman & Overman, 2004; Cunningham & Swanson, 2010; Ge & Ngai, 2020; Rouse, 2001; Siraj-Blatchford et al., 2013; Süleyman et al., 2022; Victor-Aigboidion et al., 2020; Wang et al., 2022; Waxman & Huang, 1996; Ye et al., 2024).

Several studies suggest that students' self-perceptions of their academic abilities are among the most relevant predictors of academic resilience (García-Crespo et al., 2022; Gizir & Aydin, 2009; Mohan & Kaur, 2021; Özden & Atasoy, 2020).

Further evidence highlights the role of subject-specific self-confidence in academic success. Hofmeyr (2019) identified a strong relationship between self-confidence in a specific subject and the ability of disadvantaged students to perform beyond expectations in that subject. Additionally, academic and computer self-efficacy have been recognised as pivotal factors in fostering academic resilience (Ye et al., 2024). According to an OECD (2011) report on student resilience in science, self-confident students are 1.95 times more likely to demonstrate resilience than non-self-confident students, even after controlling for student and school-level factors.

Research focused on immigrant students further underscores the importance of self-efficacy. For instance, Anagnostaki et al. (2016) found that immigrant students with higher levels of self-efficacy were more likely to achieve strong academic outcomes.

The importance of the perception of their own academic abilities also aligns with the comments of successful disadvantaged students interviewed in this study (Details in Chapter 14). Many of the interviewed students commented that they believed they were smart, and they attributed their academic success to this factor:

I am smart, I have always been, and that helps me a lot.

I do well because I am smart.

a.4. Locus of control

Resilient students tend to exhibit an internal locus of control, taking personal responsibility for their actions and believing in their ability to influence their school experiences and outcomes (Anagnostaki et al., 2016; Borman & Overman, 2004; Cappella & Weinstein, 2001; King, 2014; McMillan & Reed, 1993; Morales, 2008; Rouse, 2001; Siraj-Blatchford et al., 2013; Thorsen et al., 2021; Ye et al., 2024). They are proactive in setting long-term goals and maintain a positive outlook on their capacity to achieve them, demonstrating perseverance and self-determination (Anagnostaki et al., 2016; Borman & Overman, 2004; Cappella & Weinstein, 2001; McMillan & Reed, 1993; Ye et al., 2024).

a.5. Self-regulation and Persistence

Self-regulation is positively associated with academic resilience, with research highlighting its importance in supporting students' ability to succeed despite adversity (Koirikivi et al., 2021; King, 2014; Kumi-Yeboah, 2020; Nota et al., 2004; Siraj-Blatchford et al., 2013; Thorsen et al., 2021; Ye et al., 2024). Attributes such as willpower, self-control, and self-management are essential for disadvantaged students who succeed against the odds (Özden & Atasoy, 2020).

Furthermore, disadvantaged students who succeed against the odds also exhibit high levels of persistence and perseverance, enabling them to overcome challenges and maintain focus on

their academic goals (King, 2014; Siraj-Blatchford et al., 2013; Thorsen et al., 2021; Wills & Hofmeyr, 2019; Ye et al., 2024).

a.6. Attitude and Behaviour at School

Students who value school demonstrate a positive correlation with academic resilience (Ye et al., 2024; Gayles, 2005; Collie et al., 2017b). Specifically, students' attitudes toward subjects like mathematics and computers have been found to predict academic resilience (Ye et al., 2024; Erberer et al., 2015; Agasisti & Longobardi, 2014).

Disadvantaged students who succeed against the odds actively engage in school activities. They attend classes punctually and prepared, complete assignments diligently, and avoid disruptive behaviour (Finn & Rock, 1997). Additionally, these students invest significant effort into their schoolwork and show higher rates of homework completion (Finn & Rock, 1997; Lee et al., 1991). Resilient students use their time more effectively during and after school (Lee et al., 1991).

A sense of belonging within the school environment further enhances resilience. Students who succeed against the odds often feel more connected to their school community compared to their peers, which fosters their academic resilience (Garcia-Crespo et al., 2021; Ye et al., 2024; Wang et al., 2022; Patterson, 2012; Catterall, 1998). Schools where students experience a strong sense of belonging tend to have higher numbers of resilient learners (Bostwick et al., 2022).

a.7. Student Expectations

Career and academic expectations have been shown to predict academic resilience (Ye et al., 2024; Cui et al., 2022; Vicente et al., 2021; Kong, 2020; Thiessen, 2008; Wills & Hofmeyr, 2019). According to Erberer et al. (2015), students' high educational aspirations were identified as the strongest and most consistent predictor of academic resilience. Similarly, Gizir and Aydin (2009) found that higher educational aspirations were the second most important internal protective factor, positively influencing students' academic resilience.

a.8. Cognitive Skills and Trajectories

As expected, students' cognitive skills positively correlate with academic resilience (Ye et al., 2024). Skills such as remembering, summarising, and understanding have been identified as key predictors of resilience in academic contexts (Süleyman, 2022).

Furthermore, longitudinal research highlights that positive academic trajectories often originate in early childhood. Skills developed during this critical period serve as strong predictors of later academic success (Siraj-Blatchford et al., 2013; Cordero & Mateos-Romero, 2021).

a.9. Approach to Reading

A notable characteristic of resilient students is their approach to reading: they exhibit high self-efficacy and engagement, deriving both enjoyment and motivation from the activity (Agasisti & Longobardi, 2014; Wang et al., 2022; Gomez et al., 2015; Cheung et al., 2014; Ye et al., 2024; Vicente et al., 2021). Furthermore, applying metacognitive strategies in reading has been identified as a relevant predictor of academic resilience (Süleyman et al., 2022).

a.10. Other Personal Characteristics

The literature highlights additional traits associated with students from disadvantaged socioeconomic backgrounds who succeed against the odds. Although these characteristics have been studied less extensively than those discussed earlier, they provide valuable insights.

Students who succeed against the odds often exhibit higher task orientation than their less successful peers (Waxman & Huang, 1996). They also tend to display greater competitiveness. Süleyman et al. (2022) found that competitive students are 15% more likely to demonstrate academic resilience. Furthermore, Gizir and Aydin (2009) identified empathy as a protective factor, positively correlating with academic resilience. Resilient students were also observed to be more autonomous and to demonstrate a strong emphasis on goal setting (Özden & Atasoy, 2020).

Conversely, there is a negative association between anxiety levels and the likelihood of students succeeding against the odds (Ye et al., 2024; Mohan & Kaur, 2021; Fiorilli et al., 2020). Similarly, students who experience bullying are less likely to succeed against the odds,

as evidenced by a negative correlation between bullying and academic resilience (Erberer et al., 2015).

Lastly, students who succeed against the odds tend to adopt more advanced learning strategies, including metacognition and problem-solving, which enhance their ability to achieve academic success (Wang et al., 2022; Siraj-Blatchford et al., 2013).

b. Family characteristics

Family characteristics encompass both the traits into which children are born—those determined prior to birth—and those arising from the interactions between parents and their children, along with the relationships among other family members.

The role of family structure in determining the likelihood of students succeeding against the odds remains a topic of debate within the literature. While some studies suggest that students from two-parent families are more likely to succeed against the odds (Ye et al., 2024; Thiessen, 2008; Langenkamp, 2010), other research has found no significant relationship between family structure and students' resilience (Agasisti & Longobardi, 2014). Similarly, the influence of having siblings is inconclusive, with no consistent relationship established (Ye et al., 2024; Cheung et al., 2014).

However, the critical role of family attitudes and behaviours is consistently emphasised. Students who succeed against the odds often come from families that place a high value on education, show respect for schools and teachers, create enriching home learning environments, and actively support their children's participation in extracurricular activities (Siraj-Blatchford et al., 2013; Vivian et al., 2022).

In addition, high parental expectations regarding their children's behaviour and academic performance have been strongly associated with academic resilience (Siraj-Blatchford et al., 2013; Cunningham & Swanson, 2010). Notably, some studies have identified these expectations as the most important external protective factor in predicting resilience (Gizir & Aydin, 2009; Pan & Yi, 2011; Sacker & Schoon, 2007).

b.1. The Role of Parent-Child Relationships in Academic Resilience

Research consistently underscores the importance of a positive parent–child relationship in fostering students' resilience (Ye et al., 2024; Pan & Yi, 2011; Paat, 2015; Oldfield et al., 2020). Specifically, Kong (2020) demonstrated that a strong parent–child bond is linked to higher resilience, particularly among low-SES female students.

This positive correlation between parent–child relationships and resilience is further evident in the context of parental involvement in their children's education. Many studies have shown that parental support and active engagement in education significantly enhance the likelihood of success for students from disadvantaged backgrounds (Ye et al., 2024; Cunningham & Swanson, 2010; Pan & Yi, 2011; Schoon et al., 2004). Notably, Anagnostaki et al. (2016) found that immigrant students tend to perform better academically when their parents are more involved in their education. Likewise, Bester and Kuyper (2020) reported a strong link between parental involvement and resilience among students from extreme poverty backgrounds.

However, some studies reveal findings that challenge this generally favourable trend. For instance, Cui et al. (2022) observed that while parental involvement is generally linked to academic achievement, it has a negative impact on resilience during adolescence, mainly when parents are heavily engaged in students' studies. Similarly, Wills and Hofmeyr (2019) found that parental assistance with homework can undermine resilience, potentially hindering students' success in overcoming challenges.

The importance of parental involvement in the early years of school was frequently mentioned in the interviews with disadvantaged students conducted in the latter part of this thesis. Most disadvantaged students who had continually achieved high academic success attribute part of their achievement to the involvement of their mothers. For example, one student highlights her mother's strong involvement in her education, emphasising the expectation to study and finish her homework right after getting home. Another student credits his achievements to his parents' encouragement and motivation, who have continuously pushed him to study and have rewarded him for his good grades.

c. School factors.

School-related factors are usually the most relevant for public policy, as they represent the areas where policy interventions can exert the greatest impact. These encompass the distribution of students across schools, the overall school climate, as well as the academic support and instructional practices implemented within schools.

c.1. School Socioeconomic Factors, Location and School Dependency.

Schools with a higher concentration of resilient students tend to share several key characteristics. These schools typically enrol students from higher-than-average socioeconomic backgrounds and exhibit greater socioeconomic diversity within the student body (Zhang & Hu, 2019; Mateos-Romero, 2021; Ye et al., 2024; Cui et al., 2022; Erberer et al., 2015; Wills & Hofmeyr, 2019; Vicente et al., 2021).

In addition to the socioeconomic status (SES) of the students, the location of the school has been shown to play a role. Schools in urban areas or densely populated regions are more likely to have academically resilient students (Ye et al., 2024; Agasisti & Longobardi, 2014; Ge & Ngai, 2020).

However, no clear pattern has emerged regarding the influence of school types on the likelihood of enrolling students who succeed against the odds. Whether a school is public or private, the results remain inconclusive regarding its probability of being attended by resilient students (Ye et al., 2024; Agasisti & Longobardi, 2014; Vicente et al., 2021).

c.2. School Climate

School climate has been identified as a critical factor in fostering student resilience. A positive school climate—characterised by supportive relationships and effective disciplinary practices—is consistently associated with higher levels of resilience (Zhang & Hu, 2019; Agasisti et al., 2021). Similarly, more orderly and safe school environments positively correlate with students' resilience (Ye et al., 2024; Borman & Overman, 2004; Gazmuri et al., 2015; Koirikivi et al., 2021). Teachers who establish order in the classroom and cultivate a safe, structured environment enhance the likelihood of students demonstrating academic resilience

(García-Crespo et al., 2021). Schools with higher classroom management tend to have higher levels of resilient students one year later (Bostwick et al., 2022).

Factors related to discipline, such as attendance, also play a relevant role. Regular attendance has been found to positively correlate with resilience (Thiessen, 2008; Fantuzzo et al., 2012; Hofmeyr, 2019). Additionally, when head teachers actively address student behaviour, particularly in reducing absenteeism, the probability of the school nurturing resilient students increases (Agasisti & Longobardi, 2014).

In contrast, a discriminatory or disruptive school climate has been shown to hinder the development of academic resilience. Adverse school environments can undermine students' ability to adapt and succeed in the face of challenges (Wang et al., 2022; Cordero & Mateos-Romero, 2021).

c.3. School Academic Support

School academic support has also been shown to correlate with students succeeding against the odds. Providing additional educational resources, such as extra tuition time, promotes resilient behaviour, particularly among students from extremely impoverished backgrounds (Bester & Kuyper, 2020; Ye et al., 2024).

Furthermore, schools that offer a wide range of high-quality extracurricular activities are more likely to foster resilience among their students (Agasisti & Longobardi, 2014; Randolph et al., 2004; Ye et al., 2024).

Additionally, the OECD (2011) report on disadvantaged students who succeed in school against the odds highlights that the possibility to attend more science courses provides greater benefits to socioeconomically disadvantaged students. The report shows that resilient students spend more time learning science than their low-achieving counterparts. According to the report, the odds of academically succeeding for disadvantaged students who spend an additional hour per week in science classes are 1.27 times higher than those of disadvantaged students who do not attend science classes at school (OECD, 2011).

c.4. Instructional practices

Instructional practices that benefit resilient students include teacher-directed lessons, additional instructional time in core subjects, comprehensive textbook coverage, and regular assessments (Wells, 1996; Agasisti et al., 2021; Siraj-Blatchford et al., 2013). Teaching emphasising comprehension and reflection positively correlates with students' resilience (Garcia-Crespo et al., 2021).

c.5. Other School-Related Factors

The literature has explored two additional factors, though findings remain inconclusive. First, the impact of class size on students' resilience has yielded mixed results (Ye et al., 2024; Borman & Overman, 2004; Wills & Hofmeyr, 2019; Vicente et al., 2021). Second, the availability of instructional resources in schools has also shown inconsistent associations with students' resilience (Ye et al., 2024; Agasisti et al., 2018; Borman & Overman, 2004).

d. Teacher-Related Factors

Factors related to teachers, such as teaching quality, job satisfaction, expectations, and the relationship between students and teachers, have also been widely addressed in the literature. Like school-related factors, these are of particular interest to public policy, as they can be influenced and strengthened through targeted policy interventions.

d.1. Teacher Quality, Self-Efficacy, and Job Satisfaction

Teacher quality can be a key factor in fostering academic resilience. Higher teaching standards, including preparedness and enthusiasm, are strongly associated with students' ability to succeed despite challenges (Zhang & Hu, 2019; Wang et al., 2022; Siraj-Blatchford et al., 2013; Wells, 1996; Bester & Kuyper, 2020). Schools that avoid teacher shortages and provide sufficient resources to enhance teaching quality tend to have a higher percentage of resilient students (Agasisti & Longobardi, 2014). However, the relationship between teachers' years of experience and qualifications with student resilience remains inconclusive in the literature (Ye et al., 2024).

In addition, teachers' self-efficacy is positively correlated with the success of disadvantaged students in overcoming adversity. However, findings on the relationship between teacher job satisfaction and student resilience have been mixed (Ye et al., 2024).

d.2. Teacher-Student Relationship

Research suggests that among non-parental relationships, teacher bonding has the strongest predictive effect on students' resilience (Ye et al., 2024; Strolin-Goltzman et al., 2016). A strong relationship with teachers can safeguard students' academic achievement against the adverse effects of parental risk factors (Crosnoe & Elder, 2004). Numerous studies have highlighted the positive impact of strong teacher-student relationships on the success of disadvantaged students against the odds (Agasisti & Longobardi, 2014; Siraj-Blatchford et al., 2013; Langenkamp, 2010; Ye et al., 2024; Borman & Overman, 2004; Gizir & Aydin, 2009; Özden & Atasoy, 2020).

In particular, students from families experiencing extreme poverty are more likely to exhibit academic resilience if they have a positive relationship with their teachers. This relationship has been identified as one of the strongest predictors of resilience (Bester & Kuyper, 2020). Similarly, for African American students, a meaningful relationship with adults in the school context—most often teachers—has been shown to be a critical facilitator of educational resilience within this group (Cunningham & Swanson, 2010).

However, contrary to most existing literature, Cui et al. (2022) found that teacher-student relationships did not play a relevant role in fostering academic resilience.

The relationship between teachers and students was also a topic mentioned in the interviews conducted with disadvantaged students who had achieved success against the odds. One student noted that a teacher had been a key influence, supporting her during an especially emotionally difficult period by offering guidance and emotional support. Another student emphasised that a math teacher was crucial for his academic progress. Aware of the student's difficulties and his commitment to improve, the teacher offered additional support by remaining after class to clarify concepts for him.

d.3. Teacher Expectation

Teachers' expectations have also been positively linked to students' success against the odds. When teachers demonstrate confidence in their students' abilities, it fosters resilience among students (Sandoval-Hernández & Białowolski, 2016; Gizir & Aydin, 2009; Schoon et al., 2004). Specifically, Erberer et al. (2015) found that teachers' confidence in their students' ability to grasp challenging mathematics concepts is positively associated with students' academic resilience.

e. Peers and Community

Peer support and educational assistance from peers are positively associated with academic resilience (Ye et al., 2024; Thiessen, 2008; Koirikivi et al., 2021; Cui et al., 2022; Gizir & Aydin, 2009). Chen et al. (2018), in their study of a group of Chinese students, found that peer support predicts academic resilience beyond personal characteristics and parental support. Similarly, Crosnoe and Elder (2004) observed that support from friends can protect young girls' academic achievement from parental risk factors.

Community factors have also been shown to influence the likelihood of students succeeding against the odds. Resilience in students is positively correlated with parental networks within the community (Çelik, 2017). Conversely, higher levels of community violence and poverty are negatively associated with academic resilience (Ye et al., 2024; Ge & Ngai, 2020).

f. Programmes Supporting Students' Resilience

Various intervention programmes have been implemented to foster resilience among vulnerable student populations, aiming to enhance their social-emotional skills, engagement, and academic performance. While most evaluations focus on how these programmes improve resilience characteristics, fewer studies explicitly measure their direct impact on academic outcomes.

Rich et al. (2022) conducted a randomised controlled trial (RCT) to assess the impact of the Resilience Builder Program® on students from low socioeconomic backgrounds. The study found that participants in the programme exhibited increased resilience compared to a control

group, along with improvements in study skills, academic engagement, interpersonal skills, and academic motivation.

Ungar et al. (2014) reviewed 36 school-based interventions aimed at enhancing student resilience and found that students who faced higher adversity benefited the most from these programs. They concluded that academic improvement was largely driven by increased student engagement. However, the effectiveness of these interventions varied, with mixed results reported across the board in studies.

Bierman et al. (2008) assessed the Head Start REDI program through a randomised controlled trial in preschool classrooms. The programme aimed to enhance social-emotional competencies, linguistic abilities, and literacy. Findings revealed positive effects on vocabulary, emergent literacy, emotional understanding, social problem-solving, social behaviour, and learning engagement.

Covell (2010) investigated the Hampshire Education Authority's Rights Respect and Responsibility (RRR) initiative, designed to foster a rights-respecting school climate. The programme enhanced interpersonal harmony and student participation but did not improve academic performance orientation substantially.

Challen et al. (2011) investigated the implementation of the Penn Resiliency Program in Year 7 students across three local authorities in the UK. The programme resulted in short-term improvements in depression symptoms, school attendance, and academic performance in English. However, the effects on depression and attendance diminished after one year, although a modest positive impact on English grades persisted.

Irfan, Arif, and Mirza (2017) assessed an intervention programme designed to cultivate academic resilience in at-risk secondary school students. The programme focused on developing protective factors such as self-concept, self-efficacy, optimism, and teacher-student relationships. The study found that the intervention considerably enhanced students' overall academic resilience and positively affected each targeted protective factor.

Nears (2007) evaluated the impact of a resilience-based after-school programme designed to enhance students' academic skills, sense of belonging, and personal empowerment. The study

found that participants outperformed non-participants on standardised tests. Nevertheless, the absence of randomisation in the comparison groups raises concerns about potential unobservable differences influencing the outcome. Bester and Kuyper (2020) emphasised that schools can foster academic resilience by enhancing teacher-student relationships, teaching study methods, and providing additional educational support. Their findings suggest that targeted school-based interventions are crucial in building student resilience.

Agasisti et al. (2018) investigated educational policies that enhance academic resilience, analysing countries that increased the number of resilient students in PISA assessments between 2006 and 2015. The study highlighted the importance of a positive disciplinary climate, orderly classrooms, extracurricular activities, and effective teacher-student interactions. Additionally, policies that reduce teacher turnover and encourage mentorship between experienced and new teachers contribute to fostering an environment that supports resilience. Transformational school leadership was also identified as a key factor in maintaining structured learning environments and fostering student success.

In summary, although many programmes focused on resilience yield positive social-emotional outcomes, their direct impact on academic performance varies. Successful interventions often enhance student engagement, improve the classroom climate, and provide targeted support structures that bolster students' capacity to thrive academically despite adversity. Further research is required to explore long-term academic effects and refine programme implementation strategies to maximise effectiveness.

3.2. Conceptual Review on the Effect of Growth Mindset in Academic Achievement

Until the 1990s, most research focused on the relationship between cognitive skills, student performance, and future outcomes. However, since the 2000s, a growing body of research has highlighted the influence of non-cognitive skills on students' academic outcomes and long-term prospects.

Some economists have suggested that non-cognitive skills are as relevant as cognitive skills in explaining academic success, personal achievements, and future earnings (Elias & Haynes,

2008; Heckman et al., 2006; Heckman & Rubinstein, 2001). What amplifies the relevance of non-cognitive skills in the pursuit of improving student learning is their apparently greater malleability compared to cognitive skills. While cognitive abilities appear to stabilise after the age of 10, non-cognitive skills appear to remain malleable into adolescence and adulthood (Almlund et al., 2011; Kautz et al., 2014). Moreover, programmes designed for school-age students to enhance socioemotional skills have positively impacted both non-cognitive skills and academic achievement (Durlak et al., 2010, 2011; Ventista & Siddiqui, 2016). The malleability of these skills and their potential to influence academic performance make socioemotional interventions particularly interesting for public policy. In response to this potential, there has been a surge in interventions in recent years aimed at enhancing students' socioemotional skills.

The growth mindset concept, coined by psychologist Carol Dweck, has gained widespread popularity as part of this tendency. Many organisations and experts have offered growth mindset interventions, talks, training, books, and materials (Barnett & Macnamara, 2023). Moreover, the popularity of these programmes has created academic debate and evaluations led by many stakeholders.

Dweck (2000) identifies two key theories about students' beliefs regarding intelligence. Some students adopt an entity theory, perceiving their intelligence as a fixed trait. This perspective, known as a fixed mindset, drives them to focus on demonstrating their innate abilities. In contrast, others embrace an incremental theory, viewing intelligence as a malleable quality that can be developed. This perspective, called a growth mindset, motivates them to prioritise learning and self-improvement.

Extensive research has demonstrated a substantial relationship between a growth mindset and academic achievement. For example, Blackwell et al. (2007) found that among seventh-grade students, a growth mindset predicted an upward trajectory in grades, whereas a fixed mindset was associated with stagnant performance. Similarly, a meta-analysis by Sisk et al. (2018) reported a modest but meaningful correlation ($r = 0.10$) between mindset and academic achievement, with no differences based on students' academic performance levels or socioeconomic status. Claro et al. (2016) further corroborated these findings, showing that a growth mindset reliably predicted academic success across a nationally representative sample

of Chilean students. Notably, students from lower-income families were less likely to hold a growth mindset, but those who did were better insulated from the adverse effects of poverty on achievement. This suggests that a growth mindset could serve as a mechanism for mitigating the impact of economic disadvantage on educational outcomes.

Consequently, researchers have explored whether interventions can foster a growth mindset to enhance academic performance. For instance, Paunesku et al. (2015) demonstrated that a brief online intervention improved semester grade point averages in core academic subjects and increased the proportion of students performing satisfactorily by 6.4 percentage points among at-risk high school students. Likewise, Yeager et al. (2019) found that a short, online growth mindset intervention not only improved grades for lower-achieving students but also increased enrolment in advanced mathematics courses.

Building on these findings, the second phase of our research investigates the potential of a growth mindset to enable disadvantaged students to overcome adversity and achieve academic success. This inquiry stems from the initial findings in the first phase of this thesis, which highlighted a distinguishing trait among successful disadvantaged students: the presence of a growth mindset as opposed to a fixed mindset. Consequently, our focus in this subsequent research phase is to explore whether fostering a transition from a fixed mindset to a growth mindset could positively affect students' academic performance.

Meta-analyses on the effect of growth mindset interventions on academic achievement

Much of the literature available on the effect of growth mindset interventions in academic achievement is included in two meta-analyses published in 2022. The first one, by Macnamara and Burgoyne (2022), concluded that “the apparent effects of growth mindset interventions on academic achievement are likely attributable to inadequate study designs, reporting flows and bias”. The other meta-analysis, Burnette et al. (2022), reported a positive effect on academic outcomes. The contradiction between the results of these two studies, despite their use of similar data but different meta-analytic methodologies, raises some doubts about the suitability of meta-analytic approaches in addressing questions related to impact and causality, where they combine studies with varying levels of rigour.

The meta-analyses by Macnamara and Burgoyne (2022) incorporate the studies previously included in Sisk et al. (2018) and all available records until August 2019. Macnamara and Burgoyne (2022) conducted three meta-analyses focusing exclusively on growth mindset treatments aimed at enhancing academic performance. However, the three analyses differ in the requirement for the quality of the studies. The first meta-analysis included 63 studies (N=97,672), revealing a small effect size, d=0.05. The second meta-analysis included only the studies demonstrating the influence of interventions on students' mindset (13 studies, N=18,355). With this refined selection, they calculate an effect size of d=0.04. Finally, they included only six studies (8 samples) with high-quality evidence (N=13,571) and found an effect size of d=0.02. The study concludes that the apparent effects of a growth mindset on academic performance are not significant and are likely attributable to issues with study designs, result reporting, or biases.

Macnamara and Burgoyne's (2022) third meta-analysis aimed to be highly selective in the quality of included studies, adhering to best practices in intervention design. However, because of the extensive number of best practice criteria, no study fully met all the requirements. As a result, the authors accepted studies that met at least 60% of these criteria without prioritising which practices were most critical to the reliability of the study. Consequently, some of the six studies included in their most rigorous meta-analysis pose significant threats to trustworthiness. For instance, Hoang (2018) and De Martino et al. (2018) exhibit attrition rates close to 60% without providing a clear analysis to account for the potential bias introduced by such high attrition rates.

The Burnette et al. (2022) meta-analysis includes articles reporting the impact of growth mindset intervention using a randomised design for studies published between 2002 and the end of 2020. The meta-analysis focuses on two key moderators: the subsamples expected to benefit most and implementation fidelity. The authors included 32 studies (48 samples) that reported an effect on academic performance. This includes 51,676 students. They find an effect of d=0.09. When they isolate the effects for subgroups and high-implementation fidelity interventions, they find a bigger effect of d=0.14.

Several criticisms of Macnamara and Burgoyne's (2022) meta-analysis are made by Tipton et al. (2022), who propose an alternative meta-analytic methodology. Some criticisms are

associated with how the studies' quality was assessed, how the methodology incorporated the heterogeneity of effects among different groups, and how publication bias was addressed. Tipton et al. (2022) re-analysed the data from Macnamara and Burgoyne (2022) using Burnette et al.'s (2022) method. Their analysis, incorporating all of Macnamara and Burgoyne's (2022) studies, found a growth mindset effect of 0.09 SD. Among at-risk students, they observed an effect size of 0.15 SD. These results align better with the findings reported by Burnette et al. (2022).

Macnamara and Burgoyne (2023) respond to Tipton et al.'s (2022) critique by noting that Tipton et al.'s reanalysis not only adopts the methodology used by Burnette et al. (2022) but also introduces additional modifications to the dataset. These include altering effect sizes without accounting for baseline differences, changes in the coding of moderators, and the redefinition of at-risk samples, all without clearly justifying these decisions. Macnamara and Burgoyne (2023) then reanalysed their own data using the methodology of Burnette et al. (2023), obtaining very similar results across all three of their meta-analyses from 2022.

The divergent results observed in these two meta-analyses raise important questions, particularly given the significant resources school systems allocate to such interventions. Is mindset indeed a malleable characteristic, or do interventions merely appear to influence this trait because students learn how to answer growth mindset questionnaires without genuinely altering their internal beliefs? Furthermore, assuming that mindset is a malleable trait, the key question remains: Is there a genuine causal relationship between mindset and academic performance?

Consequently, there is a reasonable basis for undertaking a new analysis to understand the potential impact of growth mindset interventions on academic achievement. This analysis should emphasise the trustworthiness of findings across a spectrum of studies and specifically focus on the primary issues that could undermine their robustness.

3.3. Evidence on the Academic Impact of Selective Schools

Evidence from the UK

Much of the existing literature on the impact of academically selective schools has concentrated on the United States and the United Kingdom. In the UK, Grammar Schools have been the focus of extensive research. Several studies suggest that these schools do not necessarily lead to better academic outcomes. Rather, their seemingly superior results are largely attributable to the enrolment of students with higher prior academic attainment or more advantaged socioeconomic backgrounds (Gorard & Siddiqui, 2018; Clark, 2010; Capsada-Munsech & Boliver, 2024; Perry, 2018).

Other studies report more mixed findings, suggesting that students in Grammar Schools may exhibit a modest academic advantage. However, this advantage tends to diminish as more robust controls are introduced for student characteristics (Morris & Perry, 2017). Furthermore, evidence from certain local authorities indicates that Grammar Schools may have a small positive effect on student outcomes, while in others, no such effect is observed (Lu, 2020; Lu & Siddiqui, 2022).

The evidence regarding educational progression is similarly mixed. Some research has found that attendance at a Grammar School is positively associated with high school subject selection, duration of study, and university enrolment (Clark, 2010; Clark et al., 2016). In contrast, other studies report no effect on progression to higher education or enrolment in elite institutions such as Russell Group universities, once pre-existing differences are taken into account (Capsada-Munsech & Boliver, 2024; Lu, 2021; Sullivan et al., 2014).

In terms of social mobility, attending a Grammar School does not appear to have a positive effect on pupils from disadvantaged backgrounds. However, for those who do, grammar schools may enable them to ascend further (Boliver & Swift, 2011). Similarly, the long-term earnings benefits associated with attending a Grammar School appear to be modest and are disproportionately accrued by students from advantaged backgrounds, who are overrepresented in these institutions (Birkelund et al., 2021).

Furthermore, researchers have highlighted the need to consider the broader systemic effects of Grammar Schools on nearby non-selective schools. Some studies indicate that while the expansion of Grammar Schools may not impact overall academic performance, it is associated with increased educational segregation, reflected in a wider distribution of academic achievement and future earnings (Morris & Perry, 2017). Overall, selective school systems in the UK do not appear to enhance social mobility at a national level. Any advantages conferred on those attending Grammar Schools are largely offset by the disadvantages experienced by those who do not (Boliver & Swift, 2011).

Evidence from the US

Research on the impact of academically selective schools in the United States has produced mixed results. Studies employing Regression Discontinuity methodology on selective public schools in Boston, New York, and Chicago have found no significant improvements in academic gains, test scores, or college enrolment (Abdulkadiroğlu et al., 2014; Allensworth et al., 2017; Barrow et al., 2020; Dobbie & Fryer, 2011). Moreover, among students from low socio-economic backgrounds, a negative effect on GPA and a decline in attendance at selective colleges have been observed (Barrow et al., 2020). However, some positive effects have been reported in course selection, advanced high school degree attainment, and school environment (Dobbie & Fryer, 2011; Allensworth et al., 2017).

Similarly, studies conducted in other US cities have found no academic benefits associated with magnet schools or selective boarding schools after controlling for demographic factors and prior academic performance (Ballou et al., 2006; Shi, 2020). However, selective boarding schools have demonstrated a positive impact on college trajectories, particularly for disadvantaged, minority, lower-achieving, and rural students (Shi, 2020).

Furthermore, a study examining oversubscribed gifted and talented programmes in magnet schools in the southwestern United States, utilising a randomised lottery design, found no significant effects on mathematics, reading, social studies, or language outcomes. However, a notable improvement of 0.28 standard deviations was observed in science achievement (Bui et al., 2011).

Evidence from Chile

Since this study focuses on a group of selective secondary schools in Chile known as Bicentennial Schools, the following section presents the main studies available within the Chilean context.

Several studies have examined the impact of Bicentennial Schools on students' academic performance in Chile. In the absence of a randomised control group, most research has relied on matching techniques, consistently finding a positive effect of these schools. Attending a Bicentennial School has been associated with improvements in standardised test scores ranging from 0.2 to 0.5 standard deviations, with stronger effects observed in mathematics (Araya & Dussaillant, 2020; Villar, 2020; Allende & Valenzuela, 2024). However, when controlling for classmates' academic abilities, the effect was found to diminish to zero (Allende, 2015).

Matching methodologies face challenges in controlling for unobservable factors such as parental or student motivation, which may differ between students who apply and are accepted into Bicentennial Schools and those who remain in regular schools. This issue also arises when employing a matching group of academically successful students as a control group, as these students may have been eligible to apply to Bicentennial Schools based on their academic achievement but chose not to apply for different reasons. Marsh (1998) illustrates that in evaluations of Gifted and Talented Programs, studies with matching designs tend to be biased toward the treatment group due to the regression-to-the-mean effect, particularly when selection criteria for the treatment are more stringent. Marsh demonstrates that Regression Discontinuity designs offer more robust estimates of program effects.

Two studies utilise Regression Discontinuity methodology to examine the impact of two Chilean selective schools predating the Bicentennial Program. These studies offer the advantage of controlling for unobservable factors, leading certain students to apply while others do not, by comparing students attending a school with applicants not accepted but closely positioned to the cut-off score for comparability. However, the limitation is that these studies evaluate only one school each. Bucarey et al. (2014) found an effect of 0.25 standard deviations on university entrance exam scores for students entering the Instituto Nacional, the most

traditional and selective public school in Chile. Conversely, Manriquez (2016) found no impact of attending a girls-only, selective and emblematic school.

Evidence from other developing countries

Studies from other developing countries reveal mixed results. In the case of China, there is limited evidence supporting the positive impact of selective schools. For instance, a study that examined the allocation system, where lotteries are used in oversubscribed schools to assign seats to students meeting academic requirements, found minimal evidence of improvement in standardised test scores (Zhang, 2014). Another study utilising a Regression Discontinuity design revealed that elite schools in a rural county did not significantly affect college entrance exam outcomes (Wu et al., 2019). Moreover, it has been demonstrated that not all students benefit equally from attending elite schools. Well-prepared students tend to gain more from elite high schools compared to under-prepared students (Zhang & Xie, 2023). Enrolments in a Magnet class within an elite school have shown positive academic effects (Wu et al., 2019).

Studies conducted in the Mexican context using a regression discontinuity methodology found positive effects on end-of-school achievement scores of approximately 0.12 standard deviations. However, adverse effects were observed on dropout rates, with an increase in the probability of dropping out by 8% to 9% (Janvry et al., 2012; Dustan et al., 2017). This risk is particularly pronounced for students with weaker academic performance in middle school and those facing longer commutes to school.

In a different context, several studies have explored the impact of selective schools in various African countries, yielding mixed results. In Tunisia, attending a selective secondary school has been found to improve Baccalaureate exam scores by 0.13 standard deviations, as determined through a fuzzy regression discontinuity design (Zaiem, 2014). In contrast, research in Kenya suggests that elite public schools have minimal effect on learning outcomes (Lucas & Mbiti, 2014). Similarly, in Ghana, selective schools show only marginal improvements in completion rates and test scores (Ajayi, 2014).

In Central America, evidence from Trinidad and Tobago suggests that being assigned to a school with high-achieving peers positively affects test scores, examination pass rates, and meeting prerequisites for tertiary education (Jackson, 2010). Similarly, in Romania, students

attending higher-achieving schools have been found to perform better in high-stakes graduation tests, with gains ranging from 0.02 to 0.1 standard deviations (Pop-Eleches & Urquiola, 2013).

Chapter 4 Chilean Education System

This chapter examines Chile's most important educational reforms from 1920 to the present, which have shaped the country's primary and secondary education systems. Understanding this structure is important to readers for contextualising much of the research presented in this thesis.

The chapter follows a chronological approach, outlining key reforms and their cumulative impacts. It concludes with an overview of the current state of the education system.

4.1. Expansion of Primary Education (1920-1970)

Following a 1920 law, the Chilean education system prioritised expanding primary education to achieve universal coverage in the first half of the 20th century. This objective was finally realised in 1970, after substantial increases in budget and infrastructure, alongside a shift from six to eight years of primary schooling. By then, primary education coverage had exceeded 90%, while secondary education coverage stood at 49% (Cox, 2003; Delannoy, 2000).

Despite these advancements, internal indicators remained poor. In 1970, Chile's education expenditure was 4% of GDP, yet the system struggled with inefficiencies. The repetition rate was 12%, higher than in comparable countries, and students took 40% longer than the minimum required time to complete primary education. Furthermore, only 66% of students finished primary school, attendance rates were low, and schools lacked the necessary incentives to reduce absenteeism (Beyer, 2000).

During this period, Chile's Ministry of Education operated 80% of schools directly, employing and remunerating teachers themselves. By 1980, Chile had achieved full primary education coverage; however, secondary education still required improvement, with only 53% of the relevant age group enrolled (Beyer, 2000; Cox, 2003; Delannoy, 2000).

4.2. Implementation of the Universal Voucher System (1981).

In 1981, Chile introduced a major educational reform that transformed its school system by establishing a universal voucher-based funding model. This system enabled both public and private schools, including for-profit and non-profit institutions, to receive public funding through student-based vouchers. Consequently, a new category of schools emerged: private subsidised schools. These institutions remained privately owned yet were funded through government-issued vouchers. The expectation was that increased competition among schools would lead to improvements in quality, as funding was directly tied to student enrolment (Bellei & Muñoz, 2023; Mizala & Romaguera,1998; Paredes & Paredes, 2009; Contreras Guajardo, 2001)

However, the concept of subsidised private education was not entirely new. By 1980, approximately 15% of Chilean students were enrolled in free, state-subsidised private schools, primarily affiliated with religious organisations. These schools received government funding that covered about 50% of the per-student cost of public schools. Nevertheless, the reform introduced a significant shift by permitting for-profit institutions to operate schools funded entirely through public vouchers (Beyer, 2000).

The voucher system equalised funding across different school types, with monthly payments based on actual student attendance. This created a financial incentive for schools to reduce absenteeism. While the reform aimed to provide families with greater choice in school selection, institutions were not required to accept all applicants, even when vacancies were available. Many schools implemented selective admission policies based on academic performance, while religious schools often imposed additional family-related requirements, such as parental marital status.

The reform triggered a rapid expansion of private subsidised schools, increasing from fewer than two thousand schools in 1980 to nearly three thousand schools by 1990 (Cox, 2003). Private school enrolment grew by 20%. Initially, most private subsidised schools were operated by religious organisations, but for-profit institutions soon became more prevalent (Hsieh & Urquiola, 2006).

An additional aspect of the reform was the decentralisation of public education. School ownership and administration were transferred from the central government to municipal authorities, significantly altering Chile's education system. This shift placed school management in the hands of local governments, increasing autonomy but also leading to disparities in resource allocation. One of the reform's positive outcomes was the expansion of secondary education. The increase in private subsidised schools helped accommodate the growing demand, raising secondary education coverage from 65% in 1982 to nearly 80% by 1989 (Patrinos & Sakellariou, 2009). However, primary education enrolment declined between 1980 and 1988. Policies affecting schools in the poorest sectors contributed to this decline, decreasing coverage from 98% in 1985 to 93% in 1990 (Cox, 2003).

Overall, investment declined during this period. However, some internal educational indicators improved. The repetition rate decreased, the dropout rate fell, and primary school graduation rates increased. Student attendance also rose considerably, from approximately 70% to 90% (Prawda, 1993).

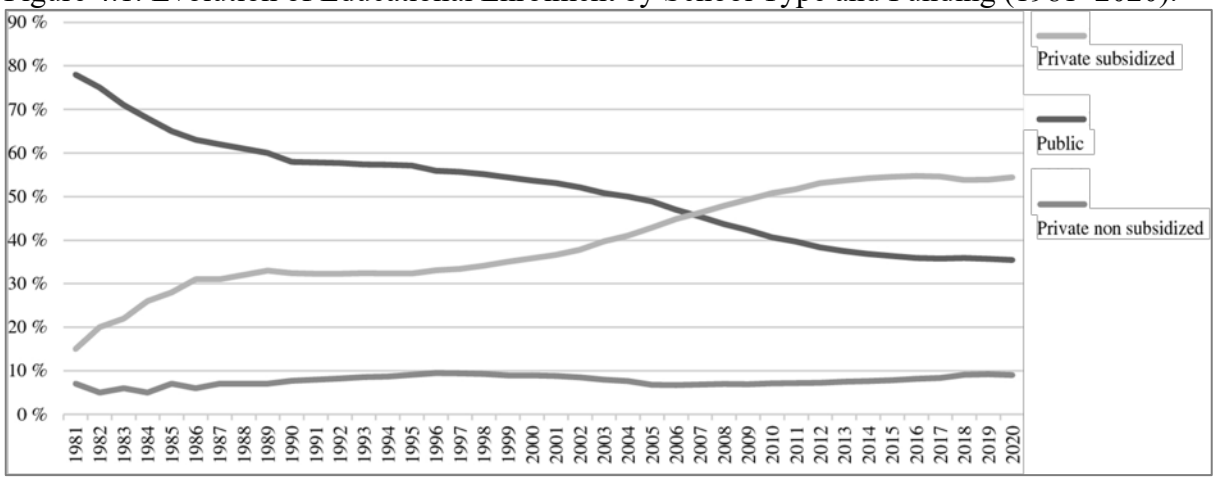
Assessing the impact of the reform on educational quality remains challenging. Comparative test score data from the early and late 1980s are not entirely reliable due to variations in test design and the inclusion of rural schools in later assessments. Nonetheless, Morales (1991) conducted a controlled comparison of schools included in both assessments, finding a slight downward trend in performance.

One major unintended consequence of the reform was increased socio-economic segregation. MacLeod and Urquiola (2009) found that allowing schools to select students intensified stratification based on parental income. High-achieving students became concentrated in private subsidised schools, while non-selective public schools primarily served lower-performing students. Contreras et al. (2010) further demonstrated that private subsidised schools frequently applied academic selection criteria, particularly in more affluent areas. After adjusting for family background and selection effects, the previously observed public-private test score gap disappeared, suggesting that differences in student performance were primarily due to selection rather than the schools' effectiveness.

The reform triggered a rapid expansion of private subsidised schools, increasing from fewer than two thousand schools in 1980 to nearly three thousand schools by 1990 (Cox, 2003). Private school enrolment grew by 20%. Initially, most private subsidised schools were operated by religious organisations, but for-profit institutions soon became more prevalent (Hsieh & Urquiola, 2006).

Figure 4.1. illustrates the important shift in school enrolment patterns following the reform. Over time, private school enrolment grew to over 50% of total students, while public school enrolment declined from nearly 80% before the reform to under 40% by 2020**.**

Figure 4.1. Evolution of Educational Enrolment by School Type and Funding (1981–2020).



Source: Bellei & Muñoz, 2023

4.3. National Evaluation System for Academic Achievement (SIMCE) (1988)

In 1988, Chile established the *Sistema de Medición de la Calidad Educativa* (SIMCE), a national evaluation system for academic achievement. Its primary objectives were to provide parents with information about school quality, empowering them to make informed choices in the newly competitive education system, and to assess education quality at both the national and school levels (Meckes & Carrasco, 2010).

Initially, SIMCE results were not made public; only schools and their teachers received them. This policy remained in place until 1995, when school-level results were officially disclosed (Cox, 2003). Consequently, SIMCE began as a low-stakes assessment, with its data primarily

used to identify schools needing support rather than for accountability measures (Meckes & Carrasco, 2010).

SIMCE assessed Language and Mathematics for fourth and eighth grades at its inception. In 1994, the evaluation expanded to include second-year secondary students, and additional subjects—history and Science—were added to the assessment (Cox, 2003; Paredes & Paredes, 2009).

The decision to make school-level results public in 1995 sparked resistance, particularly among teachers serving socio-economically disadvantaged students. Many municipal schools, which enrolled a higher proportion of low-income students, faced criticism for their lower performance (Meckes & Carrasco, 2010).

In 2014, SIMCE was further expanded to include personal and social development indicators, shifting the focus beyond purely academic outcomes to a more holistic evaluation of educational quality. This new approach included assessments in four key areas: academic self-esteem and school motivation, school climate, participation and citizenship training, and healthy life habits. These indicators are measured through surveys administered alongside the SIMCE test. Additionally, schools are evaluated on gender equity, attendance, retention, and graduation rates (Araneda, 2018).

From 1997 onwards, Chile also began participating in international assessments, enabling comparisons of its educational performance on a global scale (Meckes & Carrasco, 2010).

4.4. New Educational Reforms to Address Market Failures (1990-2002)

With Chile's return to democracy in 1990, a series of educational reforms were introduced, trying to address market failures and enhance equity and quality within the education system (Bellei & Muñoz, 2023). These policies primarily aimed to support disadvantaged sectors, particularly low-performing schools, through material and technical assistance programs. One of the most notable initiatives was the 900 Schools Programme, designed to assist the country's lowest-achieving schools.

During this period, twelve educational programs were implemented. Two had universal coverage, six targeted the lowest-performing schools, four focused on teacher training, one promoted technology development, and another supported English language instruction (UNESCO, 2004).

Education became a strategic national priority, reflected in an important and sustained increase in public spending. Between 1990 and 2000, public education expenditure rose from 2.6% to 4.3% of GDP, while the economy grew at an average annual rate of six per cent. As a result, actual education spending tripled over the decade (Cox, 2003; Arellano, 2009).

a. Shared Financing Law (1993)

In 1993, Chile introduced a shared financing model that permitted private subsidised schools to charge families an additional fee in addition to the government subsidy. This system was complemented by a scholarship program for students who could not afford the payments. By the end of the decade, around 30% of private subsidised schools had started charging parents, with an average monthly fee of approximately 15 US dollars (Cox,2003; Kutscher, 2014).

Evidence suggests this policy has increased socioeconomic segregation within the school system. Between 1994 and 2001, more than 800 new private subsidised schools were established, raising enrolment in this sector from 32% to nearly 37% (see Figure 4.1). Meanwhile, municipal school enrolment declined from almost 57% to 53%. The distribution of children from different socioeconomic statuses became increasingly segregated. In 1990, 18% of children from the two highest income quintiles attended municipal schools, but by 2000, this figure had dropped to 14% (García-Huidobro & Bellei, 2003).

b. Extended School Day (1997)

Beginning in 1997, Chile implemented a reform that extended the school day from six to nearly nine hours. This shift considerably changed school organisation, as the traditional double-shift system—where one group of students attended in the morning and another in the afternoon—was replaced by a single, full-day schedule (Beyer, 2000; García-Huidobro & Concha, 2009).

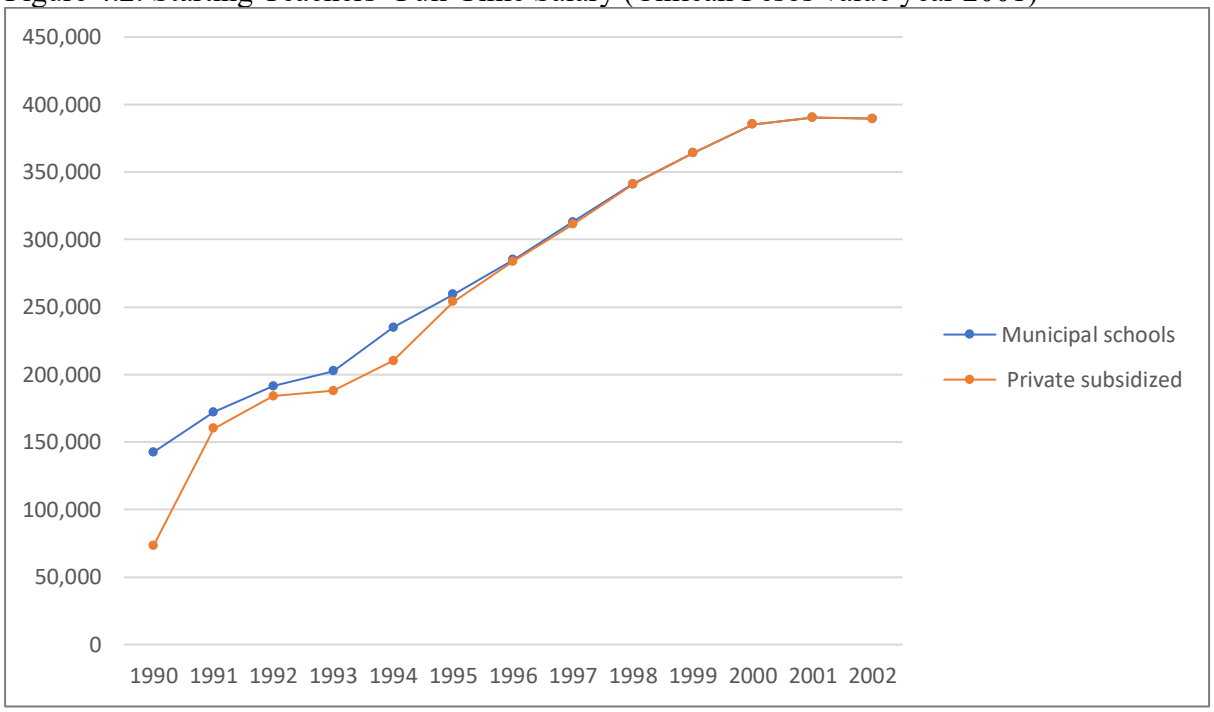
The reform required substantial investments in infrastructure, amounting to approximately 1.2 billion US dollars, as well as an increase in school subsidies to accommodate additional teacher salaries and extended instructional hours (Cox, 2003; García-Huidobro & Concha, 2009).

c. Increase in Teacher Salaries

During this period, teacher salaries rose substantially, increasing by up to 170% in real terms (Cox, 2003; Mizala & Romaguera, 2005). As

Figure 4.2 shows, teacher salaries improved impressively during this decade.

Figure 4.2. Starting Teachers' Full-Time Salary (Chilean Pesos value year 2001)



Source: Based on data from the Ministry of Education, Chile

d. Educational Results of this Period

Between 1990 and 2002, school enrolment increased by more than 500,000 students, representing a 20% growth. Of this increase, 13 percentage points were attributable to population growth, while the remaining seven percentage points stemmed from improved access to education among lower-income groups (Cox, 2003; Wolff et al., 2011). However, secondary school enrolment faced a temporary decline in the early 1990s, likely influenced by

significant increases in minimum wages. Higher wages raised the opportunity cost of studying, particularly for low-income students, who were the most affected by this change (Cox, 2003; Arellano Marín, 2001).

School dropout rates also declined during this period. In primary education, the rate fell from approximately 4% at the beginning of the 1990s to 2% from 1997 onwards. In secondary education, it dropped from 11% at the start of the decade to 7% by 2000 (Cox, 2003; Kattan & Székely, 2017).

As measured by SIMCE, student learning outcomes remained relatively stable at the eighth-grade level throughout this period. However, the overall student population taking the test expanded, with eighth-grade enrolment increasing by 20% by the decade's end. As previously explained, a third of this increase stemmed from higher enrolment among students from the poorest sectors of the population. Given this broader inclusion of students from disadvantaged backgrounds, maintaining stable learning outcomes can be considered a positive achievement (Cox, 2003).

Progress was made regarding equity in both access to education and learning opportunities. The gap in years of schooling among different socio-economic groups has narrowed, and learning disparities between the poorest students and the remainder of the population also displayed signs of improvement (Cox, 2003; Arellano, 2001)

However, the decade also witnessed a rise in socio-economic segregation within the education system. By the late 1990s, various types of schools—municipal schools, private subsidised schools without shared financing, and private subsidised schools with shared financing—became increasingly concentrated by socio-economic status. The proportion of students from the highest income quintiles attending municipal schools fell from 29% in 1987 to 11% in 2000, while the share of students from the lowest income quintile enrolled in private subsidised schools declined from 24% in 1990 to 19% in 2000 (García-Huidobro & Bellei, 2003).

4.5. Social Movements since 2006

In 2006, a student-led social movement emerged, demanding structural changes to Chile's education system. For over two months, students organised massive marches and occupied educational institutions in protest. This movement, known as the "Penguin Revolution" due to the black-and-white uniforms worn by high school students, centred around four key demands. Protesters called for free education and the elimination of shared financing, a stronger public education system to counter the increasing dominance of subsidised private schools, an end to for-profit schools, and the abolition of discriminatory school selection practices (Bellei & Cabalin, 2013).

A resurgence of the movement took place in 2011; this time, it was led by university students. Lasting nearly six months, these protests focused on the profound inequities within Chile's education system, demanding free university access for students from low- and middle-income families (Bellei & Cabalin, 2013).

These mobilisations brought educational quality and equity issues to the forefront of public debate, resulting in a series of legislative reforms designed to enhance educational opportunities for low-income students. Among the most relevant were the Preferential School Subsidy Law (2008), the Inclusion Law (2015), and the Public Education Law (2017).

a. Preferential School Subsidy Law (2008)

The Preferential School Subsidy Law addressed socio-economic educational disparities by providing additional financial support to schools serving students from disadvantaged backgrounds. Previously, school subsidies were distributed equally, but this law acknowledged that educating students from vulnerable socio-economic groups requires greater resources. The subsidy increases ranged from 40% to 60%, translating into an additional US$45 to US$65 monthly per student. Initially, 30% of students benefited from this policy, with coverage expanding to 40% in subsequent years (Raczynski et al., 2013). Schools with a higher concentration of vulnerable students received additional funding.

To access these funds, schools had to commit to specific conditions, including eliminating selective admission practices, exempting vulnerable students from fees, enhancing school

management, and promoting community participation. Participation in the programme was voluntary; schools could either accept the additional resources by meeting these requirements or continue receiving the previous level of funding. The law had two main objectives: firstly, to enhance academic performance among low-income students and to narrow achievement gaps, and secondly, to broaden access to a broader range of schools for socioeconomically disadvantaged students, ultimately reducing socioeconomic inequalities and segregation.

Research on the law's impact shows important improvements in student achievement. Raczynski et al. (2013) found that national academic performance improved in the years following its implementation, and the achievement gap between students from different socio-economic backgrounds narrowed. Schools that participated in the programme advanced at a faster rate than those that opted out. Similarly, Murnane et al. (2017) reported that average academic outcomes increased, and the income-based achievement gap decreased by one-third within five years of the law's introduction. They attributed these changes to enhanced school support and greater accountability, rather than student migration to different schools.

Carrasco (2014) evaluated the policy's effects four years after its implementation and found an improvement of 0.18 standard deviations in fourth-grade mathematics scores among participating schools compared to non-participating schools. Neilson (2015) observed a 0.20 standard deviation increase in test scores among low-income students, with the income-based achievement gap closing by one-third. He attributed this improvement primarily to enhanced school quality in low-income neighbourhoods rather than student mobility. Similarly, Navarro-Palau (2016) found a positive impact on the academic performance of vulnerable students who remained in public schools.

However, the law's impact on school segregation was less favourable. Valenzuela et al. (2012) found no reduction in segregation between 2007 and 2011. Gazmuri (2015) found that the reform did expand school choice for low-income families, resulting in a 10% increase in the likelihood of low-SES students enrolling in private, subsidised schools. *However*, higher-income students increasingly enrolled in schools that opted out of the reform. Murnane et al. (2017) also found that segregation levels remained unchanged.

b. Inclusion Law (2015)

The Inclusion Law, passed in 2015, introduced important changes to Chile's educational system. It prohibited for-profit schools from receiving state funding, banned public and subsidised schools from charging additional fees, and eliminated student selection processes. Instead, a new centralised admissions system was established, prioritising family preference and employing random assignment when demand exceeded available places. Additionally, 15% of seats were reserved for low-SES students (Rosenzvaig-Hernandez, 2022).

Elacqua and Kutscher (2023) examined the effects of this centralised system on school segregation. Their findings indicate that the reform had no discernible impact on the socioeconomic composition of students across schools or on the participation of disadvantaged families in highly sought-after institutions. This suggests that removing admission barriers alone does little to alter student distribution. A possible explanation presented in the study is that school choice patterns vary by socioeconomic status. Lower-SES families are less likely to apply to distant schools, formerly selective schools, high-quality institutions, or schools with wealthier student populations. Instead, they tend to prioritise non-academic factors, favouring schools with religious affiliations, a positive school climate, fewer reported violent incidents, foreign-sounding names, or traditional sports programs.

Similarly, Honey and Carrasco (2022) conclude that the new system had a minimal impact on the enrolment decisions of low-income families. They suggest that high pre-reform segregation was not solely a consequence of selective admission practices but was also influenced by residential segregation and self-selection, factors that remained unaffected by the reform.

Botbol and Gazmuri (2024) arrive at a similar conclusion, observing little impact on student sorting. Contrary to expectations, the reform did not increase the enrolment of low-SES students in previously selective private subsidised schools. However, they notice a positive effect on access to higher-quality schools, although this is confined to a subset of low-SES students who secured placements in the first round of admissions.

On the other hand, public perception of the new admissions system is predominantly negative. Although some parents appreciate the system for saving time and effort, preventing discrimination, and promoting desegregation, the majority express concerns. Many distrust its

transparency and fairness, feel disempowered and disconnected from the school choice process, and struggle with the application, leading to feelings of incompetence (Bellei et al., 2025).

c. Public Education Law (2017)

As part of the education reforms during this period, the Public Education Law was enacted to demunicipalize the public school system. Previously, 345 municipalities managed public schools independently; under the reform, administration shifted to 70 Local Public Education Services (SLEPs), each overseeing groups of neighbouring municipalities.

This reform was introduced in response to widespread concerns regarding the perceived low quality and declining enrolment in municipal schools (Anderson et al., 2023). Implementation is being carried out in phases from 2018 to 2025, with the reform currently in its final stages.

d. Bicentennial Schools (2010-2014, 2018-2022)

Amid a series of reforms aimed at enhancing equity in the education system, a programme launched in 2010 adopted a different approach by increasing selectivity in schools. Implemented by a centre-right government (2010–2014), the Bicentennial Programme—named in recognition of Chile's bicentennial of independence—established 60 selective high schools that admitted students based on academic performance. These schools received pedagogical, technical, and financial support from the Ministry of Education. They were held to high performance standards, targeting the top 10% of schools in the national assessment (SIMCE) and the top 5% in the higher education entrance exam. The additional funding allocated to these schools amounted to up to $1.8 million for new institutions and $0.9 million for existing ones (Araya & Dussaillant, 2020).

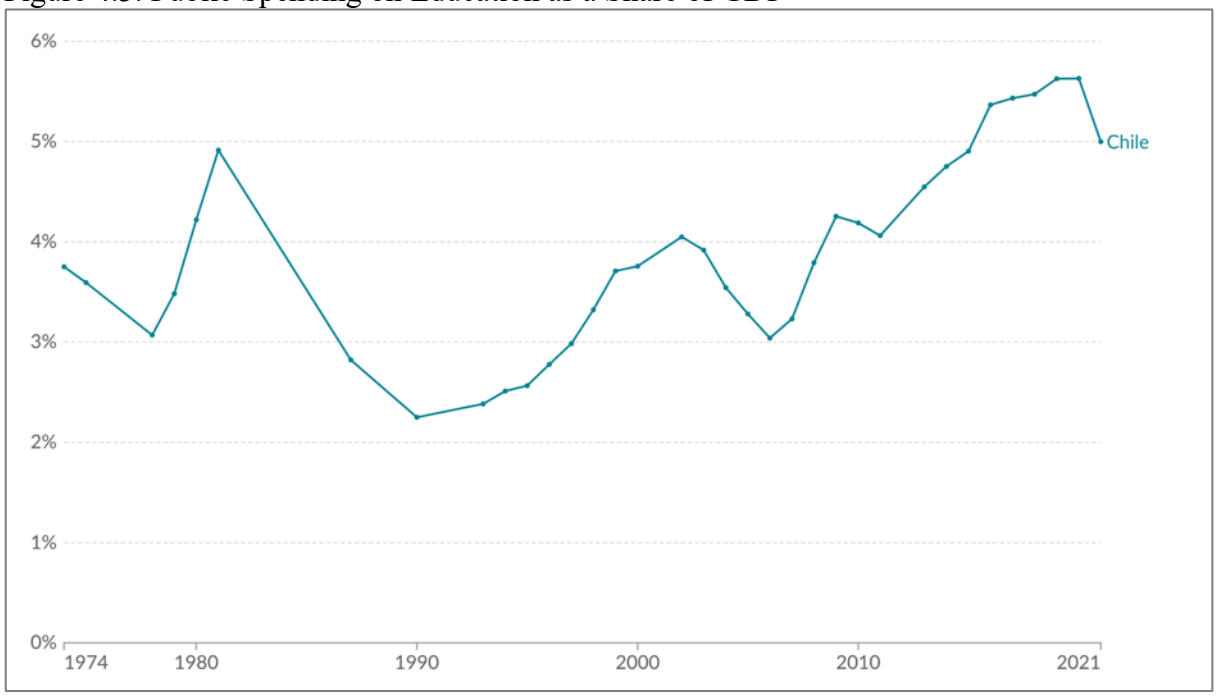
In a subsequent phase, during a second government from the same coalition (2018–2022), 140 high schools were selected for the program, raising the total to 200 nationwide (Ministry of Education of Chile 2020).

A more detailed analysis of the programme's impact is provided in Chapter 3.

4.6. Chapter Summary

Over the past five decades, Chile has undergone profound educational reforms, resulting in a school system characterised by broad school choice. The ability of schools to select students has been eliminated, and funding now follows students through a differentiated voucher system, which allocates higher subsidies to lower-income students. Public spending on education has been increasing since the 1990s and today exceeds 5% of GDP (see Figure 4.3)

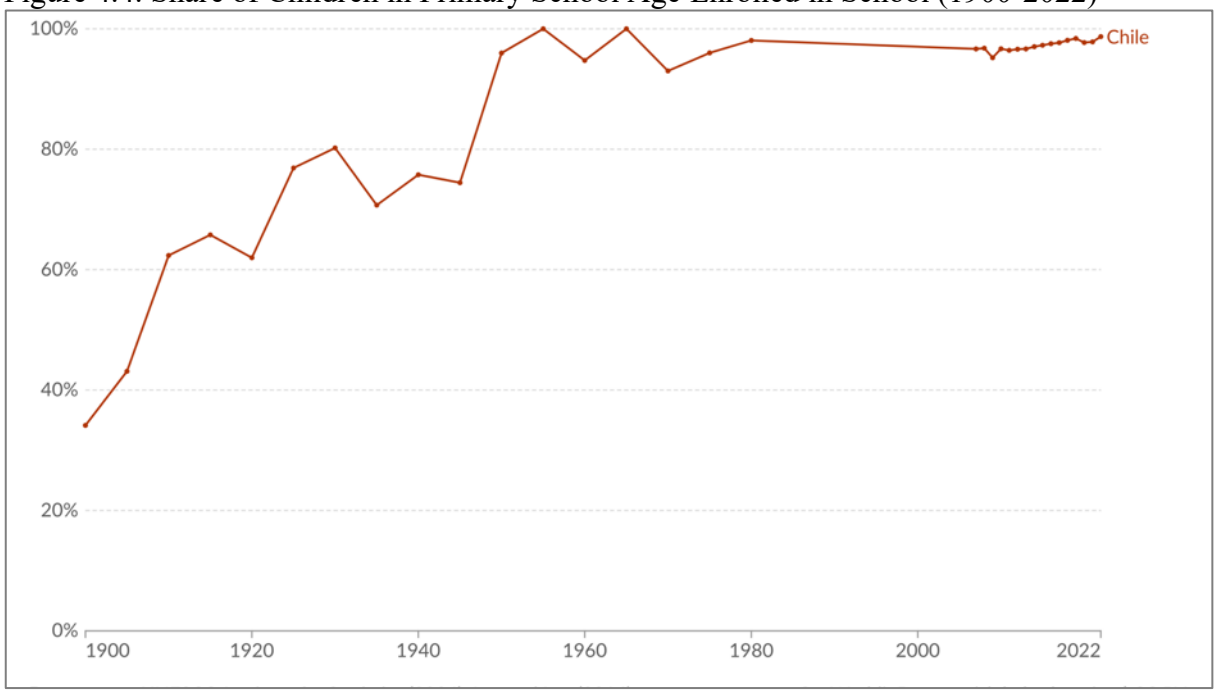
Figure 4.3. Public Spending on Education as a Share of GDP



Source: World Bank (2024); Tanzi & Schuknecht (2000) – processed by Our World in Data

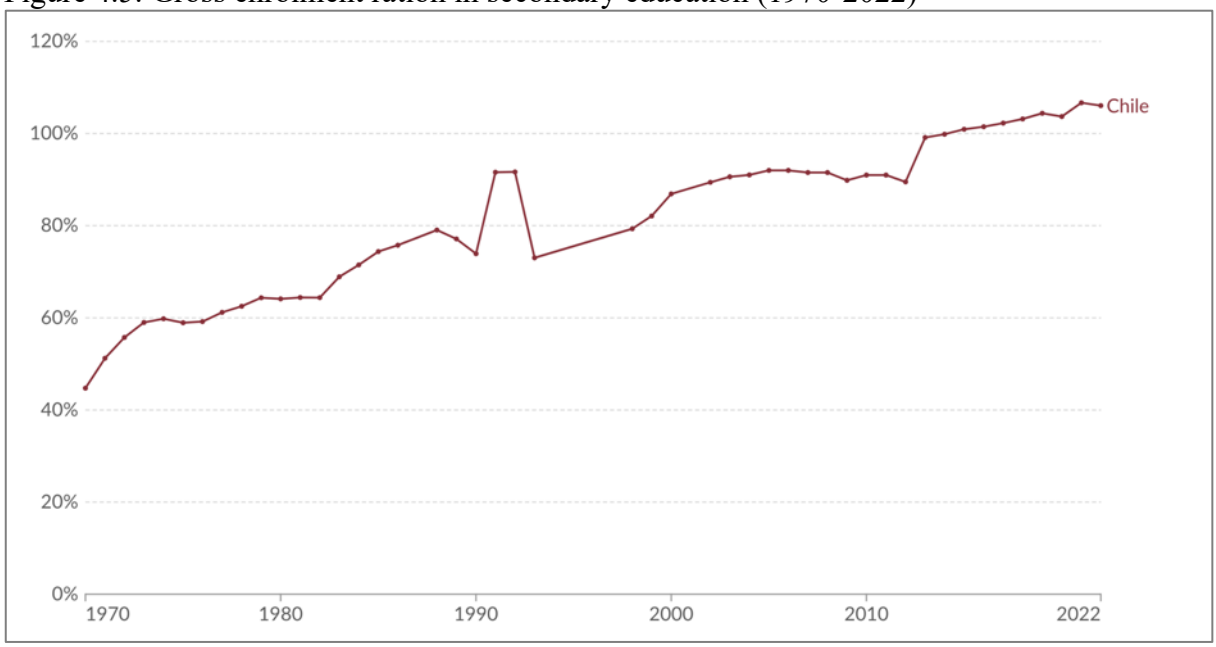
In terms of access, Chile has achieved near-universal coverage in both primary and secondary education (see Figures 4.4 and 4.5). However, academic performance presents a mixed picture. While student outcomes improved between 2000 and 2010, progress has stagnated sharply since then, with no gains over the past 15 years. This stagnation is evident in national assessments (see Figure 4.6) and international evaluations such as PISA (see Figure 4.7).

Figure 4.4. Share of Children in Primary School Age Enrolled in School (1900-2022)



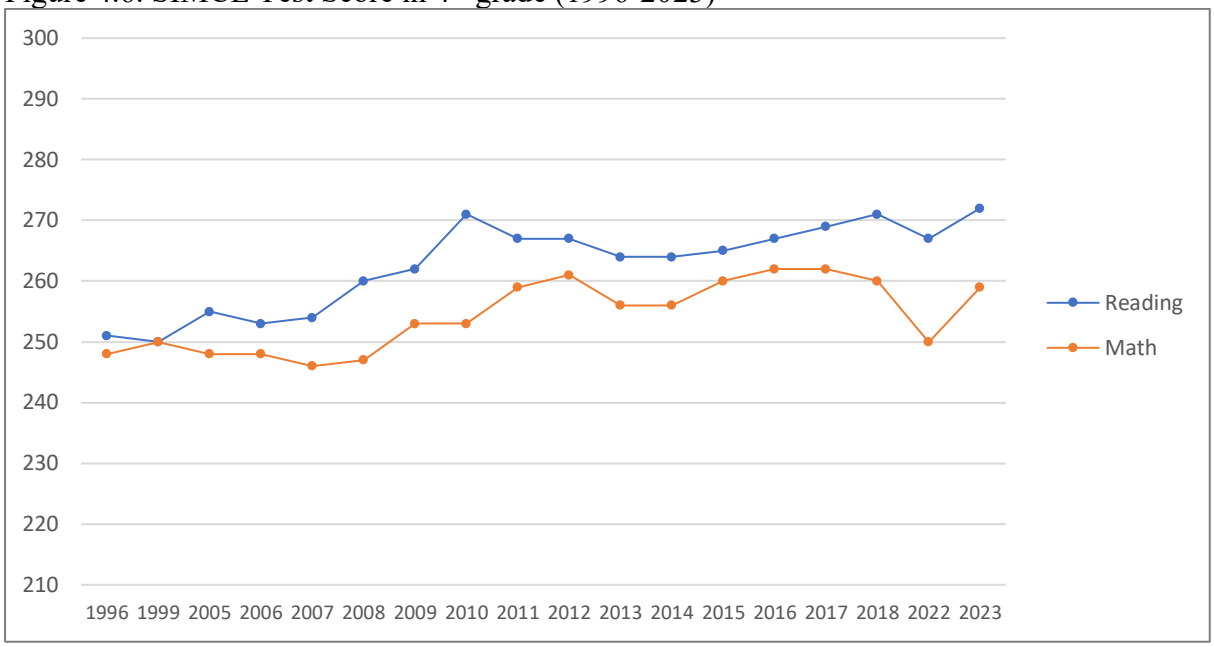
Source: World Bank (2024); Tanzi & Schuknecht (2000) – processed by Our World in Data.

Figure 4.5. Gross enrolment ration in secondary education (1970-2022)



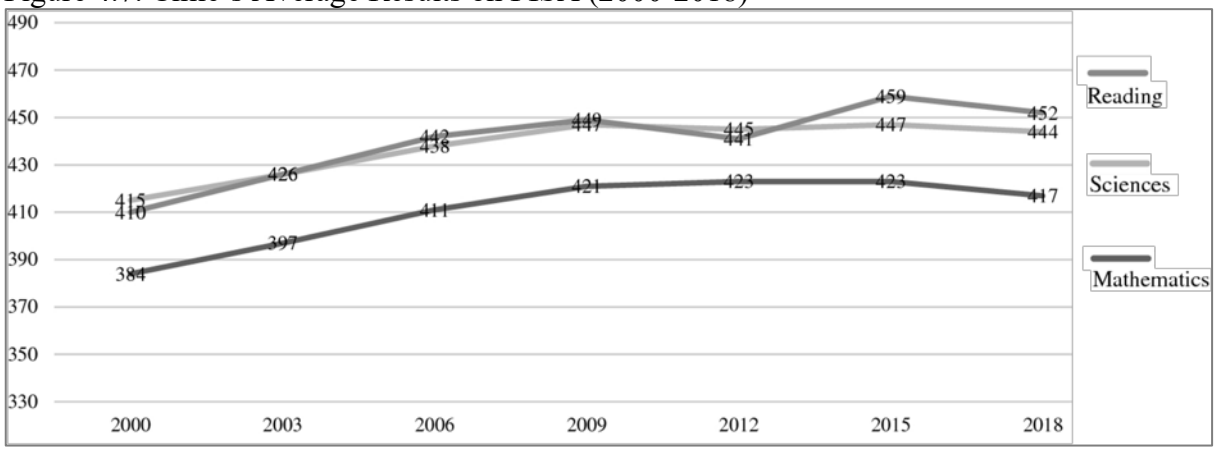
Source: World Bank (2024); Tanzi & Schuknecht (2000) – processed by Our World in Data.

Figure 4.6. SIMCE Test Score in 4th grade (1996-2023)



Source: Created with data from www.agenciadecalidad.cl

Figure 4.7. Chile's Average Results on PISA (2000-2018)



Source: Bellei & Muñoz (2021)

Despite the progress achieved by the Chilean education system in terms of expanded coverage and, to some extent, improved academic outcomes, socioeconomic segregation remains a significant and persistent challenge. While policies such as the Universal Voucher System and the Shared Financing Law have contributed to increased segregation, more recent initiatives aimed at reversing this trend have not produced the expected results. Effectively addressing this issue continues to be a critical priority for the Chilean education system.

Chapter 5 Significance of the Research

This four-phase PhD thesis contributes substantially to understanding the factors that may enable students from disadvantaged backgrounds, particularly those who begin their schooling with low academic performance, to achieve academic success. Importantly, it also challenges common misconceptions about factors assumed to support these students' success. Although specific characteristics are often attributed to students who succeed against the odds, the evidence does not consistently confirm any causal role for them. This research provides critical insight by demonstrating that some commonly held beliefs may not be accurate, enabling a nuanced view of what drives resilience and achievement among disadvantaged students.

A more precise understanding of the skills, supports, and circumstances that enable socioeconomically disadvantaged students to overcome adversity can guide the development of policies and programmes designed to foster resilience in students from similar backgrounds. By pinpointing the factors that help disadvantaged students break the widespread link between socioeconomic status and academic achievement, educators and policymakers can implement more targeted interventions that promote social mobility through education. Additionally, by identifying characteristics that do not meaningfully contribute to resilience, this research encourages more efficient allocation of resources for interventions with higher potential for impact.

This thesis is unique because the research investigated causality among various characteristics, supports, and circumstances rather than simply identifying correlations between these factors and students' success. This focus on causality provides a stronger foundation for future evidence-based interventions.

Stage one of this research uses a rich longitudinal census Chilean database, which offers detailed information about students' personal characteristics and circumstances. This dataset, previously unused for identifying traits of students who succeed against the odds, provides a valuable foundation for an in-depth analysis of these factors.

The second stage of this research employs the Sieve methodology—a novel approach in the context of growth mindset research—to evaluate the reliability of existing studies of growth

mindset. This stage emerges from the first and determines whether growth mindset interventions can genuinely influence students' academic outcomes. By focusing on the most reliable studies, this analysis offers a robust answer to the impact of a growth mindset on academic achievement.

Also emerging from the first stage, stage three examines the effect of selective secondary schools through a unique opportunity in the Chilean context: a regulatory change affecting schools' ability to select students. This analysis contributes valuable evidence to the global debate on the effectiveness of selective schools in education systems.

Stage four offers a deeper exploration of the life narratives of selected Chilean students from disadvantaged backgrounds who succeed against the odds. By comparing these students to peers from similar socioeconomic backgrounds who do not achieve the same academic success, this stage expands the understanding of resilience in this context. It highlights key factors that contribute to academic resilience. Additionally, distinguishing between academically successful disadvantaged students—those who begin their educational journey with high academic performance and those who start with low performance but are able to achieve substantial improvement over time—offers a novel and compelling perspective. This distinction highlights that these two groups are significantly different and require markedly different forms of support during their school years.

Together, these four stages offer valuable new insights into the factors that influence—or do not—resilience and academic achievement among disadvantaged students. The findings provide evidence to guide the development of more effective educational policies and interventions that support these students' success.

Chapter 6 Research Aim and Objectives

This thesis is structured into four stages, each with independent but associated research objectives, methodologies, and inquiries. However, all converge on the central research question:

> Which skills, supports, and circumstances enable students from disadvantaged backgrounds who initially struggled academically to make significant improvements during their school years and succeed against the odds?

The first stage involves an analysis of longitudinal secondary data, which reveals a strong correlation between students' belief that their intelligence is malleable and can grow through effort and academic success among students from disadvantaged backgrounds. Those who believe in a malleable intelligence are more likely to succeed academically than their peers with a fixed mindset. Furthermore, the analysis indicates that students from disadvantaged environments are more likely to overcome obstacles to success if they attend a Bicentennial School—a selective group of high schools known for their rigorous academic standards.

These findings provide a foundation for the second and third stages of the research. The second stage assesses the causal relationship between a growth mindset and academic achievement, while the third stage investigates the specific impact of attending a Bicentennial School on students' academic outcomes.

The final stage of the research encompasses an in-depth exploration of the lived experiences of disadvantaged students who succeed against the odds, contrasting their experiences with those of other students from socioeconomically similar backgrounds but with different achievement trajectories.

The following sections detail the specific research aims and objectives for each of the four stages of this investigation, and the final section of this chapter presents an overview of the subsequent chapters.

6.1. Longitudinal Secondary Data Analysis of Characteristics of Students Succeeding Against the Odds

The first phase of this research involves a longitudinal secondary data analysis designed to identify and examine a group of socioeconomically disadvantaged students who exceed expected educational outcomes. Often regarded as outliers due to their divergence from typical educational trajectories among disadvantaged students, these individuals represent a minority who achieve academic success despite significant socio-economic challenges. This phase uncovers the defining characteristics, supports, and circumstances that set these students apart and contribute to their educational achievements.

Three primary factors distinguish this initial phase of the research. First, it draws on longitudinal data that tracks students from age 10 through their entry into tertiary education, offering a comprehensive view of their educational development over time. Second, the analysis is conducted on a substantial, nationwide census dataset from Chile, allowing for generalisable insights into the factors affecting educational outcomes on a broad scale. Third, it focuses on a specific subset of students—those who demonstrate academic success beyond expected levels despite socio-economic adversity.

The guiding research question for this phase is as follows:

> What characteristics, supports, and circumstances serve as key determinants for socioeconomically disadvantaged students who succeed against the odds?

6.2. Structured Literature Review of Growth Mindset Programs

Findings from the first phase of this research indicated a relevant correlation between high academic achievement among disadvantaged students and the presence of a growth mindset. A greater proportion of high-achieving students from disadvantaged backgrounds displayed a growth mindset compared to their peers with average or below-average results.

The second phase of this thesis investigates the following research question:

> Is there a causal relationship between a growth mindset and academic performance, or is the relationship merely correlational?

This phase involves a structured review of studies evaluating growth mindset programs to influence students' beliefs and perceptions about their academic potential. The literature review assesses whether strong evidence supports a causal relationship between a growth mindset and academic achievement. Although this research primarily focuses on students from disadvantaged backgrounds, the literature review encompasses all available studies on growth mindset and its impact on school-age students' academic performance to provide a comprehensive understanding of the evidence.

To establish causality, the review prioritises studies employing designs that allow for causal inference, focusing on randomised controlled trials evaluating the effect of a growth mindset on academic performance.

6.3. Evaluation of Bicentennial Schools

The first phase of this thesis identified that disadvantaged students who succeed against the odds are more likely to attend Bicentennial Schools, a group of highly selective secondary schools in Chile. The third phase conducts secondary data analysis to examine the impact of these selective schools on student achievement.

The main question of this phase is as follows:

> Is the higher achievement of students at Bicentennial Schools due to the school's inherent effect on student success, or is it a result of its selective admissions practices?

The analysis draws on data points matched with regulatory changes that limited selective admissions practices to address this question. By comparing student achievement across three cohorts enrolled before the regulatory change and one cohort after, this study distinguishes the

effect of selective admissions from the schools' intrinsic contributions to student academic success.

6.4. In-Depth Interviews with Disadvantaged Students

The first phase of this study identified two influential factors associated with success among disadvantaged students: a growth mindset and attendance at a Bicentennial School. However, subsequent analyses in phases 2 and 3 did not provide evidence of a causal link between these factors and the students' academic success. In this final phase, in-depth, unstructured interviews were conducted with disadvantaged students to explore other potential contributors to their academic resilience and success that could not be obtained from secondary data.

This phase explores the following research question:

> What specific characteristics, circumstances, or supports, which could not be identified through secondary data analysis, may have enabled disadvantaged students to succeed against the odds?

Interviews were conducted with disadvantaged students who succeeded against the odds, as well as those with expected or below-expected academic performance. The conversational format of these interviews allows for the exploration of a broad range of potential factors influencing academic resilience and success.

6.5. Chapters Overview

This chapter provides an overview of the following three sections of this thesis, encompassing Chapters 8 through 19.

The following section of this thesis, section two, provides a detailed outline of the research design and methods applied in each phase of this study. Chapter 7 describes the research design and methods for the longitudinal secondary data analysis of disadvantaged students who

succeed against the odds, including details on the database utilised, identification strategies, and the binary logistic models applied. Chapter 8 explains the research design for the structured literature review of growth mindset programs to enhance academic achievement, covering the search process, inclusion criteria, and the assessment framework used to evaluate evidence. Chapter 9 outlines the research methods for evaluating Bicentennial Schools, describing the data sources and the regression model design. Chapter 10 details the method and process used for interviewing disadvantaged students, including the participant selection process, the interview plan, and the analysis strategy.

Section three presents the results and findings from each phase of the research. Chapter 11 discusses the longitudinal secondary data analysis findings on disadvantaged students who succeed against the odds, covering descriptive statistics, logistic regression results, and a summary of key findings. Chapter 12 examines the results from the structured literature review on growth mindset programs, including an overview of the studies reviewed, quality ratings of the evidence, effect sizes, and an analysis of potential biases related to conflicts of interest. Chapter 13 explores the academic impact of Bicentennial Schools through descriptive characteristics of the students, linear regression results, and a summary of the findings. Chapter 14 focuses on interviews with disadvantaged students, presented in two ways: organising student narratives around seven thematic categories, comparing responses across groups, and summarising individual success stories based on the factors students identified as key to their academic improvement.

The final section, Section Four, begins with a summary of the findings presented in Chapter 15. This is followed by an analysis of the study's limitations in Chapter 16. In Chapter 17, the main conclusions and their implications are discussed. Chapter 18 explores these implications in greater depth, focusing on their relevance to various stakeholder groups. Finally, Chapter 19 provides suggestions for future research.

Section Two: Research Design and Methods

This section outlines the research design for the four phases of the thesis. Chapter 7 details the secondary analysis, which identifies and characterises disadvantaged students who succeed against the odds. Chapter 8 presents the research design for the second phase, focusing on a structured literature review of growth mindset interventions. Chapter 9 outlines the methodology for evaluating the impact of Bicentennial Schools on academic performance. Finally, Chapter 10 describes the research design for interviewing disadvantaged students.

Chapter 7 Research Design of Longitudinal Secondary Data Analysis of SAO Students

This chapter presents the research design for the analysis of secondary data and explains the rationale, methods, and justification for identifying students from disadvantaged backgrounds who succeeded against the odds. Subchapter 7.1 describes the data used in the regression models, while Subchapter 7.2 explains the three identification models used to find these students. Finally, Subchapter 7.3 outlines the design of the binary logistic model employed to characterise the resilient students.

This research method was selected due to the access to a longitudinal database rich in socio-economic, socio-emotional, attitudinal, and academic information, with national census coverage, where students are tracked from age 10 to 16. Additionally, this database was complemented with data on higher education access.

The literature search revealed a lack of studies with longitudinal information on these characteristics and their representation. Such studies would allow for an understanding of students' socio-emotional characteristics and a comparison of these characteristics based on their academic progress throughout their educational trajectory.

7.1. Data: National Pupil Data in Chile 2000-2020

The data used for this evaluation comes from five Chilean databases:

(1) Student Enrolment Database (https://datosabiertos.mineduc.cl/matricula-por-estudiante-2/)
(2) Schools Database (https://datosabiertos.mineduc.cl/directorio-de-establecimientos-educacionales/)
(3) Database of Students with Priority Status. (https://datosabiertos.mineduc.cl/alumnos-preferentes-prioritarios-y-beneficiarios-sep/)
(4) Higher Education Enrolment Database. (https://datosabiertos.mineduc.cl/matricula-en-educacion-superior/)
(5) SIMCE Database

The first four databases are publicly available on the Ministry of Education of Chile's website (https://datosabiertos.mineduc.cl/). The Student Enrolment Database contains each student's identification information, the school and class they were enrolled in each year, gender, and date of birth.

The Schools Database contains information about each school, including the type of education it provides, its financial method, its administrator, whether it teaches faith education, whether it charges parents' fees, and the number of students it enrols yearly.

The Students with Priority Status Database provides information on students' assigned Prioritario status. This status is a binary value indicating low-income students and is determined by the Ministry of Education based on family income or related precarious socioeconomic conditions. It is used to identify students who qualify for additional subsidies. Furthermore, schools receive significantly greater subsidies for students with this status compared to other students. The priority status is based on household income and other variables, such as health coverage and employment status.

The Higher Education Enrolment Database contains information on students who enrol in tertiary education, including the institutions and programs they attend, as well as their continuity and graduation status in the following years.

The SIMCE database, owned by the Education Quality Agency of the Government of Chile, can be accessed by request at https://formulario.agenciaeducacion.cl/solicitud_cargar. The Chilean national learning outcome assessment system, *Sistema de Medición de Calidad de la Educación* (SIMCE), is a census-based assessment conducted since 1988. It encompasses math and Spanish (reading and writing); it also evaluates science or social sciences in some years. SIMCE assessments occur in school years 4, 6, 8, and 10. Year 4 is assessed annually, but years 6, 8, and 10 are assessed alternately. However, between 2012 and 2018, year 10 was continuously assessed. Between 2019 and 2021, the SIMCE assessment was interrupted due to social upheaval in 2019 and the pandemic in 2020 and 2021.

The SIMCE evaluations also involve surveys administered to all students, parents, and teachers, yielding substantial supplementary information. The augmented dataset for SIMCE-evaluated cohorts includes:

(1) Standardised test scores in Math, Language, and Science.
(2) From the student survey there is self-reported information about: students' habits and activities (homework, study at home, reading, participation in extracurricular activities, drugs and alcohol use), students' perceptions about themselves (capacity of learning, personal abilities, feeling of belonging to the school, education expectation, growth mindset, seriousness of negative actions), students' perceptions about the school (respect between students and teachers, opinion about the school, health, nutrition, physical activity, bullying, discrimination, violence, extracurricular activities, teacher concern about students)
(3) From the parent or carer questionnaire there is self-reported information about the family situation (age of the parent, familiar relationship with students, people living in the student household), socioeconomic status (education level for both parents, monthly income range, number of books at home, internet and computer available at home), ethnicity and language, parental perception about school (violence and bullying, quality of education and teachers, respect between students and teachers, support and consideration of parents, general opinion of the school, school activities), perceptions about the student (feeling of belonging to school, motivation, learning, education expectation)

It is important to note that not all information is uniformly available across all years and cohorts. Moreover, the more granular insights into students' perceptions are specifically accessible for those aged 14 and 16.

Table 7.1 outlines the cohorts subjected to SIMCE evaluations, delineating the corresponding years. It is noteworthy that the SIMCE application was disrupted between 2019 and 2021. This hiatus resulted from social protests in 2019, which disrupted the evaluation process, followed by the global pandemic in 2020 and 2021.

Table 7.1. Cohorts and Years Assessed by SIMCE

	8 years old	10 years old	12 years old	14 years old	16 years
2010		YES			YES
2011		YES		YES	
2012	YES	YES			YES
2013	YES	YES	YES	YES	YES
2014	YES	YES	YES	YES	YES
2015	YES	YES	YES	YES	YES
2016		YES	YES		YES
2017		YES		YES	YES
2018		YES	YES		YES
2019				YES	
2020					
2021					
2022		YES			YES

Several student cohorts underwent multiple evaluations throughout their academic journey, providing a valuable opportunity to track their progress, achievements, circumstances, and personal characteristics over time. Table 7.2 highlights in yellow the only cohort undergoing consecutive evaluations at ages 10, 12, 14, and 16. This cohort began compulsory education in 2008, with birthdates ranging from late 2000 to early 2002. Only the cases from this cohort were included in the analysis to ensure a thorough and continuous examination of their academic journeys, providing valuable insights into their developmental trajectories.

Table 7.2. Cohorts with Additional Information

	8 years old	10 years old	12 years old	14 years old	16 years
2010		YES			YES
2011		YES		YES	
2012	YES	YES			YES
2013	YES	YES	YES	YES	YES
2014	YES	YES	YES	YES	YES
2015	YES	YES	YES	YES	YES
2016		YES	YES		YES
2017		YES		YES	YES
2018		YES	YES		YES
2019				YES	
2020					
2021					
2022		YES			YES

7.2. Identification Strategy

Three distinct strategies were used to identify academically successful students. The initial approach identified those disadvantaged students who demonstrated notable advancements in test scores from primary school (age 10) to secondary school (age 16), exceeding the expected progress compared to their peers. This group will be called students who meet the Success Against the Odds (SAO) criteria. In the second strategy, academically successful students are identified as those who, despite a disadvantaged background, successfully completed secondary school and subsequently enrolled in tertiary education. The third strategy, while akin to the second, adopts a more stringent approach, designating as successful those disadvantaged students who not only entered tertiary education but specifically enrolled in a prestigious university for their academic pursuits.

It is important to highlight that using graduation from tertiary education as a measure of success is currently not feasible, as this cohort is still advancing through their tertiary studies.

a. Identification strategy 1: Exceptional progress from 10 to 16 years old

A linear regression model was developed to predict students' scores at 16 using their 10-year-old scores as a predictor. The residual, representing the variance between the predicted and actual scores, was used to measure unexpected progress. To identify exceptional performance cases, the focus was placed on the top 20% of students exhibiting the most positive residuals, indicating substantial overachievement compared to the model's predictions. This group will be referred to as Success Against the Odds (SAO) students.

b. Identification strategy 2: Enrolment in higher education

An alternative approach to identifying students who beat the odds was to look at whether they continued to higher education. This method is not particularly strict, with more than half of the disadvantaged students in our study pursuing further education (76% for students not coming from a disadvantaged background). In Chile, the proportion of students entering higher education within three years of completing secondary school is notably high compared to other countries in the region and globally. This trend is a recent phenomenon, primarily attributed to introducing a free higher education policy in 2016, designed to benefit students from families

within the lowest 60% of income earners. However, a significant challenge persists as many students discontinue their higher education studies within one or two years of enrolment.

c. Identification strategy 3: Enrolment in a prestigious university (CRUCH group of universities)

A third strategy was used to identify academically successful students. This time, students from disadvantaged backgrounds who secured admission to a university affiliated with the Council of Rectors (CRUCH) were identified. CRUCH comprises 30 universities known for their rich educational history, experience, highly competitive intake, and high quality of education. These universities receive a major share of government research funds, and most are public institutions.

7.3. Binary Logistic Model

Returning to the initial research question, this section focuses on finding the specific characteristics of students from disadvantaged backgrounds who achieve academic success. However, not just any characteristics are of interest; the focus is mainly on those that are malleable in students. Identifying these characteristics could potentially assist more students from disadvantaged environments in succeeding in their education.

Predictive logistic models were employed to achieve this. These models identify characteristics that increase a student's likelihood of belonging to the successful group and those that decrease that probability. The logistic method was chosen because it allows for a more realistic non-linear relationship and is more convenient when using categorical independent and dependent variables (Peng et al., 2002; Gorard, 2003, p. 219; Agresti, 2002, p 165). Three logistics models were used, with the dependent variable being belonging to the academically successful groups described in the previous section.

The dependent variables in the binary logistic regression models take a binary value of 1 if students belong to the academically successful group being considered, and zero if they do not. Only students from disadvantaged backgrounds are considered, because the intention is to

identify factors linked to success for disadvantaged students. Separate models are run for the three identification strategies to identify characteristics contributing to a student's membership in each successful group.

The independent variables are entered into the model in seven biographical blocks, reflecting the sequence in which each group of variables shows association with the students' lives (Osborne, 2015, p. 256; Menard, 2010, p.120; Gorard et al., 2012; Siddiqui et al., 2023).

The variables in each step are:

(1) The first step includes variables mainly determined at birth and are unlikely to change: semester of birth and sex.
(2) The second step encompasses family socioeconomic variables: mother's education, father's education, declared income, number of books at home, years receiving government benefits, and years receiving extra government benefits.
(3) The third step includes the student's average test scores in math and reading at 10 years old.
(4) The fourth step includes other variables related to the student at age 10: school type, parental help, academic self-esteem, whether the student lives in the same geographical zone as their school, and whether the student has changed schools.
(5) The fifth step incorporates information about the student at 12 years old: school type, parental help, academic self-esteem, and student persistence.
(6) The sixth level includes information from when the student was 14 years old: school type, academic self-esteem, persistence, and education expectations.
(7) The seventh level includes the students' responses at the age of 16 regarding school type, academic self-esteem, student persistence, growth mindset, and education expectations.

The rest of this chapter will explain the logistic regression model for each successful group.

a. Binary logistic model predicting disadvantaged students who made exceptional progress from ages 10 to 16

In this first binary logistic model, the outcome is assigned a value of 1 for students in the Success Against the Odds group (SAO) and 0 for all other students. The SAO group consists

of students identified in strategy one from the preceding section (7.2.a). The model includes only disadvantaged students, defined as those whose parents did not complete compulsory education. The SAO group comprises 1,446 students, while the comparison group comprises 12,859 students.

Given the numerical imbalance between the two groups, the comparison group is divided into nine random subgroups, following the stratified sampling design (Lacey, 1997; King & Zeng, 2001; White & Selwyn, 2013; de Haan-Ward et al., 2025). Lacey (1997) explains that a stratified sampling design can be an effective solution for studies where the event of interest may be rare. White and Selwyn (2013) used this design to evaluate patterns of internet use. They created sub-samples with equal responses to the dependent variable to create meaningful models with a dichotomous dependent variable that is unevenly distributed. This involved including all cases from the category with the fewest responses and combining them with an equally sized, randomly selected sample from the category with the most responses. The same procedure was used in this analysis.

The comparison group of disadvantaged students who do not belong to the SAO group was divided into nine subgroups to achieve comparison groups of equivalent size to the group of interest, which are the students belonging to the Success Against the Odds group. Then, nine logistic regressions were performed, each comparing the SAO group with one of the nine comparison subgroups. The variables were systematically introduced into the model using the Forward Method, where variables are added one at a time, starting with those that most enhance the model, until the addition of a new variable ceases to impact it.

Afterwards, the model incorporating the fewest variables and achieving the highest percentage of correct predictions was chosen and replicated for the nine comparison groups. Subsequently, the average was computed across these nine groups to determine the correctly predicted percentage at each stage and estimate the coefficient associated with each independent variable. The results of these models are presented in Chapter 11, Section 3.

b. Binary logistic model predicting disadvantaged students who enrolled in higher education.

The outcome of the second binary logistic model assigns a value of 1 to students who enrolled in tertiary education for at least one year within three years following the completion of

compulsory education and 0 to students who did not enrol in higher education during that timeframe. In this model, 7,678 disadvantaged students enrolled in higher education, and 6,528 did not. Since the group of disadvantaged students who entered higher education is similar in size to those who did not, there is no need to divide the comparison group into multiple subgroups, as was done in the previous model and will be done in the next model.

As in the previous model, variables were introduced at each step using the Forward Method. The results of this model are presented in Chapter 11.

c. Binary logistic model predicting disadvantaged students who enrolled in a prestigious university.

For the third model, the outcome takes the value 1 for disadvantaged students who enrolled in a CRUCH university, using the same time frame as the previous model, and 0 for all other disadvantaged students in the model, as was explained in section 7.2. c. CRUCH university is a group of 30 prestigious universities, rich in educational history, experience, and quality.

There are 2,949 disadvantaged students enrolled in a CRUCH university, and 11,311 disadvantaged students in the comparison group. Due to the imbalance between the groups, the comparison group was divided into four randomised groups, and the students enrolled in a CRUCH university were compared with each of the comparison groups. The variables were entered into the model in each step using the Forward Method.

The four models with the fewest variables and the highest prediction accuracy were selected. This selected model was then replicated for the four comparison groups. Subsequently, the average was computed across these four models to determine the correctly predicted percentage at each stage and assess the impact of each variable. The results of these models are presented in Chapter 11.

7.5. Missing Data

In this study, the treatment of missing data was approached in a differentiated manner, dependent on the relevance of the information; the case was excluded, or a missing category was created.

a. Cases excluded

For the identification of students with exceptional progress from 10 to 16 years old, it was necessary to have information about their SIMCE scores at years 4 and 12. Therefore, Students for whom this information was missing were excluded from the analysis. The SIMCE scores for those years are a key component in defining the category of students who succeed against the odds, and their absence precludes accurate identification of these cases. This decision prioritises classification accuracy over the inclusion of all potential cases, thereby minimising the risk of Type I errors—that is, incorrectly identifying a student as disadvantaged when they are not. While this strategy may not capture all students who truly belong to this group, it ensures that all included students meet the established criterion. Case deletion may reduce statistical power and, if the missing data is not random, could potentially bias the results (Little & Rubin, 1989; Dong & Peng, 2013; Gorard, 2020).

To understand the size and potential impact of the bias on the results, it is helpful to identify the sources of the missing data and their extent. Among the students who were enrolled in Year 4 in 2011, not all continued to Year 12 in 2017. Students may leave the system because they move to another country or drop out of school, a much more problematic situation, as school dropouts are not random; they tend to be students from low socioeconomic backgrounds and those with low academic achievement. Additionally, students who were retained in at least one academic year were also not in Year 12 in 2017. Once more, this group is not random; students who repeat a grade tend to be those with lower academic performance.

Additionally, some students were enrolled in the system at the time but did not take the test due to school absences on the testing days. Among these absentees, some cases may be considered random, for example, students who were temporarily ill and whose absence was incidental. These students are unlikely to differ significantly from those who attended school and completed the test. However, students with higher levels of chronic absenteeism are more

likely to have missed the SIMCE test day, and this group should not be considered missing at random. Moreover, some students may deliberately choose not to attend school on the day of the assessment, either by personal choice or due to potential incentives from schools aimed at preventing low-performing students from taking the test and negatively impacting the school's overall results. In such cases, the absence is clearly non-random and may be systematically associated with lower academic performance.

Chapter 11 provides a detailed analysis of the number of students excluded from the study due to the absence of academic performance data, as well as an examination of how these students differ from those included in the analysis.

For the identification of students from disadvantaged socioeconomic backgrounds, cases with insufficient information to reliably determine family background were also excluded from the analysis. Again, the idea behind this decision is to make sure all students identified as disadvantaged are indeed disadvantaged, although this may result in the exclusion of some genuinely disadvantaged students from the analysis. Regarding the family background, it is more challenging to understand the reason behind the lack of information, given that the information was compiled from various sources, including enrolment information and SIMCE databases. In cases where different sources had contradicting information about parental school completion, the higher level of schooling was used. There are two reasons behind this decision. First, it is plausible for a parent to increase the level of schooling by completing an additional level; however, it is not possible to decrease the level of education. Second, to prioritise that all students identified as disadvantaged are actually disadvantaged, over the possibility that some disadvantaged students are not identified as such.

b. Missing categories

For student characteristics—characteristics of the schools they attend, or responses to student and parent questionnaires in the SIMCE databases—missing data were treated as an additional category for the variable in the analysis. For example, in the variable indicating the number of books at home, a specific category was included for cases where the information was not available. Similarly, for the question on academic self-perception ("I am smart"), the response options included "no information" for students who did not answer the question. This method,

known as “treating missingness as a response,” allows all cases to remain in the analysis and is particularly appropriate for categorical variables (Gorard, 2021; Little & Rubin, 2002).

7.6. Chapter Summary

In summary, the research design for the secondary data analysis, which identifies students from disadvantaged backgrounds who achieve academic success and examines their characteristics, begins with three linear regression models. Each model corresponds to a distinct definition of academic success. The first model identifies students who exhibit substantial improvement in academic performance between the ages of 10 and 16. The second defines academic success as progression to higher education, while the third considers it admission to a prestigious university within the higher education system.

Following this, binary logistic regression models were applied to each group of academically successful students. These models were designed to uncover the characteristics or circumstances associated with socioeconomically disadvantaged students who achieve academic success, comparing them with students who share similar family traits but did not achieve academic success.

These models predicting disadvantaged students who made exceptional progress and who enrolled in prestigious universities employed a stratified sampling design, as the students achieving this academic success represented a minority within the entire sample of disadvantaged students in the models. This approach enhances efficiency by ensuring an adequate number of cases in each subgroup, facilitating more accurate model estimation and generalisation.

Chapter 8 Research Design of the Structured Review of Growth Mindset

One of the key findings from the secondary data analysis, conducted as the initial stage of this research (with the research design detailed in Chapter 7 and the results presented in Chapter 11), was that students from socioeconomically disadvantaged families who achieved academic success against the odds were markedly more likely to believe that intelligence can change and can be improved with effort compared to their peers from similar backgrounds who did not experience academic success during their school years. This observation prompts the question of whether this socio-emotional trait could be the primary factor, or one among several, that facilitates their academic success. Building on this question, the second phase of this research explores whether a causal relationship exists between a growth mindset and academic performance.

A structured review of existing literature was undertaken to address whether mindset is a malleable characteristic and whether there is evidence to claim a genuine causal relationship between mindset and academic performance. This research method was selected because there are many experiments already conducted on this topic, many of which are randomised controlled trials with sufficiently large samples. Given that the question to be answered is of a causal nature, randomised controlled trials are a suitable method for addressing this question.

An assessment methodology that had not been used in this topic before was employed to assess the quality of the existing research. The trustworthiness of findings across diverse studies was prioritised, with particular attention given to addressing potential factors that may compromise their robustness. Thus, well-informed conclusions regarding the efficacy of growth mindset interventions are enabled, while the quality of each study included is meticulously considered.

This chapter will outline the methodology employed for conducting the search, establishing inclusion criteria, and assessing the quality of the evidence.

8.1. Search and Inclusion Criteria

The review included all studies that met the inclusion criteria (below) and were featured in the two most recent meta-analyses conducted by Macnamara and Burgoyne (2022) and Burnette et al. (2022). Additionally, an updated search was conducted to incorporate studies that became available after the cessation of those two meta-analyses' data collection, extending until the end of 2023.

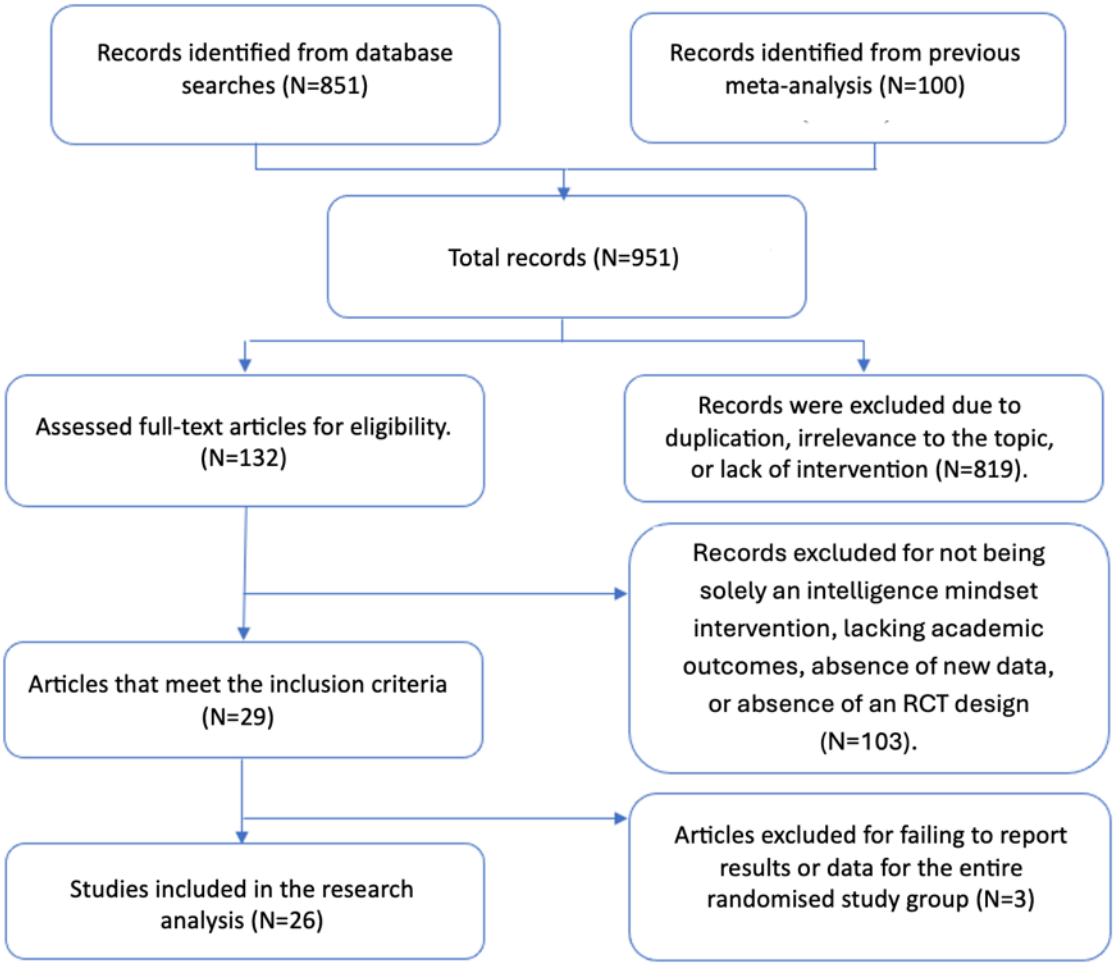
The search encompassed a range of terms related to ‘growth mindset’ and its synonyms, including ‘lay theory’, ‘implicit theory’, ‘developmental mindset’, ‘incremental theory of intelligence’, and ‘self-theories of intelligence’. Additionally, the search included terms associated with the evaluation of interventions, such as ‘intervention’, ‘trial’, ‘randomised control trial’ (RCT), ‘programme’, ‘remedial action’, ‘initiative’, ‘workshop’, and ‘training’. Furthermore, search terms reflecting the contexts in which the interventions were implemented were incorporated, covering any terms related to ‘student’, ‘school’, ‘class’, ‘children’, ‘pupil’, ‘educational institution’, ‘academy’, and ‘institute’. The databases searched included ERIC, APA PsycInfo, Google Scholar, and ScienceDirect.

To be considered for inclusion, studies had to meet the following criteria:

(1) The study should evaluate a growth mindset intervention aimed at school-age children.
(2) The studies should be focused exclusively on interventions related to incremental theories of intelligence, excluding those centred on incremental theories of personality.
(3) It must have employed a randomised controlled trial (RCT) design to assess the efficacy of an intervention.
(4) The study should have included a measure of academic performance as an outcome.
(5) The research had to be published in English.
(6) The study should provide the essential information required to calculate Cohen’s d effect size for the entire randomised sample.

The number of studies found at each stage is shown in Figure 8.1.

Figure 8.1. PRISMA Flowchart of Records Discovered



8.2. Assessment of Evidence

The studies meeting the inclusion criteria underwent an evaluation process to judge the quality of their findings. The framework used is the 'sieve' approach, as proposed by Gorard (2021), to assess the trustworthiness of each study's outcomes. The ‘sieve’ method has been used effectively by research review teams (e.g. Siddiqui & Ventista, 2018; Owen et al., 2022) and is the basis for the security ratings used by the EEF in England. The aim was to ensure that conclusions were influenced most by the most robust results concerning the potential impact of growth mindset interventions on student achievement. The ‘sieve’ method appropriately defines quality and provides a consistent scale to rate the individual studies.

The ‘sieve’ approach outlines four key criteria for evidence assessment, as shown in Table 8.1. First, it examines whether the research design suits the claims being made. This study is concerned with causal claims. Given that the review selection criteria required the use of randomised control trials (RCTs), all the studies included in this review were awarded the highest rating (4) for this criterion. This is a suitable design for a ‘what works’ question. The second criterion concerns the size of the randomised groups, while the third addresses attrition levels, and the fourth criterion considers the data quality. Assessing studies based on these four criteria, their quality was rated on a scale from 0 to 4. A rating of 0 indicated the lowest level of quality, adding nothing to knowledge, whereas a rating of 4 signified the highest level, reserved for the most robust and reliable evidence. It is crucial to emphasise that ratings do not reflect the quality of the studies themselves but rather the quality of the evidence they contribute toward addressing the research question concerning the impact of growth mindset interventions on student achievement.

To ensure the studies were rated accurately, two additional experienced researchers independently rated a subsample of the articles using the same framework at the outset. The ratings provided by these two researchers and the author of this paper were highly consistent across the four criteria assessed by the sieve framework. Furthermore, the same research team reviewed all studies with any uncertainty regarding the assigned rating.

Table 8.1. ‘Sieve’ Approach to Estimate the Trustworthiness of Each Study

Design	Scale	Completeness of data	Data quality	Rating
Strong design for research question	Large number of cases per comparison group	Minimal missing data, no evidence of impact on findings	Standardised, independent, pre-specified, accurate	4
Good design for research question	Medium number of cases per comparison group	Some missing data, possible impact on findings	Standardised, independent, not pre-specified, some errors	3
Weak design for research question	Small number of cases per comparison group	Moderate missing data, likely impact on findings	Not standardised, independent, or pre-specified, some errors	2
Very weak design for research question	Very small number of cases per comparison group	High level of missing data, clear impact on findings	Weak measures, high level of error, too many outcomes	1
No consideration of design	A trivial scale of study, or number is unclear	Huge amount of missing data, or not reported	Very weak measures, or accuracy not addressed	0

Source: Gorard (2021)

Studies employing an RCT design with a sample size exceeding 400 students per group were assigned a 4* rating. In case classrooms were randomised, they needed to have at least 50 classrooms per group. Additionally, they exhibited attrition rates of 10% or less and demonstrated robust academic outcomes such as GPA, standardised tests, or exam scores.

Slightly smaller sample sizes characterised studies receiving a 3* rating, though still surpassing 70 students per group, or they exhibited dropout rates between 10% and 20%. Studies rated as 0* to 2* faced more significant quality issues, such as smaller sample sizes or higher dropout rates. Given the substantial number of 3* and 4* studies found, which is unusual, this paper focuses on this high-quality evidence to address the research question.

Regarding data completeness, studies received a 3* rating when concerns about data completeness were present but not significant enough to undermine the reliability of the results. Studies with data completeness below 90% did not receive the highest rating for this item, and if attrition exceeded 30%, the rating was downgraded to 2* or lower.

The fourth criterion in the sieve quality assessment is data quality. Most studies did not encounter issues in this category, as they employed standardised tests, GPA, and end-of-year grades as outcomes. A few studies exhibited lower data quality due to the use of non-standardised tests as outcomes. However, many of these studies faced significant threats in other evaluation criteria, indicating that data quality was not the primary factor influencing their final rating and, therefore, the validity of their findings.

8.3. Chapter Summary

In summary, the structured review of studies examining the impact of growth mindset interventions on academic achievement included research published in English up to the end of 2023. These studies focused on growth mindset interventions rooted in incremental theories of intelligence and targeted school-age children. To meet the inclusion criteria, studies had to employ a randomised controlled trial (RCT) design and measure academic performance as an outcome. In total, 26 studies satisfied these criteria.

The trustworthiness of these studies' findings was evaluated using the 'sieve' approach proposed by Gorard (2021). Studies that used an RCT design, had a sample size exceeding 400 students or 100 classrooms, had 10% or lower attrition rates, and assessed robust academic outcomes such as GPA, standardised test scores, or examination results received the highest confidence rating (4*).

Chapter 9 Research Design of the Evaluation of Bicentennial Schools

In the initial phase of this research, secondary data analysis revealed that socioeconomically disadvantaged students who succeeded against the odds were not only more likely to believe that they could enhance their intelligence through effort and hard work but also disproportionately attended a group of academically selective institutions known as Bicentennial Schools. Building on this finding, the third phase of this research investigates whether a causal relationship exists between attending one of these selective schools and achieving academic success against the odds for socioeconomically disadvantaged students.

Evaluating the quality of a school or a group of schools is challenging, as students' results depend not only on the quality of the school but also primarily on the individual characteristics of the students, their families, and their past experiences. Identifying the extent to which a student's results are attributable to the teaching received at a school rather than personal and external factors has been a persistent challenge in school effectiveness research. This challenge is particularly pronounced in the case of selective schools, where students are admitted based on a selection process. In such instances, the students attending these schools differ considerably from those attending non-selective institutions. This is exemplified by Grammar Schools in England (Capsada-Munsech & Boliver, 2024; Gorard & Siddiqui, 2018; Morris & Perry, 2017), Exam Schools or Magnet Schools in the United States (Abdulkadiroğlu et al., 2014; Allensworth et al., 2017; Barrow et al., 2020; Dobbie & Fryer, 2011), Bicentennial Schools in Chile (Allende, 2015), and numerous other selective schools worldwide(Zhang, 2014; Wu et al., 2019).

The Chilean context provides a unique opportunity to evaluate the effect of selective high schools by isolating the impact of student selection. Following the year 2016, the possibility of schools selecting students in Chile gradually decreased, contingent upon the institution's geographical location. This circumstance enables us to discern the degree to which the apparent effect of these selective schools is attributable to their selection process and how much can be attributed to the intrinsic value added by the schools themselves.

This section presents the research design of the third phase of the thesis. The impact of the Bicentennial Schools, a group of highly selective Chilean schools, is evaluated through a

secondary data analysis leveraging a regulatory change restricting selective admissions. The reason for selecting this research method was that most of the available literature evaluating this group of schools in Chile failed to adequately control for the effects of the schools' selection process and the self-selection of students applying to these schools. Therefore, a new analysis was conducted, innovatively utilising a change in Chilean regulations, which gradually reduced the ability of schools to select their students starting from 2016.

Due to this regulatory change, the impact of these schools was compared across three cohorts that entered before the change and one cohort that entered after the change. The difference in impact calculated for those cohorts isolates the estimated effect of student selection from the schools' intrinsic impact.

The first subsection of this chapter presents the data used for the evaluation, while the second subsection explains the design of the regression model.

9.1. Administrative Secondary Data

The data used for this evaluation comes from three existing databases:

- Student Enrolment Database
- Schools Database
- SIMCE database and its parent questionnaires

The first two databases are openly available on the website of the Ministry of Education of Chile, while the third database needed to be requested from the Education Quality Agency of the Government of Chile.

The Chilean national learning outcome assessment system, *Sistema de Medición de Calidad de la Educación* (SIMCE), is a census-based assessment conducted since 1988. It encompasses math and Spanish (reading and writing); it also evaluates science or social sciences in some years. SIMCE assessments occur in school years 4, 6, 8, and 10. Year 4 is assessed annually, but years 6, 8, and 10 are assessed alternately. However, between 2012 and 2018, year 10 was

continuously assessed. Between 2019 and 2021, the SIMCE assessment was interrupted due to social upheaval in 2019 and the pandemic in 2020 and 2021.

The analysis focuses on four cohorts, each named according to the year in which the students were in Year 10, when they took the last SIMCE assessment:

(1) Cohort 2016: Students of this generation were assessed by the SIMCE test in year 4 (2010), year 8 (2014), and year 10 (2016).
(2) Cohort 2017: They were assessed in years 4 (2011), 6 (2013), 8 (2015), and 10 (2017).
(3) Cohort 2018: Their assessments took place in years 4 (2012), 6 (2014), and 10 (2018).
(4) Cohort 2022: Their assessments were conducted in year 4 (2016), year 6 (2018), and year 10 (2022).

Table 9.1 displays the assessments taken by each cohort, and Table 9.2 presents the years each cohort attended year 9 (the year most students enrol in Bicentennial Schools).

Table 9.1. SIMCE Assessments per Cohort

	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Cohort 2016	2010				2014		2016
Cohort 2017	2011		2013		2015		2017
Cohort 2018	2012		2014				2018
Cohort 2022	2016		2018				2022

Table 9.2. Year 9 per Cohort

	Year 9
Cohort 2016	2015
Cohort 2017	2016
Cohort 2018	2017
Cohort 2022	2021

The analysis included all students who were in Year 10 in the respective year and took the corresponding SIMCE test in a school with the same type of education as that provided by the Bicentennial Schools (Scientific-Humanistic Education or Technical Professional Education in Commerce, Industry, or Agriculture). Adult students and students from private fee-paying

schools were excluded. Students who did not have SIMCE scores in previous years were also excluded.

Finally, only students from geographical zones where at least one student attended a Bicentennial School were considered. Since the first round of Bicentennial Schools comprised only 60 schools distributed nationwide, students in certain areas were unable to attend a Bicentennial School. Therefore, they were not included in the analysis as they are not comparable to students who attended Bicentennial Schools.

9.2. Regression Model Design

Two linear regression models were estimated for each of the four cohorts included in the analysis. The first model used the language score at year 10 as the dependent variable, while the second used the math score in the same year. The predictor variables entered the model in eight chronological blocks, following Gorard et al. (2012) and Siddiqui et al. (2023).

The stages of the model were as follows:

(1) Stage 1: variables determined at birth (gender and semester of birth)
(2) Stage 2: family socioeconomic variables (parental education, family income, number of years the student has had Prioritario Status)
(3) Stage 3: variables regarding the type of school the student attended in year 4 (school type and rurality)
(4) Stage 4: Test scores in math and language at year 4.
(5) Stage 5: Test scores in math and language at year 6.
(6) Stage 6: characteristics of the school the student attended in year 8 (school type, tuition fees, religion, rurality)
(7) Stage 7: characteristics of the school the student attended in year 10 (school type, tuition fees, religion, rurality)
(8) Stage 8: If the student attends a Bicentennial School in year 10.

For the 2016 cohort, there was a slight variation in the model because this generation was not assessed in year 6, so the year 8 test scores were used instead.

To estimate the impact of attending a Bicentennial School on students' academic outcomes, the improvement in the predictive model of students' outcomes at age 16 when including information on attendance at these schools was estimated. Specifically, the focus was placed on the increase in R-squared of the regression. However, since the number of students attending these schools constitutes a minority within the overall student population considered, the effect of attending these selective schools could be diluted in the analysis. To address this, the comparison group (students who did not attend Bicentennial Schools) was divided into 17 random groups, similarly to the process explained in Chapter 7. Regressions comparing students who attended Bicentennial Schools with each comparison group were estimated to obtain balanced comparisons. Subsequently, the results of each regression were averaged, and the average R-squared and coefficients for the 17 regressions will be reported. The findings and results of this estimation are reported in Chapter 13, in the third section of this document.

9.3. Missing Data

As noted in the initial stage of this investigation, as explained in Chapter 7, students for whom academic outcome data were unavailable were excluded from the analysis. Excluding these cases may reduce statistical power and, if the missing data are not random, could potentially bias the results (Little & Rubin, 1989; Dong & Peng, 2013; Gorard, 2020). Chapter 13 presents an analysis of the excluded cases to understand the potential bias they could introduce to the findings.

For other variables, such as students' characteristics, socioeconomic characteristics, parents' schooling, and school characteristics, missing values were addressed by adding an additional category to each variable that represents those cases with missing information. This approach enables all cases to remain in the analysis and is particularly suitable for categorical variables (Gorard, 2021; Little & Rubin, 2002).

9.4. Ethics of Using Secondary Data

This study utilises secondary data sourced from the Ministry of Education of Chile, ensuring that all records are fully anonymised to protect the confidentiality of individual cases. Employing anonymised secondary data is consistent with established ethical guidelines in educational research, as it eliminates the possibility of tracing information back to specific individuals. As a result, the research adheres to institutional and legal data protection requirements, and no additional consent from participants was required due to the dataset's aggregated and anonymous nature.

9.5. Chapter Summary

In summary, the evaluation of Bicentennial Schools examines the apparent academic impact of these institutions by comparing results for the 2016, 2017, and 2018 cohorts, when schools were permitted to select students, with the 2022 cohort, when student selection was significantly restricted. The comparison between the estimated impacts for the earlier cohorts and the final cohort highlights the extent to which the schools' apparent success can be attributed to the selection of students with higher academic potential versus the actual academic value added by the schools.

To estimate these impacts, linear regression models were employed, using students' performance in national language and mathematics tests at age 16 as the dependent variables. These models controlled for factors determined at birth, socioeconomic variables, characteristics of the schools attended, and prior performance in national tests. The variables were entered into the models in chronological order to account for their temporal progression.

Chapter 10 Methodology of Interviews with Disadvantaged Students

Phase 1 of this thesis described that students from disadvantaged backgrounds who succeeded against the odds were more likely to exhibit a growth mindset and to have attended selective schools. However, findings from Phases 2 and 3 indicated that these factors did not demonstrate a causal relationship with success against the odds. Building on these insights, Phase 4 focuses on identifying other characteristics or circumstances that may contribute to students' success against the odds, particularly those that cannot be captured through database analyses.

This section describes the methods used in the final research phase, which involved semi-structured interviews with students from disadvantaged backgrounds. The interview method was chosen to address the thesis's central question:

> Which skills, supports, and circumstances enable students from disadvantaged backgrounds who initially struggled academically to make significant improvements during their school years and succeed against the odds?

Building on the findings from secondary data analysis and the critical examination of causality among the most strongly correlated factors, the research question was revisited with a more exploratory perspective. This approach was employed to uncover potentially relevant but more idiosyncratic factors in the students' lives that might explain how they overcame their initial low academic performance and achieved success against the odds. These factors, circumstances, or characteristics are not detectable through database analysis, as they represent unique events or influences in each child's life, with potentially varying impacts across individuals (Wickham, 2019 & Johnston, 2014).

Revisiting this question from this exploratory perspective allows the study to identify potentially relevant factors that may have occurred in the students' lives, which are key to explaining how they overcame their initial low academic performance and succeeded against the odds. These factors, circumstances, or characteristics cannot be captured through any secondary analysis of structured surveys, as there is a wide range of events in a child’s life that they perceive to have impacted their academic life and outcomes.

Semi-structured interviews were conducted with students from disadvantaged backgrounds, including those classified as 'Success Against the Odds' (SAO) students and those who are not. As described in the previous chapters of this thesis, the SAO group consists of students who, despite beginning their schooling with low academic performance and facing socioeconomic disadvantages, demonstrate substantial academic progress over time, ultimately achieving high academic success. The primary research question involves identifying the specific characteristics, circumstances, or types of support that have enabled these students to excel academically. This analysis was based on what is already known about each student. The interviews went beyond these variables and explored various aspects of their lives, including broader family background, school experiences, personal traits, key individuals who influenced their development, and additional topics raised by the students. The goal was to uncover any differences in the narratives between SAO students and other students from similar backgrounds who have shown differing levels of academic achievement throughout their schooling.

This chapter begins by detailing the process of selecting the students for the interviews. It then outlines the structure of the interview plan before concluding with a description of the analysis plan.

10.1. Selection of Students for Interviews

To select students for the interviews, the identification strategy detailed in Chapter 7 was replicated for a cohort of students attending the penultimate year of compulsory education in 2025 (most of these students turned 17 years old in that year). Students from disadvantaged backgrounds who demonstrated a significantly above-expected improvement in SIMCE scores between ages 10 and 16 were classified as ‘Success Against the Odds’ (SAO) students. Re-identifying SAO students was necessary, as the original cohort studied in the first phase of this thesis has already completed compulsory education and is no longer attending school. This makes reaching them for interviews challenging, given the anonymity of the database, which lacks both names and contact information. The cohort selected for the interviews was still

enrolled in school when the interviews were conducted, making it possible to identify the school they attended and interview them at the school.

Subsequently, schools with the highest concentration of SAO students were identified. Targeting these schools increases the likelihood of reaching the students of interest. The five schools with the highest number of students fitting these criteria were approached. Table 10.1 displays the number of students identified as SAO and those classified as disadvantaged in Year 11 in each selected school.

Table 10.1. SAO and Disadvantaged Students in Each School

School name	SAO students	Disadvantaged students
School 1	34	117
School 2	13	43
School 3	12	66
School 4	11	39
School 5	11	32

Five schools were contacted via email to their head teachers. Subsequently, online meetings were held with the individuals designated by the head teachers as the primary contacts. In these meetings, the objectives and process of the research were explained, and the schools were invited to participate. Of the five schools contacted, three agreed to participate. The three schools that chose to participate in the research did so voluntarily, without any external incentives or pressure, simply because they found the topic relevant. Their only requirement was access to the results once the research was completed. Schools that declined to participate did not provide a reason; they did not respond to contact attempts.

The next step involved collaborating with the schools on the student selection procedure. Each school identified students from disadvantaged families according to the criteria specified in Chapter 7, specifically, families where neither parent completed compulsory education. Subsequently, a letter containing information about the study and a consent form were sent to parents requesting their authorisation for student participation. An English translation of the information provided to parents and the consent form is included in Appendix 4.

Not all students who received parental consent for interviews were ultimately interviewed. The choice of students was left to the schools' discretion. The number of students interviewed, from those who met the socio-economic profile and had parental approval, was primarily determined

by the length of time the schools were willing to allow the interviews. While the selection process for students meeting the outlined criteria was at the schools' discretion, they were asked to prioritise students who fit the profile of the "Success Against the Odds" group, which is the focus of this study.

Before the interview began, students received information about the study and were asked for verbal consent to participate. The interviewer also explained that if they chose to participate, they could decline to answer any question or stop the interview at any time. Furthermore, if students wanted to erase any answers they had already provided, they simply needed to inform the interviewer. If they wish to have the entire interview erased, they can request this at any point during the interview.

10.2. Interview Plan

Depending on the school's location, some students were interviewed remotely using Microsoft Teams, while others were interviewed in person. However, given an unstable internet connection, some interviews that were supposed to be conducted in Microsoft Teams had to be conducted by phone. Table 10.2 provides a breakdown of the number of students interviewed by the school.

Table 10.2. Number of Students Interviewed by the School

School	Students
School 1	21
School 2	9
School 3	6
Total	**36**

Interview structure

The interviews were planned to begin with open-ended questions, allowing students to freely discuss topics they deemed relevant. Based on the subjects introduced by the students, more specific questions were posed to address any areas not yet explored. The conversation typically started with broad questions, encouraging students to speak freely. Not all questions were asked

in every interview; in some cases, students talked about topics intended for later questions early in the conversation. However, when necessary, all three main questions were used.

The interviews were conducted in Spanish, and the following questions are translations of the original ones.

Initial Questions:

(1) Could you please introduce yourself and provide some details about your background?
(2) Can you share a bit about your personal history and family background?
(3) Could you describe your educational journey, starting with your first year of school?

Depending on the topics raised by the student, these were supplemented with more specific questions, such as:

(1) Can you think of someone who has had a profoundly significant impact on your life? If so, how?
(2) Are there any personal traits you possess that contributed to your academic success?
(3) Can you think of any circumstances that have supported your educational achievements?
(4) How do you usually spend your time outside of school?

To gain insight into the student's academic performance, the interview also included the following questions:

(1) What was your academic performance like during your early years in school (grades 1-4)?
(2) How would you describe your current academic performance?

Finally, to confirm the student's disadvantaged background, the last question addressed:

What is the highest level of education attained by your father and mother?

The duration of the interviews varied considerably. While some students gave concise and rapid responses, concluding the interview in less than 10 minutes, others provided more in-depth explanations, extending the interview to as long as 45 minutes.

10.3. Analysis Plan

All interviewed students fall within the socioeconomically disadvantaged category, as outlined in Chapter 7. For data analysis, the students were classified into three groups according to their achievement trend:

1. Success Against the Odds (SAO): Students whose academic performance has substantially improved during their schooling, as detailed in Chapter 7. Their progress was considered unexpected, as they ranked in the top 20% when comparing their predicted performance at age 16 (based on their 10-year-old scores) with their actual outcomes.
2. Consistently High Academic Achievers (CHAA): Students who have consistently been among the top performers in their class or ranked in the top 20% on standardised tests.
3. Comparison Group: This group includes students with three distinct patterns of achievement:
    a. Consistently Underperforming: Students consistently ranked in the bottom 30% of their class or on standardised tests.
    b. Consistently Average: Students who have performed at an average level (above the bottom 30% but below the top 20%) throughout their schooling.
    c. Considerable Decline in Achievement: Students whose academic performance has significantly declined over time, from high achievement to underperformance or from a regular-to-high level to underperformance.

In Stage 1 of this thesis, a secondary data analysis was conducted to identify students who Success Against the Odds (SAO) and their defining characteristics (see Chapter 7). SAO students were defined as those from socioeconomically disadvantaged families who began their schooling with low academic achievement but significantly improved their performance over time. This corresponds to Group 1 in the interviews.

However, it could be argued that Group 2, comprising students who have consistently been top performers despite their socioeconomically disadvantaged backgrounds, also exemplifies a kind of success against the odds due to their sustained high achievement. Indeed, most studies on success against the odds in the existing literature include such students within the SAO category. For this reason, the three groups are analysed separately in this study, allowing for a nuanced examination of the similarities and differences between students with varying achievement trajectories.

Themes used to analyse the interviews

The information was organised into seven thematic areas to analyse the data obtained from the interviews. These themes were identified based on the information provided by the students, specifically focusing on the topics they most frequently referred to. A theme of analysis was developed if mentioned in more than two student interviews. In the analysis of themes, SAO students and their counterparts were compared to observe the differences and dominance of factors. The themes are as follows:

a. Influential individuals

This category refers to people the student perceives as having a significant impact on their educational journey and academic achievement. These may include family members, teachers, peers, or other figures who have been pivotal in shaping the student's approach to learning and school performance.

b. Key life circumstances

This encompasses significant personal or family circumstances that the student identifies as affecting their school experience and academic outcomes. These could include parental divorce, health issues, financial challenges, or other life changes that have influenced their engagement with their education.

c. Educational interventions

Any targeted support, programs, or actions the school takes to help the student address academic difficulties. This can involve tutoring, special education services, counselling, or retention (repeating a grade).

d. Personal Characteristics

This category encompasses traits or qualities the students identify in themselves and believe have influenced their academic performance or school experience. These may include resilience, intelligence, work ethic, curiosity, adaptability, confidence, anxiety, procrastination, or a lack of motivation.

e. School transitions

The number of different schools the student has attended throughout their education, whether due to relocation, changes made by the student or their family, or other external factors.

f. Attitudes towards school and learning

This category captures the students' views and feelings about school, including their motivation, interest in learning, and overall attitude towards their education. It reflects their engagement with schoolwork and how they perceive their own role in the academic environment.

g. Student preferences and affinities towards specific subjects.

Statements regarding the student's affinity towards specific subjects, whether they find certain subjects easier or more enjoyable, or conversely, if there are subjects they find particularly challenging or dislike. This category helps highlight areas of academic strength or difficulty and personal interests in specific disciplines.

10.4. Ethical considerations

The study has been reviewed and approved by the School of Education Ethics Committee at Durham University (see Appendix 5). All interviewed students remained anonymous, as the researcher and interviewer were unaware of their real names. Before participation, written parental consent was obtained, along with verbal consent from the student. Although these consent forms included the students' real names, their identities were not disclosed during the interviews. In reporting the interviews in Chapter 14, all identifying details were protected. The names of places, schools, and specific circumstances that could lead to identification were altered to ensure confidentiality.

10.5. Purpose and Limitations of the Research Design

The research design used in-depth interview methods to delve deeply into the life stories of students who have "Succeeded Against the Odds" compared to the experiences of other students from disadvantaged backgrounds who have not achieved similar success. This comparative analysis is to develop hypotheses about the factors that may enable certain students to overcome significant challenges while others do not. The non-experimental design and the small sample size have been chosen to prioritise the richness and depth of the data collected and its subsequent analysis. This approach, however, inherently limits the study's ability to establish causal or correlational relationships that could be generalised to a broader population.

10.6. Chapter Summary

In summary, the methodology for the interview stage of this thesis began by identifying students from disadvantaged backgrounds who succeeded against the odds and were currently in their penultimate year of compulsory education. Schools with a higher concentration of such students were then identified, and three of these schools, which agreed to participate, were selected for the study. At each of these schools, interviews were conducted with both SAO and

non-SAO students to enable a comparative analysis of life histories and narratives across different student groups from low socioeconomic backgrounds and varied academic achievement patterns.

The semi-structured interviews started with open-ended questions, encouraging students to speak freely about their life stories, personal characteristics, and relevant topics. These initial responses were then supplemented with more targeted questions on themes that had not emerged in the early stages of the conversation. The interview analysis focused on the themes most frequently highlighted by the students, which were organised into predetermined categories.

Section Three: Results and Findings

The third section of this thesis consists of five chapters, spanning Chapters 11 to 14. Chapter 11 presents the results of a secondary analysis of longitudinal data on students who have succeeded against the odds. Chapter 12 outlines the findings of a structured literature review investigating the impact of growth mindset interventions on academic achievement. Chapter 13 examines the effects of a subgroup of selective schools called Bicentennial Schools. Finally, Chapter 14 details the results of interviews conducted with disadvantaged students.

Chapter 11 Findings from Longitudinal Analysis of Students that Succeed Against the Odds

This chapter presents the findings of a longitudinal secondary data analysis of students from disadvantaged backgrounds who achieved high academic outcomes. Chapter 7 of the preceding section provided a detailed description and justification of the methodology used in this analysis. This chapter is organised into four key sections.

The first section presents descriptive statistics for students identified as disadvantaged and those classified as succeeding against the odds, based on the three identification strategies outlined in Chapter 7. These statistics provide a detailed profile of the characteristics and demographics of both groups.

The second section presents the results of logistic regression models applied to each identification strategy. It begins by presenting the models developed for each comparison subgroup and then discusses the model selection process and its replication across various comparison groups.

The third section identifies key independent variables that emerged as relevant in the logistic models. These variables are categorised into traditional factors, academic self-esteem, parental involvement, student persistence, and student mindset.

The final section summarises the main findings of the analysis, which serve as critical inputs for the subsequent sections of this thesis.

11.1. Descriptive Statistics

a. Students Identified as Disadvantaged

This section presents descriptive statistics on students identified as disadvantaged based on the identification strategy outlined in Chapter 7. It highlights the socioeconomic disparities between disadvantaged students and their peers and the differences in their academic performance.

The longitudinal analysis focuses on students who were in Year 4 in 2011. These students, born between late 2000 and early 2002, turned 10 between late 2010 and early 2012. As discussed in Chapter 7, this cohort was selected because it consistently participated in the SIMCE, Chile's national system for assessing educational outcomes, at four critical points: ages 10, 12, 14, and 16.

The study includes 95,156 students from this cohort for whom data were available across four years: 2011, 2013, 2015, and 2017. Among these students, 14,281 were identified as disadvantaged because neither parent had completed compulsory education. Parental education was chosen as a proxy for socioeconomic disadvantage due to its strong predictive power and the higher availability of this data compared to other indicators. Under this definition, 15% of the cohort were disadvantaged (see Table 11.1).

Table 11.1. Students Identified as Disadvantaged

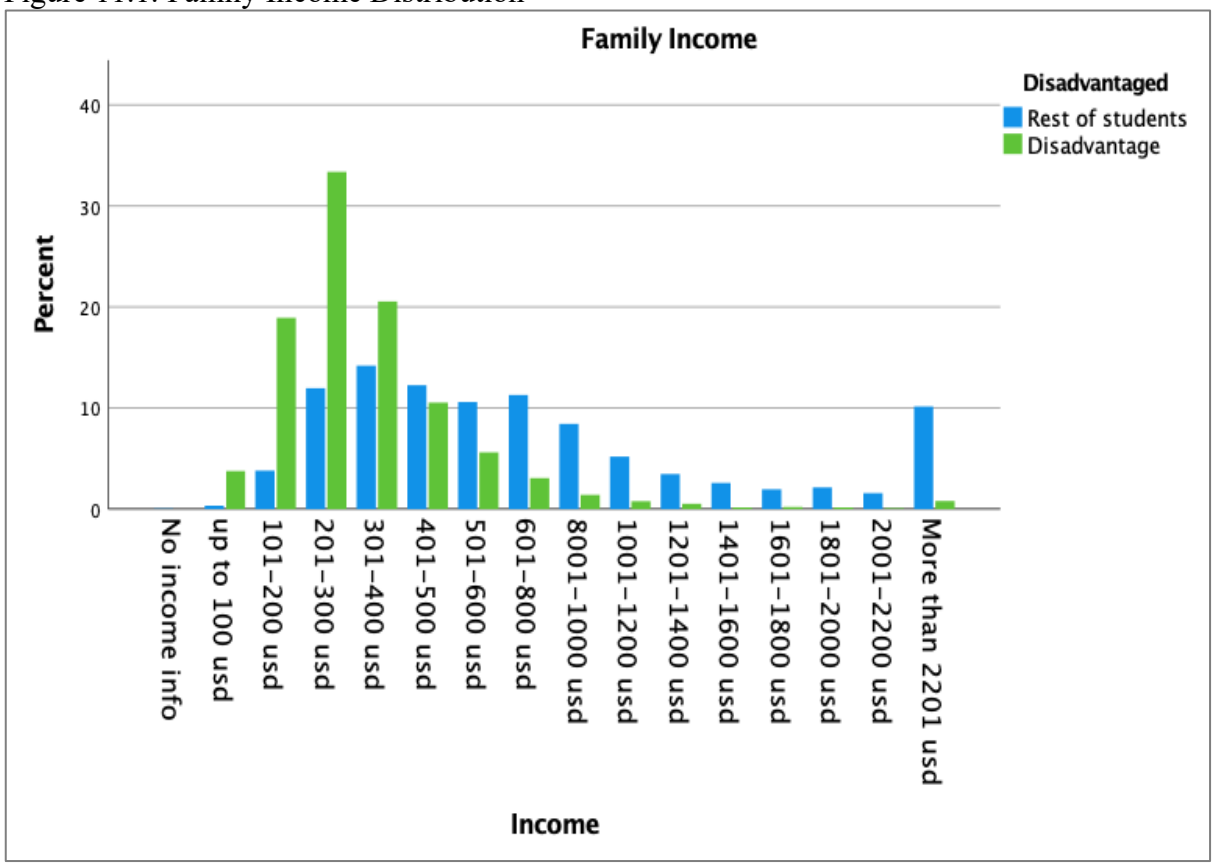
Students	Count	Percentage (%)
Disadvantaged Students	14,281	15
Rest of the Students	80,875	85
Total	95,156	100

Family socioeconomic situation

The majority of the identified disadvantaged students come from families with a monthly income of less than USD 400. In contrast, non-disadvantaged students exhibit a broader income range, with 10% of their families earning over USD 2,200 per month (see Figure 11.1)

It could be argued that some students with a family income below USD 400 have been classified as non-disadvantaged, even though their income suggests they should be categorised as disadvantaged. However, the primary concern of this research is to ensure that all students classified as disadvantaged genuinely come from socioeconomically disadvantaged families. It is less critical if some students who should be in this group are excluded. In other words, the focus is on minimising the likelihood of a Type I error—false positives (incorrectly identifying someone as socioeconomically disadvantaged)—while being less concerned about the risk of committing a Type II error—false negatives (failing to identify someone as disadvantaged when they are).

Figure 11.1. Family Income Distribution



Their parents' educational attainment further distinguishes disadvantaged students. According to the identification criteria, all disadvantaged students have parents who did not complete secondary education. Among these families, over 70% of parents completed only primary education, while nearly 30% did not finish primary school. By contrast, approximately 90% of non-disadvantaged students have parents who completed secondary education, and 48% have parents with some tertiary education (see Table 11.2).

Table 11.2. Percentage of Parental Education Level by Group of Students

	Mother's Education		Father's Education	
	Non-Disadvantaged Students	Disadvantaged Students	Non-Disadvantaged Students	Disadvantaged Students
Unfinished Primary	2	28	1	22
Completed Primary	3	35	4	39
Unfinished Secondary	6	37	6	40
Completed Secondary	42	0	40	0
Tertiary Vocational	26	0	20	0
Tertiary University	22	0	28	0

Academic Achievement

As expected, disadvantaged students consistently perform lower on standardised tests across all subjects and age groups. The performance gap is most pronounced in mathematics, increasing as students increase in age. By contrast, the gap in language proficiency remains relatively stable, showing only a slight increase with age.

In mathematics, the gap between disadvantaged and non-disadvantaged students increases from 0.45 standard deviations at age 10 to 0.60 at age 16. This trend highlights a widening disparity in math achievement as students progress through school (see Table 11.3 11.3). Meanwhile, the language proficiency gap remains relatively stable, fluctuating between 0.36 and 0.42 standard deviations (see Table 11.4).

Table 11.3. Math Standardised Test Scores

Age	Non-Disadvantaged Students	Disadvantaged Students	Difference
10 years old	0.29	-0.16	0.45
12 years old	0.34	-0.16	0.50
14 years old	0.34	-0.23	0.58
16 years old	0.32	-0.28	0.60

Table 11.4. Language Standardised Test Scores

Age	Non-Disadvantaged Students	Disadvantaged Students	Difference
10 years old	0.26	-0.10	0.36
12 years old	0.30	-0.07	0.38
14 years old	0.30	-0.05	0.36
16 years old	0.27	-0.16	0.42

Higher Education Enrolment and Outcomes

Data linking students' school records with tertiary education enrolment and graduation records over three- and two-year periods reveals notable disparities between disadvantaged and non-disadvantaged students. As shown in Table 11.5, 54% of disadvantaged students pursued higher education within this timeframe, compared to 77% of their non-disadvantaged peers.

Among disadvantaged students, 13% enrolled in higher education during their first year but did not progress to subsequent years, suggesting a potential dropout. While this group is

presumed to have left their studies, it remains possible they could re-enter education at a later stage, as the data does not confirm permanent withdrawal. This dropout rate is higher than the 9% observed among non-disadvantaged students.

Table 11.5. Percentages of Higher Education Enrolment and Outcomes

	Non-Disadvantaged Students	Disadvantaged Students
Enrolled in Higher Education	77	54
Not Enrolled in Higher Education	14	32
Dropped Out	9	13
Graduated	0	1

Further analysis reveals important differences in the types of institutions disadvantaged students attend. Over half (56%) of disadvantaged students who pursue higher education enrol in vocational institutions, compared to only 30% of non-disadvantaged students. By contrast, non-disadvantaged students are more likely to attend traditional universities (45%) and other universities (25%), as shown in Table 11.6. These patterns highlight the lower enrolment rates of disadvantaged students and their preference for vocational pathways over university education.

Table 11.6. Percentages of Attendance at Higher Education Institutions by Type

Institution Type	Rest of the Students	Disadvantaged Students
Traditional Universities	45	31
Other Universities	25	13
Vocational Institution	30	56

These findings underscore the persistent inequities in higher education access and outcomes, with disadvantaged students facing both lower enrolment rates and different institutional trajectories compared to their non-disadvantaged peers.

It is relevant to consider that in Chile, higher education is free for the most vulnerable 60% of the population at all institutions that participate in the gratuity system (Chilean Ministry of Education, 2025). By 2019, when the analysed cohort entered higher education, over 850,000 students from this group were benefiting from free higher education (Instituto Libertad y Desarrollo, 2021).

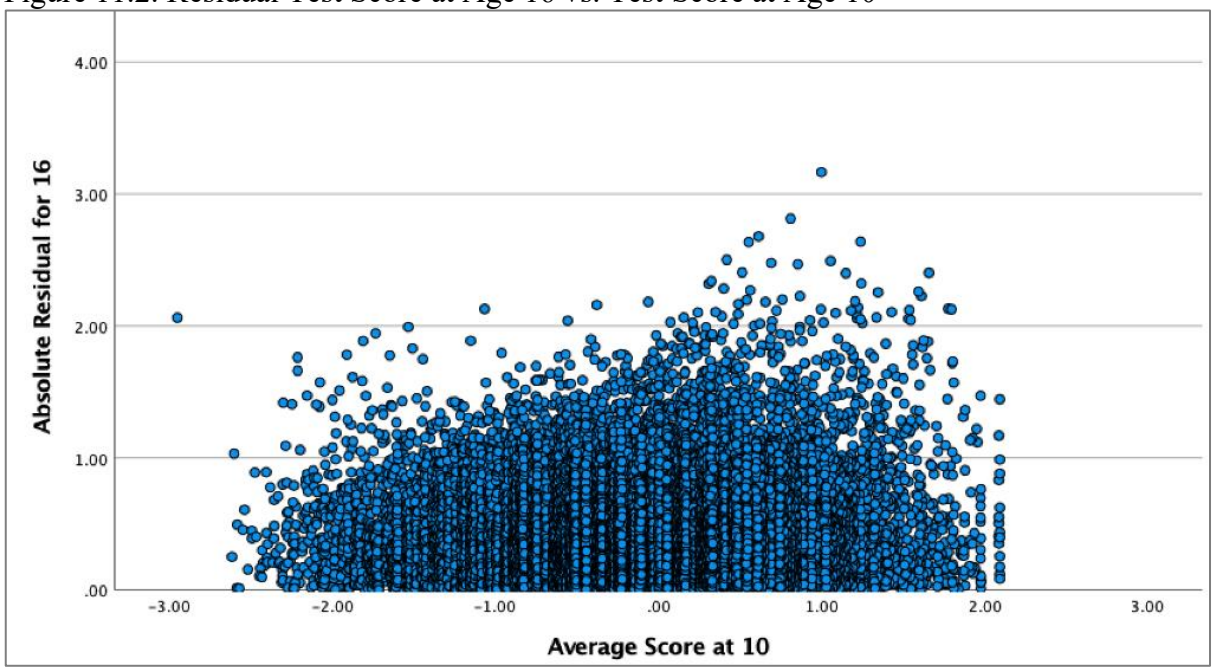
b. Students Succeeding Against the Odds Using the 1st Identification Strategy.

This section provides descriptive statistics for disadvantaged students identified as Success Against the Odds (SAO) using the first identification strategy outlined in Chapter 8. These SAO students are compared with other disadvantaged students across several dimensions, including socioeconomic characteristics, gender, birth semester, type of educational institution, and standardised test performance.

As detailed in Chapter 7, the first identification strategy for SAO students relies on measuring the degree of improvement in standardised test scores between the ages of 10 and 16. A linear regression model was employed to predict each student's test score at age 16, using their score at age 10 as the sole predictor. Students whose actual scores at age 16 substantially exceeded their predicted scores—those with the highest residuals—were classified as SAO. This approach emphasises exceptional academic improvement, regardless of students' starting performance levels.

To further understand this classification, it is crucial to investigate whether students with varying initial test scores at age 10 qualified for the SAO group based on their residuals. Figure 11.2 presents a scatter plot of residual test scores at age 16 versus test scores at age 10. The plot reveals substantial residual variability, with no apparent relationship between initial test scores and the likelihood of being classified as SAO. Notably, low-performing and high-performing students at age 10 exhibit substantial positive residuals, demonstrating that exceptional improvement is not limited to any specific starting point.

Figure 11.2. Residual Test Score at Age 16 vs. Test Score at Age 10



This analysis highlights the inclusivity of the first identification strategy, which captures students across the spectrum of initial academic achievement who demonstrate remarkable progress against the odds.

Comparison of SAO Students and Other Disadvantaged Students

This analysis examines the characteristics of students classified as Success Against the Odds (SAO) and compares them to other disadvantaged students who do not meet the SAO criteria. The findings, summarised in Tables 11.7 to 11.9, highlight both similarities and differences between the groups.

Socioeconomic Backgrounds and Demographics

Although both groups are disadvantaged, SAO students generally come from slightly higher socioeconomic backgrounds. For example, 38.5% of SAO students' mothers began but did not complete secondary school, compared to 36.6% of other disadvantaged students. Similarly, SAO families have received government benefits for an average of 3.17 years, marginally less than the 3.27 years reported for their peers. A modest difference in family income also favours SAO students, suggesting slightly greater financial stability. Additionally, SAO students are more likely to be female (+2%) and younger (+4%) than non-SAO students.

Educational Context

A striking difference between the groups is the type of schools they attended. At ages 10 and 16, a higher percentage of SAO students were enrolled in private subsidised schools, exceeding their peers by 12%. In Chile, these schools are managed privately but rely on government funding. While some may charge additional fees, most do not, making them accessible to low-income families.

Another distinction is enrolment in Bicentennial Schools, a government initiative launched in 2011–2012 to enhance academic performance in 60 high schools through extra financial and technical support. By age 16, 9% of SAO students were enrolled in these schools, compared to 3% of other disadvantaged students.

Academic Performance

The most pronounced difference between the two groups is reflected in their academic outcomes. At age 10, test scores of SAO and other disadvantaged students showed minimal variation. However, as students progressed through school, the performance gap widened considerably. By later ages, SAO students consistently achieved higher scores, underscoring their resilience and ability to excel academically despite challenging circumstances (see Table 11.9). This difference in academic performance at an older age was anticipated because, according to identification criteria, students in the SAO group demonstrated the most substantial improvement in their academic results over their schooling years.

Table 11.7. Characteristics of SAO Students vs. Other Disadvantaged Students (Percentage)

		SAO Disadv. Students	Other Disadv. Students	Difference
Gender	Male	43.9	45.8	-2
	Female	56.1	54.2	2
Mother education	Unfinished primary	26.0	28.3	-2
	Primary	35.5	35.2	0
	Unfinished secondary	38.5	36.6	2
Father education	Unfinished primary	20.5	21.8	-1
	Primary	39.5	38.6	1
	Unfinished secondary	40.0	39.6	0
Income	No income info	0.0	0.0	0
	up to 100 usd	2.0	4.0	-2
	101-200 usd	16.7	19.2	-2
	201-300 usd	33.1	33.4	0
	301-400 usd	21.9	20.4	1
	401-500 usd	13.4	10.2	3
	501-600 usd	5.8	5.6	0
	601-800 usd	3.1	3.1	0
	8001-1000 usd	0.8	1.5	-1
	1001-1200 usd	0.8	0.8	0
	1201-1400 usd	0.7	0.5	0
	1401-1600 usd	0.1	0.2	0
	1601-1800 usd	0.3	0.2	0
	1801-2000 usd	0.1	0.2	0
	2001-2200 usd	0.2	0.1	0
	More than 2201 usd	1.0	0.8	0
Books at home	No info	0.0	0.0	0
	No books	1.0	1.4	0
	Up to 10	26.3	31.3	-5
	11-50	53.0	51.4	2
	51-1001	14.8	11.9	3
	More than 100	4.8	4.0	1
Born semester	2000-2	2.5	5.0	-2
	2001-1	8.1	11.1	-3
	2001-2	48.7	48.1	1
	2002-1	40.7	35.8	5
School type at 10	Public	53.9	66.3	-12
	Private subsided	46.1	33.7	12
School type at 16	Public	35.9	51.3	-15
	Private subsided	55.7	41.5	14
	Delegated Admin.	8.2	7.1	1
Bicentennial school at age 16		9.2	3.5	5.7
Count of Students		1,446	12,835	

Table 11.8 Years Receiving Government Benefits of SAO vs. Other Disadvantaged Students

	SAO Disadv. Students	Other Disadv. Students	Difference
Yeas in government benefits	3.17	3.27	-0.11
Years in extra gov. benefits	1.94	2.09	-0.15

Table 11.9 Average Test Scores of SAO Students Compared to Other Disadvantaged Students

	SAO Disadv. Students	Other Disadv. Students	Difference
At 10 years olds	-0.29	-0.11	-0.18
At 12 years olds	0.16	-0.15	0.31
At 14 years olds	0.34	-0.20	0.53
At 16 years olds	0.74	-0.33	1.07

Achievement Trajectory of SAO Students

Figures 11.3 to 11.6 illustrate the trajectory of test scores for students identified as Success Against the Odds (SAO) from ages 10 to 16. In these visualisations, SAO students are depicted in red, while their disadvantaged peers are shown in blue. At age 10, the test scores for both groups are broadly distributed across the entire range, reflecting a similar starting point.

However, a distinct shift emerges within the SAO group as students get older. Their scores increasingly migrate towards the right side of the distribution, indicating notable academic improvement. By age 16, a relevant proportion of SAO students have progressed into the top 50% of the score distribution.

This upward trend highlights the remarkable academic growth achieved by SAO students over time, setting them apart from their disadvantaged peers and underscoring their exceptional ability to overcome challenges and excel academically.

Figure 11.3. Test Scores at Age 10.

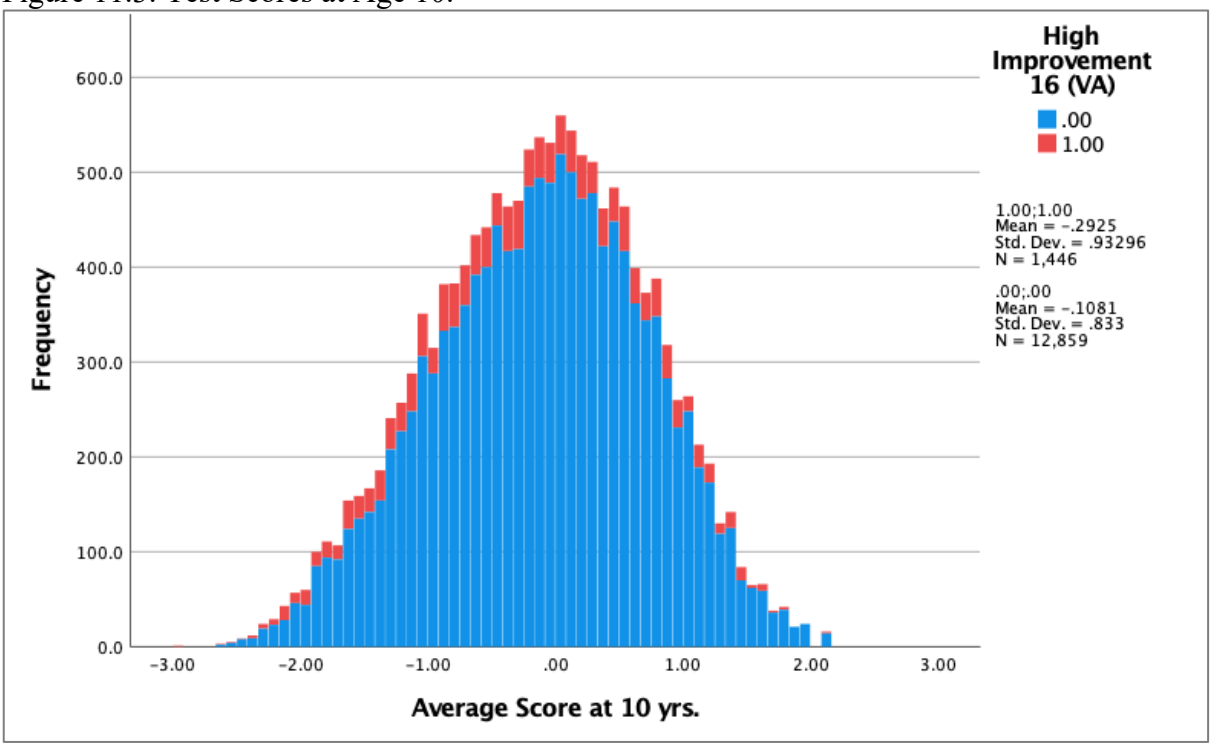


Figure 11.4. Test Scores at Age 12

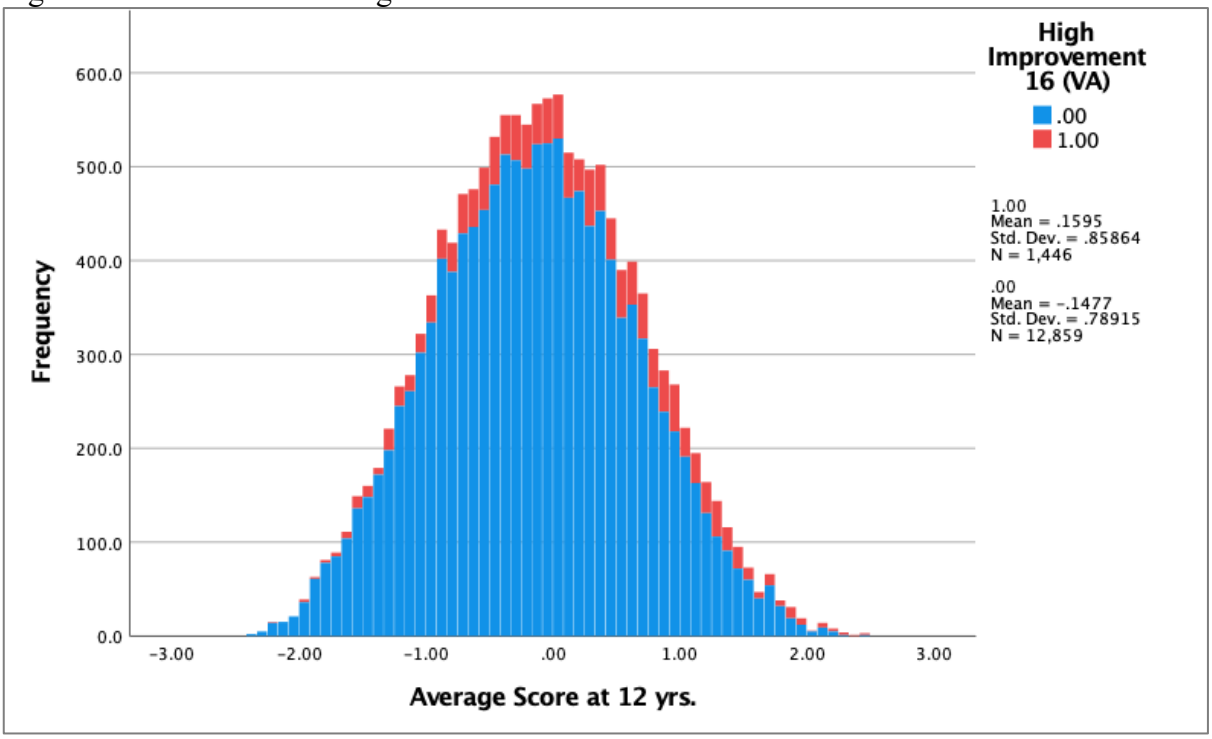


Figure 11.5. Test Scores at Age 14

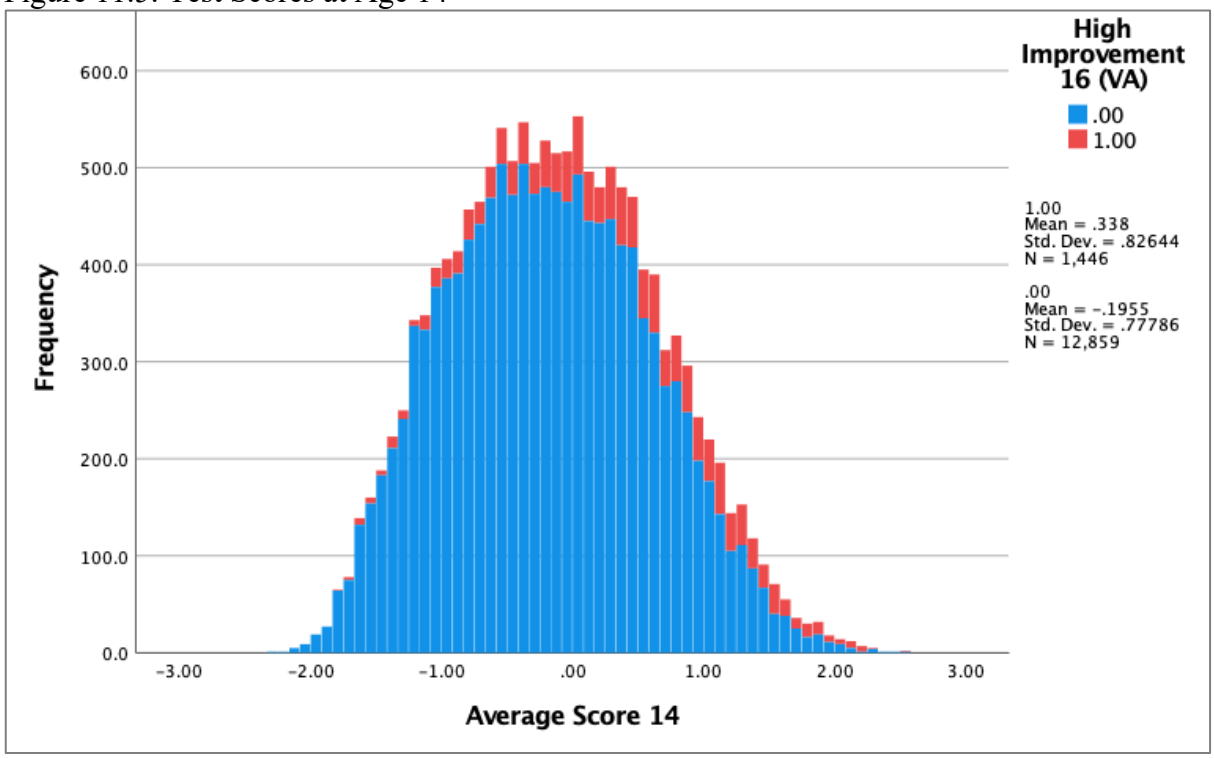
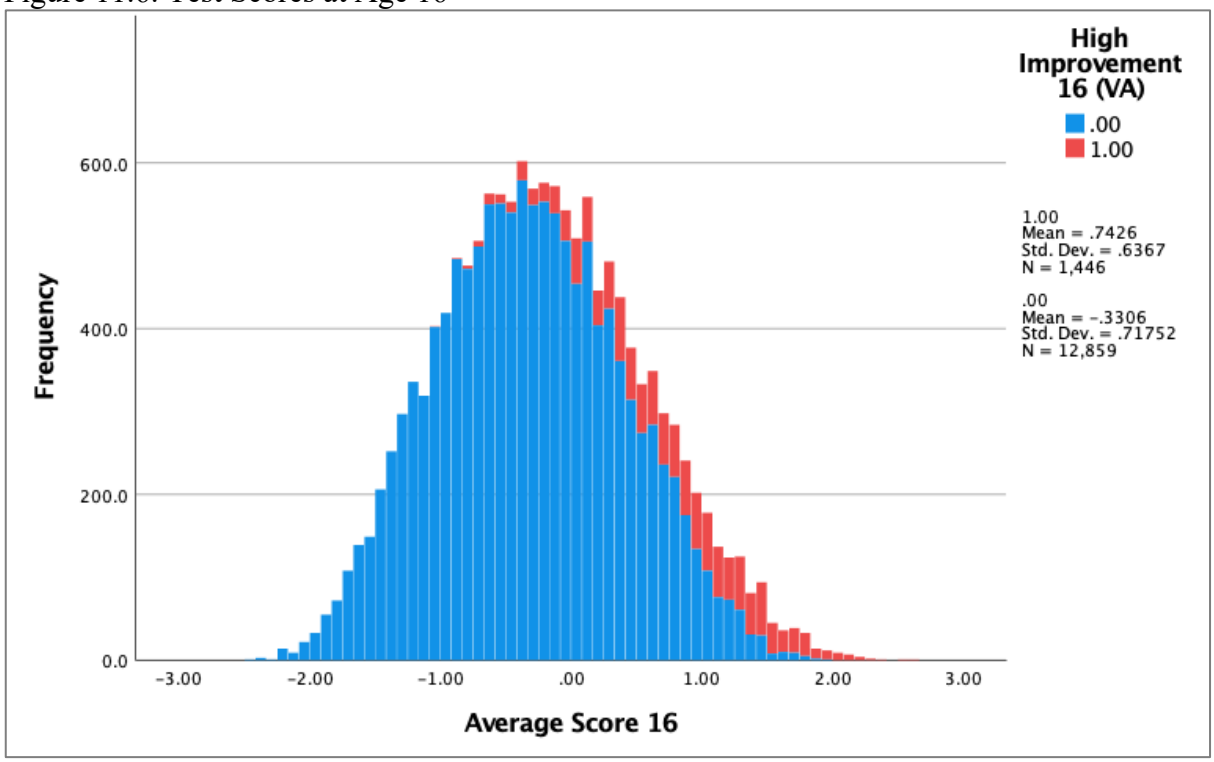


Figure 11.6. Test Scores at Age 16



In summary, these graphs illustrate the academic journey of the Success Against the Odds (SAO) students, represented in red in the graphs. These students begin school with varying levels of educational achievement, but they are more likely to be among the lowest 60% of performers. However, over the years, their performance has improved remarkably. By the final assessment at age 16, nearly all SAO students rank in the top 50% of academic achievers (see Figure 11.6).

c. Disadvantaged Students Enrolled in Higher Education (2nd Identification Strategy)

This section presents descriptive statistics for disadvantaged students who pursued higher education based on the second identification strategy described in Chapter 7. It compares the characteristics of disadvantaged students who enrolled in higher education with those of their peers who did not, focusing on socioeconomic background, gender, birth semester, school type, and standardised test performance.

Table 11.10 provides a detailed breakdown of the characteristics of disadvantaged students who enrolled in higher education within one to three years of completing high school. A striking difference lies in the gender composition: 63% of disadvantaged students in higher education are female, compared to 45% among those who did not pursue higher education. Moreover, students who continued to higher education generally came from slightly higher socioeconomic backgrounds and tended to be younger than their peers who did not enrol.

Role of School Type

School type played a role in higher education enrolment. At age 10, 38% of students who pursued higher education attended private subsidised schools, compared to 31% of their peers who did not. This difference became even more pronounced by age 16, where 46% of higher education enrollees attended private subsidised schools, compared to 39% of non-enrollees. Additionally, students in higher education were more likely to have attended Bicentennial Schools—5.6% of higher education enrollees attended such schools at age 16, compared to only 2.2% of those who did not continue their studies.

Academic Performance

One of the most relevant factors distinguishing these groups is academic performance. Students who enrolled in higher education consistently outperformed their peers on standardised tests, with the performance gap widening as they progressed through school. For instance, the average test score difference between the groups increased from 0.37 at age 10 to 0.48 by age 16, underscoring the role of academic success in facilitating access to higher education.

Socioeconomic Background

Higher education enrollees showed modest socioeconomic advantages. For example, they reported slightly shorter durations of receiving government benefits (3.18 years compared to 3.37 years) and were more likely to come from households with higher parental education levels. Furthermore, these students were slightly more likely to have access to books at home, with 14% having between 51 and 100 books compared to 10% of their non-enrolling peers.

Table 11.10. Characteristics of Disadvantaged Students Enrolled in Higher Ed. (Percentage)

		Not Enrolled in H. Ed.	Enrolled in H. Ed.	Difference
Gender	Male	55.30	37.20	-18
	Female	44.70	62.80	18
Mother education	Unfinished primary	30.90	25.60	-5
	Primary	34.80	35.60	1
	Unfinished secondary	34.20	38.80	5
Father education	Unfinished primary	24.00	19.70	-4
	Primary	38.00	39.30	1
	Unfinished secondary	38.00	41.10	3
Income	up to 100 usd	4.70	3.00	-2
	101-200 usd	21.10	17.10	-4
	201-300 usd	34.60	32.40	-2
	301-400 usd	19.20	21.70	3
	401-500 usd	9.40	11.50	2
	501-600 usd	4.80	6.30	2
	601-800 usd	2.60	3.50	1
	8001-1000 usd	1.20	1.50	0
	1001-1200 usd	0.80	0.80	0
	1201-1400 usd	0.50	0.50	0
	1401-1600 usd	0.10	0.20	0
	1601-1800 usd	0.20	0.20	0
	1801-2000 usd	0.10	0.20	0
	2001-2200 usd	0.10	0.10	0
	More than 2201 usd	0.70	0.90	0
Books at home	No books	1.50	1.30	0
	Up to 10	34.20	27.90	-6
	11 to 50	50.50	52.60	2
	51-1001	10.20	13.80	4
	More than 100	3.60	4.40	1
Born semester	2000-2	6.87	2.93	-4
	2001-1	12.73	9.06	-4
	2001-2	46.28	49.74	3
	2002-1	34.13	38.27	4
School type at 10	Public	69.00	61.70	-7
	Private subsided	31.00	38.30	7
School type at 16	Public	52.80	47.20	-6
	Private subsided	38.70	46.50	8
	Delegated Admin.	8.50	6.20	-2
Bicentennial school at age 16		2.2	5.6	-3.4
Count of students		6,567	7,714	

Table 11.11. Years Receiving Government Benefits of Disadvantaged Students in Higher Ed.

	Not Enrolled in H. Ed.	Enrolled in H. Ed.	Difference
Yeas in government benefits	3.37	3.18	-0.19
Years in extra government benefits	2.22	1.95	-0.27

Table 11.12. Average Test Scores of Disadvantaged Students Enrolled in Higher Education

		Not Enrolled in H. Ed.	Enrolled in H. Ed.	Difference
Standardized Test score	Average score at 10	-0.33	0.04	0.37
	Average score at 12	-0.33	0.06	0.39
	Average score at 14	-0.37	0.05	0.42
	Average score at 16	-0.48	0	0.48

d. Disadvantaged Students Enrolled in Prestigious Universities (3rd identification strategy)

This section examines the characteristics of disadvantaged students who gained admission to prestigious universities, specifically CRUCH (*Consejo de Rectores de las Universidades Chilenas*) institutions, using the third identification strategy detailed in Chapter 7. CRUCH universities are recognised for their academic excellence, high standards, and long-standing educational tradition. Table 11.13 compares disadvantaged students enrolled in CRUCH universities with those who were not, focusing on socioeconomic factors, gender, birth semester, educational institution type, and standardised test performance.

Gender and Socioeconomic Background

In line with trends observed in the second identification strategy, female students were more likely to enrol in CRUCH universities. Female enrolment accounted for 62% of CRUCH students, compared to 52.5% among those who did not attend these prestigious institutions—a gender gap of 10%. However, no notable socioeconomic differences were observed between CRUCH enrollees and their peers. Indicators such as parental education, household income, and government benefits were remarkably similar across both groups.

Type of School

The type of school attended played a key role in university enrolment. At age 10, 38% of CRUCH students attended private subsidised schools, compared to 34% of their peers. By age 16, however, the pattern slightly reversed: only 42% of CRUCH students were in private subsidised schools, compared to 43% of those not attending these universities. Public school attendance at age 16 was higher among CRUCH enrollees (52.8%) compared to their peers (48.9%). Importantly, students enrolled in CRUCH universities were more likely to have attended Bicentennial schools at age 16 (7.37% compared to 3.17%).

Academic Performance

The most striking difference between the two groups lies in their academic performance. Students admitted to CRUCH universities consistently outperformed their peers on standardised tests. The gap in average test scores widened with age, increasing from 0.62 at age 10 to 0.76 at age 16. This pattern highlights the critical role of sustained academic achievement in securing admission to prestigious universities.

Table 11.13. Characteristics of Students Enrolled in Prestigious Universities (Percentage)

		Not enrolled in a Prestigious University	Enrolled in Prestigious University	Difference
Gender	Male	47.50	38.00	-10
	Female	52.50	62.00	10
Mother education	Unfinished primary	28.30	27.10	-1
	Primary	35.00	36.30	1
	Unfinished secondary	36.70	36.60	0
Father education	Unfinished primary	28.30	27.10	-1
	Primary	35.00	36.30	1
	Unfinished secondary	36.70	36.60	0
Income	up to 100 usd	3.80	3.70	0
	101-200 usd	19.10	18.50	-1
	201-300 usd	33.60	32.80	-1
	301-400 usd	20.50	20.70	0
	401-500 usd	10.60	10.30	0
	501-600 usd	5.60	5.80	0
	601-800 usd	2.90	3.70	1
	8001-1000 usd	1.40	1.40	0
	1001-1200 usd	0.90	0.40	-1
	1201-1400 usd	0.50	0.60	0
	1401-1600 usd	0.20	0.20	0
	1601-1800 usd	0.20	0.20	0
	1801-2000 usd	0.10	0.30	0
	2001-2200 usd	0.10	0.10	0
	More than 2201 usd	0.70	1.20	1
Books at home	No books	1.40	1.20	0
	Up to 10	31.40	28.60	-3
	11 to 50	51.50	51.80	0
	51-1001	11.90	13.30	1
	More than 100	3.80	5.10	1
Born semester	2000-2	5.40	2.20	-3
	2001-1	11.80	6.90	-5
	2001-2	47.00	52.50	6
	2002-1	35.80	38.40	3
School type at 10	Public	65.80	62.10	-4
	Private subsided	34.20	37.70	4
School type at 16	Public	48.90	52.80	4
	Private subsided	43.10	42.30	-1
	Delegated Administration	7.90	4.60	-3
Bicentennial school at age 16		3.17	7.37	-4.2
Count of students		11,311	2,970	

Table 11.14. Years Receiving Benefits of Disadvantaged Students in Prestigious Universities

	Not enrolled in a Prestigious University	Enrolled in Prestigious University	Difference
Yeas in government benefits	3.27	3.25	-0.02
Years in extra government benefits	2.10	2.00	-0.10

Table 11.15. Average Test Scores of Disadvantaged Students in Prestigious Universities

		Not enrolled in a Prestigious University	Enrolled in Prestigious University	Difference
Standardized Test score	Average score at 10	-0.26	0.36	0.62
	Average score at 12	-0.26	0.4	0.66
	Average score at 14	-0.29	0.4	0.69
	Average score at 16	-0.38	0.38	0.76

e. Overlap of Students Across the Three Identification Strategies

Chapter 7 outlines three strategies for identifying successful students from socio-economically disadvantaged backgrounds. The first strategy is to recognise students who have greatly improved their test scores from primary school (at age 10) to secondary school (at age 16), exceeding the expected progress relative to their peers. The second strategy involves considering students who go on to enter higher education, while the third focuses on those who enrol in prestigious higher education institutions. This section will explore the overlap among these three groups and examine the extent to which students with notable advancements in their test scores also pursue higher education and attend prestigious colleges or universities.

While there is some overlap between students identified as 'Success Against the Odds' (SAO) across the three identification strategies, this overlap is only partial. Tables 11.16 to 11.19 provide an exploration of this overlap. For instance, 70% of students identified as SAO using the first strategy enrolled in higher education within two years of completing secondary school (see Table 11.16). In contrast, only 52% of disadvantaged students who were not identified as SAO by the first strategy pursued higher education (see Table 11.17). Furthermore, 41% of SAO students enrolled in a prestigious university (see Table 11.18), compared to 18% of their disadvantaged peers who were not identified as SAO (see Table 11.19).

This overlap indicates that students identified as SAO using the first research strategy—those demonstrating significant academic improvement during their school years—are more likely to attend higher education. Participation increased from 52% to 70%. Additionally, their probability of enrolling in a prestigious university is more than double that of their non-SAO counterparts, rising from 19% to 41%.

Table 11.16. Higher Education Participation of Students Identified as SAO in Strategy 1

SAO students (Strategy 1)	1,446	Higher Education	1,006 (70%)
		No Higher Education	440 (30%)

Table 11.17. Higher Education Participation of Students Not Identified as SAO

Non-SAO students (Strategy 1)	12,835	Higher Education	6,708 (52%)
		No Higher Education	6,127 (48%)

Table 11.18. Prestigious University Enrolment of Students Identified as SAO

SAO students (Strategy 1)	1,446	Prestigious University	590 (41%)
		No Prestigious University	856 (59%)

Table 11.19. Prestigious University Enrolment of Students Not Identified as SAO

Non-SAO students (Strategy 1)	12,835	Prestigious University	2,380 (19%)
		No Prestigious University	10,455 (81%)

One possible explanation for the only partial overlap between the three identification strategies is that factors beyond academic achievement, such as family economic circumstances, influence higher education enrolment. Even though disadvantaged students have access to free higher education, the opportunity costs of remaining in education instead of entering the workforce can be substantial. Therefore, students from families facing financial hardship may opt to work immediately after completing compulsory education rather than continue their studies.

Additionally, the data used in this study on higher education enrolment only covers the two years following secondary school graduation. Some students may choose to enter the workforce temporarily and enrol in higher education at a later stage.

Finally, geographic location may also impact access to prestigious universities. For disadvantaged students, relocating to a different city to attend a prestigious institution can present significant financial challenges, limiting their opportunities to pursue such education.

f. Examination of Cases Excluded

As explained in Chapter 7, students without information about their test scores at year 4 or year 12 were excluded, because this information was essential to identify students with exceptional progress. To understand the size and potential impact of the bias on the results, an analysis was made about the number of students that were excluded and the reasons, as well as an analysis of the difference between students included and students excluded from the analysis.

Student not enrolled in Year 12 in 2017.

Among the 243,157 students who were enrolled in Year 4 in 2011, not all were enrolled in Year 12 in 2017. Some students left the system. The reason why they left the system is quite relevant, given that it is an entirely different situation if a student leaves the system because they move to another country than if they drop out of school. After all, school dropouts tend to be students from low socioeconomic backgrounds and low academic achievement. Unfortunately, it is not possible to know the reason why they left the system. Table 11.20 shows that 4% of the students enrolled in Year 4 in 2011 left the system for some reason, between Year 4 and Year 12.

Additionally, students who were retained in at least one academic year were also not in Year 12 in 2017. Once more, this group is not random; these students tend to be those with lower academic performance. Twenty per cent of the cohort was retained one grade or more between 2011 and 2017. This is a very high percentage. This means that in a class of 40 students, eight students were held back over six school years, resulting in an average of 1.3 students retained per year.

There are two other groups of students who were not in the regular school system in 2017. On the one hand, students who transitioned to the adult system (3%). It is expected that they will be older students who move to the adult system to be able to work and study at the same time. On the other hand, students who move to a specialised school given a strong disability (this group represent less than 1%).

Finally, only 73% of the students in Year 4 in 2011 were enrolled in Year 12 in 2017.

Table 11.20. Students enrolled in Year 4 in 2011 and their situation in 2011.

	Students	% of students enrolled in Year 4 in 2011
Students enrolled in Year 4 in 2011	243,157	100%
Students who were not enrolled in the school in 2017	10,514	4%
Students who were retained in a lower grade	49,297	20%
Students who transitioned to the adult system	6,185	3%
Students who switch to a separate system due to disabilities	723	0%
Students enrolled in Year 12 in 2017	176,438	73%

Student enrolled in school but without test scores.

Other students were enrolled in the system when the SIMCE test took place, but were not present at school on the testing days. As Table 11.21 shows, 26% of the Year 4 students in 2011 did not have complete scores for the SIMCE test. The average attendance rate for this year group in October 2011—the month in which the SIMCE assessment was administered—was 87% (calculated based on data available from Mineduc.cl). This suggests that approximately half of the students without a SIMCE score can be attributed to expected absences. However, there remains a further 13% whose absence cannot be explained by typical attendance patterns. This group may reflect more problematic circumstances, such as students who deliberately chose not to attend school on the day of the assessment, whether incentivised by the school or due to personal reasons.

Table 11.21. Year 4 students from 2011 with SIMCE score

	Students	%
Students In year 4 in 2011	243,157	100%
Students without SIMCE score in Year 4	64,085	26%
Students with SIMCE score in Year 4	179,072	74%

In 2017, a higher proportion of students—reaching 31%—did not have a SIMCE score in Year 12 (see Table 11.22). This figure is again substantially greater than the average absenteeism rate for that level in October of the same year, which stood at 17%

Table 11.22. Year 12 students from 2017 with SIMCE scores

	Students	%
Students In year 12 in 2017	230,611	100%
Students without SIMCE score in Year 4	71,779	31%
Students with SIMCE score in Year 4	158,832	69%

As shown in Table 11.23, of the total number of students enrolled in Year 4 in 2011, only 48% were included in the analysis, as the remaining 52% did not have academic results for the SIMCE assessment in either Year 4, Year 12, or both. Given the high proportion of excluded students, the following section presents an analysis of the differences between excluded and included students.

Table 11.23. Students included in the analysis

	Students	%
Students In year 4 in 2011	243,157	100%
Students with year 4 SIMCE score in 2011	179,072	74%
Students with year 4 SIMCE score in 2011 and enrolled in year 12 in 2017	134,889	55%
Students with year 4 SIMCE score in 2011 and year 12 SIMCE score in 2017	116,887	48%

Differences between Students with and without SIMCE Scores

This section examines the vulnerability of students who did not take the SIMCE assessment in either of the two years. For this analysis, socioeconomic status is measured using the "priority status" indicator, which identifies students considered a priority by the education system. As discussed in Chapter 7, the Ministry of Education assigns a binary priority status based on family income or socioeconomic conditions to identify low-income students and assess their eligibility for additional subsidies (Honey & Carrasco, 2022). This approach is similar to the Free and Reduced-Price Lunch programme in the United States and Free School Meals in the United Kingdom.

As Table 11.24 shows, the cohort of students enrolled in Year 4 in 2011 had an average of 8.6 years of priority status (out of a maximum of 15 years, which is the duration of compulsory schooling). Among those who remained in the system and were enrolled in Year 12 in 2017, the average number of years with priority status was lower, at 6.9 years. This indicates that

students who were no longer in Year 12 in 2017, whether due to leaving the education system or repeating a year, tended to be more socioeconomically vulnerable than those who progressed as expected. Finally, students with SIMCE scores in both years had an average vulnerability score of 6.3, suggesting that those absent from school on the day of the SIMCE assessment were, on average, more vulnerable than those who took the tests.

Table 11.24. Number of years with priority status.

	Mean number of years with prioritario status
Year 4 in 2011	8.6
Year 4 in 2011 and Year 12 in 2017	6.9
Simce score in 2011 and 2017	6.3

Figure 11.7 displays, in blue, the percentage of students included in the analysis according to the number of years they held priority status. For instance, among students with 15 years of priority status (represented by the bar furthest to the right), fewer than 10% are included in the analysis, as more than 80% are no longer in Year 12 by 2019, and of those who are present in Year 12, more than half do not take the assessments. Conversely, for students who were never classified as priority at any point (the bar furthest to the left), over 50% are included in the analysis and have SIMCE scores for both years. This figure illustrates that the analysis excludes the majority of students with 14 or 15 years of priority status, specifically the most vulnerable students.

Figure 11.7. Percentage of Students Included by Years with Priority Status.

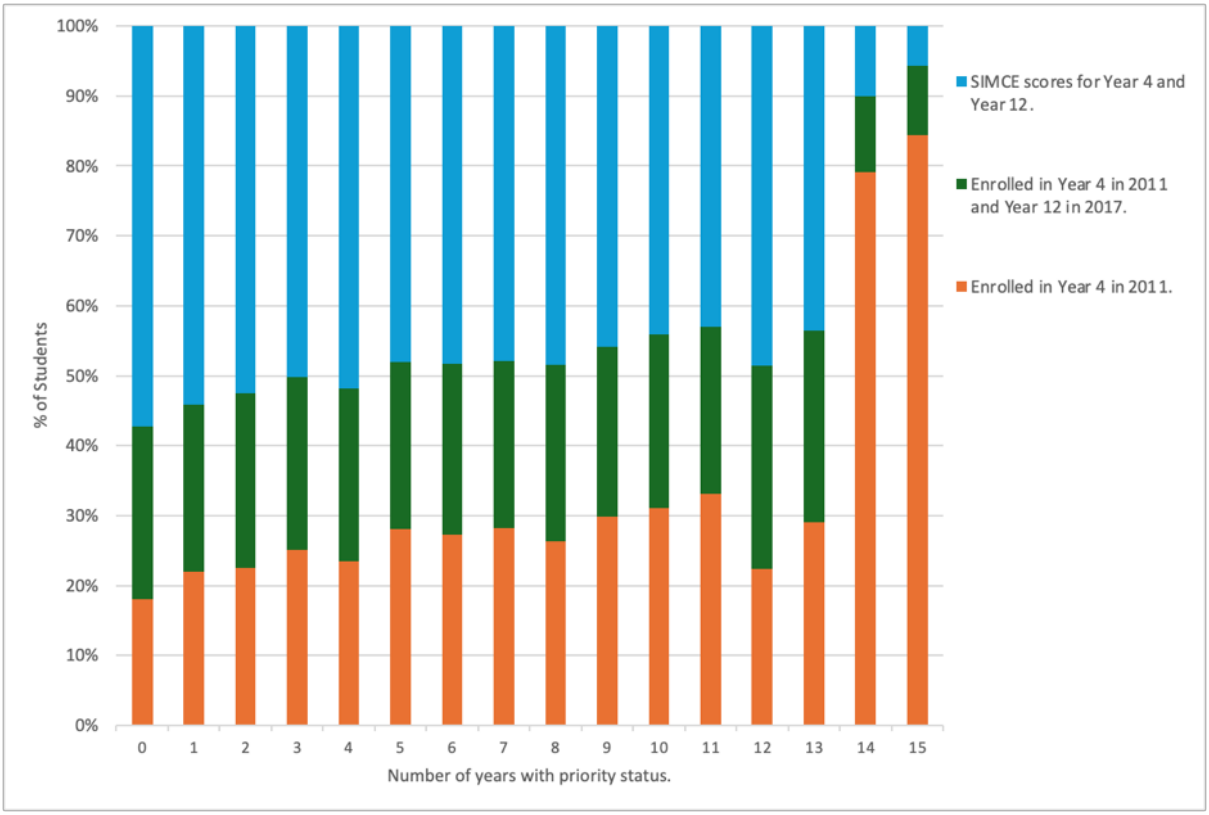


Table 11.25 presents a comparison of the average SIMCE scores in Year 4 between students who sat both assessments and those who only participated in the Year 4 SIMCE. For example, in the subject of language, the overall group of Year 4 students who took the SIMCE achieved an average score of 244 points. In contrast, students who completed the SIMCE in both years obtained an average score of 278 points in Year 4, which is nearly 14% higher.

Table 11.25. Comparison of Mean Score of Year 4 SIMCE of included and excluded students.

	Reading score for Year 4	Math score for Year 4
Enrolled in Year 4 in 2011	244.7436	235.2075
Enrolled in Year 4 in 2011 and Year 12 in 2017	269.8615	260.8424
SIMCE scores for Year 4 and Year 12	278.7567	271.511

Students without information on parental schooling.

Understanding the reason behind the lack of information about parental schooling is particularly challenging, given that the information was compiled from various sources as explained in Chapter 7. The majority of students lacking data on their parental education were excluded from the analysis, as they were also missing the SIMCE scores previously described. Among those with information about SIMCE results, only 233 students—representing 0.2% of the total—lacked information regarding their parents' education.

Further analysis indicates that the characteristics of this group do not differ substantially from those of students included in the analysis. Students missing parental education data exhibit similar language scores and slightly higher mathematics scores compared to their peers (see Table 11.26), and they display a slightly greater average number of years with priority status (see Table 11.27).

Table 11.26. Mean Y4 Score of students lacking information on parental schooling

	Reading score for Y4	Math score for Y4
Students Included in the Analysis	278	271
Students without parentsal schooling information	277	278

Table 11.27. Mean years of priority status of students lacking information on parental schooling

	Number Years of Prioritario Status
Students Included in the Analysis	6.7
Students without information about their parents' schooling	6.3

Summary of Bias Arising from Excluded Cases

When interpreting the results, it is essential to acknowledge that the analysis does not encompass all students in the cohort; instead, it includes only those for whom sufficient information was available to assess their academic trajectory. This exclusion results in a relevant number of students being omitted from the study, many of whom are not comparable to those included. Specifically, the excluded students tend to be more socioeconomically disadvantaged and exhibit lower academic performance initially. Consequently, the findings

have to be interpreted in this context and cannot be generalised for the more extremely disadvantaged students who were disproportionately excluded from the analysis due to the lack of information.

11.2. Results from the Logistic Models

This section presents the results of the logistic regression models developed for the three identification strategies of successful disadvantaged students, as outlined in Chapter 7.

For each strategy, the dependent variable in the model represented membership in the high-achieving group, or not. These groups included:

(1) Students demonstrating substantial academic improvement (Success Against the Odds or SAO),
(2) Students who enrolled in higher education, and
(3) Students who enter a prestigious university.

The models were structured by introducing independent variables in biographical blocks, reflecting the sequential influence of various factors on the students' lives. This methodological approach follows the frameworks of Gorard et al. (2012) and Siddiqui et al. (2023). Variables within each block were introduced using a forward selection method, which was applied consistently across all three identification strategies and their subgroups.

This section presents the average outcomes of the logistic regression models for each identification strategy. The coefficients of the independent variables are discussed in Section 11.3.

a. Logistic Model Results for Success Against the Odds Students (1st Identification Strategy).

Table 11.28 provides the average prediction accuracy across all nine logistic regression models. Students in the SAO group were coded as 1, while all other disadvantaged students were coded as 0. The specifics of the nine logistic regression analyses can be found in Appendix 6.

The average accuracy increased substantially throughout the stages, reaching 68% at Step 7, up from the baseline accuracy of 51%. Variables introduced in the early steps, such as birth characteristics, had a modest impact, increasing accuracy to just over 53%. Socioeconomic status (SES) variables provided limited predictive power, increasing accuracy slightly to 54%. This limited impact likely reflects the homogeneity of the sample, as most students came from families where neither parent had completed secondary education. Academic performance at age 10 contributed further but less prominently as the dependent variable focused on students who had achieved substantial academic improvement rather than consistently high-performing individuals. By age 10, prediction accuracy rose to just over 59%, indicating that factors at this stage began to play a more influential role. The data introduced at ages 12 and 14 contributed steady gains in predictive power, with accuracy increasing to nearly 64%. The most relevant improvement occurred when data from age 16 were included, with prediction accuracy jumping by over four percentage points to reach 68%. Section 11.3 will discuss the specific variables and their coefficients in detail.

Table 11.28 Average Percentage of Correct Predictions by Step

	Average	Increase
Base	50.74	
Step 1: Birth	53.17	2.44
Step 2: SES	54.40	1.23
Step 3: 10-year-old score	56.05	1.65
Step 4: 10 years	59.23	3.18
Step 5: 12 years	61.96	2.73
Step 6: 14 years	63.89	1.93
Step 7: 16 years	68.01	4.12

b. Logistic Model Results for Disadvantaged Students Enrolled in Higher Education (2nd identification strategy)

In the second identification strategy, the logistic regression model examined the likelihood of disadvantaged students enrolling in higher education within two years of completing secondary school. The dependent variable was coded as 1 for students who enrolled in higher education and 0 for those who did not. Unlike the first identification strategy, where subgroup comparisons were necessary, this model included the entire comparison group, as the numbers of students in each category—those enrolled and those not enrolled—were nearly equal. This

balance eliminated the need to divide the group into subgroups or calculate averages across multiple models. Tables 11.29 and 11.30 summarise the student counts and the model's prediction accuracy at each stage, respectively.

The model's baseline prediction accuracy was 54%, which increased steadily as biographical blocks were added. The most substantial improvement occurred in step 1, where birth characteristics were included, raising accuracy by 5.72 percentage points to 59.76%. Another notable increase was observed in step 3, which introduced prior test scores, further boosting accuracy by 2.78 points to 64.18%. Subsequent steps—adding data from ages 10, 12, and 14—resulted in more minor, incremental improvements. The final step, incorporating information from age 16, brought the prediction accuracy to 67.98%, marking a total improvement of nearly 14 percentage points from the baseline.

The model correctly predicted enrolment outcomes for 68% of the cases, demonstrating strong predictive power. These results highlight the importance of early biographical factors and academic performance in understanding the pathways of disadvantaged students into higher education.

Table 11.29. Binary Logistic Regression of Enrolment in Higher Education

Group	Students
Not enrolled in Higher Education	6,528
Enrolled in Higher Education	7,678

Table 11.30. Percentage of Correct Predictions by Step

Percentage predicted correctly by each step		Increase
Base	54.05	
Step 1: Birth	59.76	5.72
Step 2: SES	61.40	1.64
Step 3: 10-year-old score	64.18	2.78
Step 4: 10 years	64.41	0.23
Step 5: 12 years	64.65	0.24
Step 6: 14 years	66.42	1.77
Step 7: 16 years	67.98	1.56

c. Logistic Model Results for Disadvantaged Students Enrolled in Prestigious Universities (3rd Identification Strategy).

The third identification strategy examined disadvantaged students' likelihood of enrolling in prestigious universities, defined as those affiliated with the Council of Rectors (CRUCH). CRUCH represents 30 universities renowned for their educational traditions, academic excellence, and extensive experience. The outcome variable was coded as 1 for students who enrolled in CRUCH-affiliated universities and 0 for all other disadvantaged students.

Table 11.31 presents the models' average performance across the four logistic regressions. The specifics of the four logistic regression analyses can be found in Appendix 7. The baseline accuracy of the models was 51%, reflecting random prediction. Incorporating birth characteristics in Step 1 led to a notable increase, raising prediction accuracy by 4.94 percentage points to 56.13%. The largest single improvement occurred in Step 3, which incorporated students' test scores at age 10, increasing 9.38 percentage points. Subsequent steps, which added data from ages 12, 14, and 16, produced smaller but steady gains, with the final step raising prediction accuracy to 71.90%—a total improvement of 20.71 percentage points over the baseline.

These findings underscore the importance of early academic performance, particularly test scores at age 10, as a strong predictor of prestigious university enrolment for disadvantaged students. Birth characteristics and data at age 16 also contributed to the model's predictive power. The following section provides further details on the variables included in each step and their coefficients.

Table 11.31. Average Percentage of Correct Predictions by Step

	Average	Increase
Base	51.19	
Step 1: Birth	56.13	4.94
Step 2: SES	56.97	0.84
Step 3: 10-year-old score	66.35	9.38
Step 4: 10 years	66.77	0.42
Step 5: 12 years	67.95	1.18
Step 6: 14 years	68.86	0.90
Step 7: 16 years	71.90	3.05

11.3. Independent Variables' Relevance for the Logistic Models

This section provides an overview of the independent variables incorporated into the logistic models described in the previous section. These models identified characteristics or contextual factors that increase the likelihood of a disadvantaged student being classified in the academically successful groups.

The variables are presented in five thematic categories instead of following the original sequence in which they were introduced into the models. This approach facilitates a clearer understanding and more effective comparison.

(1) Traditional Background Variables: These include factors that have been consistently identified in the literature as strong predictors of educational outcomes, as socioeconomic situation, gender, and previous test scores.
(2) Academic Self-Esteem Variables: This category encompasses variables that reflect students' self-perception of their academic abilities and capture their confidence in their academic potential.
(3) Parental Involvement Variables: These variables assess the degree of parental engagement in their child's education, including activities such as assisting with homework and being informed about the student's academic progress.
(4) Student Persistence Variables: This group focuses on students' self-reported resilience and determination, particularly in academic settings. It reflects their ability to overcome obstacles and stay motivated.
(5) Student Mindset Variables: Based on Carol Dweck's theory of mindset, this category distinguishes whether a student holds a fixed mindset (believing intelligence is static) or a growth mindset (believing intelligence can be developed through effort).

These categories help clarify the factors contributing to students' success and enable a more structured approach to understanding the influences on their academic trajectories.

a. Traditional background determinants

Table 11.32 presents the traditional background variables that have consistently been found to predict academic performance. In the logistic models discussed in the previous section, these

variables were relevant in predicting the likelihood of a disadvantaged student being classified in any of the three academically successful groups.

Gender

Female disadvantaged students demonstrate a considerably higher likelihood of enrolling in higher education. They are twice as likely to enrol in higher education and up to 40% more likely to attend prestigious universities than male disadvantaged students. However, they are not more likely to belong to the exceptional progress group.

Socioeconomic Determinants

The model incorporates six socioeconomic variables: income level, number of books in the household, mother's education, father's education, years receiving government benefits, and years receiving additional government support. The latter two variables capture the duration of economic disadvantage and extreme financial hardship. While all students included in the regressions come from socioeconomically disadvantaged families, the level of disadvantage varies, which is reflected in these variables.

The relationship between income and academic success is complex. In the first model, students from medium-low-income households are likelier to belong to the Success Against the Odds (SAO) group. In the second model, those from medium-income households show up to a 20% greater likelihood of entering higher education. However, in the third model, no clear pattern emerges regarding the relationship between family income and attending prestigious universities.

Similarly, the number of books at home does not consistently correlate with academic outcomes. Nonetheless, parental education is an important predictor of higher education enrolment. Students whose parents did not complete primary education are less likely to attend tertiary education, with a 10% to 20% lower probability than those whose parents completed primary education.

Furthermore, the number of years receiving government benefits reveals a more consistent pattern. The longer a student receives government assistance, indicating prolonged economic

vulnerability, the lower the likelihood of entering higher education or belonging to the SAO group, which comprises students who make exceptional academic progress.

Prior Academic Achievement

The third stage of the model introduces students' prior academic performance, specifically their average scores in mathematics and language at age 10. This variable's impact differs across the three academic success groups. For the SAO group, a higher score at age 10 is associated with a reduced likelihood of being classified as part of this group. This aligns with the definition of the SAO group, which is characterised by substantial academic improvement between the ages of 10 and 16. Consequently, students with higher initial scores have less room for academic growth.

Although Figure 11.2 at the beginning of this chapter shows that students with varying levels of initial achievement can still belong to the SAO group, this coefficient indicates that students with lower scores at age 10 are more likely to be classified in the SAO group. In contrast, higher initial scores at age 10 are positively associated with an increased likelihood of entering higher education, with a more substantial effect for prestigious universities.

Type of Schools

School choice does not clearly correlate with academic outcomes at ages 10 and 12. However, relevant patterns emerge at ages 14 and 16. Students attending subsidised private schools at age 14 are 60% more likely to belong to the SAO group, 15% more likely to enter higher education, and 20% more likely to attend a prestigious university than students in municipal schools.

By age 16, the influence of school type becomes even more pronounced. Students in subsidised private schools are 90% more likely to be classified in the SAO exceptional progress group and have a 10% higher probability of entering higher education, though their chances of attending a prestigious university decrease by 30%. This drop may reflect that non-CRUCH universities are concentrated in Santiago, the capital city, where many subsidised private schools are located, and these institutions are not classified as prestigious in the study's criteria.

Additionally, students from Delegated Administration Schools, which provide more vocational training, are 70% more likely to belong to the SAO group, but 20% less likely to enter higher education and 40% less likely to attend a prestigious university.

The Bicentennial School variable at age 16 stands out as particularly relevant. These schools, part of a government initiative that includes 60 selective schools with ambitious academic curricula, show remarkable results. Students attending Bicentennial Schools at age 16 are more than four times more likely to be in the SAO exceptional progress group, have a 70% greater likelihood of entering higher education, and a 10% higher probability of enrolling in a prestigious university.

Students' Expectations

Student expectations for future educational attainment are also strong predictors in the model. At age 14, students who expect to attend university are 50% more likely to belong to the SAO group, 90% more likely to pursue higher education, and 50% more likely to attend a prestigious university than those who do not anticipate further education.

By age 16, these expectations become even more important. Students who expect to attend university are 60% more likely to be classified in the SAO exceptional progress group, twice more likely to enrol in higher education, and 2.5 times more likely to attend a CRUCH university. Additionally, students who aspire to a Master's or PhD are twice as likely to belong to the SAO exceptional progress group, twice as likely to enter higher education, and nearly three times more likely to attend a prestigious university.

Table 11.32. Coefficients of Traditional Variables

Step	Variables		Reference category	Exp (B)		
				Exceptional progress	Higher education	Prestigious university
1.Birth	Gender	Female	vs. male		1.961	1.394
2.SES	Income	201-300 usd	vs. Up to 200 usd	1.202	1.014	0.909
		301-400 usd		1.148	1.126	0.885
		401-500 usd		1.346	1.129	0.839
		501-600 usd		1.067	1.232	0.877
		601-800 usd		0.810	1.128	1.064
		More than 800 usd		0.846	1.182	0.913
	Books at home	11-50	vs. Up to 10 books		1.052	0.941
		51-100			1.194	0.959
		More than 100			1.005	1.070
	Mother Education	Primary	vs. unfinish primary		1.118	
		Unfinish secondary			1.160	
	Father Education	Primary	vs. unfinish primary		1.187	
		Unfinish secondary			1.110	
	Years with government benefits			0.993	0.980	
	Years with additional government benefits				0.985	
3.Previous score	Score at 10 years old			0.443	1.345	1.942
4.10 years	School type	Subsidized private	vs municipal	0.987	1.104	
4.12 years	School type	Subsidized private	vs municipal		0.944	
6.14 years	School type	Subsidized private	vs municipal	1.624	1.167	1.234
	Highest level of education expected	Tertiary Vocational	vs. High school or no high school	1.035	1.384	0.929
		Tertiary University		1.575	1.952	1.484
		No answer		0.964	1.532	1.414
7.16 years	School type	Subsidized private	vs municipal	1.890	1.115	0.674
		Delegated administration		1.764	0.834	0.577
	Bicentennial school			4.490	1.709	1.133
	Highest level of education expected	Tertiary Vocational	vs. High school or no high school	0.994	1.610	1.172
		Tertiary University		1.624	2.151	2.586
		Master or PhD		2.108	2.319	2.843
		No answer		1.098	1.370	1.753

b. Academic Self-Esteem Variables

The model incorporates variables from students' responses to statements designed to assess their academic self-esteem. These responses were collected via a questionnaire administered alongside the SIMCE (Chile's national system for assessing educational outcomes). Students were asked to indicate their level of agreement with the following statements:

(1) "I generally understand very little of what I am taught in class."
(2) "Although a subject is difficult, I think I can understand it with study."
(3) "When I grow up, I will achieve everything I set my mind to."
(4) "I learn more easily than the rest of my classmates."
(5) "I am smart."
(6) "I know I can do the homework, even if it is difficult."
(7) "I know I can get good grades if I put in the effort."
(8) "There are certain things that I just cannot learn."

Table 11.33 presents the coefficients associated with these variables for the three models analysed.

At age 10, students who strongly disagreed with the statement, "In general, I understand very little of what I am taught in class," were 20% more likely to belong to the Success Against the Odds (SAO) group, 20% more likely to pursue higher education, and 30% more likely to enrol in a prestigious university.

By age 12, students who strongly agreed with the statement, "I learn more easily than the rest of my classmates," were 70% more likely to be in the SAO group and 40% more likely to attend a prestigious university. Similarly, students who strongly agreed with the statement, "I am smart," were 50% more likely to be in the SAO group and 30% more likely to attend a prestigious university.

The responses at age 14 did not display a clear pattern, and some findings appeared counterintuitive. For example, students who strongly agreed with the statement, "I know I can get good grades if I put in the effort," had a lower probability of entering higher education than

those who disagreed. However, the small number of students who disagreed with this statement may have distorted the results.

By age 16, students who strongly agreed with the statement, "I know I can do the homework, even if it is difficult," were 60% more likely to belong to the Success Against the Odds group, 30% more likely to enter university, and 40% more likely to enrol in a prestigious university compared to those who disagreed. However, responses to the other two statements evaluated at this age—"I know I can get good grades if I put in the effort" and "There are certain things that I just cannot learn"—did not show consistent patterns.

Overall, the findings indicate that students with higher academic self-esteem are more likely to belong to the SAO group, pursue higher education, and enrol in prestigious universities. This aligns with the existing literature, as detailed in Chapter 3, which consistently demonstrates that students who succeed against the odds possess positive perceptions of their cognitive abilities and exhibit greater self-esteem compared to their peers with lower academic performance (Borman & Overman, 2004; Cunningham & Swanson, 2010; Ge & Ngai, 2020; Rouse, 2001; Siraj-Blatchford et al., 2013; Süleyman et al., 2022; Victor-Aigboidion et al., 2020; Wang et al., 2022; Waxman & Huang, 1996; Ye et al., 2024; García-Crespo et al., 2022; Gizir & Aydin, 2009; Mohan & Kaur, 2021; Özden & Atasoy, 2020).

Table 11.33. Coefficients of Academic Self-Esteem Variables

Step	Variables		Reference category	Exp (B)		
				SAO	Higher Ed.	Prestigious University
4.10 years old	I understand little what I am taught	Agree	vs. Strongly Agree	0.860	1.055	0.987
		Disagree		1.129	1.070	1.086
		Strongly disagree		1.214	1.198	1.308
		No answer		1.000	0.917	1.053
	With effort I can understand difficult subject	Strongly agree	vs. Strongly disagree		1.190	
		Agree			1.117	
		Disagree			0.965	
		No answer			1.351	
5.12 years	I will achieve everything I set my mind to	Strongly Agree	vs Disagree or Strongly Disagree		1.199	
		Agree			1.176	
		No answer			0.997	
	I learn more easily than my classmates	Strongly agree	vs. Strongly disagree	1.674	1.027	1.443
		Agree		1.232	1.064	1.225
		Disagree		1.058	0.984	1.082
		No answer		1.532	0.939	1.045
	I am smart	Strongly agree	vs. Disagree or Strongly disagree	1.540	1.078	1.273
		Agree		1.256	0.984	1.111
		No answer		1.525	1.055	1.383
6.14 years	I can do difficult homework	Agree	vs. Disagree or Strongly disagree		0.911	
		Strongly agree			0.986	
		No answer			1.106	
	I can get good grades	Agree	vs. Disagree or Strongly disagree		0.763	
		Strongly agree			0.780	
		No answer			0.679	
7.16 years	I can do difficult homework	Agree	vs. Disagree or Strongly disagree	1.220	1.085	1.120
		Strongly agree		1.651	1.349	1.431
		No answer		1.903	1.204	1.704
	I can get good grades	Agree	vs. Disagree or Strongly disagree		0.934	1.061
		Strongly agree			1.085	1.292
		No answer			1.128	1.170
	Certain things I am not capable of learning	Strongly agree	vs. Strongly Disagree		1.097	
		Agree			0.905	
		Disagree			1.026	
		No answer			0.744	

c. Parental Involvement Variables

The SIMCE questionnaire included items at ages 10 and 12 that assessed students' perceptions of their parents' support and involvement in their education. Data collected when students were 10 years old did not contribute to the model. However, responses from students at age 12 revealed more meaningful relationships.

As shown in Table 11.34, students who consistently received parental assistance with their studies at age 12 were less likely to be classified in the Success Against the Odds (SAO) group, pursue higher education, or attend prestigious universities. A plausible explanation for this finding is that high-achieving students may require less parental assistance, particularly when their parents, who may not have completed compulsory education, lack the academic expertise to effectively support their children's advanced learning needs. This result is consistent with the findings of Cui et al. (2022), who reported that while general parental involvement is positively associated with academic achievement, excessive involvement in academic studies can negatively affect resilient students during specific periods of their lives. Similarly, it aligns with Wills and Hofmeyr's (2019) findings, which suggest that parental assistance with homework can undermine resilience, potentially hindering students' ability to overcome challenges.

This positive correlation between parent–child relationships and resilience is further evident in the context of parental involvement in their children's education. Many studies have shown that parental support and active engagement in education enhance the likelihood of success for students from disadvantaged backgrounds (Ye et al., 2024; Cunningham & Swanson, 2010; Pan & Yi, 2011; Schoon et al., 2004). Notably, Anagnostaki et al. (2016) found that immigrant students tend to perform better academically when their parents are more involved in their education. Likewise, Bester and Kuyper (2020) reported a strong link between parental involvement and resilience among students from extreme poverty backgrounds.

In contrast, there is a positive correlation between parents' awareness of their children's academic performance and the likelihood of students gaining admission to a prestigious university. This suggests that while direct parental help may not always be beneficial, parents'

active engagement and understanding of their children's academic progress positively correlate with their educational outcomes.

Table 11.34. Coefficients of Parental Involvement Variables

Step	Variables		Reference category	Exp (B)		
				SAO	Higher Ed.	Prestigious university
12 years	Parents help studying	Always	vs Never	0.743	0.768	0.631
		Most of the time		1.067	0.812	0.791
		Sometime		1.134	0.796	0.812
		No answer		0.888	0.910	0.724
	My parents know the grades I have	Always	vs Never or sometime			1.181
		Most of the time				1.098
		No answer				0.973

c. Student Persistence Variables

At age 14, the SIMCE questionnaire posed two questions to assess students' persistence in the face of academic challenges. The statements were as follows:

(1) "When I do poorly in a subject, I give up quickly."
(2) "If I get a bad grade, I study more for the next test."

As shown in Table 11.35, students who strongly disagreed with the statement "When I do poorly in a subject, I give up quickly" were 30% more likely to belong to the Success Against the Odds group and enter a prestigious university than those who strongly agreed.

Similarly, regarding the statement "If I get a bad grade, I study more for the next test," students who strongly agreed were 30% more likely to enter higher education and 50% more likely to attend a prestigious university than those who strongly disagreed.

This finding aligns with the literature, which has shown that disadvantaged students who succeed against the odds also demonstrate high levels of persistence and perseverance (King, 2014; Siraj-Blatchford et al., 2013; Thorsen et al., 2021; Wills & Hofmeyr, 2019; Ye et al., 2024).

Table 11.35. Coefficients of Student Persistence Variables

Step	Variables		Reference category	Exp (B)		
				SAO	Higher Ed.	Prestigious university
14 years	When I do badly in a subject, I give up quickly	Strongly disagree	vs. Strongly Agree	1.368		1.328
		Disagree		1.160		1.240
		Agree		0.918		1.193
		No answer		1.084		1.097
	If I get a bad grade, I study more for the next test	Disagree	vs. Strongly disagree		1.001	1.138
		Agree			1.114	1.344
		Strongly agree			1.319	1.526
		No answer			1.320	1.537

d. Student Mindset Variables.

For 16-year-old students, the SIMCE questionnaire included items designed to assess whether they held a growth or fixed mindset. Four statements were used to capture this concept:

(1) "If I am not naturally talented in Spanish, I will never do well in that subject."
(2) "If I am not naturally talented in Math, I will never do well in that subject."
(3) "My intelligence is something I cannot change."
(4) "Challenges will not make me smarter."

Table 11.36 shows the strongest correlation with the statement: "If I am not naturally talented in Math, I will never do well in that subject." Students who strongly disagreed with this statement were 2.5 times more likely to belong to the Success Against the Odds (SAO) group than those who strongly agreed, and they had a 70% higher probability of entering a prestigious university. Similarly, students who strongly disagreed with the statement "Challenges will not make me smarter"—indicating a belief that challenges could enhance their intelligence—had an 80% higher likelihood of being in the SAO group.

Therefore, students who exhibit a growth mindset, as reflected in their responses to these statements, are more likely to belong to the SAO group, pursue tertiary education, and attend a prestigious university.

Table 11.36. Coefficients of Student Mindset Variables

Step	Variables		Reference category	Exp (B)		
				SAO	Higher Ed.	Prestigious university
16 years	If I am not naturally talented for Spanish, I will never do well in that subject	Strongly disagree	vs. Strongly Agree		1.18	
		Disagree			1.16	
		Agree			0.99	
		No answer			1.27	
	If I am not naturally talented for Math, I will never do well in that subject	Strongly disagree	vs. Strongly Agree	2.52		1.72
		Disagree		1.76		1.38
		Agree		1.17		1.03
		No answer		1.71		0.92
	My intelligence is something I cannot change	Strongly disagree	vs. Strongly Agree	0.90		0.86
		Disagree		1.22		1.05
		Agree		1.03		0.89
		No answer		1.75		1.44
	Challenges will not make me smarter	Strongly disagree	vs. Strongly Agree	1.82		
		Disagree		1.59		
		Agree		1.23		
		No answer		0.95		

11.4. Summary and Conclusion.

This phase of the thesis analysed a longitudinal secondary data to identify key characteristics of students from disadvantaged backgrounds who were able to substantially improve their academic performance during their school years, thereby succeeding against the odds.

This research method was chosen because a comprehensive longitudinal database, rich in socio-economic, socio-emotional, attitudinal, and academic information, with national census coverage, was available. The database follows students ages 10 to 16 and was supplemented with data on higher education access.

Logistics models were employed to understand the characteristics of students from disadvantaged backgrounds who exhibited the most progress in language and mathematics between the ages of 10 and 16. These students were labelled as the Success Against the Odds (SAO) group, as exceptional progress was made despite the low likelihood of such achievement

among students from disadvantaged families. Specific personal characteristics were identified within this group, with particular attention given to their high academic self-esteem, strong perseverance, and growth mindset. The latter's relevance was emphasised, as students with a growth mindset were more than twice as likely to succeed against the odds compared to those with a fixed mindset.

The importance of high academic self-esteem and strong perseverance for disadvantaged students who succeed against the odds aligns with findings in the literature. Research consistently demonstrates that resilient students exhibit higher levels of academic self-efficacy compared to their peers with lower academic performance (Borman & Overman, 2004; Cunningham & Swanson, 2010; Ge & Ngai, 2020; Rouse, 2001; Siraj-Blatchford et al., 2013; Süleyman et al., 2022; Victor-Aigboidion et al., 2020; Wang et al., 2022; Waxman & Huang, 1996; Ye et al., 2024; Hofmeyr, 2019; OECD, 2011; Anagnostaki et al., 2016). Additionally, several studies highlight that self-perceptions of academic abilities are among the most significant predictors of academic resilience (García-Crespo et al., 2022; Gizir & Aydin, 2009; Mohan & Kaur, 2021; Özden & Atasoy, 2020). Perseverance has also been identified in the literature as a key characteristic of students who overcome adversity (King, 2014; Siraj-Blatchford et al., 2013; Thorsen et al., 2021; Wills & Hofmeyr, 2019; Ye et al., 2024).

Another variable highlighted in the model was the type of school attended. Attending a Bicentennial School was strongly correlated with succeeding against the odds. Students enrolled in a Bicentennial School were four times more likely to belong to the SAO group than those attending other institutions.

The same analysis was conducted to identify the characteristics of students from disadvantaged families who successfully entered higher education or enrolled in a prestigious university. Successful students stood out for similar personal characteristics: high academic self-esteem, strong perseverance, and a growth mindset. In these groups, Bicentennial High School students were also more likely to enter higher education and prestigious universities.

This analysis provides insights into some of the characteristics of students who are able to succeed academically despite adverse circumstances. However, it cannot be determined whether these characteristics contribute to the high achievement of disadvantaged students,

whether they are a consequence of academic success, or whether other factors influence these traits, leading to changes in academic performance. It is only known that a positive correlation exists, which remains even after controlling for socioeconomic factors and previous test scores. Therefore, further research is required before any conclusions can be drawn.

In the second and third phases of the thesis, the two most relevant variables from the models—having a growth mindset and attending a Bicentennial High School—are examined in greater detail using various methodologies. For growth mindset, the focus is on whether this trait is malleable in students and if shifting them from a fixed to a growth mindset can improve academic achievement. Bicentennial High Schools are also analysed to determine whether they contribute to greater student progress and what factors might account for their success.

Chapter 12 Findings form the Structured Review of Growth Mindset Interventions.

The secondary data analysis of disadvantaged students who succeed against the odds, in the first section of this thesis, revealed a strong correlation between students' mindsets and their likelihood of being classified in the Success Against the Odds (SAO) group. This group comprises disadvantaged students who began their education with low achievement levels but demonstrated substantial academic progress over time. As highlighted in the preceding chapter, students with a growth mindset were up to 2.5 times more likely to belong to the SAO group.

Building on these findings, the second part of this thesis examines whether there exists a causal relationship between possessing a growth mindset and academic performance. As explained in Chapter 8, a structured literature review was conducted to investigate this topic, focusing on studies that assess the impact of growth mindset interventions on students' academic achievement. This review has been published in a peer-reviewed journal (Gazmuri, 2025). The findings of the review are presented in the following sections.

12.1. Included Studies

The structured review included 29 studies that met the selection criteria described in Chapter 8. Specifically, those utilising randomised controlled trials (RCTs) to evaluate the effects of intelligence-focused growth mindset interventions on the academic performance of school-age students. However, three studies (see Table 12.1) were excluded from the analysis due to the inability to compute effect sizes for the whole randomised group, as they reported only on specific subgroups (Paunesku et al., 2015; Yeager et al., 2016, 2019).

Table 12.1. Reasons for Excluding Certain Studies.

Study	Reason for Exclusion
Paunesku et al. (2015)	The study reports result only for at-risk students, not for the entire randomised group.
Yeager et al. (2016)	Results are provided solely for students one standard deviation above or below prior achievement measures, not for the entire randomised group.
Yeager et al. (2019)	The study report results exclusively on lower-achieving students, omitting results for the full randomised group.

12.2. Rating the Quality of the Evidence.

The analysis of the remaining 26 studies yielded 62 distinct academic outcomes. When multiple outcomes were reported for one study, the review prioritised the most reliable ones. For example, when a study presented both Intent to Treat (ITT) estimates with low attrition and Average Treatment Effect on the Treated (ATT) estimates with high attrition, the ITT estimate was used, as it provides a more reliable measure of impact for the randomised group.

These outcomes were classified using the sieve analysis framework outlined in Chapter 8. Notably, 14 of the 62 outcomes received the highest security rating of 4*, indicating particularly robust and trustworthy findings. This is unusual. A further 16 outcomes were rated at 3*, while 25 were rated 2*. However, seven outcomes received the lowest ratings, with five classified as 1* and two as 0* (Table 12.2).

Table 12.2. Number of Outputs by Security Rating

Security Rating	Number of Outputs
4*	14
3*	16
2*	25
1*	5
0*	2
Total	62

12.3. Reasons for Studies Receiving 2* or Lower Rating

Several studies in the analysis were rated 2* or lower, primarily due to limitations in their research design and execution that affected the robustness of their findings.

Nine studies, comprising 25 outcomes, received a 2* rating for two key reasons. First, both Alan et al. (2019) and Wilkins (2014) employed relatively small-scale randomisations. Alan et al. (2019) randomised only 16 schools, while Wilkins (2014) randomised 16 teachers. Despite involving a substantial number of students, the small number of units randomised raises concerns about possible imbalances between the treatment and control groups, which could undermine the reliability of the results. Zhao et al. (2023) randomised a large cohort of students at the classroom level; however, the exact number of randomised classrooms was not specified,

with estimates ranging from 30 to 40 classrooms. While this is not a particularly small sample, the imbalance in gender distribution, with a higher proportion of boys in the control group, may have influenced the slower progress in language subjects compared to mathematics. Similarly, studies by Brougham and Kashubeck-West (2017), with a sample of around 80 students, and Good et al. (2003), which randomised 138 participants into four groups, provided less reliable findings than higher-rated studies.

Other studies, such as Rienzo et al. (2015), Bettinger et al. (2018), and Porter et al. (2020), were rated 2* due to significant attrition rates, with dropout rates around 30%. Additionally, Blau and Benolol (2016) received a 2* rating because their outcomes extended beyond strictly academic criteria, including aspects of a computer programming project that fell outside the core academic focus of this review.

Three studies, encompassing five outcomes, were rated 1*. Schrodt (2015) had a small sample size of only 27 students, while Blackwell et al. (2007), despite having a sample size of 87 students, randomised them into approximately eight advisory groups, leading to a low effective sample size. Dommett et al. (2013) randomised five schools into five different conditions, including two treatment conditions, two active control conditions, and one no-intervention control group. Small sample sizes and complex designs resulted in lower reliability.

Finally, two studies with two outcomes were rated 0*. Both Orosz (2017) and Glerum et al. (2020) had only 55 students, with randomisation occurring at the classroom level, further reducing the effective sample size. These factors significantly compromised the ability to draw reliable conclusions from their findings.

The complete list of ratings for each study is provided in Appendix 1.

12.4. Effect Sizes

Figures 13.1 and 13.2 illustrate the effect sizes of the findings, categorised by the security levels achieved in individual studies. In these graphs, findings towards the left represent less robust evidence, while those on the right indicate more secure outcomes. The effect sizes are plotted

on the y-axis, with dots below the horizontal zero line representing findings with negative effect sizes.

As shown in Figure 12.1, the weakest studies report the largest effect sizes. Notably, findings with lower security ratings display a wider distribution range than those rated higher. Outcomes with a security rating of 0* or 2* range from -0.7 to +1.9. In contrast, the effect sizes for outcomes rated 3* and 4* are more tightly grouped, spanning a narrower range of -0.15 to +0.38. Studies rated 4* mainly concentrate around zero impact, indicating more modest or negligible effects.

Figure 12.1. Effect Sizes of Growth Mindset Interventions by Security Level (0 to 4)

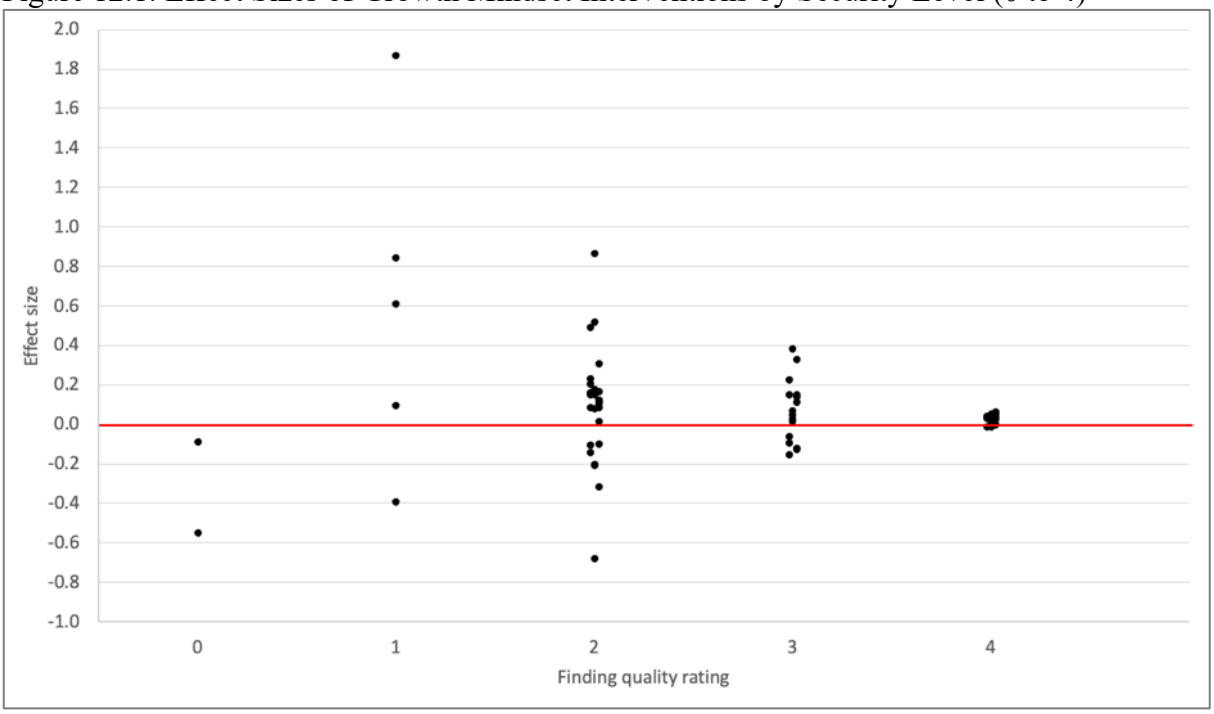


Figure 12.2 offers a zoomed-in view to provide greater clarity. It focuses solely on studies rated 3* and 4*. This figure shows that 3* findings exhibit effect sizes ranging from -0.15 to +0.38, while 4* findings demonstrate an even tighter range of -0.01 to +0.064.

Figure 12.2. Effect Sizes of Growth Mindset Interventions by Security Levels (3 and 4)

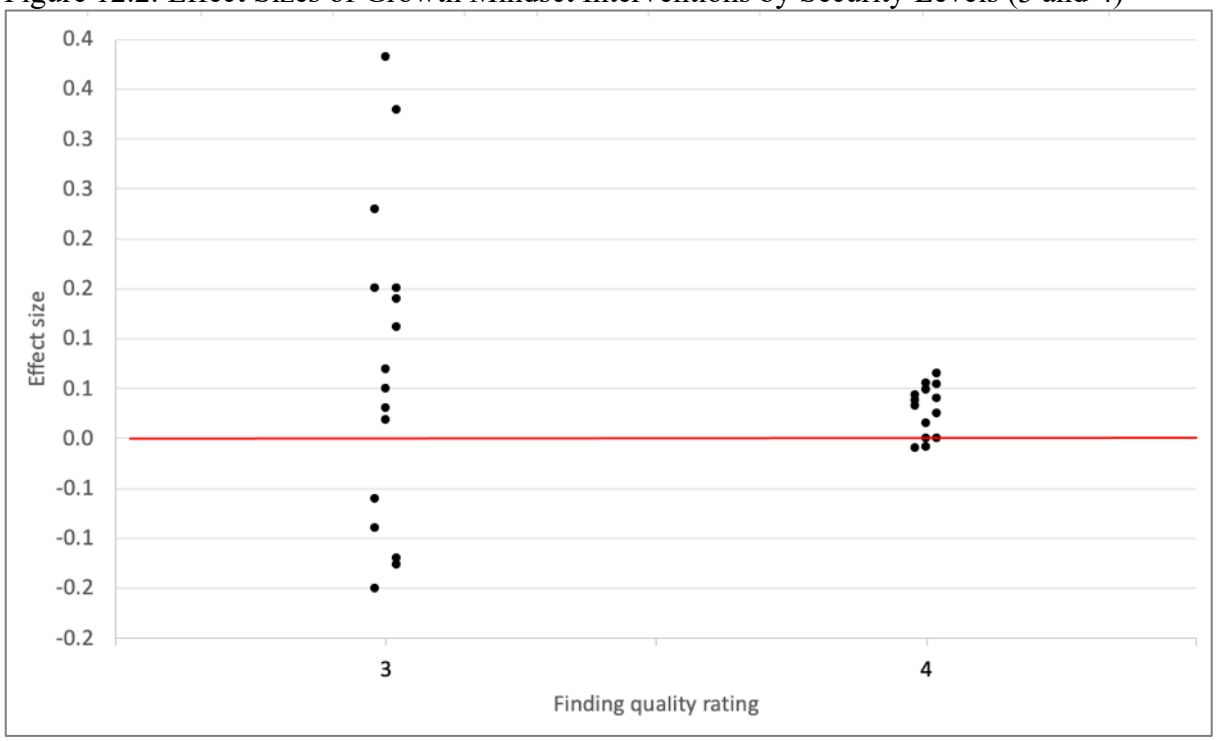


Table 12.3 summarises the results of each study included in the structured review, organised according to the strength of the evidence. It provides an overview of each study's reliability and impact.

Table 12.3. Strength of Evidence and Impact of Included Studies

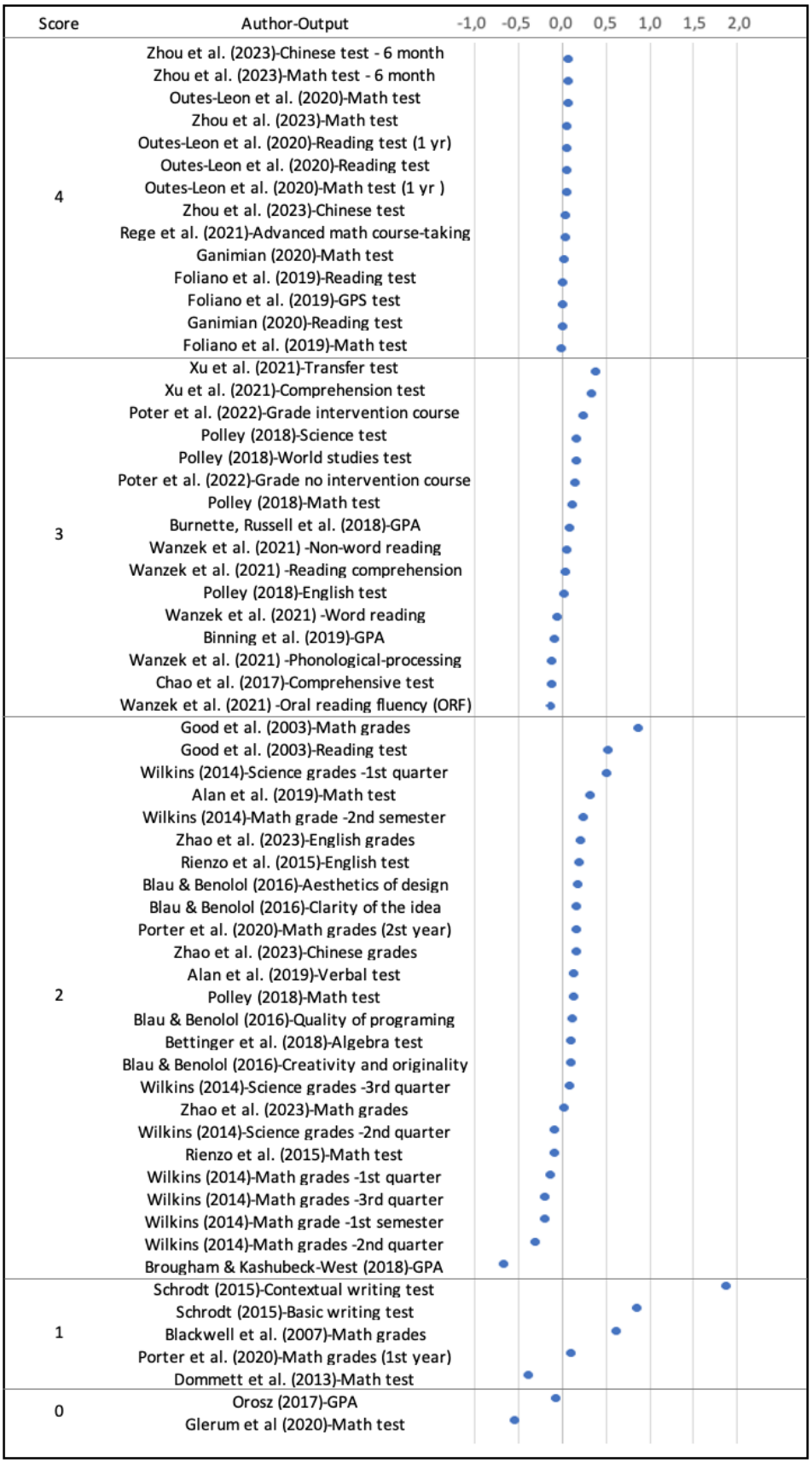
Strength of Evidence	Positive	Unclear/ mixed/ very small	Negative
4		5	
3	3	3	1
2	5	3	1
1	2		1
0		1	1

Additionally, Table 12.4 presents the detailed effect sizes calculated for each study and their corresponding outcomes, categorised by security level.

These tables and figures underscore the importance of evaluating the robustness of the findings. Studies with higher security ratings tend to report smaller, more reliable effect sizes, while lower-rated studies are more likely to report varied and exaggerated results.

In summary, the weakest studies report the largest effect sizes, ranging from -0.7 to +1.9. Studies rated 3* exhibit effect sizes between -0.15 and +0.38, while 4* findings demonstrate an even tighter range of -0.01 to +0.064.

Table 12.4. Effect Sizes for Individual Studies and Output by Security Level (0 to 4)



12.5. Results for Studies with a 4* Security Rating

This section analyses the five studies that achieved a 4* security rating and encompassed 14 outcomes. Three of these studies demonstrated small but positive effect sizes.

Outes-Leon et al. (2020) implemented a school-level RCT in Peru, enrolling 800 urban secondary schools. Of these, 400 schools in the treatment group received materials and instructions to facilitate three 30-minute sessions on growth mindset. However, participation was voluntary, and about half of the schools did not fully engage with the intervention. Due to the low compliance rate, both Intent to Treat (ITT) and Average Treatment Effect on the Treated (ATT) estimates were calculated. Given the low dropout rate (1%), the review prioritised the ITT estimates, resulting in the study receiving a 4* security rating. Two months after the intervention, the effect sizes on standardised test scores were d=0.054 for mathematics and d=0.04 for reading. Follow-up assessments conducted 14 months later showed a slight decrease, with math at d=0.038 and reading at d=0.044.

Rege et al. (2021) conducted an individual-level RCT in Norway involving 6,541 secondary school students. This intervention focused on the idea that engaging with challenging tasks could improve abilities over time, particularly during adolescence, a period of significant brain development. The ITT impact was modest (d=0.025) on advanced math course enrolment and pass rates. The authors noted that math course selections had been made in some schools before the intervention. While students had the opportunity to change their choices later, this may have attenuated the observed effect size.

Similarly, Zhou et al. (2023) conducted an individual-level RCT in rural China involving 1,680 Year 5 students, many of whom were from low-income backgrounds and had absent parents. The intervention consisted of intensive weekly growth mindset sessions for two hours over five weeks. The effect of the intervention was measured on official, centrally graded mathematics and Chinese exams shortly after the intervention and six months later. With low attrition rates (2% at midline and 4.1% at endline), the study found little evidence of impact, with effect sizes ranging from 0.03 to 0.06 standard deviations in Chinese and mathematics at both time points.

The two remaining studies also rated 4* and reported effect sizes close to zero, showing both marginal negative and marginal positive results. Foliano et al. (2019) conducted a school-level

RCT in England involving 101 primary schools and 5,018 Year 6 students. The intervention aimed to foster a growth mindset through an eight-week programme delivered by head teachers and Year 6 teachers. Despite the extensive training and programme implementation, there was no significant improvement in Key Stage 2 tests in reading, grammar, punctuation, spelling, or mathematics compared to the control group (KS2 maths: d=-0.01, KS2 reading: d=0.00, KS2 Grammar, Punctuation, and Spelling: d=0.00).

Similarly, Ganimian (2020) randomly assigned 202 public secondary schools in Argentina, involving 9,805 Grade 12 students, to either a treatment or control group. The intervention consisted of a single session focused on the malleability of intelligence. Despite full implementation, no significant impact was observed on national assessments in mathematics (d=0.015) or reading (d=-0.008).

In summary, five studies received the highest security rating of 4 stars. Among these, three studies showed small but positive effect sizes, with standardised test score effects ranging from d=0.03 to d=0.06, and effects on advanced math course enrolment and pass rates at d=0.025. The other two studies, which also achieved the highest rating, reported effect sizes close to zero, with values between -0.01 and 0.01 for standardised tests.

12.6. Results for Studies with a 3* Security Rating

This section discusses seven studies with a 3-star security rating, comprising 16 outcomes. These studies employ robust randomised controlled trial (RCT) designs, with relatively large student samples and low attrition rates. However, they fall short of a 4* rating due to factors such as smaller sample sizes and other design limitations. Three studies report sample sizes ranging between 100 and 200 students, as opposed to over 400 in the 4* studies (Burnette et al., 2018; Wanzek et al., 2021; Xu et al., 2021). Chao et al. (2017) randomised 107 classes but distributed them across six groups, resulting in only 17 to 20 classes per group. Additionally, three studies were downgraded to 3* due to attrition rates ranging from 13% to 19% (Binning et al., 2019; Polley, 2018; Porter et al., 2022).

Among the 3* studies, four showed positive effects. Xu et al. (2021) reported the most substantial effect size among 3* and 4* studies. This laboratory-based study involved 140 16-year-old students from two public high schools. Students in the growth mindset group completed a 10-minute reading and writing task on brain function and the malleability of intelligence. In contrast, the control group received similar information on general brain functioning without discussing intelligence. Afterwards, both groups engaged in a 12-minute learning task on sound travel and the Doppler effect. The growth mindset group significantly outperformed the control group in comprehension and transfer tasks, with Cohen's d = 0.33 for comprehension and d = 0.38 for transfer. This larger effect size might be attributed to the controlled environment and the specialised nature of the learning task.

Porter et al. (2022) examined a teacher-led growth mindset intervention involving 50 middle school teachers and 1,996 students. Teachers in the treatment group were trained to develop lesson plans incorporating growth mindset principles and deliver interventions lasting between 30 minutes and one hour. Students who received these lessons outperformed their peers in the targeted growth mindset lessons (Cohen's d = 0.23) and unrelated classes (Cohen's d = 0.14).

Polley (2018) conducted an RCT in Bangladesh with 600 secondary school students who received a 45-minute computer-based growth mindset intervention. The control group experienced the same intervention, minus commentary on how learning changes the brain. The intervention resulted in an average increase of 0.12σ in test scores (Cohen's d values: 0.112 for math, 0.151 for science, 0.018 for English, and 0.151 for world studies).

Burnette et al. (2018) evaluated a 45-minute online growth mindset intervention with 222 10th-grade girls from four rural, low-income U.S. high schools. The intervention had a negligible effect on GPA, with a Cohen's d = 0.07.

Conversely, three 3* studies reported negative results. Chao et al. (2017) examined primary school students from low-income areas in India. The study randomly allocated 107 classes (949 students) into six groups: three treatment groups (growth mindset with varying incentives) and three control groups (no growth mindset but with different incentives). The growth mindset intervention had a negative effect on standardised test scores (d = -0.13).

Binning et al. (2019) tested a growth mindset intervention against a control (study skills) group involving 598 high school students. The intervention resulted in a negative effect on GPA (d = -0.09).

Lastly, Wanzek et al. (2021) compared the effects of a reading intervention with and without a growth mindset component on 240 fourth-grade students with reading difficulties. The study reported negative or near-null effect sizes in various reading measures: oral reading fluency (d = -0.15), non-word reading (d = 0.05), phonological processing (d = -0.12), word reading (d = -0.06), and reading comprehension (d = 0.03).

In summary, seven studies received a 3* security rating, with effect sizes ranging from d = -0.15 to d = 0.38. Four of these studies demonstrated positive effects. The study with the largest positive effect size was laboratory-based, showing effect sizes between d = 0.33 and d = 0.38. Two studies reported impacts on test scores, with effect sizes ranging from d = 0.12 to d = 0.23, while one study showed a minor, nearly negligible effect on GPA (d = 0.07). Three of the 3* studies reported negative results: one indicated a negative effect on standardised test scores (d = -0.13), another on GPA (d = -0.09), and a third study showed a range of effects on reading measures, from d = -0.15 to d = 0.05.

12.7. Possible Bias due to Conflicts of Interest

Smaller, less rigorous studies tend to report larger effect sizes, while the 4* studies show little or no substantial effect of the intervention. Another important factor to consider is the potential role of researchers' conflicts of interest, especially given the rise of enterprises and consultancy groups centred around the growth mindset theory. Since the theory gained popularity, schools, districts, governments, and NGOs have directed significant funding to mindset training, interventions, books, and other related initiatives.

This review examined studies in which at least one researcher had a potential conflict of interest to assess whether they might influence outcomes. A conflict of interest was defined as direct involvement, such as being a founder, co-founder, owner, or board member, or receiving compensation from organisations that sell products related to mindset training (e.g., books,

seminars, or consulting services). It also includes researchers charging substantial fees for talks on the topic.

As shown in Table 12.5, seven papers with nine outcomes were identified in which the authors had apparent conflicts of interest. These outcomes included one rated 4*, three rated 3*, three rated 2*, and two rated 1*.

Table 12.5. Studies with Apparent Conflicts of Interest

Study	Authors	Conflict of Interest	Source
Bettinger et al. (2018)	E. Bettinger, S. Ludvigsen, M. Rege, I. F. Solli, D. Yeager	D. S. Yeager offers mindset talks for a fee.	https://thelavinagency.com/speakers/david-yeager/
Blackwell et al. (2007)	L. S. Blackwell, K. H. Trzesniewski, C. S. Dweck	L. S. Blackwell is president/co-founder of Mindset Works; C. S. Dweck co-founded Mindset Works and later distanced herself in 2015 to avoid conflict of interest.	https://www.mindsetworks.com/about-us/default. https://www.speakerbookingagency.com/talent/carol-dweck https://www.allamericanspeakers.com/celebritytalentbios/Lisa+Blackwell,+PhD/399102
Burnette et al. (2018)	J. L. Burnette, M. V. Russell, C. L. Hoyt, K. Orvidas, L. Widman	K. Orvidas leads mindset workshops for a fee.	https://www.kaseyorvidas.com/programs
Good et al. (2003)	C. Good, J. Aronson, M. Inzlicht	J. Aronson advises Casa Laxmi, providing expertise in the field of mindset, and has authored books on mindset.	https://www.casalaxmi.com/our-team/executive-advisors/
Porter et al. (2022)	T. Porter, D. Catalán Molina, A. Cimpian, S. Roberts, A. Fredericks, L. S. Blackwell, K. Trzesniewski	L. S. Blackwell is president/co-founder of Mindset Works.	https://www.mindsetworks.com/about-us/default.
Rege et al. (2021)	M. Rege, I. F. Solli, S. Ludvigsen, R. Crosnoe, C. Muller, A. Duckworth, P. Hanselman, C. S. Dweck, E. Bettinger, G. Walton, D.S. Yeager	D.S. Yeager offers mindset talks for a fee; Angela Duckworth promotes growth mindset as part of Amazon's Insight to Entrepreneurs team, writes books, and co-founded Character Lab.	https://www.amazon.com/Angela-Duckworth-Insights-for-Entrepreneurs/b?ie=UTF8&node=17395092011 https://angeladuckworth.com/about-angela/about-character-lab/ https://thelavinagency.com/speakers/david-yeager/
Orosz et al. (2017)	G. Orosz, S. Péter-Szarka, B. Bo˝the, I. Tóth-Király, R. Berger	G. Orosz co-founded the Heroes Square Initiative, offering mindset programs for schools and teachers. Rony Berger advises the Center for Compassion and Altruism Research and Education, which offers growth mindset training.	https://hosoktere.org/kik-vagyunk/#tortenetunk https://ccare.stanford.edu/people/rony-berger-psyd/

Figure 12.3 visualises the results, with studies marked by crosses for conflicts of interest and circles for those without. Notably, most studies with conflicts of interest report positive effect sizes, except for Orosz et al. (2017), a 1* study showing a small negative effect. In contrast, studies without conflicts of interest display a broader range of outcomes, including both positive and larger negative effects.

Figure 12.3. Effect Size by Conflict of Interest by Security Levels (0 to 4).

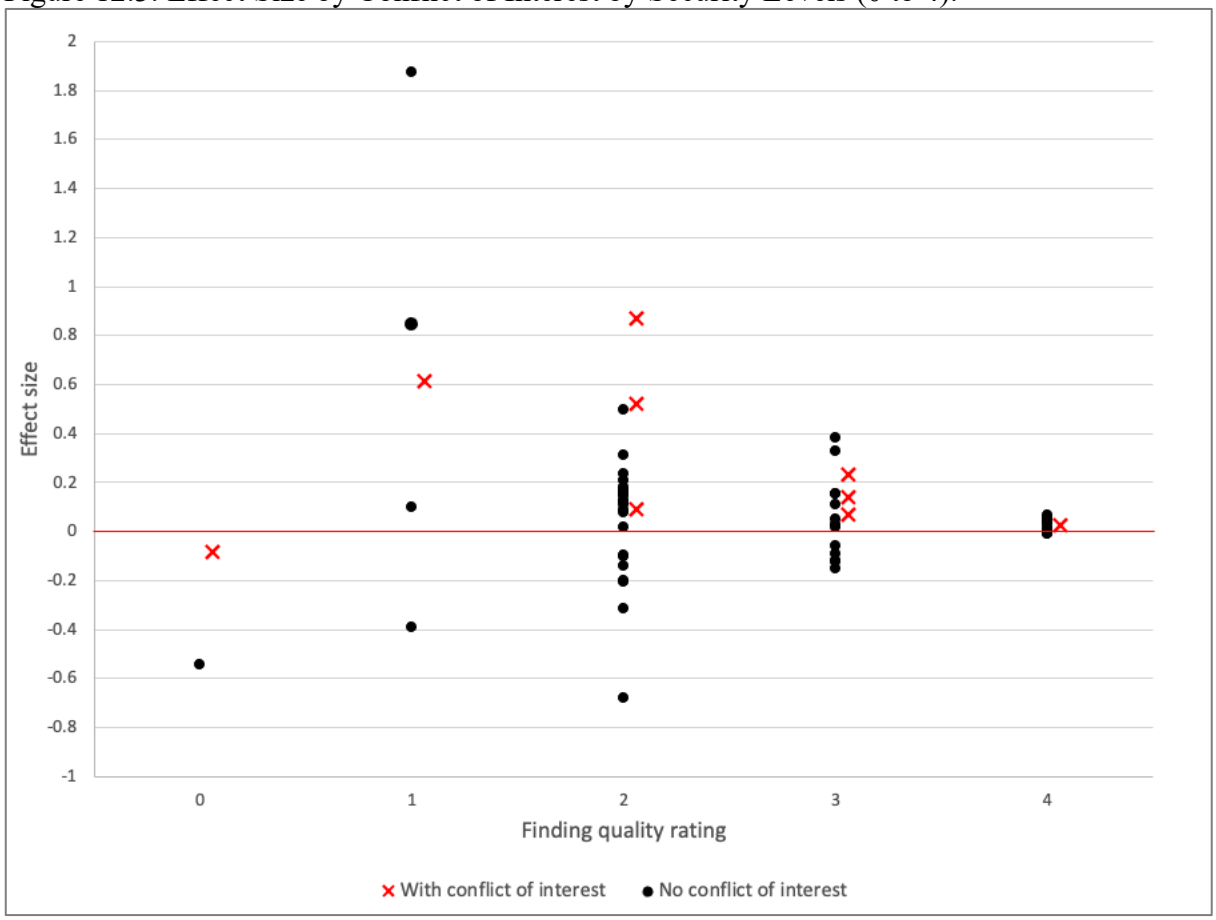
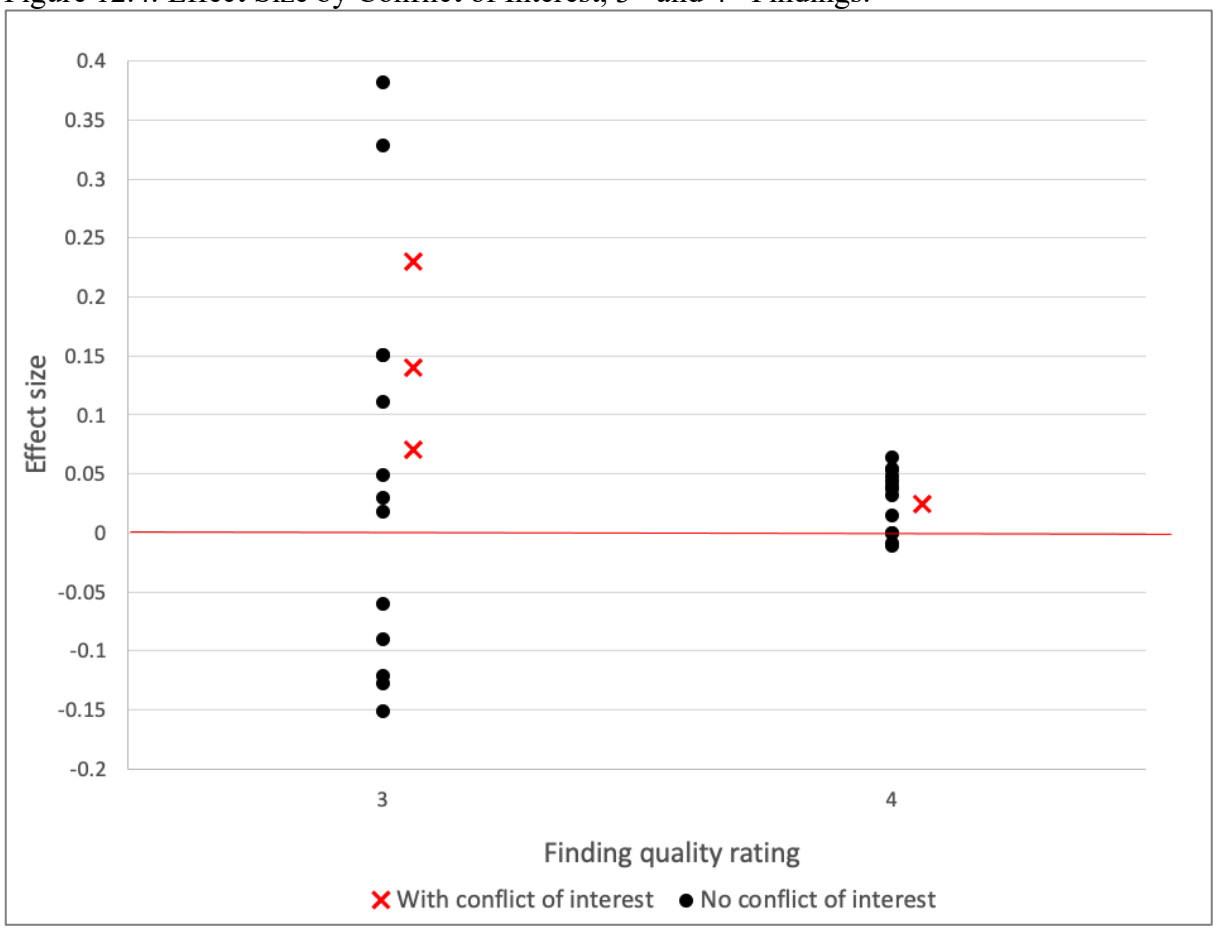


Figure 12.4 focuses specifically on 3* and 4* studies. Although the four outcomes in studies with conflicts of interest all report positive effects, the effect sizes are not larger than those from studies conducted by authors without such conflicts.

Figure 12.4. Effect Size by Conflict of Interest, 3* and 4* Findings.



Given that 3* and 4* studies authored by individuals with conflicts of interest do not show disproportionately larger effects, the review finds limited evidence suggesting that studies with conflicts of interest exaggerate the results. However, it is noteworthy that most studies involving conflicts of interest report positive outcomes. This raises the possibility that studies yielding negative results may not be published due to potential conflicts of interest. This suspicion is further supported by the fact that the three studies excluded from our analysis because they failed to report results for the entire randomised group and did not provide sufficient information to calculate results for the entire sample, were authored by individuals with conflicts of interest (Paunesku et al., 2015; Yeager et al., 2016, 2019). Although these papers explicitly focused on assessing the impact on specific groups (such as at-risk students or low achievers), it is surprising that they did not report results for the entire randomised group alongside the outcomes for their targeted group of interest.

Conflict-of-interest bias could affect the findings of any meta-analysis due to the aggregation of effect sizes. Conversely, the absence of certain negative results does not substantially alter the overall conclusion because this analysis displays each effect size independently. This can explain why the conflict of interest was so concerning in Macnamara and Burgoyne's (2022) meta-analysis. They reveal a lower average effect size for published studies lacking financial incentives, in contrast to a notably higher effect size for studies with financial incentives. This disparity is primarily driven by the scarcity of negative results within studies with financial incentives.

12.8. Summary and Conclusion

This section assesses whether there is a causal relationship between students having a growth mindset and improvements in their academic performance. This inquiry builds on the first stage of this research, where secondary data analysis revealed that a considerably higher proportion of disadvantaged students in the Succeeded Against the Odds group had a growth mindset compared to those not in this group. As a result, the second stage of this study explores whether the observed relationship between a growth mindset and belonging to the Succeeded Against the Odds group was indeed causal.

The review reveals numerous experiments that have tested the effectiveness of growth mindset interventions in enhancing academic achievement. While some of these studies had relevant limitations that call their findings into question, many randomised controlled trials (RCTs) yielded robust results due to their rigorous research designs, independent evaluations, substantial sample sizes, minimal data gaps, and high data quality.

Moreover, the analysis highlights that the 'sieve' analysis, as proposed by Gorard (2021) for evaluating evidence, is a valuable and effective tool for assessing the trustworthiness of research. Studies that scored more favourably on this framework tend to demonstrate coherence and consistency in findings, which form the basis of a rigorous synthesis.

Given the large number of RCTs on this topic and the availability of high-quality evidence, the most reasonable approach to answering the research question is to focus on the most robust studies.

Among the outcomes rated 3* and 4*, the effect sizes ranged from -0.15 to +0.38. Notably, the two highest effect sizes, above 0.3, were derived from a single laboratory-based experiment. Recognising the stark differences between such controlled conditions and real-world educational environments, it is reasonable to exclude these outcomes when reviewing pragmatic trials. This exclusion would result in a more constrained range of effect sizes, between -0.15 and +0.23. When greater emphasis is placed on the 4* studies, which are methodologically the most reliable, the range of effect sizes narrows further, from -0.01 to 0.064.

An analysis of a possible bias due to conflict of interest was conducted; seven studies had at least one author directly involved in organisations selling mindset-related products. Most studies with conflicts of interest reported positive effect sizes. In contrast, studies without conflicts of interest showed a range of impacts, including both positive and negative results. The fact that studies with conflicts of interest mainly report positive effect sizes suggests that some negative results might be unpublished, probably due to these conflicts of interest. However, the effect sizes reported by studies with conflicts of interest do not differ from those reported by studies without such conflicts. Because each effect size is displayed independently in this analysis, the absence of certain negative results does not substantially alter the overall conclusion. However, conflict-of-interest bias could affect findings in a meta-analysis due to the aggregation of effect sizes.

Considering the narrow range of effect sizes found by the most reliable studies, it can be cautiously inferred that implementing a growth mindset intervention might produce only a very modest impact on students' academic performance under the most favourable circumstances, potentially achieving a Cohen's d effect size of 0.05. However, given the null impact observed in two of the four most rigorous studies (Foliano et al., 2019; Ganimian, 2020), it is not recommended to allocate substantial resources for implementing public policies aimed at improving academic outcomes by investing resources in growth mindset programmes.

This structured literature review found insufficient evidence to establish a causal relationship between growth mindset interventions and improvements in academic achievement. Thus, when revisiting the original research question—"*What characteristics or circumstances enable some students from disadvantaged backgrounds to succeed against the odds?*"— The finding suggests that while there is a strong correlation between students who succeed against the odds and having a growth mindset, this correlation does not indicate a causal relationship. Therefore, it is not a growth mindset that is helping disadvantaged students succeed against the odds.

In light of this, the third section of this thesis explores whether the type of school these students attend contributes to their success against the odds. This variable also emerged as highly relevant in the secondary data analysis conducted in the first stage of this research.

Chapter 13 Impact of Bicentennial Schools

The secondary data analysis in the first section of this thesis revealed a strong correlation between students' attending a group of selective schools called Bicentennial Schools and their likelihood of being classified in the Success Against the Odds (SAO) group. This group comprises disadvantaged students who began their education with low achievement levels but demonstrated significant academic progress over time. Students from disadvantaged families who attended Bicentennial High Schools were found to be 450% more likely to belong to the SAO group, 70% more likely to enter higher education, and 13% more likely to gain admission to a prestigious university. Therefore, an evaluation of the academic impact of Bicentennial Schools was undertaken to determine whether a causal relationship could be established and whether attendance at these schools might be a relevant factor in the academic success of these students.

This section presents the findings from evaluating the impact of Bicentennial Schools on student achievement. It isolates the effect of student selection from the schools' intrinsic impact by comparing the outcomes of the first three cohorts, which underwent an extensive selection process, with those of the final cohort, where new regulations restricted student selection. The details of the methodology are described in Chapter 9.

13.1. Characteristics of Students Attending Bicentennial Schools

The following section compares Bicentennial School students and those enrolled in other institutions nationwide, categorised by cohort. Notably, the final cohort of Bicentennial School students differs significantly from the first three cohorts, as these students enrolled under conditions where the schools’ ability to select applicants was substantially restricted by the Government policy implemented in stages to stop student selection.

Socioeconomic situation

Three variables were considered to assess students' vulnerability: the percentage of students whose mothers did not complete secondary education, the percentage of students whose families report a monthly income of 200,000 Chilean pesos or less, approximately equivalent to 210 USD or 160 GBP, and the percentage of students who have held Prioritario Status for 11 or more years.

The Ministry of Education assigns Prioritario Status, a binary indicator based on family income or related precarious socioeconomic conditions, to identify low-income students and determine which students qualify for additional subsidies (Honey & Carrasco, 2022). This measure is comparable to the Free and Reduced-Price Lunch programme in the US or Free School Meals in the UK. Students with Prioritario Status for 11 or more years were included, reflecting students who experienced prolonged economic vulnerability throughout their school and pre-school education.

Tables 13.1 through 13.3 indicate that Bicentennial Schools have a lower proportion of students whose mothers did not complete secondary education, students with Prioritario Status for 11 or more years, and students from families reporting a monthly income of 200,000 Chilean pesos or less.

Table 13.1. Percentage of Students with Mothers without Completed Compulsory Education

	Bicentennial Schools	Rest of schools	Odds ratio
Cohort 2016	20	25	0.77
Cohort 2017	19	24	0.77
Cohort 2018	17	23	0.73
Cohort 2022	10	15	0.69

Table 13.2. Percentage of Students with Prioritario Status for 11 or More Years

	Bicentennial Schools	Rest of schools	Odds ratio
Cohort 2016	20	24	0.85
Cohort 2017	22	27	0.80
Cohort 2018	25	30	0.84
Cohort 2022	23	26	0.88

Table 13.3. Percentage of Students with Family Income of 200,000 Chilean Pesos or Less

	Bicentennial Schools	Rest of schools	Odds ratio
Cohort 2016	9	12	0.73
Cohort 2017	7	9	0.72
Cohort 2018	7	10	0.73
Cohort 2022	3	5	0.66

Gender

A gender disparity exists among students. In Bicentennial Schools, the percentage of female students is notably lower compared to other schools. However, this gap has narrowed in the 2022 cohort (see Table 13.4).

Table 13.4. Percentage of Female Students

	Bicentennial Schools	Rest of schools	Odds ratio
Cohort 2016	43	50	0.87
Cohort 2017	43	49	0.87
Cohort 2018	43	49	0.88
Cohort 2022	44	47	0.93

Academic outcomes

Tables 13.5 and 13.6 show that students in Bicentennial Schools achieve higher scores at age 16 compared to their peers, with differences of approximately 0.5 standard deviations in language and 0.6 standard deviations in mathematics for the 2016, 2017, and 2018 cohorts. This disparity is expected, as these schools selected students based on academic criteria and therefore have fewer vulnerable students. Moreover, the more pronounced difference in mathematics may be attributed to a higher percentage of male students. Notably, these differences diminish in the 2022 cohort—the group that entered the schools after student selection processes were reduced, declining to approximately half of their previous levels.

Table 13.5. Mean Language Scores at 16 Years Old

	Bicentennial Schools	Rest of schools	Standard deviation	'Effect' size
Cohort 2016	276	247	50.89	0.59
Cohort 2017	278	251	49.89	0.55
Cohort 2018	270	248	48.19	0.46
Cohort 2022	257	241	52.65	0.29

Table 13.6. Mean Math Scores at 16 Years Old

	Bicentennial Schools	Rest of schools	Standard deviation	Effect size
Cohort 2016	301	262	62.47	0.62
Cohort 2017	299	263	61.08	0.59
Cohort 2018	296	259	61.71	0.59
Cohort 2022	265	247	57.86	0.32

It is worth highlighting that students from Bicentennial Schools already demonstrated higher scores than their peers nationwide in Year 4 before transitioning to the Bicentennial Schools. For the 2016, 2017, and 2018 cohorts, this difference was approximately 0.4 standard deviations. Although a performance gap remains for the 2022 cohort, it is notably smaller. This information is illustrated in Tables 13.7 and 13.8.

Table 13.7. Mean Language Scores at 10-years-old

	Bicentennial Schools	Rest of schools	Standard deviation	Effect size
Cohort 2016	293	272	49.05	0.42
Cohort 2017	288	270	48.23	0.38
Cohort 2018	290	269	49.58	0.42
Cohort 2022	280	267	50.44	0.27

Table 13.8. Mean Math Scores at 10-years-old

	Bicentennial Schools	Rest of schools	Standard deviation	Effect size
Cohort 2016	276	255	51.09	0.42
Cohort 2017	279	259	49.21	0.41
Cohort 2018	282	262	48.16	0.42
Cohort 2022	273	261	46.98	0.26

13.2. Results from the Regression Models.

Two linear regression models were estimated for each of the four cohorts analysed: one with the language score at age 16 as the dependent variable and the other with the mathematics score for the same year. These models quantify the proportion of variance in student scores attributable to attending Bicentennial Schools. Predictor variables were entered into the models in eight sequential blocks, following the methodological framework of Gorard et al. (2012) and Siddiqui et al. (2023).

Table 13.9 shows the number of students included in the analysis for each cohort. The proportion of students who attended Bicentennial Schools in each cohort is relatively constant, representing approximately 5% of the national student population in Year 10.

Table 13.9. Students Included in the Analysis

	Cohort 2016	Cohort 2017	Cohort 2018	Cohort 2022
Students included	97,180	94,123	98,409	93,722
Students in Bicentennial Schools	5,058	4,976	5,288	4,359

Increase in R-squared

Table 13.10 displays the R-squared values for each stage of the regression analysis. As expected, the R-squared value increases with each subsequent stage, reflecting the incorporation of additional information and variables into the model. This indicates that the proportion of variability in the 16-year-old scores explained by the model grows as more data is included. A critical focus of the analysis is the increase in the R-squared value observed in Stage 9, which occurs when information about students attending a Bicentennial school is included in the model.

Table 13.11 presents the average increase in R-squared at each analysis stage. For the first three cohorts examined, attending a Bicentennial School in year 10 accounts for an average of 0.5% to 0.9% of the variability in language test scores. In contrast, the average for the 2022 cohort drops considerably to just 0.1%, indicating that attendance at a Bicentennial School has minimal impact on students' language scores at age 16. Regarding mathematics scores, attendance at a Bicentennial school explains between 1.5% and 2.3% of the variability in scores for the first three cohorts. In contrast, this figure decreases to only 0.3% for students in the 2022 cohort.

Table 13.10. Average R-squared at Each Stage

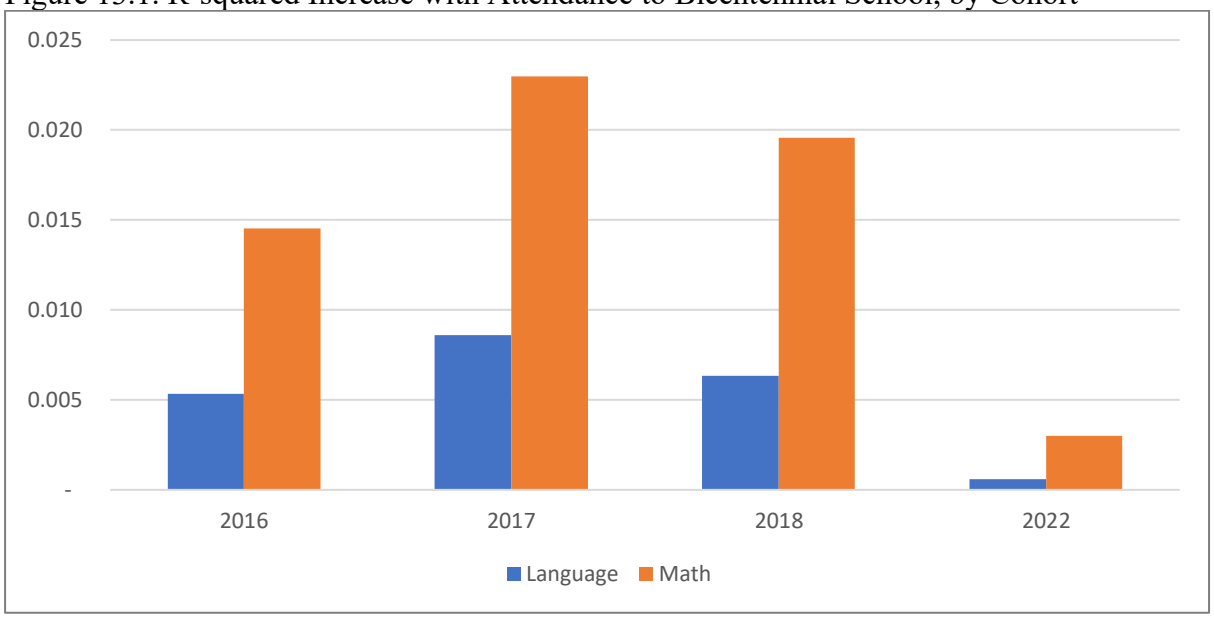
Dependant variable:		Language				Math			
Cohort:		2016	2017	2018	2022	2016	2017	2018	2022
1	Born characteristics	0.049	0.053	0.048	0.047	0.040	0.040	0.037	0.023
2	SES	0.090	0.088	0.084	0.094	0.108	0.106	0.096	0.082
3	Type of school 10 years old	0.091	0.089	0.086	0.095	0.109	0.111	0.100	0.085
4	Score at 10	0.329	0.341	0.326	0.389	0.386	0.404	0.391	0.358
5	Score at 12 (14 for cohort 2016)	0.479	0.426	0.405	0.477	0.558	0.494	0.493	0.461
6	Type of school 14 years old	0.480	0.430	0.406	0.479	0.559	0.496	0.499	0.464
8	Type of school at 16	0.484	0.435	0.409	0.481	0.561	0.500	0.500	0.465
9	Bicentennial School at year 10	0.489	0.443	0.415	0.481	0.576	0.523	0.520	0.468

Table 13.11. Average Increase in R-squared at Each Stage.

Dependent variable:		Language				Math			
Cohort:		2016	2017	2018	2022	2016	2017	2018	2022
1	Born characteristics	-	-	-	-	-	-	-	-
2	SES	0.040	0.034	0.036	0.047	0.067	0.066	0.059	0.059
3	Type of school 10 years old	0.002	0.001	0.002	0.001	0.002	0.006	0.004	0.003
4	Score at 10	0.238	0.252	0.240	0.294	0.276	0.292	0.291	0.273
5	Score at 12 (14 for cohort 2016)	0.150	0.085	0.079	0.087	0.173	0.090	0.102	0.103
6	Type of school 14 years old	0.001	0.004	0.001	0.002	0.001	0.003	0.005	0.003
8	Type of school at 16	0.004	0.004	0.003	0.002	0.002	0.004	0.001	0.002
9	Bicentennial School at year 10	0.005	0.009	0.006	0.001	0.015	0.023	0.020	0.003

Figure 13.1 provides a graphical representation of the change in the increase of R-squared value for each cohort when information about attending a Bicentennial School is included in the models.

Figure 13.1. R-squared Increase with Attendance to Bicentennial School, by Cohort



The values in Table 13.11 represent averages from regressions conducted using 17 different comparison groups, as outlined in Chapter 9. Since students attending Bicentennial Schools constitute a minority, the effect of attending these selective schools could be diluted in the analysis. To address this, the comparison group was divided into 17 random subgroups, following the methodology of White and Selwyn (2013). Notably, the variability among these regressions does not affect the overall conclusions. Appendix 2 presents the R-squared values for each stage of the regression analysis for the 17 regressions.

For the language test, the increase in R-squared associated with attending a Bicentennial School in the 2016 cohort ranges from 0.004 to 0.007; in 2017, from 0.006 to 0.009; in 2018, from 0.005 to 0.008; and in 2022, it drops considerably to a range of 0.000 to 0.001. These results indicate that the R-squared increases for the three cohorts with student selection are higher, whereas the 2022 cohort, without selection, shows a nearly negligible increase.

The mathematics model reveals a similar trend. For the 2016 cohort, the R-squared increase ranges from 0.013 to 0.016; for 2017, from 0.020 to 0.025; for 2018, from 0.017 to 0.022; and for 2022, it declines sharply to a range of 0.002 to 0.005.

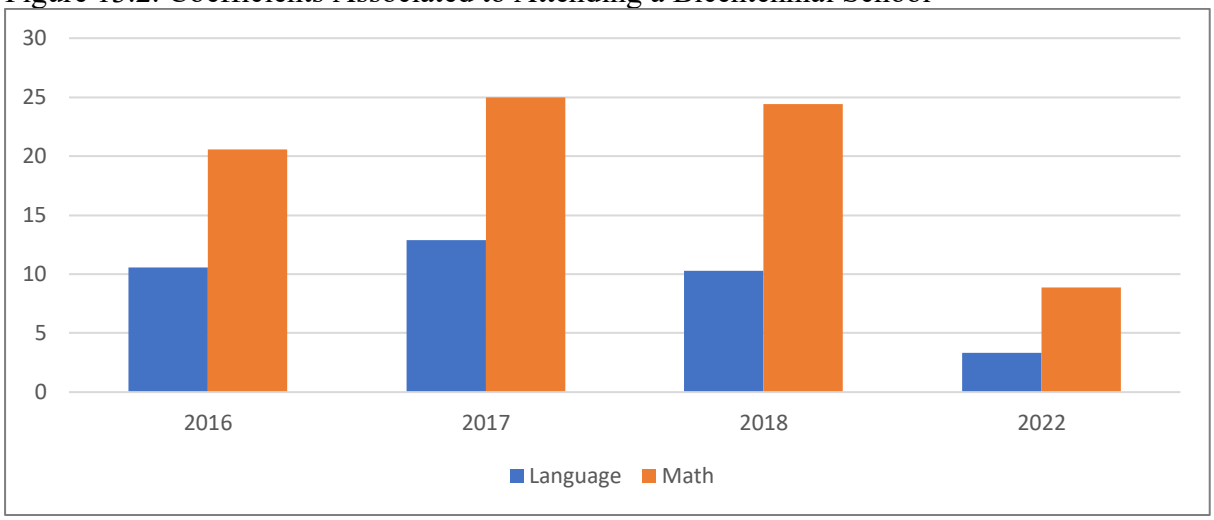
Regression coefficients

Another way to assess the impact of attending a Bicentennial School is by examining the coefficient associated with attending a Bicentennial School. Table 13.12 and Figure 13.2 show that for the language model, the variable's coefficient that indicates if the students attended a Bicentennial School ranges from 10 to 12 for the 2016 to 2018 cohorts but drops abruptly to 3 for the 2022 cohort. A similar trend is observed in the mathematics model, where the coefficient associated with attending a Bicentennial School exceeds 20 for the first three cohorts yet declines sharply to 9 in 2022.

Table 13.12. Coefficients Associated with Attending a Bicentennial School

	Language				Math			
	2016	2017	2018	2022	2016	2017	2018	2022
Bicentennial school at 16	10.6	12.9	10.3	3.3	20.6	25.0	24.4	8.9

Figure 13.2. Coefficients Associated to Attending a Bicentennial School



The coefficient values presented in Table 13.12 are averages derived from 17 regressions (explained in the method in Chapter 9) with consistent patterns across each regression and no significant deviations.

For the language test, the coefficient associated with attending a Bicentennial School in the 2016 cohort ranges from 9 to 12; for the 2017 cohort, from 11 to 15; for the 2018 cohort, from 9 to 12; and for the 2022 cohort, this range drops dramatically to between 1 and 5. A similar pattern is observed in the mathematics test. In the 2016 cohort, the coefficient ranges from 20 to 22; for the 2017 cohort, from 24 to 26; for the 2018 cohort, from 22 to 26; and for the 2022 cohort, the range falls notably between 8 and 12. Appendix 3 presents the detailed coefficients for all the variables and the 17 regressions.

13.3. Examination of cases excluded from the analysis due to missing data

As explained in Chapter 9, cases with missing data were addressed by excluding students for whom no information on academic performance was available. This section presents an analysis of the number of cases excluded and compares the characteristics of excluded students with those included in the analysis, in order to assess the potential biases that such exclusions may introduce into the results.

As shown in Table 13.13, the proportion of excluded students is approximately 40% of the cohort, with an increase observed in 2022. This is a considerable amount of missing data. The later rise may be attributable to a decline in attendance following the period of school closures during the COVID-19 pandemic.

Table 13.13. Number of students excluded from the analysis by cohort

	Cohort 2016		Cohort 2017		Cohort 2018		Cohort 2022	
	Students	%	Students	%	Students	%	Students	%
Included Students	97,180	60%	94,123	60%	98,409	61%	93,722	52%
Excluded Students	64,767	40%	63,753	40%	61,724	39%	86,206	48%
Total	161,947		157,876		160,133		179,928	

Table 13.14 demonstrates that, across all four cohorts analysed, students excluded from the analysis have, on average, a lower family income than those included. A similar pattern is observed for initial academic performance (i.e., in Year 4), with excluded students achieving, on average, lower scores in both language and mathematics assessments compared to their included peers (see Tables 13.15 and 13.16).

Table 13.14. Average Income for excluded and included students

	Cohort 2016	Cohort 2017	Cohort 2018	Cohort 2022
Included Students	618	683	652	796
Excluded Students	471	542	503	738

Table 13.15. Average Reading Scores in Year 4 for excluded and included students

	Cohort 2016	Cohort 2017	Cohort 2018	Cohort 2022
Included Students	280	275	276	271
Excluded Students	267	265	263	268

Table 13.16. Average Math Scores in Year 4 for excluded and included students

	Cohort 2016	Cohort 2017	Cohort 2018	Cohort 2022
Included Students	263	267	269	266
Excluded Students	249	254	255	263

This demonstrates that students excluded due to missing SIMCE scores are not randomly distributed; instead, they tend to be more socioeconomically disadvantaged and to have lower initial academic performance. This is an important consideration when interpreting the results. It may make Success again the Odds appear more common than it actually is, or the analysis might be missing an unknown number of potential SAO cases.

13.4. Summary and Conclusion

In the first phase of this thesis, the secondary data analysis not only revealed a strong correlation between being a Success Against the Odds (SAO) student and having a growth mindset, but it also demonstrated that belonging to the SAO group was strongly correlated with attending a group of selective secondary school, called Bicentennial School. Students from disadvantaged backgrounds who attended Bicentennial Schools were 450% more likely to be part of the SAO group than those who did not attend such schools.

Through a structured literature review, the second section of this thesis concluded that having a growth mindset was unlikely to be a leading cause of disadvantaged students succeeding against the odds. Therefore, in this third section, the academic impact of Bicentennial Schools was analysed to assess whether attending these selective schools could explain the success of the SAO group.

A secondary data analysis was conducted to evaluate the academic impact of Bicentennial Schools. One of the main challenges in evaluating schools that select students based on academic performance is isolating the effect of student selection from the schools' intrinsic impact. To address this, the impact of attending a Bicentennial School across four cohorts was compared. In the first three cohorts (2016, 2017, and 2018), the schools were allowed to select their students, whereas in the fourth cohort (2022), student selection was restricted due to new regulations.

The analysis showed that for the 2016, 2017, and 2018 cohorts, where Bicentennial Schools implemented selection processes, students from these schools performed better than their counterparts in non-selective schools nationwide. The data revealed that attending a

Bicentennial School explained between 0.5% and 0.9% of the variance in language test results at age 16, even after controlling for socioeconomic variables and prior academic performance. However, in the 2022 cohort, where student selection was notably reduced, attending a Bicentennial School accounted for only 0.1% of the variance in language test scores. A similar trend was observed in mathematics: attending a Bicentennial School explained between 1.5% and 2.3% of the variance for the 2016 to 2018 cohorts, but for the 2022 cohort, this dropped to just 0.3%.

Based on these results, it can be concluded that Bicentennial Schools' perceived impact is more likely due to their selective admissions policies than the provision of better education. As such, it is improbable that attending a Bicentennial School directly improves the academic outcomes of students in the SAO group. Instead, these schools appear to admit such students disproportionately, which could explain why disadvantaged students who attended Bicentennial Schools were 450% more likely to belong to the SAO group.

These findings are consistent with those of other authors on selective US, UK, and Chinese schools. Studies employing the most robust research designs, better equipped to account for the selective admission of academically talented students, suggest that selective schools do not provide a substantially higher quality of education. Instead, their seemingly superior outcomes can be attributed to the admission of more talented students (Abdulkadiroglu et al., 2014; Allensworth et al., 2017; Bui et al., 2011; Clark, 2010; Barrow et al., 2020; Capsada-Munsech & Boliver, 2023; Dobbie & Fryer, 2011; Gorard & Siddiqui, 2018; Wu et al., 2019; Zhang, 2014). In contrast, this pattern does not hold in some developing countries, such as Trinidad and Tobago, Tunisia, and Romania, where studies have identified a positive impact of selective schools on educational outcomes (Jackson, 2010; Zaiem, 2014; Pop-Eleches & Urquiola, 2013).

Given these results, it is necessary to revisit the original research question, which remains unanswered: What characteristics or circumstances enable some disadvantaged students to succeed academically against the odds? Although school type and student mindset have been ruled out as the main factors, it remains unclear which elements contribute to students' success in the SAO group.

Chapter 14 Findings from Disadvantaged Students Interviews

This thesis addresses the question:

> Which skills, supports, and circumstances enable students from disadvantaged backgrounds, who initially struggled academically, to make significant improvements during their school years and succeed against the odds?

In the first stage of the thesis, a secondary analysis of longitudinal data was conducted to identify students who succeeded against the odds and to examine their characteristics and circumstances. Two key factors stood out among this group of students. First, a very high proportion of them exhibited a growth mindset, compared to a similar group of students from comparable socio-economic backgrounds who did not succeed academically. Secondly, it was found that students attending a group of selective schools, called Bicentennial Schools, had an important higher likelihood of succeeding against the odds.

In stages two and three of the thesis, the potential causal relationship between these conditions - having a growth mindset and attending a Bicentennial School - was assessed to determine if they contributed to the students' success. As no evidence was found to establish causality, the fourth stage involved conducting exploratory interviews to uncover potentially relevant factors in the students' lives that could explain how they overcame their initial academic struggles and succeeded against the odds. These factors, circumstances, or characteristics are not detectable through database analysis, as they represent unique events or influences in each child's life, with varying impacts across individuals.

Chapter 10 describes the methodology used for the interviews, while this chapter presents the findings and results.

A total of 36 interviews were conducted with students from three different schools, all in their penultimate year of compulsory education, aged between 16 and 18. One-third of the participants were female, while two-thirds were male. The gender imbalance in the sample can be explained mainly because two of the three schools offered technical specialisations, such as Industrial Mechanics, Metal Construction, and Electrical Engineering, that have traditionally

attracted a predominantly male student population. As a result, this gendered trend in the interviews is reflected in the schools' gender composition.

14.1. Interviews by Achievement Group

As explained in Chapter 10, all interviewed students came from socioeconomically disadvantaged backgrounds. For the analysis, they were classified into three groups based on their patterns of academic achievement:

1. Success Against the Odds (SAO): Students whose academic performance has substantially improved during their schooling, as detailed in Chapter 7. Their progress was considered unexpected, as they ranked in the top 20% when comparing their predicted performance at age 16 (based on their 10-year-old scores) with their actual outcomes.
2. Consistently High Academic Achievers (CHAA): Students who have consistently been among the top performers in their class or ranked in the top 20% on standardised tests.
3. Comparison Group: This group includes students with three distinct patterns of achievement:
    a. Consistently Underperforming: Students consistently ranked in the bottom 30% of their class or on standardised tests.
    b. Consistently Average: Students who have performed at an average level (above the bottom 30% but below the top 20%) throughout their schooling.
    c. Considerable Decline in Achievement: Students whose academic performance has significantly declined over time, from high achievement to underperformance or from a regular-to-high level to underperformance.

As discussed in Chapter 10, Group 1 of the SAO students are individuals from socioeconomically disadvantaged families who began their schooling with low academic achievement but demonstrated significant improvement over time. This aligns with the Success Against the Odds definition used in Stage 1 of this thesis, a longitudinal secondary data analysis that identifies and characterises such students. However, the literature also recognises a second group—students who, despite similar socioeconomic challenges, have consistently been top performers—as another form of success against the odds. These two groups are analysed

separately in this interview stage, enabling a nuanced exploration of the commonalities and differences among students with diverse achievement trajectories.

It is important to acknowledge that the proportion of students in each group is not representative of the wider disadvantaged student population or the demographic composition of the three schools where the interviews were conducted. This is due to a non-random selection process, as schools were instructed to prioritise students fitting the "Success Against the Odds" profile. Furthermore, there is evidence of selection bias in the interview samples, as schools tended to nominate higher-achieving students from disadvantaged backgrounds, contingent upon obtaining parental consent for participation.

As shown in Table 14.1, one-third of the interviewed students belong to Group 1, the Success Against the Odds (SAO) category (N = 12). Nearly one-fifth are part of Group 2, the Consistently High Academic Achievers (CHAA) category (N = 7). The remaining students, comprising almost half of the interview sample (N = 17), belong to the Comparison Group. Within this group, three students have consistently demonstrated low academic performance, eight have maintained an average performance, and six have experienced a decline in academic performance over the years.

Table 14.1. Number of Interviews by Achievement Group

Group	Students
Success Against the Odds (SAO)	12
Consistently High Academic Achievers (CHAA)	7
Comparison Group	17
Total	**36**

14.2. Finding by Thematic Categories

The following sections present the findings for the seven themes of analysis described in Chapter 10. These themes focused on the topics most frequently referred to by the students.

First, the results will outline the students' reflections on individuals they perceive as having significantly impacted their educational journey and academic achievement. Second, the analysis will focus on the important life circumstances students identify as having influenced

their school experience. Third, the interventions implemented by the school to help students address academic difficulties will be discussed. Fourth, the personal characteristics that students recognise in themselves, which they believe have influenced their academic performance, will be explored. Fifth, the analysis will present data on the number of schools students have attended throughout their education. Next, the students' personal views and feelings about school and study will be examined. Finally, the results will highlight the students' affinity towards specific academic subjects.

To illustrate the students' responses on the various themes, quotations from the interviews are included to exemplify the different topics and the varying emphases. These quotations are translations of the original responses, as the interviews were conducted in Spanish, the students' native language, as previously mentioned.

a. Influential Individuals

This theme in the interviews refers to people the student perceives as having a significant impact on their educational journey and academic achievement. These may include family members, teachers, peers, or other figures who have been pivotal in shaping the student's approach to learning and school performance.

In most interviews (32 out of 36), students spontaneously mentioned influential and significant individuals during the initial stage in response to introductory questions intended to encourage open narratives on topics of their choosing. Only in four cases was it necessary to ask directly about influential people in their lives during the second part of the interview.

The mother was the most frequently cited influential figure among the total number of students interviewed. In most instances, the mother was identified as the sole source of influence, although in a minority of cases, mothers were mentioned alongside another individual. However, the group of students characterised as Consistently High Academic Achievers (CHAA) referenced their mothers as the most influential figure far more frequently, with five out of seven students highlighting their mothers. In contrast, the Success Against the Odds (SAO) group mentioned their mothers much less often, with only four out of twelve students citing them. Among the comparison group, mothers were identified as influential in half of the cases (see Table 14.2)

Table 14.2. Mentions of Mother as the Most Influential Figure

	Mentions mother	Does not mention mother	Total	Percentage
Success Against the Odds (SAO)	4	8	12	33
Consistently High Academic Achievers (CHAA)	5	2	7	71
Comparison Group	9	8	17	53

Table 14.3 shows that when the comparison group is broken down into the three achievement levels described earlier, the only group displaying similar behaviour to the SAO group is the one where students consistently perform at an average level. However, caution should be exercised when interpreting these results, as the total number of interviews in some groups is too small to draw strong conclusions.

Table 14.3. Mentions of Mother as the Most Influential Figure by Achievement Group

		Yes	No	Total	Percentage
Success Against the Odds (SAO)		4	8	12	33
Consistently High Academic Achievers (CHAA)		5	2	7	71
Comparison Group	Consistently Underperformed	2	1	3	67
	Consistently at an Average Level	3	5	8	38
	Considerably Declined Achievement	4	2	6	67
Total		**18**	**18**	**36**	**50**

Additionally, students in the SAO group identified a notably broader range of influential figures than those in the comparison or CHAA groups. Among the SAO students, a diverse array of figures was mentioned, including siblings, friends, teachers, stepmothers, grandparents, fathers, and boyfriends. In contrast, students in the CHAA group, besides mothers, identified only siblings and parents as influential, while those in the comparison group referenced siblings, fathers, friends, or grandparents. This distinction is further illustrated in Table 14.4.

The SAO group demonstrated a considerably higher number of individuals mentioned as influential figures other than mothers. Specifically, SAO students made 10 such references across 12 interviews, whereas students in the CHAA group made only two references across seven interviews, and the comparison group made seven references across 17 interviews. This comparison is also summarised in the final row of Table 14.4.

Table 14.4. Mentions of Other Significant Individuals

Influential Individual	SAO Students	Consistently High Achievers	Comparison Group
Sibling	2	1	2
Friends	2		3
Teacher	2		0
Grandparent	1		1
Stepmother	1		0
Father	1	1	1
Boyfriend	1		0
Total	**10**	**2**	**7**

Below are some of the students' reflections on the influence of these other figures:

> Since my stepmother started living with us, she started helping me a lot. She cares about my studies, and she can help me with my homework… she made sure I studied for my tests. Also, a maths teacher helped me a great deal. I was really struggling, and she helped me study, and I started getting better grades. — Success Against the Odds Student

> My boyfriend helps me with science and math. I find them very difficult, but he doesn't, so he has been helping me understand science for the past two years we have been together, and I am doing much better in my tests— Success Against the Odd Student.

The differences in accounts of influential figures between students in the SAO group, CHAA group, and students in the comparison group, particularly the diminished emphasis on mothers as primary influences and the broader range of figures mentioned, may partially explain the academic improvements observed among SAO students. While these students initially exhibit weak academic performance, they later demonstrate significant gains. It is reasonable to assume that the mother's influence remains relatively stable over time or even intensifies when students are younger. In contrast, other influential figures, such as teachers, stepparents, or partners, may emerge later in the student's educational journey, potentially contributing to positive shifts in academic outcomes. These later influences might have played a critical role in students' progress, supporting their positive shift in achievement. This aligns with the observation that students in the Consistently High Academic Achievers group most frequently identify their mothers as their primary source of influence, with few mentions of other individuals as significant. This pattern is consistent with the notion that maternal influence often emerges early in a child's educational journey and remains relatively constant over time.

Additionally, no students in the comparison or CHAA groups identified a teacher as an influential figure. In contrast, two students in the SAO group described a teacher as highly influential and relevant to their academic development. While this difference may seem minor at first glance, it is significant considering that the SAO group comprises only half the number of students in the combined comparison and CHAA groups. Proportionally, the frequency of teachers being mentioned in the SAO group is four times higher. This difference might also help explain why some students succeed against the odds while others do not. It may be that when a teacher takes a particular interest in a student and establishes a deep, enduring relationship, this relationship becomes a decisive factor in the significant academic improvements observed among SAO students.

It is important to emphasise that these findings regarding influential figures in students' lives do not constitute evidence of causality. Given the non-experimental design and the small sample sizes, these results should be interpreted as exploratory, providing hypotheses for future research that could examine the causal effects of these influential figures.

b. Key Life Circumstances

This section addresses significant personal or familial circumstances that students identify as impacting their school experiences and academic performance. These factors include events such as parental divorce, health issues, financial difficulties, or other life changes that have influenced their engagement with education.

In interviews, students primarily highlighted adverse circumstances rather than positive ones. The most mentioned themes include parental separation or divorce, relocating to a new city—sometimes linked to changes in family composition—and periods when they struggled in school due to conflicts with peers, including instances of bullying. Additionally, two students reported having problems with teachers who mistreated them.

Below are some examples:

> The move was tough. When we came here, it was hard… My mom and I rented a house by ourselves... We moved because Santiago became dangerous, and my mom wanted to live in a safer place... but here we did not know anyone, the school was different, everything was different. — Constantly High-Achieving Student.

> At the first school I went to, they always left me out. I was really lonely; I had a terrible time. I did not like going to school. Things got better when I changed schools, and now I do not feel like that anymore. — Constantly Regular Achiever Student.
>
> My parents separated when I was 13. That was really tough… we had to move to (name of a different city), I had to switch schools, and everything changed at home. Those were some complicated years. — SAO Student.

As shown in Table 14.5, there were no relevant differences in the type or frequency of challenging life circumstances reported by students in the Success Against the Odds (SAO) group, the Consistently High Academic Achievers (CHAA) group, or the comparison group. Consequently, it cannot be concluded that the SAO group experiences a greater or lesser degree of adverse circumstances that might influence their academic performance. Similarly, the CHAA group does not appear to encounter fewer adverse circumstances that could explain their sustained academic success.

Moreover, no differences were observed in how these circumstances were recounted, and there was no evidence to suggest that one group interpreted these experiences more positively or negatively than the others. Across all three groups, the most commonly reported challenging circumstances were relocating to a different city or experiencing changes in family composition, typically due to parental divorce or separation.

Less frequently, students described negative peer experiences at school, which were predominantly instances of bullying or social isolation. In two cases, students reported negative interactions with teachers. In one case, a teacher was described as mistreating a student, while in the other, a student believed the teacher disliked him personally.

Table 14.5. Key Life Circumstances Mentions

Key Life Circumstances	SAO Students (n=12)	CHAA Students (n=7)	Comparison Group (n=17)
Relocation to a Different City or Country	4	2	5
Significant Change in Family Composition	3	2	4
Negative Experiences with Peers at School	2	1	2
Negative Experiences with Teachers at School	1	0	1
Total	**10**	**5**	**12**

c. Educational Interventions

This category refers to any targeted support, programmes, or interventions schools implement to help students address academic difficulties. This category may include tutoring, special education services, counselling, or retention (repeating a grade).

With few exceptions, students did not mention specific interventions by their schools to support their academic improvement. This may be because the interventions implemented were not relevant or memorable to them, were not perceived as formal interventions, or simply because the schools did not implement targeted support for low-performing students. Whatever the reason, it is notable that, in the rare instances where students mentioned school actions that influenced their performance, grade retention was the most common intervention. Three cases of grade repetition were reported within the Success Against the Odds (SAO) group (representing 25% of the total SAO students interviewed). In each case, students indicated that the fear of having to repeat a year again motivated them to work harder in their studies.

One SAO student recounted how, as a young boy, he struggled to adapt to the school norms and rules, and how the fear of repeating a grade again pushed him to improve:

> When I was little, in first grade, I just could not get used to school. I would stay out in the playground when we were supposed to go back to class, I did not pay attention, I did not follow instructions, I did not know how to behave—it was really tough. They made me repeat the year because I did not know how to behave, and I had not even learned to read or write... I hated it, it was embarrassing being the oldest, so I started trying really hard to fit in better. I remember struggling a lot because I was so absent-minded. The whole time in primary school, I was terrified of repeating again, I was scared of getting a bad grade.

Another SAO student commented:

> Repeating third grade was traumatic. The school was super strict. After that, I worked really hard so I would not have to repeat again.

There were also two instances in the comparison group where students had repeated a grade. However, in both cases, the students explained that they had repeated due to illness, which had caused them to miss a great number of school days. Unlike the SAO students, they did not describe the same fear and embarrassment or report that the experience motivated them to work

harder. There was no grade retention in the Constantly High Academic Achievement (CHAA) group.

Lastly, only one other student mentioned a different type of intervention. This SAO student described receiving psychological support at school, which she credited with helping her improve her performance:

> I was not doing well because I could not concentrate in class—I was always thinking about other things because I had a lot of problems I could not stop worrying about. When I got to school X, there was a psychologist who would take me aside to talk, and she started helping me. She would take me out of class so I could talk to her about my problems, and that really helped me focus. I think that was really important for me to improve my grades.

These two types of interventions—whether through the fear instilled by the prospect of repeating a year or, in a more positive scenario, the psychological support provided by another student—may partially explain the improvement in student performance. However, for students who express panic and fear, these experiences could also have adverse effects on their mental health or enjoyment of learning, aspects that are beyond the scope of this study. Additionally, as previously discussed, this finding should be viewed as a tentative hypothesis; given the non-experimental design and small sample size, it is not intended to establish causal relationships.

d. Personal Characteristics

This theme refers to students' recognised characteristics or abilities that they believed had impacted their academic performance or overall school experience. These self-perceived traits might include resilience, intelligence, perseverance, adaptability, curiosity, or confidence, as well as challenges like anxiety, procrastination, or lack of motivation.

Most students found it difficult to spontaneously identify personal characteristics that had contributed to their academic success. However, one exception was a student from the Success Against the Odds (SAO) group, who shared:

> I motivate myself. I think my own enthusiasm and drive have helped me do good at school.

Another student from the Consistently High Academic Achievers (CHAA) group remarked:

> I have a strong personality, and I like doing difficult things my way. I am pretty stubborn with my ideas, and that has helped me a lot, though it has also gotten me into trouble sometimes.

When directly asked about personality traits that may have aided their academic performance, many students mentioned their intelligence or ability to adapt to new environments. Interestingly, all students who cited their intelligence were either from the SAO or CHAA groups.

Two students from the SAO group remarked:

> I am smart, I have always been, and that helps me a lot.

> I am good at adapting and getting along with everyone.

Similarly, a student from the CHAA group stated:

> I do well because I am smart.

Table 14.6 illustrates that both Success Against the Odds (SAO) students and Consistently High Academic Achievers (CHAA) students frequently describe themselves as “smart” or “intelligent”. A quarter of SAO students and over half of CHAA students identified with this characteristic. In contrast, no students in the comparison group described themselves as intelligent.

Additionally, one SAO student and two CHAA students characterised themselves as High Achievers, meaning they expressed a strong desire to rank among the top performers in their class or to focus significantly on excelling academically. Among students in the comparison group, the most notable characteristics were being friendly or having ease in forming relationships and making friends. Three of the 17 students in the comparison group identified with this trait, compared to only one in the SAO group and none in the CHAA group. Finally, adaptability was a self-identified characteristic found exclusively among students in the SAO and the comparison groups, with no CHAA students describing themselves this way.

Given the high proportion of students who describe themselves as intelligent within the two groups currently demonstrating strong academic performance—namely, the SAO group, whose performance has significantly improved, and the CHAA group, whose performance has consistently been high—this raises questions about the potential relationship between self-perceptions of intelligence and academic success. Specifically, it is unclear whether considering oneself intelligent contributes to achieving strong academic performance or whether it is a consequence of such performance. Furthermore, it is possible that these factors mutually reinforce one another. However, the data provided by the students does not allow for a definitive conclusion on this matter.

Table 14.6. Personal Characteristics

Personal Characteristics	SAO Students (n=12)	CHAA Students (n=7)	Comparison Group (n=17)
Smart	3	4	-
Friendly	1		3
Stubborn	-	1	-
Shy / introvert	1	-	1
High Achiever	1	2	-
Able to Self-Motivate	1	-	1
Adaptable	2	-	3
Total	**9**	7	**8**

e. School Mobilities and Transitions

The number of schools a student has attended throughout their education, whether due to relocation, family decisions, personal choice, or other external factors, might be expected to influence their academic performance. As shown in Table 14.7, the average number of schools attended by the entire group of interviewed students is approximately three (2.9 schools). This number is identical for both the Success Against the Odds (SAO) and the comparison groups. However, it is marginally lower for the Consistently High Academic Achievers (CHAA) group, with an average of 2.6 schools.

Table 14.7. School Transition.

	Average schools attended
Success Against the Odds (SAO)	2.9
Consistently High Academic Achievers (CHAA)	2.6
Comparison Group	2.9
Total	2.9

Table 14.8. Frequency on Numbers of Schools

Number of Schools	Students	Group
2	19	All groups
3	11	All groups
4	2	SAO and CHAA group
5	3	SAO and comparison group
9	1	Comparison group

An analysis of the frequency of school transitions reveals, as shown in Table 14.8, that most students (N=19) attended two schools - typically one primary and one secondary. Another significant group (N=11) attended three schools, with the majority of these cases involving attendance at two primary schools and one secondary school. Students from all achievement groups were represented among those who attended two or three schools.

Only two students attended four schools, one from the SAO group and one from the CHAA group. Additionally, three students attended five schools—one from the SAO group and two from the comparison group. Of these two comparison group students, one demonstrated declining academic performance, while the other exhibited consistently average performance. Finally, only one student attended as many as nine schools; this student belonged to the comparison group and demonstrated consistently average academic performance.

It is noteworthy that no student in the CHAA group attended more than four schools. This could suggest that maintaining consistently high academic achievement over time becomes increasingly challenging with more than four school transitions.

Apart from the expected transition from primary to secondary school, most school changes were attributed to family relocations. These were typically involuntary moves rather than

decisions made by the student or their parents to pursue different or better educational opportunities.

Most students described changing schools as a challenge, something they had to adapt to:

> The moves were tough because I am not really close to people... I had to switch schools because my family moved, I did not have a choice... but it took me a while to get used to a new school.
>
> When we moved from Santiago to here, it was really hard for me because it was a big change, especially because my dad was not with us any more… that it is why we move... and I struggle to adapt to new environments, at first I am pretty shy.

However, a minority of students felt that changing schools had been beneficial and opened new opportunities. As one student who had attended five schools explained:

> I feel like switching schools has helped me. My first school was bad, the teacher did not care if we learned. The other schools were better, I learned more, and I got to go on school trips. Now in high school, I have way more options, the teachers really care, and I can choose from lots of different specialisations.

Changing schools was identified as a challenge, so it is not possible to attribute this factor to success or failure. However, it appears that a large number of school changes—four or more—are uncommon among students who maintain consistently high academic performance over time. That said, a larger sample of Consistently High Academic Achievers would be required to draw this conclusion more definitively.

f. Attitudes Towards School and Learning.

This theme captures students' personal perspectives on school and study, encompassing their motivation, interest in learning, and overall attitude toward education. It reflects their sense of engagement with schoolwork and how they perceive their role within the academic environment.

Some students from the Success Against the Odds (SAO) group described a positive shift in their attitude towards their studies. For example, two students shared:

> I used to skip school a lot, and no one noticed. But as I got older, I realised that missing classes did not do me any good—it was only hurting me. So now, I always show up, I barely miss any days.
>
> I did not care much before, but now I do. Now I am more dedicated. I take it more seriously.

Although only three students mentioned a change in their attitude, all were from the SAO group, with no comparable reports from students in the comparison group or the Consistently High Academic Achievers (CHAA) group. The fact that three students from the SAO group reported positive changes in attitude suggests that this shift may have played a role in their improved academic performance. While this observation is intriguing, understanding the underlying reasons for this change is even more important—what motivated this shift in students' attitudes? Efforts to explore this question further during interviews were met with vague responses; the students acknowledged the change but could not provide specific explanations of the cause behind the change.

One possible reason is that these changes in attitude are simply part of a natural process of personal maturation. Another possibility is that external factors may have influenced this shift. For instance, influential figures in the students' lives or school interventions may have contributed to this change. However, when questioned directly, the students did not identify such factors.

One student, who shared that he used to skip school frequently but not anymore, mentioned that his older sister moved back home when he was around ten years old. He described her as a significant figure who has supported his academic development. However, when asked if she influenced his change in attitude, he responded that she had not, explaining that no one at home would have noticed if he skipped school since everyone left for work before he left and returned after he had come home. Another student, who indicated a newfound dedication to her studies, did not attribute the shift to influential people in her life. However, she explains that this shift occurred upon entering high school, though she did not credit any particular aspect of the school itself; instead, she saw it as a change that happened within her upon transitioning to a new environment. Finally, a third student who described a shift in attitude also did not link it to any external influences, nor did she attribute it to a change in school. Instead, she framed it as a change that developed in her own mindset.

Besides students talking about a shift in their attitude towards school, two students talked about setting personal goals. This sentiment appeared in both the SAO group and the CHAA group:

> I have set myself a goal to improve each year, so I can feel proud of myself and make my loved ones happy. - Success Against the Odds student.

> I used to study just to pass, but now in high school, I have set a goal, and I have achieved it. - Consistently High Academic Achiever.

In contrast, in the comparison group, two students expressed negative attitudes toward school. Of these two students, one has a consistently regular achievement, and the other has a consistently low achievement. There were no negative attitudes in the SAO or the CHAA groups' narratives. An example of a negative attitude is:

> At my school (primary), I did not try hard, mostly because of the pandemic… Even now, I barely make an effort. - *Consistently Regular student.*

g. Student Preferences and Affinities Towards Specific Subjects

This category explores students' preferences for particular subjects, assessing whether they find certain areas of study easier, more enjoyable, or, conversely, more challenging and less appealing. It highlights their academic strengths and areas of difficulty, as well as their personal interests in specific disciplines.

As shown in Table 14.9, there are minimal differences between the two groups regarding subject preferences. In the three groups, the Success Against the Odds (SAO), the Consistently High Academic Achievement (CHAA) and the comparison group, close to one-third of the students express a preference for scientific subjects such as mathematics and science, while another third favour humanities subjects, including language and history.

Similarly, regarding subjects perceived as least enjoyable or most challenging, between one-quarter and one-third of the students across all three groups identified mathematics or science as particularly difficult (see Table 14.10). However, only two students—one from the SAO group and one from the comparison group—reported language as the most challenging subject.

Notably, no students from the CHAA group identified language as their most challenging subject.

Some comments that illustrate these preferences include:

> I find math easier, but language and history harder. — Consistently High Academic Achiever student.
>
> History, civics, and language come easily to me. — Consistently Regular Academic Achiever student.
>
> I like Language and Physical Education, but math is difficult for me. — Success Against the Odds student.

Table 14.9. Preferred Subjects

	SAO Students (n=12)	Consistently High Achievers (n=7)	Comparison Group (n=17)
Language	3	1	3
History and Civics Ed.	1	1	2
Math	4	2	5
Science	1	1	0
Physical Education	2		2
Optional Subjects	1		3

Table 14.10. Most Difficult Subjects

	SAO Students (n=12)	Consistently High Achievers (n=7)	Comparison Group (n=17)
Language	1		1
Math	2	1	3
Science	2	1	1

This data suggests a relatively balanced distribution of preferences and difficulties across the three groups, with no pronounced differences in subject affinities.

14.3. Findings Organised by Relevant Factors Identified by Success Against the Odds Students

In the previous section, the findings were organised thematically, comparing disadvantaged students from the Success Against the Odds (SAO) group, the Consistently High Academic Achievement (CHAA) group, and the comparison group. This section narrows the focus to a detailed analysis of the 12 SAO students interviewed. The experiences the students narrated in the interviews are organised based on the factors they identify as contributing to their academic improvement. The goal is to explore the distinct aspects of their personal narratives and to propose hypotheses about the elements that may have enabled their success, despite facing disadvantaged family circumstances and their initially poor academic performance in their early school years.

Three of the 12 SAO students recognise a family member other than their mother as a key figure in their academic progress. Two highlight the influence of someone outside their family but within their social circle. Four students point to a specific school intervention as a pivotal factor in their performance, while three attribute their improvement to a personal shift in attitude. The following sections provide a detailed exploration of these four groups, alongside individual case descriptions.

The names used for the students are fictitious to safeguard their anonymity, and certain specific characteristics have been modified as they could potentially reveal their identities.

a. SAO students highlighting a family member's support

Three of the 12 SAO students' interviews emphasised the crucial role of a specific family member in their academic success. In one instance, the key figure was the student's sister; in another, her grandfather; and in the third, his stepmother. Notably, two of these students also highlighted the importance of a teacher, one who offered emotional support and another who provided targeted help in a subject where the student faced challenges. Each of these cases is detailed individually below.

Tomas (SAO student, Relevant Person: Sister)

Tomas describes himself as a sociable and friendly person who enjoys spending time with his friends. In his leisure time, he likes reading graphic novels and horror books. Having attended five different schools, he reports adapting easily to changes and expresses that his current school is his favourite among the five. Since the age of 12, he has been a boarding student and finds this mode of schooling enjoyable and well-suited to his needs. He feels that switching schools has helped him because the first school was not good, the schools he attended later were better, and his current school is the one he likes most.

Reflecting on his early academic journey, the student acknowledges facing challenges as a young learner. However, he experienced a turning point around the age of 11 while attending his second school. He attributes this improvement to the guidance and encouragement of his older sister, who moved back into the family home and took an active role in his education. Her involvement was especially impactful in mathematics, where she designed fun exercises to help him improve during the summer holidays. Beyond academics, she inspired him to put more effort into studying by emphasising the broader opportunities available to him compared to those of their parents.

Tomas is currently excelling in high school, achieving exceptional academic results and ranking among the top performers in his year group.

Diana (SAO Student, Relevant Person: Grandparent and Teacher)

Diana relocated from Santiago to a small city in southern Chile at the age of 13. She recalls the move as a profoundly challenging experience, primarily due to the family breakdown that prompted it. She describes herself as someone who initially struggles to adjust to new environments because of her introverted personality.

Although Diana now excels academically, she acknowledges this was not always the case. While she considers herself intelligent and quick to grasp lessons, her success also results from consistent hard work and dedication. Her mother is not actively involved in her education; she trusts her to be responsible by herself.

Diana's grandfather, who lived with her family during his final years, was a transformative figure in her academic journey. He often stressed the importance of seizing the opportunities available to Diana. After his passing, Diana felt a deep commitment to honouring his memory by improving her studies and striving to achieve something meaningful in life.

Another pivotal influence was a teacher Diana had at the age of 14, who provided critical support during an especially emotionally difficult period. This teacher offered her guidance and emotional support, even helping her navigate the aftermath of a suicide attempt. The compassion and encouragement she received played a crucial role in her personal growth and academic progress in the following years.

Teo (SAO Student, Relevant Person: Stepmother and Teacher)

Teo spent his early years living with his father and older brother. During this time, he struggled academically and came close to repeating a grade several times.

A turning point occurred when he was around 10 years old, following his father's remarriage and the arrival of his stepmother into the household. Her presence marked a significant change, as the family had previously lacked a female figure. Teo describes his stepmother as a critical influence on his education. She ensured he completed his homework, helped him prepare for tests, and reviewed learning materials with him before assessments. Teo credits her consistent support with helping him develop the habit of studying at home, a practice he had not previously adopted.

In addition to his stepmother's influence, a math teacher played a pivotal role in Teo's academic improvement. Recognising the student's struggles but also his determination to improve, the teacher provided extra assistance, staying after class to explain concepts when Teo made mistakes. Teo believes this targeted support was instrumental in his progress, particularly in maths.

In his penultimate year of high school, Teo achieved excellent academic results and is considering pursuing a degree in architecture at university.

Analysis of Support Structures

Notably, in all three cases, the influential family member moved into the student's household during their school years. In one case, the sister returned to live at home, while the grandfather and stepmother joined the family due to different circumstances. Despite these similarities, there are notable differences in the type of support provided.

In the sister's case, the assistance was focused primarily on math and broader motivational support. For the grandfather, the influence was more general and motivational, with his death intensifying the student's commitment to succeed. In the stepmother's case, her support spanned multiple subjects and was more related to developing study habits and general academic strategies.

Another important point is the role of teachers as significant figures in two of these cases. However, the type of support provided by the teachers differs significantly. In one case, the teacher's role was primarily emotional and personal, offering support during a period of depression. In the other, the teacher's assistance was specific to mathematics, where the student faced challenges.

b. SAO Students highlighting a non-family member support

Two interviewed students identified individuals outside their families as key contributors to their academic success. The influential figures were friends for one student, while for the other, it was a boyfriend. In both cases, these relationships became particularly impactful during high school.

In the first case, the student's friends offered consistent and comprehensive support, primarily through a peer group with high educational aspirations. This group fostered a culture of motivation and academic dedication that positively influenced the students' own efforts.

In the second case, the boyfriend's support was more focused, specifically targeting mathematics and science subjects, which the student found particularly challenging. His assistance in these areas helped the student overcome academic difficulties and improve her performance.

Gabriel (SAO Student, Relevant Person: Friends)

Gabriel has attended three different schools. While his academic performance at his first school was mediocre, he is now excelling. He notes that mathematics has always been his natural strength, whereas reading and language-related subjects have posed more challenges. Living with his parents and siblings, he stands out as the family member who has progressed the furthest in education, currently nearing the completion of secondary school.

Gabriel attributes much of his academic improvement to his current group of friends. At his present school, he is part of a group of highly motivated friends who pursue higher education. Together, they work hard to achieve good grades, aiming to secure enrolment at their preferred universities. Reflecting on his earlier schooling experience, he remarks, “This was not the case at my previous school. There, nobody cared about studying or education at all.” In contrast, his current environment fosters collaboration, with students frequently helping one another and gathering to complete assignments and prepare for exams.

Gabriel also highlights the reciprocal nature of his friendships. His strong skills in mathematics and physics allow him to assist two friends who find these subjects difficult, while another friend supports him in language and grammar, which he struggles with. Gabriel values the group study sessions, not just for their effectiveness but also for their enjoyment, stating, “It is so much more fun to study as a group than on your own.”

Nora (SAO Student, Relevant Person: Boyfriend)

Nora grew up in a rural area, living in an isolated community until the age of 14, when she relocated to a city in southern Chile. At the age of 13, her father left the family home, leaving her and her mother to live alone. She describes her early years in a rural primary school as particularly challenging, marked by difficulties with teachers and classmates. Some peers mistreated her, and certain teachers were similarly harsh, including one who pulled her hair and discarded her work.

As she grew older, she developed the habit of reviewing her schoolwork at home, driven by a strong desire to excel and become a successful student. However, despite her efforts, mathematics proved to be especially difficult.

Nora attributes much of her academic improvement in mathematics, physics, and chemistry to her boyfriend, who excels in these subjects. She explained that he had helped her grasp mathematical concepts that once seemed incomprehensible and assisted her with the scientific subjects that felt overwhelming when she began high school. His guidance has made these subjects far more manageable for Nora, although she still seeks his help with new and particularly challenging topics.

Nora also acknowledges her mother's support in her earlier years, noting that her mother encouraged her studies when the material was less advanced. However, as the curriculum became more complex, her mother could not provide direct assistance. Currently, she primarily studies independently or with her boyfriend's help, crediting him with significantly improving her confidence and performance in subjects she once struggled with.

c. SAO students emphasising the effect of a school intervention

Among the four students who highlighted school interventions as pivotal to their academic progress, three described being held back a grade as a negative yet profoundly impactful experience. Although difficult at the time, these setbacks motivated them to dedicate greater effort to their studies. These grade repetitions occurred at an early age, one at age seven and two at age 9, and are associated with strong negative emotions in their memories.

In the fourth case, the intervention occurred during adolescence and involved psychological support similar to counselling therapy. This intervention addressed personal challenges and provided emotional guidance, playing a crucial role in the student's development.

Kevin (SAO Student, School Intervention: Retention)

As a child, Kevin lived with his mother and two older siblings. He recalls struggling to adjust when he started primary school. For instance, during breaks, he would stay outside playing alone instead of returning to the classroom, and when in class, he often failed to pay attention or follow instructions. He reflects, "It was not that I was being bad, but I just did not know what to do. I was really disoriented; I did not understand why everything was so different from preschool."

Kevin was held back a grade because he had not yet learned to read and write, and struggled with appropriate classroom behaviour. He describes repeating the year as a deeply difficult experience, marked by intense embarrassment. Being significantly taller than his younger classmates made the situation even more noticeable and uncomfortable for him.

However, the experience became a turning point. After being held back, Kevin began to adapt better to school life. The fear of repeating another grade motivated him to work hard and aim for good grades. He recalls, “I was terrified whenever I got a bad grade.”

Today, Kevin excels academically. While he no longer lives with his family, he spends the weekdays with his girlfriend’s family, whose home is closer to his school. He returns to his family house on weekends. Remarkably, he will be the first in his family to graduate from high school, as neither his parents nor his older siblings completed secondary education.

Eric (SAO Student, School Intervention: Retention)

Eric has always lived alone with his mother. As a child, he struggled with school, had few friends, and found academics particularly challenging. The most difficult experience he recalls was being held back in third grade due to his inability to read proficiently. While his mother reassured him that the decision was made to help him, he remembers it as a profoundly traumatic event.

Eric recalls that his primary school was very strict, which made the experience of repeating the year even more difficult. After that, he feared failing again, which drove him to work harder on his studies.

Today, Eric enjoys his current school and believes his friends are the most important people in his life. He notes that he made close friendships upon entering high school and that these friends support each other academically and emotionally whenever needed.

Rebeca (SAO Student School, Intervention: Retention)

Rebeca has attended two schools. She initially lived in Santiago but later moved to a southern city with her family. She lives with both parents and a younger sister. As a child, Rebeca struggled at school, and she recalls that in third grade, she was made to repeat the year due to

a significant decline in her grades. She describes this experience as particularly challenging, as she lost her friends, and starting over in a new class was difficult, especially since everyone knew she had been held back. Following this, Rebeca made a firm decision to focus on her studies to ensure it did not happen again. She explains that from that point onwards, she began to pay more attention in class, and her academic performance gradually improved.

Today, Rebecca is doing well at school, excelling particularly in Language and History. However, she mentions that Chemistry and Physics are more difficult subjects for her. When asked about her future plans, Rebecca expresses a desire to attend university but remains uncertain about what she would like to study.

Ema (SAO Student, School Intervention: Psychological Support)

Ema lives with her mother and younger brother. She enjoys reading and playing football. Although she faced academic challenges as a child, she now performs very well in school. While strict and insistent on good grades, her mother has never been able to provide direct help with homework or studying.

Ema attributes her early struggles to an inability to concentrate during lessons. She explains that family problems often weighed on her mind, leaving her preoccupied and unable to focus on class.

A psychologist noticed Ema's difficulties at her current school and invited her to talk outside class. The psychologist provided a safe, supportive environment where the student could openly discuss her worries. These sessions, which took place almost weekly, allowed her to release pent-up emotions and alleviate some of her stress. In addition, the psychologist taught her practical strategies to improve her concentration and engagement during lessons.

Ema credits this intervention with transforming her academic performance and helping her overcome the challenges that once held her back.

d. SAO students emphasise their attitude change.

Three students attributed their improved academic performance to changing their attitudes. In one case, this shift involved a newfound appreciation for the importance of attending school,

demonstrated by a significant reduction in absences. Another student highlighted increased dedication and effort towards their studies as the driving force behind their progress. A third student credited her success to self-motivation, which was entirely self-initiated.

In all three instances, the students could not pinpoint an external factor or specific event that triggered their change in attitude. Instead, they emphasised internal transformation as the key to their academic success. The following sections provide a detailed account of each case.

David (SAO Student, Change in Attitude Towards School Attendance)

David, who has attended two schools, has a passion for singing—an activity currently supported by his current school. In the future, he aspires to join the police force. David now lives with his mother and older sister, both of whom he describes as significant figures in his life.

David's mother, who did not complete her education, is deeply involved in supporting his academic journey despite her limited ability to assist with specific subjects. His older sister, who moved back home some years before, often steps in to provide academic help when needed.

Reflecting on his school attendance, David shares that he frequently missed school. Over time, he realised that these absences negatively affected his academic performance. Determined to improve, he now rarely misses school.

Previously, David took advantage of his mother and sister leaving for work early in the morning, allowing him to skip school unnoticed. However, he eventually recognised that these absences were self-sabotaging and led to poor grades. When asked about the turning point in his attitude, David attributes it to a personal realisation: skipping school harmed his progress, and he wanted to avoid falling behind. He does not credit any individual or external factor for this change, instead emphasising his self-awareness and determination.

Sara (SAO Student, Change in Attitude: Dedication and Effort)

Sara has attended four different schools. She recalls struggling academically in primary school but began improving significantly upon entering secondary school, where she is now one of

the top students in her class. Sara lives with a large family, including her parents, uncles, and cousins, and describes her parents as particularly supportive, especially in providing emotional encouragement.

Sara attributes her improved academic performance to a change in how seriously she approaches her studies. She explained that, in the past, she did not care much about school, but now she dedicates more time to studying. She believes this change occurred when she started secondary school, but emphasises that it was not due to switching schools. Instead, she simply realised the importance of studying and performing well. She does not credit this change to any individual. Sara aspires to study medicine in the future, and she knows that achieving good grades is essential for reaching this goal.

Maria (SAO Student, Change in Attitude: Self-Motivation)

Maria lived in a different country until the age of seven, when her family moved to Chile due to a worsening economic situation in her home country. With her parents having completed only three and four years of education, it is a significant milestone for the family that she is on track to complete secondary school.

The transition to Santiago was challenging for Maria because everything felt different. Her house was much smaller, the school was farther from home, and her grandparents were no longer nearby. She struggled at her first school, feeling excluded and unable to make friends. Maria made some friends at her second school and felt better, but she feels happiest and has learned the most at her current school.

Reflecting on her academic improvement, Maria notes that she did not perform well at his first two schools but began improving when she grew up. She explained that when she was around 13 years old, she had changed her mindset and started caring about school and her future. Maria thinks this is the reason for her improvement; she explains: “I am the one who motivates myself. No one reminds me to study or pushes me—it is my own motivation that has helped me.” She does not attribute this change in attitude to anyone else’s support or any specific event, but rather to a personal decision.

14.4. Findings Organised by Relevant Factors Identified by Consistently High Academic Achievement Students

This section analyses the seven students identified as exhibiting Consistently High Academic Achievement (CHAA). As the previous section focused on the Success Against the Odds (SAO) students, the analysis is structured around the factors most prominently highlighted in the student interviews as contributing to their consistently positive academic outcomes, to explore distinct aspects of their personal narratives and propose hypotheses regarding the elements that may have facilitated their sustained academic success despite challenging family circumstances.

The narratives of the seven CHAA students interviewed differ considerably from those of the SAO group. For this group, the academic support provided by the mother emerges as a substantially more influential factor. In five of the seven cases, the mother—or, in one instance, both parents—was identified as the primary contributor to the student's academic excellence. Of the remaining two students, one attributed his success to an inherent ease of learning, while the other credited her personal attitude as the decisive factor.

The names used for the students are fictitious to safeguard their anonymity, and certain specific characteristics have been modified as they could potentially reveal their identities.

a. CHAA students emphasising the role of mothers or parents

Four of the seven CHAA students interviewed highlighted their mothers as the primary factor contributing to their academic success, while one credited both parents. Below is a summary of the personal narratives shared by these five students.

Ana (CHAA Student, Mother: early routine of study and homework)

Ana describes herself as having a strong personality and being firm in her ideas. She views herself as someone who enjoys challenges and prefers solving them in her own way. While she likes mathematics, she dislikes it when teachers progress too slowly, finding it boring; instead, she appreciates teachers who cover material more quickly.

Ana recalls entering school at a young age, following her older brother, who was one year ahead of her, and occasionally being allowed to sit in on classes, even though she did not yet meet the minimum age requirement. She emphasises that her mother has always been deeply involved in her education, insisting that she study and complete her homework immediately after returning home. Ana believes this early routine was critical to her academic excellence. While she no longer needs her mother's assistance with schoolwork, her mother remains engaged, often helping her prepare presentations or complete assignments on weekends.

Nicolas (CHAA Student, Parents: Motivation to study and rewards for good grades)

Nicolás, a table tennis enthusiast, enjoys spending time with friends and describes himself as introverted and shy when meeting new people. He has attended two schools and reports always performing well academically.

Nicolas attributes his success to the encouragement and motivation from his parents, who have consistently urged him to study and rewarded him for good grades. He acknowledges that his parents' support and motivation led him to strive for academic excellence. Over time, Nicolas developed an intrinsic motivation to succeed, making parental involvement less necessary. He is acutely aware of the opportunities available to him compared to his parents, who did not complete secondary education. Nicolas aspires not only to graduate from secondary school but also to pursue higher education and build a professional career.

Lilian (CHAA Student, Mother: Emphasis on reading)

Lilian describes herself as a smart person who has consistently achieved high grades in all the schools she has attended. She explained that she had been enrolled in four different schools and performed well in all of them. Her most significant school transition occurred when she was 10 years old, when her parents separated. Her mother transferred her to a new school after moving to a different city area.

Lillian highlights her mother as the most influential figure in her academic success. She characterises her mother as a very strict person who, from an early age, encouraged her to read extensively. Lillian notes that her mother has always been passionate about reading and insisted that she develop a similar enthusiasm, believing it would greatly aid her studies and life.

Moreover, her mother ensured she completed her homework at home and consistently demanded good grades. Lillian believes that this focus on reading has contributed to her ease with subjects like language and history, which have always been her strongest areas.

James (CHAA Student, Mother support and sister inspiration)

James reports that he has always performed well in school, achieving the top rank in his class almost yearly. He is strongly interested in animals, particularly dogs and cats, and aspires to become a veterinarian. His favourite subject is Science. James lives with his mother, his older sister, and his nephew.

He mentions that of the three schools he has attended, he prefers the current secondary school because it is larger, has more people, and offers a broader range of activities and opportunities. James attributes his academic success to his mother and sister's support and his own capacities. While he notes that his mother has always supported him academically, he now requires less assistance, as he can complete his homework and assignments independently. Nevertheless, he acknowledges that whenever he does need help, his mother is there to assist him or to provide any materials he might require.

James identifies his mother as the most significant influence on his education, but also credits his older sister as a source of inspiration. James admires her sister for completing her professional degree despite the challenges of raising a child, and this motivates him to believe that he can achieve similar success. James has a clear vision of the career he wants to pursue and the university where he intends to study.

Hector (CHAA Student, Mother: Support with Homework and Responsibility)

Hector begins his story by recounting a significant change in his life: moving with his mother to another city when he was nine years old. He explains that it was challenging for various reasons, mainly because his father did not move with them. He also shared that he struggled at his new school, as he felt different and struggled to make friends. Hector notes that the other children were interested in different things, and he often felt isolated, even believing that some classmates mocked him.

Despite these challenges, Hector has always excelled academically in the three schools he has attended. He credits his mother when asked why he believes he has consistently performed well. Hector explains that from an early age, his mother helped him with his studies, supported him with homework, and encouraged him to be responsible. Although he has always found mathematics somewhat difficult, his mother's guidance enabled him to succeed. While he no longer finds mathematics as challenging as he once did, he recognises that he still needs to put in extra effort in mathematics and science-related subjects, as they do not come as naturally to him as humanities subjects.

b. CHAA students highlighting personal characteristics or abilities

Two CHAA students highlighted personal characteristics as the primary contributors to their academic success. One student emphasised a natural ease with learning, while the other focused on her consistent effort and motivation to achieve good grades. Their stories are detailed below.

Arturo (CHAA Student, Ease of Learning)

Arturo explains that school has always been easy for him. He has consistently performed well without needing to study much, attributing this to his intelligence and his natural ability to learn. He recounts that, as a very young child, he learned to read on his own, well before his peers in preschool. From that point onwards, he excelled in school despite rarely studying. Arturo notes that his grades dipped slightly during the pandemic year, as he disliked online classes, but once in-person schooling resumed, he quickly regained his strong academic performance.

He lives with both parents and a younger brother. Arturo mentions that his parents have never been significantly involved in his studies. He believes this is because he has always done well, so they tend to leave him to manage independently. However, he observes that his mother is more involved in his younger brother's education, as his brother finds studying more challenging.

Arturo aspires to study engineering at university and plans to apply to institutions in Santiago. Although he acknowledges that living in Santiago would be more expensive, he is confident that his parents can support him financially in this endeavour.

Laura (CHAA Student, Personal commitment to study)

Laura explained that she has attended three different schools. She spent only one year at the first school because her mother decided to transfer her, finding the environment too chaotic. She then attended another school, where she completed her primary education, and is now enrolled in a secondary school. Laura has always performed well academically in all three schools, never finding her studies particularly challenging. Mathematics, in particular, has always been an easy subject for her.

She emphasises that achieving good grades has always been important to her, so she has consistently dedicated herself to studying. Laura believes this commitment has been the decisive factor in her strong academic performance. She lives with her mother and grandmother, who both value education highly but do not involve themselves much in her studies.

Laura considers herself intelligent, but she feels that her academic success is primarily due to her consistent effort and determination. Doing well has always significantly mattered to her. Among her hobbies, Laura enjoys reading and spending time with her friends. She aspires to study odontology at university and to become a dentist.

14.5. Results Summary

The key findings from the two analyses presented in this chapter are summarised below.

The initial analysis compares the narratives of three groups of students according to thematic categories that were selected based on the topics most frequently mentioned by the students. The three groups are:

1. Success Against the Odds (SAO) students. Students from disadvantaged backgrounds who begin their schooling with low academic performance but demonstrate significant improvement over time.
2. Consistently High Academic Achievement (CHAA) students. Students, despite similar disadvantaged circumstances, consistently achieve high academic performance.

3. Comparison group. Students from similar socioeconomic backgrounds who did not attain academic success.

The second analysis delves into the personal stories of SAO and CHAA students, understanding their perceptions of the factors that enabled them to succeed despite the challenges they faced.

Comparison between SAO, CHAA and comparison students

When the interviewed students from the two successful groups—*Success Against the Odds (SAO)* students and *Consistently High Academic Achievement (CHAA)* students—are compared with those who did not achieve academic success, significant differences emerge across four key areas: influential individuals, educational interventions, personal traits, and attitudes towards school and learning.

Firstly, SAO students are the group least likely to identify their mothers as influential figures, unlike CHAA students and the comparison group. Conversely, CHAA students most frequently cite their mothers as the primary factor contributing to their academic success. This underscores fundamentally different circumstances between the two successful groups. While CHAA students benefit from consistent and strong parental support, particularly from their mothers, SAO students, who succeed academically despite initial struggles, lack this parental support and instead identify alternative sources of assistance to achieve their success.

At the same time, SAO students identified a broader range of influential individuals, unlike CHAA students, who almost exclusively point to their parents as their primary influence. The diversity of influential figures reported by SAO students may partially explain their improved academic outcomes. For instance, while mothers often provide a consistent source of support, other individuals, such as a stepmother entering the family at a crucial moment or a grandparent assuming a significant role later in life, may emerge during critical periods and contribute meaningfully to the student's academic performance.

Second, SAO students also highlighted the role of school-based interventions in addressing their academic difficulties. Although references to such interventions were relatively rare, three SAO students (a quarter of the total SAO group) mentioned grade retention, an experience they

described as traumatic. For these students, the fear of repeating a year again became a key motivator to study harder and exert greater effort. However, the psychological and long-term impacts of this fear-driven motivation warrant further exploration. Additionally, one SAO student reported receiving psychological support from the school, significantly improving her ability to focus in class and, consequently, her academic performance. In contrast, no CHAA group student described any interventions their schools implemented.

Thirdly, a notable difference between SAO and non-SAO students was the emphasis on changes in attitudes towards school and learning. Three SAO students reported significant attitude shifts, including improved attendance, greater care for their studies, and increased seriousness about schoolwork. While these changes seem to account for their academic improvement, the underlying triggers for such shifts remain unclear. The students provided vague explanations, such as "I just realised" or "I started to care," which may indicate the influence of natural maturation or external factors they could not articulate.

No CHAA students reported a change in attitude. However, one student highlighted her sustained commitment to studying as a decisive factor in her consistently strong academic performance.

Finally, when asked about the personal traits that contributed to their academic success, both CHAA and SAO students frequently cited their intelligence. However, this was more common among CHAA students than SAO students. In contrast, none of the students in the comparison group described themselves as smart. It is difficult to determine whether perceiving oneself as intelligent is a factor that helped these students succeed, a consequence of achieving good academic results, or a combination of both cause and effect.

No relevant differences were found between SAO students, CHAA students, and the comparison group regarding the number of schools they had attended, the significant life circumstances they identified, or their affinity towards specific academic subjects.

Insights from SAO and CHAA student narratives.

Focusing exclusively on the narratives of SAO students, it is notable that more than two-thirds of the group (9 out of 12 students) attributed their academic improvement to external support.

This support ranged from individuals (e.g., grandparents, stepmothers, teachers, siblings, friends, or boyfriends) to school-based interventions such as grade retention or psychological therapy.

The remaining third of the group (3 students) credited their success solely to personal changes in attitude, without acknowledging any external influences. This raises questions about whether these students genuinely lacked external support or whether factors such as personality, selective memory, or other reasons led them to overlook or fail to recognise the role of external assistance in their transformation.

In contrast, focusing exclusively on the narratives of CHAA students, 5 out of 7 identify their mothers as the most significant factor in their academic success. This highlights the importance of the maternal figure for students who consistently perform well throughout their schooling. The remaining two students attribute their academic success to personal traits they have had since childhood.

14.6. Conclusion

This thesis took a multi-phase approach to identify the characteristics, circumstances, or supports that enable disadvantaged students to succeed against the odds. The initial phase involved a longitudinal data analysis to identify the factors most strongly correlated with academic success among socioeconomically disadvantaged students. These factors were then examined in greater detail to evaluate potential causal relationships between them and students' ability to succeed against the odds. However, in stages 2 and 3, no evidence of causality was found for the characteristics that initially appeared promising based on the longitudinal data. Consequently, the final stage of the thesis adopted a more exploratory perspective, focusing on questions that could not be answered through database analyses. By definition, these answers require investigating the unique events and influences in each student’s life, as their impacts vary across individuals.

This final stage involved semi-structured interviews with 36 students in their last years of compulsory education, all from socioeconomically disadvantaged backgrounds. Among these,

some students belonged to the Success Against the Odds (SAO) group, defined as those who began their schooling with low academic performance but significantly improved over time, ultimately achieving high academic outcomes. Another group, called Consistently High Academic Achievers (CHAA), included students who consistently demonstrated excellent academic performance throughout their schooling despite socioeconomic disadvantages. A third group served as a comparison, comprising students from similar socioeconomic backgrounds whose academic performance was average or poor.

The interviews revealed that SAO students often attributed their academic success to a specific person or intervention that altered their trajectory. In some instances, these students credited an internal shift in attitude, independent of external circumstances, as the reason for their success. By contrast, CHAA students typically attributed their success to the influence of their mother, who was described as the primary source of motivation and support. A smaller number identified their own abilities or intelligence as the key factor.

Notable differences emerged in the influential figures identified by each group. As mentioned, CHAA students overwhelmingly pointed to their mothers as central to their academic success, highlighting their consistent encouragement and guidance. On the other hand, SAO students, who initially struggled academically but improved over time, credited a broader range of individuals. These influential figures often entered their lives later in their schooling. They provided support in various forms, such as improving study habits, assisting with specific academic subjects, or offering emotional encouragement. Unlike CHAA students, SAO students rarely mentioned their parents in this context. Instead, they highlighted the role of grandparents, stepmothers, siblings, friends, or teachers, describing these individuals as pivotal in transforming them from underperforming students into high achievers.

These findings cannot be directly compared to the existing literature on socioeconomically disadvantaged students who succeed against the odds. Due to their lack of a longitudinal design, most studies in this area fail to distinguish between the two groups of successful students identified here: those who demonstrate strong academic performance from the outset of their schooling and those who begin with poor performance but achieve significant improvement over time. The literature consistently underscores the critical role of a positive parent–child relationship, as well as parental support and engagement in their children's

education, in fostering resilience among disadvantaged students (Ye et al., 2024; Pan & Yi, 2011; Paat, 2015; Oldfield et al., 2020; Kong, 2020; Cunningham & Swanson, 2010; Schoon et al., 2004; Anagnostaki et al., 2016; Bester & Kuyper, 2020). This perspective aligns with insights from students in the Consistently High Academic Achievers (CHAA) group, who frequently identify their mothers as the primary influence on their academic success.

In contrast, this pattern differs for the Success Against the Odds (SAO) group—students who begin their educational journey with low academic performance but progress significantly over time. These students rarely cite their mothers as the primary influence; instead, they often attribute their success to other influential figures, including teachers. This aligns with studies in the literature indicating that, among non-parental relationships, teacher bonding is one of the strongest predictors of student resilience (Ye et al., 2024; Strolin-Goltzman et al., 2016; Crosnoe & Elder, 2004; Agasisti & Longobardi, 2014; Siraj-Blatchford et al., 2013; Langenkamp, 2010; Ye et al., 2024; Borman & Overman, 2004; Gizir & Aydin, 2009; Özden & Atasoy, 2020; Bester & Kuyper, 2020; Cunningham & Swanson, 2010).

A group of SAO students highlighted specific school interventions as pivotal moments in their academic journeys. For instance, some described repeating a grade as a powerful motivator, with the experience and the fear of repeating it again driving them to apply greater effort. However, the broader literature on grade retention generally does not support the notion that this measure produces positive outcomes. Influential systematic reviews and meta-analyses consistently find no evidence that grade retention benefits students (Jackson, 1975; Holmes & Matthews, 1984; Holmes, 1989; Jimerson, 2001). These reviews, however, predominantly rely on studies using matching comparison groups rather than more robust experimental or quasi-experimental designs. Among studies employing Regression Discontinuity (RD) methodologies, findings are mixed. For instance, Manacorda (2012), using an RD design, concluded that grade retention significantly increases dropout rates and reduces educational attainment.

In contrast, Mariano and Martorell (2013), also using an RD design, found that grade retention had substantial and positive effects on students' academic performance two years after the intervention. Further analysis of this debate suggests that the methodological rigour of the research designs significantly influences the outcomes reported. Allen et al. (2009)

demonstrated that studies with stronger designs are more likely to report positive outcomes than those with weaker methodologies. Similarly, Goos et al. (2021) found that evaluations using RD methods tend to report more positive effects of grade retention than those relying on other designs.

One SAO student interviewed highlighted the importance of psychological support provided by their schools, which helped her focus on class and improve their performance. Such interventions were not mentioned as influential by the other groups.

In addition to external influences, some SAO students reported internal changes in their attitudes toward school as a key factor in their improved academic performance. These students often could not identify a specific external trigger for these shifts, describing them as internal transformations that occurred independently.

Both CHAA and SAO students occasionally mentioned intelligence as a defining characteristic contributing to their academic success. However, it remains unclear whether their academic performance reinforced their self-perception of being intelligent or whether their self-perception motivated their academic success. This is consistent with the literature, which consistently demonstrates that resilient students exhibit higher levels of academic self-efficacy compared to their peers with lower academic performance (Anagnostaki et al., 2016; Borman & Overman, 2004; Cunningham & Swanson, 2010; García-Crespo et al., 2022; Ge & Ngai, 2020; Gizir & Aydin, 2009; Hofmeyr, 2019; OECD, 2011; Mohan & Kaur, 2021; Özden & Atasoy, 2020Rouse, 2001; Siraj-Blatchford et al., 2013; Süleyman et al., 2022; Victor-Aigboidion et al., 2020; Wang et al., 2022; Waxman & Huang, 1996; Ye et al., 2024).

Overall, the findings suggest that external support plays a crucial role in helping most students succeed against the odds. For many, this support comes from a person who enters their lives and has a significant impact, while for others, school interventions are transformative. These insights have important implications for public policy and for schools and teachers, who can implement interventions to positively influence students' academic trajectories. Chapter 18 explores these implications further.

Section Four: Conclusion and Discussion

The final section of this thesis synthesises and connects the findings from the four research stages undertaken to address the central research question:

> What characteristics or circumstances enable a group of disadvantaged students who initially perform poorly in school to substantially improve their academic performance over the years and succeed against the odds?

The section begins with a summary of key results and findings. It then discusses the associated limitations and, taking these limitations into account, presents the conclusions and implications of the research.

Chapter 15 Findings Summary

This chapter synthesises the key findings from the four stages of this thesis and examines how these findings contribute to answering the original question of this thesis:

The first stage of this thesis used a longitudinal analysis of secondary data to identify students from disadvantaged backgrounds who achieved academic success against the odds and to uncover the characteristics and circumstances that distinguished these students from peers in similar socioeconomic conditions who did not achieve comparable outcomes.

The analysis yielded several key insights, but two were the most relevant. First, the students' mindset emerged as one of the most meaningful predictors of success. Students with a growth mindset were 2.5 times more likely to achieve exceptional progress and had a 70% higher probability of gaining admission to a prestigious university. Second, students attending a group of selective secondary schools called Bicentennial Schools were 4.5 times more likely to achieve exceptional progress, 70% more likely to enter higher education, and 13% more likely to gain admission to a prestigious university.

Building on these findings, new research questions were introduced, concerned with the extent to which these variables causally contribute to students' academic success. The logistic models developed in the first stage indicate only correlations, leaving the causal mechanisms unexplored. The first new question asks whether a growth mindset actively drives students to achieve academic success. The second focuses on whether Bicentennial Schools offer higher-quality education than other schools, thereby increasing their students' likelihood of academic success.

To answer the. First new question, the thesis's second stage consisted of a structured review of studies examining the academic impact of growth mindset interventions. Given the wealth of experimental research, the literature review approach was chosen as the method to explore the potential causal link between a growth mindset and academic success.

The most robust randomised studies reviewed show very small effect sizes clustered around zero, with minimal effects ranging from -0.01 to 0.064, and therefore did not support a causal link between growth mindset interventions and academic improvement. Even under optimal

conditions, the academic impact of such interventions appears negligible, with a potential Cohen's d effect size capped at approximately 0.05. As such, a growth mindset cannot be identified as the driving factor behind the academic success of disadvantaged students who succeed against the odds.

The third stage of this thesis evaluates the causal role of the second variable identified as highly relevant in the logistic models: attendance at a Bicentennial School. As found in the first stage, students from disadvantaged families who attended these selective schools were 450% more likely to belong to the exceptional progress group. This stage addresses whether the academic success of these students can be attributed to the schools themselves or if it primarily reflects the characteristics of the students admitted.

One of the main challenges in assessing the impact of selective schools is separating the effects of student selection from the schools' intrinsic educational quality. The analysis leverages a regulatory change that limited selective admission practices to address this. By comparing the performance of students enrolled before and after the change, it becomes possible to isolate these effects. For cohorts with student selection, attending a Bicentennial School accounted for 0.5% to 0.9% of the variance in language performance after controlling for socioeconomic factors and prior academic achievement. In mathematics, the variance explained ranged from 1.5% to 2.3%. However, for the cohort when selective admissions were curtailed, the explanatory power of attending a Bicentennial School dropped to 0.1% for language and 0.3% for mathematics.

Similar patterns emerged in the regression coefficients associated with the variable indicating whether the student attended a Bicentennial School. In the language model, coefficients for the earlier cohorts ranged from 10 to 12 but fell to just 3 for the cohort after the selection was banned. In mathematics, coefficients exceeded 20 for cohorts before the change but declined to 9 for the cohort after the change. These results indicate that the perceived impact of Bicentennial Schools is mainly attributable to their selective admission practices rather than to superior educational quality.

Given the results of the second and third stages, which reveal no causal relationships for variables strongly correlated with success against the odds, the central research question

remains unresolved: What factors enable some disadvantaged students to achieve academic success against the odds? While school type and student mindset have been ruled out as primary contributors, the underlying drivers of these students' success remain unclear, warranting further investigation.

The fourth part of this research revisits the original question with an exploratory approach to uncover potential factors that secondary existing data analysis alone cannot identify. It investigates additional characteristics, circumstances, or support mechanisms that could have enabled a group of socioeconomically disadvantaged students to succeed academically against the odds. For the analysis, the disadvantaged students interviewed were classified into three groups according to their academic achievement and trajectory. The first group, Success Against the Odds (SAO), consists of students with significantly improved academic performance. The second group, Consistently High Academic Achievers (CHAA), includes students who have consistently ranked among the top performers in their class. The third group, serving as a comparison group, comprises students with average, underperforming, or declining academic outcomes.

The findings suggest distinct pathways to success for the two high-achieving groups. For CHAA students, maternal involvement emerges as the dominant factor. For SAO students, however, the drivers of academic improvement are far more varied and individualised. These include influential figures like stepmothers or grandparents, school-based interventions such as repeating a year or receiving psychological support, or internal shifts in mindset and habits.

Returning to the original research question, the second and third stages rejected the hypotheses that a growth mindset or attendance at a selective school were the key enablers. This final stage points to new possible answers to the research question. The factors driving SAO students' achievements vary, ranging from external support at pivotal moments to school interventions and internal psychological growth. These findings suggest that success against the odds cannot be attributed to a single factor but rather to a complex interplay of circumstances, relationships, and personal development.

The following section discusses the limitations regarding the different methodologies used that must be considered when interpreting the findings and drawing conclusions.

Chapter 16 Limitations

Several general limitations relevant to most research phases need to be considered in this thesis, first, regarding the context. Since the data for the two secondary analyses and the student interviews were collected in Chile, the results may not directly apply to other cultural and educational systems. Chile is a middle-income country with a relatively low poverty rate of 6.5%, but it has high levels of income inequality. Additionally, the educational system in Chile features a distinctive school choice system due to a voucher scheme implemented in 1981, which allows parents significant freedom in selecting schools for their children. As a result, the findings of this research may have limited relevance for countries or cultures with different social, economic, and educational structures. However, this limitation does not apply to the findings related to the impact of growth mindset interventions, as the literature review includes studies from a diverse range of international contexts.

When examining the findings, it is important to consider a second limitation regarding the available data. The research begins with a longitudinal analysis identifying common characteristics among pupils in the Success Against the Odds (SAO) group. However, this search for distinctive features is constrained by the variables available in the longitudinal datasets used. While these datasets offer substantial information, including data on students' habits, self-perceptions, school perceptions, family circumstances, socioeconomic status, ethnicity, and language, some potentially valuable information is missing. For instance, there is no access to health-related data, detailed birth records, or comprehensive indicators of educational support. The absence of these factors limits the analysis, potentially causing key influences to be overlooked, which could provide additional insights into the factors that enable disadvantaged students to succeed.

Another limitation related to the previous point is the temporal scope of the data used in the models. This restricts the analysis to outcomes observed only within three years after students complete their secondary education. Consequently, the study cannot consider longer-term indicators of academic success, such as higher education attainment or career progression. These factors could offer a more comprehensive understanding of students' long-term educational paths and life outcomes.

Using national standardised tests to measure academic performance presents several additional limitations. Although these tests are widely used, they may not fully reflect the impact of interventions on academic achievement, particularly when the skills and knowledge assessed do not align perfectly with those targeted by the interventions (Sussman & Wilson, 2019; May et al., 2009; Somers et al., 2011). Moreover, national or state test scores can introduce larger standard errors in evaluations than tests designed for research purposes (Olsen et al., 2011). Single-day testing, which is often employed, can be influenced by temporary factors such as illness or distractions. This may not accurately represent students' overall academic abilities, especially when contrasted with cumulative GPA evaluations. Additionally, variations in schools' emphasis on test preparation can result in performance differences that do not truly indicate authentic learning outcomes.

This research uses the Chilean national standardised test as an outcome measure. This national test does not provide individual student scores; only aggregate results at the class and school levels are reported. This could create an additional distortion in the outcomes, as some students might not make their best effort on this assessment since it has no personal consequences for them. Consequently, depending heavily on standardised testing might limit our nuanced understanding of students' academic achievement.

An additional limitation arises from the definition of disadvantage. In this research, disadvantaged students are identified solely based on socioeconomic status and parental educational attainment. This definition excludes other forms of disadvantage, such as learning difficulties, socio-emotional challenges, or location-based barriers that extend beyond socioeconomic factors. Consequently, the findings should be interpreted within this specific framework and should not be generalised to students experiencing other types of disadvantage. By limiting the scope of disadvantage to socioeconomic factors, this research may overlook additional barriers and support needs relevant to students facing non-socioeconomic challenges, thereby restricting the broader applicability of the findings.

Finally, analyses based on secondary data are limited by both the number and characteristics of students who were excluded due to the absence of academic outcome information. In the first stage of this study, which examines the characteristics of disadvantaged students who succeed against the odds, as well as in the third stage, analysing the academic impact of

selective schools, a considerable number of students were excluded for not having participated in the SIMCE assessment. This excluded group tends to be, on average, more socioeconomically vulnerable than those who did sit the assessment and also demonstrates lower initial academic performance. Many of these students may be absent due to habitual non-attendance, but there is also a proportion whose absence may be specifically related to the days on which the SIMCE is administered. There have been reports of schools discouraging low-performing students from attending on test days, or even temporarily removing them from the classroom during the assessment (Botella & Ortiz, 2018). It is therefore important to acknowledge that the results presented here may be biased, as a proportion of the most disadvantaged students and those with lower academic achievement have been excluded from the analysis.

16.1. Specific Limitations of the Literature Review on Growth Mindset Interventions

The second stage of this thesis evaluated the impact of growth mindset interventions on students' academic achievement through a structured literature review. The conclusions drawn from this review were based on various studies employing randomised controlled trial (RCT) designs. Consequently, the reliability of this study's conclusions hinges on the trustworthiness of the findings reported in the included studies.

To address this, the quality of the studies was assessed using the 'sieve' approach proposed by Gorard (2021). This framework prioritises the most critical factors affecting study quality, particularly those that pose the greatest threat to the reliability of the conclusions. However, it does not account for all potential issues that might compromise study quality, focusing instead on the most relevant ones. For example, unblinded RCTs may introduce biases such as teacher bias or researcher expectancy effects. Furthermore, this review did not consider the issue of studies measuring an excessive number of outcomes, which can undermine the reliability of their findings. The pre-registration of studies was also not required to achieve the highest quality rating within this framework.

Another limitation of this review is its focus on published studies in English or Spanish. This exclusion of studies published in other languages and unpublished research may have

introduced publication bias. Such bias arises because studies with positive results are more likely to be published, potentially leading to an underrepresentation of studies with negative or neutral outcomes. Consequently, excluding these studies may have influenced the conclusions of this review.

16.2. Specific Limitations of the Evaluation of Bicentennial Schools

The third stage of this thesis evaluates the impact of a selective group of schools known as Bicentennial Schools through a secondary data analysis. The analysis concludes that Bicentennial Schools do not enhance students' academic achievement more than other types of schools. The apparent differences in academic results are primarily due to student selection rather than superior educational quality. This conclusion is supported by the finding that Bicentennial Schools appeared to have a relevant impact only in the first three cohorts, during which student selection was permitted. In contrast, for the fourth cohort, where student selection was no longer allowed, the impact of attending a Bicentennial School virtually disappeared.

However, this finding is subject to certain limitations, as the fourth cohort possesses a unique characteristic that complicates its comparability with the previous three. The fourth cohort was significantly affected by the COVID-19 pandemic, which caused prolonged school closures during 2020 and, to a lesser extent, 2021. To address this limitation, data on school closure days were analysed using a database provided by the Ministry of Education. This analysis revealed no differences in closure days between Bicentennial Schools and other schools within the same regions, suggesting that the pandemic’s impact was likely similar across both groups. Nevertheless, to definitively rule out the possibility that the diminished effect of attending a Bicentennial School is attributable to pandemic-related factors, further analysis of cohorts post-2022, when the pandemic's effects were less severe and student selection was tightly restricted, will be necessary.

Another limitation of this research is its exclusive focus on the academic outcomes of Bicentennial Schools as measured by standardised tests taken at age 16. These schools may have a greater impact on tertiary education entrance exam results, typically taken at age 18,

after students have spent more time in these schools. However, as the only cohort affected by the end of student selection with available data is the 2022 cohort, it is currently impossible to assess the impact on tertiary education entrance exam performance.

Finally, Bicentennial Schools may influence students in ways that are not captured by higher scores on standardised tests. They may have socio-emotional impacts or contribute to improvements in student well-being, outcomes that were not considered within the scope of this analysis.

16.3. Specific Limitations of the Interviews of Disadvantaged Students

The fourth phase of the thesis involves 36 semi-structured interviews with students from disadvantaged families in their penultimate year of compulsory education. While this is a substantial number of in-depth interviews, it does not represent the national or regional population. Furthermore, all the students were drawn from just three schools, limiting the representativeness of their experiences. The participants' responses reflect specific contexts and cannot be assumed to be broadly applicable to other schools or regions where differing socio-economic dynamics, support systems, or educational practices may shape student experiences and outcomes.

Given the non-experimental design of this research, the results offer only indicative insights into factors potentially contributing to the academic success of disadvantaged students. Unlike experimental studies that can identify causal factors through controlled conditions, this research relies on participants' narratives, which may reveal patterns or common themes but cannot establish causal relationships. The analysis allows for comparative insights between disadvantaged students with varying levels of academic success, illustrating potential contributing factors. The helpful factors identified in students' accounts cannot be definitively linked to their academic outcomes, as other unobserved factors may also be at play. This limitation highlights the exploratory nature of the research, emphasising the findings as hypotheses for future studies rather than definitive explanations.

An additional limitation arises from the reliance on self-reported data, which is subject to several biases. Firstly, recall bias is likely, as students may have difficulty accurately remembering past events, especially those from early childhood, and may unintentionally omit or misrepresent key details. This reliance on memory can bias the accuracy of the data, as not all influential factors may be entirely recalled or articulated. Social desirability bias is also a significant consideration, given that participants may withhold information about specific personal experiences or circumstances to avoid negative judgment from others or to conform to perceived societal expectations. This tendency to present oneself favourably can lead students to downplay difficulties or omit sensitive details, potentially obscuring important aspects of their experiences. Subjective interpretation presents an additional challenge from the perspective of the students, whose personal views and emotions may colour their recounting of events, and from that of the researcher, who must interpret the students' accounts through their own analytical lens. This interpretive process is inherently subjective and may introduce unintended biases or misinterpretations, which could affect the analysis.

Chapter 17 Discussion

This chapter explores the main issues arising from this research, examining how the findings contribute to existing knowledge and their implications for educational practice, policy, and families.

Why should we draw attention to students who succeed against the odds?

An initial finding of this research is identifying a group of students who, despite beginning school with low academic performance and coming from socioeconomically disadvantaged backgrounds, manage to drastically improve their outcomes and achieve academic success. The existence of these students, who succeed against the odds, carries important implications for families, educators, and policymakers.

First, families—parents and children—must be made aware of such students' existence and success stories. Learning about peers from similar or even more challenging backgrounds, who initially struggled but ultimately flourished through sustained effort, can serve as a powerful source of hope and motivation. These narratives may be particularly meaningful for families who fear that their children's early academic difficulties are indicative of inevitable failure. For students themselves, exposure to these stories can be transformative. Many children who struggle in the early years of schooling come to believe that they are simply "not academic" or not intelligent enough, leading them to disengage from learning. Such beliefs often diminish motivation, especially when effort appears futile. By showcasing examples of peers who overcame similar obstacles, it becomes possible to challenge these internalised narratives and foster a sense of possibility.

Schools and teachers also play a crucial role in recognising and nurturing the potential of these students. Maintaining high expectations for all pupils—regardless of their starting point or the level of support they receive at home—is essential. A wealth of research has shown that teacher expectations can have a noteworthy impact on students' academic trajectories, and low expectations can become self-fulfilling prophecies.

Why is it important to consider students' academic trajectories?

Another important contribution of this research is a clear distinction, both in terms of life circumstances and support needs, between two groups of successful disadvantaged students: those who begin school with low academic achievement and improve over time, and those who maintain high academic performance throughout their school years despite economic adversity. This distinction is often overlooked in prior research, partly due to the limitations of cross-sectional or short-term studies that cannot capture students' academic trajectories. The findings here indicate that these are fundamentally different groups. While both groups experience economic disadvantages, the students who sustain high academic performance tend to benefit from consistent and strong family support, especially maternal involvement, from an early age. In contrast, those who initially perform poorly but later improve often receive little academic support at home during their formative years. Consequently, these groups require distinct types of interventions. If educational policies or school-based initiatives are informed by studies that fail to distinguish these two groups, there is a risk that the specific needs of initially low-performing disadvantaged students will be inadequately addressed.

What kind of support do students who succeed against the odds receive?

Interviews conducted as part of this study further revealed that, in cases where disadvantaged students managed to improve drastically, an external source of support often played a critical compensatory role for a lack of parental involvement. This support could come from a teacher, tutor, counsellor, older sibling, or another figure who became integrated into the student's life. In most cases, such support emerged through chance rather than being provided systematically. Nevertheless, these examples underscore the powerful influence of such relationships on student development. To prevent students without home support from being left behind, targeted policies and interventions are needed to ensure that they have reliable access to external academic and emotional support.

How relevant is the role of teachers?

As illustrated in the interview findings, teachers can play a crucial role in the lives of students who lack substantial support at home. A sustained and trusting relationship with a teacher may provide the guidance and encouragement that are otherwise missing. Sometimes, this connection can be a decisive factor in a student's academic progress. Based on the students' testimonies, it can be hypothesised that teachers' influence tends to be more relevant in cases where parental involvement is limited. In such contexts, teachers may partially compensate for the absence of family support. Conversely, when strong parental support is present, the teacher's role, while still important, may be less central to the student's academic development.

What can we learn about the effectiveness of spot or easy interventions?

In a more specific topic, this research calls into question the current overreliance on spot educational interventions, such as growth mindset programmes. While such interventions are widely promoted, their effectiveness tends to be overstated. As shown in the case of growth mindset interventions, they yield positive results only in low-quality research, with research designs unsuitable for causal conclusions, lacking a reasonable sample size, suffering from high attrition, or with limited measures of academic performance. When assessed through rigorous methodologies, their effects largely disappear. Therefore, policymakers, educators, and school leaders must critically assess the quality of the evidence underpinning educational innovations. Novel approaches should not be adopted uncritically simply because they are fashionable or widely endorsed.

This critique further highlights the importance of integrating research literacy into teacher training programmes. Future educators should be equipped with the skills to interpret and evaluate evidence, enabling them to discern which interventions are genuinely supported by robust research and which are not.

Do selective schools help students to succeed against the odds?

Lastly, this research contributes to the ongoing debate about the effectiveness of selective schools. One key issue is that evaluating the actual impact of these institutions is highly problematic, as much of their apparent success stems from the enrolment of high-performing students rather than from the quality of education offered. Studies using matching designs often fail to adequately correct for selection bias due to selective admissions criteria or family self-selection. As a result, claims regarding the superiority of selective schools should be treated with caution. In contrast, research employing regression discontinuity designs provides more reliable insights, as this method offers stronger control over selection effects. While such designs have their own limitations—most notably, that they can estimate impacts mainly around the selection threshold—they are more robust in isolating the actual contribution of the school from the characteristics of the enrolled students.

Unfortunately, policymakers often overestimate the value of selective schools, not fully recognising that the apparent advantages may be mainly attributable to the nature of their student intake. This has led to support for expanding selective schooling policies despite the critical economic and social costs associated with increased educational stratification and segregation.

These issues are particularly relevant in current political debates in Chile, where discussions around whether to restrict or allow selectivity in high-performing schools continue to generate controversy. Such debates are often based on superficial comparisons of student outcomes, failing to account for differences in school intake that arise from selective admissions.

Chapter 18 Implications

This chapter outlines the implications of the research findings for a range of key stakeholders. It begins by considering the implications for teachers, schools, and school districts, followed by reflections relevant to families and parents, and concludes with recommendations for policymakers. Even though many of these implications were addressed in Chapter 17 as part of the broader discussion, they are revisited here with a more focused emphasis on their significance for each stakeholder group and are presented in a more detailed form.

18.1 Implications for Teachers, Schools and School Districts

This thesis highlights a group of students from socioeconomically disadvantaged backgrounds who overcome adversity, make substantial progress, and graduate with high academic achievement despite beginning their education with low academic performance. These students often lack adequate academic support at home, making external assistance critical in unlocking their potential and fostering significant academic improvement.

For teachers, recognising the needs of such students is essential for two primary reasons. First, it ensures that teachers maintain high expectations for all students, regardless of their initial performance. Research consistently shows that teachers' low expectations can hinder students' potential and limit their achievements (Rosenthal & Jacobson, 1968; Rubie-Davies, 2010; Wang et al., 2018; De Boer et al., 2018). Second, it underscores teachers' transformative role in providing the external support these students require to succeed academically.

Interviews with students reveal that individualised, sustained, and meaningful teacher-student relationships are vital for fostering resilience and motivation in disadvantaged learners. These relationships can catalyse academic progress, enabling students to overcome challenges and succeed. This aligns with findings in the literature, which indicate that, among non-parental relationships, teacher bonding has the most potent predictive effect on students' resilience (Ye et al., 2024; Strolin-Goltzman et al., 2016; Crosnoe & Elder, 2004; Agasisti & Longobardi, 2014; Siraj-Blatchford et al., 2013; Langenkamp, 2010; Ye et al., 2024; Borman & Overman, 2004; Gizir & Aydin, 2009; Özden & Atasoy, 2020).

Schools and school districts also play a pivotal role in addressing the needs of disadvantaged students with low initial performance and limited familial support. Proactive measures should focus on targeted external assistance, which could include the following:

(1) Tutoring or mentoring programmes: Pairing students with supportive adults to guide their academic journey.
(2) Teacher support: Allocating time and resources to enable teachers to build meaningful relationships with students who require additional attention.
(3) Psychological support initiatives: As one of the interviewed students who succeeded against the odds emphasised, such programmes can enhance students' emotional and academic well-being.

Research strongly supports the effectiveness of tutoring programmes. A meta-analysis by Nickow et al. (2020) of 96 randomised controlled trial (RCT) evaluations reported a substantial positive impact (effect size of 0.37 SD), with even greater effects observed for programs led by teachers and paraprofessionals, particularly for younger students. When the analysis was restricted to studies with larger sample sizes (over 400 participants), the pooled effect size decreased slightly to approximately 0.25 SD. In a subsequent meta-analysis of RCT evaluations conducted in 2024, Nickow et al. reaffirmed the robust effects of tutoring programs (effect size of 0.288 SD), with benefits observed across mathematics and literacy outcomes. Notably, one-to-one tutoring emerged as the most effective approach, yielding the largest effect sizes. Interestingly, while literacy outcomes showed smaller effect sizes in higher grades, the benefits of mathematics tutoring remained consistent across all grade levels. These findings align with earlier meta-analyses. For example, Ritter et al. (2009) analysed 21 randomised studies of volunteer tutoring programmes, reporting a pooled effect size of 0.23 SD for elementary students' reading outcomes. Similarly, Dietrichson et al. (2017) examined educational interventions targeting students with low socioeconomic status and identified tutoring programs as among the most effective strategies, with an effect size of 0.36 SD. Collectively, this evidence underscores the substantial and consistent benefits of tutoring, particularly for students requiring additional academic support.

In contrast, this thesis found that growth mindset interventions generally yield limited academic effects. A structured literature review of these interventions found that their impact is typically

marginal. Schools and districts are therefore advised to allocate resources cautiously, prioritising evidence-based interventions like tutoring over those with less proven efficacy. Growth mindset interventions should only be considered if they can be implemented at minimal cost.

18.2 Implications for Parents and Families

Interviews with disadvantaged students who consistently achieved strong academic results revealed that a key factor driving their success was the support and involvement of their mothers in their academic development. This highlights the critical role of maternal involvement, particularly during the early years of schooling. Consistent with findings in the literature (Fan & Chen, 2001; Hill & Tyson, 2009; Desforges & Abouchaar, 2003; Ye et al., 2024; Pan & Yi, 2011; Paat, 2015; Oldfield et al., 2020; Kong, 2020; Cunningham & Swanson, 2010; Schoon et al., 2004; Anagnostaki et al., 2016; Bester & Kuyper, 2020), many interviewees credited their early academic success to their mothers' encouragement and support. Over time, as they developed effective study habits, learning strategies, and a strong appreciation for education, their reliance on maternal assistance naturally diminished.

Another key implication for families, especially those with young children facing academic difficulties, is the recognition that a poor start in school does not necessarily preclude later success. Despite beginning their education with low performance, this thesis's evidence highlights that some students can substantially improve with the proper support.

Families should be aware of these success stories, even if they represent a minority, as they can provide hope and motivation. A poor start or even repeating a school year does not doom a child’s academic future. Instead, such situations should be viewed as opportunities to provide additional support to enable the child to achieve excellent academic outcomes and potentially pursue higher education.

18.3 Implications for Policymakers

The findings about the academic impact of a group of selective schools known as Bicentennial Schools suggest that the perceived success of these schools is primarily due to their selective admissions policies rather than any inherent advantage in the quality of education they provide. These results align with similar studies on selective schools in other developing countries (Zhang, 2014; Wu et al., 2019; Lucas & Mbiti, 2014), evaluations of grammar schools in the United Kingdom (Clark, 2010; Gorard & Siddiqui, 2018; Capsada-Munsech & Boliver, 2023), and findings from studies on selective schools in the United States (Abdulkadiroglu et al., 2014; Dobbie & Fryer, 2011; Barrow et al., 2020; Allensworth et al., 2017; Ballou et al., 2006).

Based on these findings, policymakers are encouraged to reconsider policies that prioritise or expand selective schools. While these schools may appear to deliver strong academic outcomes, their apparent success primarily reflects the higher academic performance of the students they admit rather than the quality of education provided. Furthermore, the selective nature of these schools contributes to increased segregation among students and fails to address the needs of those who require the most support, particularly students from disadvantaged backgrounds with limited familial resources.

Chapter 19 Future research

This study has generated new research questions and avenues for future exploration. This chapter outlines the most compelling directions, beginning with ideas related to the primary research question and conclusions and continuing with specific suggestions inspired by each stage of this thesis.

To address one of the broader limitations discussed in Chapter 16, replicating this research in countries with diverse contexts would be highly valuable. For example, conducting similar studies in nations with higher poverty levels could shed light on the more pronounced challenges students from disadvantaged backgrounds face. Similarly, examining countries with greater racial diversity could provide insights into the unique difficulties encountered by students from specific racial minorities.

Expanding the definition of disadvantaged students to include those with cognitive, psychological, or special educational needs could yield important findings. Such an approach would help identify individuals within these groups who succeed against the odds and illuminate the support they require to achieve academic success.

The following sections delve into research ideas inspired by each of the four stages of this thesis.

19.1. Future Research Directions from the Longitudinal Data Analysis

Several promising research avenues emerge from the longitudinal data analysis, offering opportunities to deepen our understanding of the factors influencing students' academic trajectories.

First, extending the time horizon of longitudinal studies could uncover long-term outcomes associated with the variables identified in this research. Tracking students into adulthood could provide insights into their tertiary education attainment, career success, and broader personal

and professional development. Such an approach would allow researchers to evaluate the enduring impact of succeeding against the odds.

Second, future research could incorporate additional variables not included in the current dataset, particularly those relating to early childhood experiences. Factors such as health indicators, preschool behaviours, family dynamics, and foundational support systems could offer valuable insights into the conditions that foster or hinder academic resilience from an early age. Exploring these dimensions would enhance our understanding of the initial factors shaping students' educational journeys.

19.2. Future Research Direction from the Literature Review on Growth Mindset Interventions

This study has revealed that while there is a consistent correlation between academic outcomes and growth mindset, the most rigorous causal studies report only limited or negligible effects of mindset interventions on academic performance. This finding raises critical questions about whether these popular growth mindset interventions genuinely alter students' beliefs or merely affect their responses to mindset questionnaires.

Future research should focus on investigating the true malleability of the growth mindset. It is crucial to evaluate whether widely adopted, low-cost, low-intensity interventions can foster meaningful and enduring changes in students' beliefs or if they primarily influence how students self-report on questionnaires. This distinction is essential for understanding the actual impact of mindset interventions.

Moreover, future studies could focus on evaluating more intensive interventions that engage students at a deeper, experiential level. These interventions should prioritise how students actively experience and apply growth mindset principles rather than simply introducing them to them abstractly and with stories about others. Such comprehensive engagement could result in more profound shifts in students' core beliefs and can produce long-term improvements in their learning and development.

19.3. Future Research Direction from the Evaluation of Bicentennial Schools

The evaluation of Bicentennial Schools highlights valuable opportunities for further research. A key area of focus is the analysis of cohorts affected by the policy change that restricted student selection in the admissions process but were not impacted by disruptions caused by pandemic-related school closures. These cohorts, comprising students turning 16 in 2024 or later, will provide a clearer basis for evaluation once the relevant data becomes available. Such analysis could offer deeper insights into whether the observed decline in the effectiveness of Bicentennial Schools is partially a consequence of the pandemic or solely attributable to the limitations imposed on the student selection process.

Another promising avenue involves using tertiary education entrance exam scores (at age 18) as the dependent variable rather than standardised test scores at age 16. Additionally, examining the long-term effects of Bicentennial Schools on outcomes such as higher education retention, graduation rates, and future earnings could provide a more comprehensive understanding of their impact.

Finally, evaluating the influence of these schools on non-academic outcomes—including socio-emotional development, quality of life, and overall well-being—could provide valuable insights into their broader contributions to students' lives.

19.4. Future Research Directions from the Interviews of Disadvantaged Students

The interviews with disadvantaged students revealed themes that warrant further exploration. A recurring theme in the narratives was the pivotal role of specific individuals—such as a stepparent, grandparent, sister, or friends—who entered students' lives during their school years and provided critical guidance and support. Many students attributed their academic success to these relationships, which often arose by chance.

Future research could explore structured programmes to replicate these supportive relationships, such as mentorship schemes, school-based tutoring, or social work initiatives. Investigating the impact of long-term, intentional connections with positive adult role models

on disadvantaged students' academic growth could provide valuable insights into the potential of such interventions.

Another area of interest involves examining the impact of grade repetition. In this study, three students who succeeded against the odds described repeating a grade as a transformative experience that motivated them to work harder to avoid similar setbacks. Future research could investigate whether and how grade repetition impacts other students and identify characteristics that influence its effects.

Finally, future studies could expand the sample to include students from more diverse schools, cultural backgrounds, and national contexts. Such research would provide a richer understanding of how supportive relationships and other factors influence students across varying institutional and cultural settings, contributing to the generalisability of these findings.

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Appendix 1. Main Reasons for the Rating of Each Study.

Paper	Rating	Main concern influencing the rating.
Alan et al. (2019) -S2	2	Despite a large number of students, the randomisation unit are only 16 schools, leading to the likelihood of unbalanced groups. Specifically, the two groups exhibit imbalances in verbal test scores. Additionally, I only considered short-term scores due to a 48% dropout rate in the long term.
Bettinger et al. (2018)	2	The study experienced a 28% dropout rate because of students not taking the test. I exclusively reported the overall test effect and not some portions of the test reported in the paper.
Binning et al. (2019)	3	The study does not provide clarity regarding the number of students included in the regression analysis used to calculate the impact. However, based on the available information, we have calculated a dropout rate of 13%.
Blackwell et al. (2007)	1	Although 95 students participated, they were grouped into advisory groups consisting of 12-14 students, and these advisory groups were randomised. Consequently, we determined that approximately 7 or 8 advisory groups were randomised, which is a small randomisation size.
Blau and Benolol (2016)	2	The outputs are not robust for assessing academic achievement. They evaluated a programming project based on criteria such as the clarity of the idea, computing quality, creativity, and the aesthetics of the design. Additionally, the sample size of the study encompassed a little over 100 students.
Brougham and Kashubeck - West (2018)	2	The randomisation encompasses only 89 students, and the dropout rate exceeds 20%.
Burnette, Russell et al. (2018)	3	With a sample size of 222 students, it is not sufficiently large to qualify as a robust 4-star study.
Chao et al. (2017)	3	The randomised units were classes, with 107 classes assigned to 6 different groups, resulting in groups consisting of 17 to 20 classes each. This size is not big enough to achieve a 4-star rating.
Dommett et al. (2013)	1	The study had a small randomisation size, with only 5 schools assigned to 5 different intervention conditions.
Foliano et al. (2019)	4	The study includes a significant sample size, with 101 schools assigned to either the control or treatment group. Despite an attrition rate close to 10%, a 4-star rating has still been awarded.
Ganimian (2020)	4	A substantial sample size is featured in the study, with 202 schools allocated to either the control or treatment group. Despite an attrition rate nearing 10%, the study has still been awarded a 4-star rating.
Glerum et al. (2020)	0	The study had a limited sample size, consisting of only 55 students, with randomisation conducted at the classroom level, further reducing the effective sample size
Good et al. (2003)	2	138 students were randomised into four groups, and the size of each group was insufficient to warrant a 3 or 4-star rating.
Orosz (2017)	0	The study had a limited sample size, consisting of only 55 students, with randomisation conducted at the teacher level, further reducing the effective sample size
Outes-Leon et al. (2020)	4	The study benefits from a large sample size of 800 randomised schools, with minimal dropout rates for the ITT results.
Polley (2018)	2-3	Clarity regarding the dropout rate is lacking in the paper; however, based on calculations, it has been estimated to range between 14% and 33% for various

		outcomes. Consequently, the study is rated between 2 and 3, depending on the specific outcome.
Porter et al. (2020)	1-2	The study exhibits a substantial dropout rate, ranging from 36% to 57% for various outcomes. Consequently, the study is rated between 1 and 2 stars, depending on the specific outcome
Poter et al. (2022)	3	With a randomised sample of only 52 teachers, the study's sample size limits its rating to a maximum of 3 stars.
Rege et al. (2021)	4	Given the substantial sample size of 6,541 students and very low attrition rates for the ITT results, the study merits a 4-star rating
Rienzo et al. (2015)	2	The study has a significant dropout rate of 38%
Schrodt (2015)	1	The study has a small sample size of only 27 students.
Wanzek et al. (2021)	3	A sample size of 240 students qualifies the study for a 3-star rating
Wilkins (2014)	2	The study features a small sample size, with only 16 teachers randomised.
Xu et al. (2021)	3	A sample size of 140 students qualifies the study for a 3-star rating
Zhao et al. (2023)	2	Randomization occurred at the classroom level; however, the exact number of classrooms in each group was not specified. I estimated a total of around 30-40 classrooms, with 20-25 in the treatment group and 10-15 in the control group. The groups were not balanced in terms of age or gender. There were more boys in the control group, which may have influenced the slower progress observed in the two language subjects, in contrast to the relatively better progress in mathematics.
Zhou et al. (2023)	4	The sample size consisted of 1,680 students, with an attrition rate between 2% and 4%. The data quality is high, as it includes results from officially centrally graded exams in both Chinese and Mathematics.

Appendix 2. R-squared at Each Stage for each regression.

Math Regressions 2016		Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6	Reg 7	Reg 8
Number observations		10,856	10,893	10,872	10,868	10,859	10,684	10,962	10,772
R^2	Born characteristics	0.039	0.039	0.041	0.039	0.041	0.035	0.037	0.040
	SES	0.110	0.104	0.107	0.103	0.107	0.100	0.112	0.111
	Type of school at 10	0.111	0.107	0.109	0.105	0.108	0.101	0.114	0.112
	Score at 10	0.389	0.386	0.379	0.383	0.372	0.382	0.399	0.394
	Type of school at 14	0.393	0.389	0.383	0.387	0.377	0.386	0.403	0.398
	Score at 14	0.557	0.561	0.556	0.564	0.549	0.555	0.571	0.569
	Type of school at 16	0.560	0.563	0.557	0.566	0.551	0.558	0.573	0.571
	Bicentennial School at 16	0.575	0.579	0.572	0.579	0.567	0.572	0.589	0.584

Math Regressions 2016		Reg 9	Reg 10	Reg 11	Reg 12	Reg 13	Reg 14	Reg 15	Reg 16	Reg 17
Number observations		10,757	10,878	10,807	10,970	10,748	10,787	10,955	10,805	10,840
R^2	Born characteristics	0.043	0.045	0.037	0.044	0.036	0.044	0.045	0.038	0.043
	SES	0.111	0.111	0.102	0.111	0.104	0.107	0.112	0.106	0.114
	Type of school at 10	0.113	0.112	0.104	0.112	0.106	0.108	0.113	0.107	0.115
	Score at 10	0.390	0.380	0.370	0.387	0.381	0.392	0.395	0.390	0.382
	Type of school at 14	0.394	0.384	0.374	0.392	0.384	0.397	0.399	0.395	0.387
	Score at 14	0.564	0.554	0.547	0.560	0.553	0.569	0.563	0.557	0.555
	Type of school at 16	0.567	0.557	0.549	0.563	0.556	0.571	0.565	0.559	0.557
	Bicentennial School at 16	0.581	0.571	0.565	0.576	0.570	0.584	0.579	0.575	0.571

Language Regressions 2016		Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6	Reg 7	Reg 8	Reg 9
Number observations		10,778	10,824	10,822	10,778	10,762	10,621	10,873	10,697	10,643
R2	Born characteristics	0.050	0.047	0.048	0.045	0.051	0.053	0.049	0.051	0.051
	SES	0.091	0.082	0.089	0.083	0.087	0.091	0.092	0.095	0.095
	Type of school 10 years old	0.092	0.084	0.091	0.085	0.089	0.093	0.093	0.097	0.097
	Score at 10	0.335	0.328	0.323	0.326	0.327	0.331	0.325	0.341	0.333
	Type of school 14 years old	0.339	0.335	0.328	0.330	0.332	0.337	0.330	0.347	0.336
	Score at 14	0.478	0.478	0.474	0.479	0.479	0.483	0.476	0.492	0.483
	Type of school at 16	0.482	0.481	0.478	0.482	0.483	0.486	0.479	0.495	0.486
	Bicentennial School at 16	0.489	0.487	0.483	0.488	0.489	0.491	0.485	0.499	0.491

Language Regressions 2016		Reg 10	Reg 11	Reg 12	Reg 13	Reg 14	Reg 15	Reg 16	Reg 17
Number observations		10,805	10,712	10,848	10,694	10,685	10,856	10,745	10,765
R2	Born characteristics	0.049	0.048	0.050	0.047	0.050	0.052	0.045	0.051
	SES	0.087	0.088	0.093	0.088	0.087	0.096	0.086	0.091
	Type of school 10 years old	0.089	0.090	0.094	0.090	0.088	0.097	0.087	0.093
	Score at 10	0.326	0.326	0.335	0.320	0.330	0.335	0.333	0.324
	Type of school 14 years old	0.331	0.332	0.343	0.326	0.335	0.339	0.339	0.330
	Score at 14	0.485	0.480	0.483	0.473	0.481	0.486	0.482	0.473
	Type of school at 16	0.489	0.484	0.487	0.477	0.485	0.488	0.485	0.477
	Bicentennial School at 16	0.495	0.490	0.491	0.482	0.489	0.495	0.491	0.483

Math Regressions 2017		Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6	Reg 7	Reg 8	Reg 9
Number observations		10987	10981	11060	10938	10888	10906	10898	10977	10877
R^2	Born characteristics	0.039	0.046	0.038	0.042	0.042	0.035	0.038	0.037	0.038
	SES	0.105	0.108	0.103	0.114	0.107	0.099	0.101	0.101	0.102
	Type of school at 10	0.112	0.113	0.110	0.119	0.112	0.104	0.107	0.108	0.108
	Score at 10	0.403	0.406	0.407	0.401	0.400	0.398	0.403	0.405	0.413
	Score at 12	0.497	0.496	0.495	0.500	0.491	0.487	0.498	0.487	0.505
	Type of school at 14	0.500	0.499	0.497	0.502	0.493	0.489	0.501	0.490	0.508
	Type of school at 16	0.505	0.503	0.502	0.505	0.496	0.493	0.504	0.493	0.512
	Bicentennial School at 16	0.528	0.527	0.526	0.528	0.519	0.517	0.527	0.516	0.532

Math Regressions 2017		Reg 10	Reg 11	Reg 12	Reg 13	Reg 14	Reg 15	Reg 16	Reg 17
Number observations		10986	10967	10971	10923	10905	11007	10995	10968
R^2	Born characteristics	0.040	0.035	0.039	0.041	0.044	0.044	0.039	0.043
	SES	0.108	0.098	0.104	0.110	0.112	0.109	0.110	0.106
	Type of school at 10	0.112	0.104	0.108	0.116	0.118	0.113	0.116	0.111
	Score at 10	0.407	0.402	0.391	0.407	0.411	0.398	0.406	0.404
	Score at 12	0.499	0.488	0.481	0.498	0.497	0.492	0.492	0.490
	Type of school at 14	0.502	0.491	0.484	0.501	0.500	0.495	0.496	0.492
	Type of school at 16	0.506	0.494	0.487	0.504	0.505	0.498	0.499	0.498
	Bicentennial School at 16	0.526	0.516	0.512	0.526	0.526	0.523	0.523	0.521

Language Regressions 2017		Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6	Reg 7	Reg 8	Reg 9
Number observations		10864	10847	10904	10813	10798	10764	10746	10833	10757
R^2	Born characteristics	0.050	0.054	0.059	0.055	0.054	0.048	0.050	0.051	0.053
	SES	0.085	0.088	0.093	0.091	0.090	0.084	0.084	0.082	0.087
	Type of school at 10	0.086	0.088	0.094	0.092	0.091	0.085	0.085	0.084	0.088
	Score at 10	0.338	0.340	0.344	0.345	0.339	0.335	0.339	0.339	0.347
	Score at 12	0.427	0.419	0.431	0.429	0.425	0.428	0.428	0.419	0.434
	Type of school at 14	0.430	0.423	0.435	0.434	0.430	0.432	0.433	0.424	0.438
	Type of school at 16	0.435	0.427	0.440	0.438	0.434	0.437	0.438	0.428	0.442
	Bicentennial School at 16	0.445	0.438	0.449	0.447	0.443	0.446	0.446	0.436	0.448

Language Regressions 2017		Reg 10	Reg 11	Reg 12	Reg 13	Reg 14	Reg 15	Reg 16	Reg 17
Number observations		10862	10825	10863	10764	10759	10879	10831	10834
R^2	Born characteristics	0.053	0.050	0.059	0.050	0.057	0.059	0.053	0.055
	SES	0.089	0.082	0.091	0.084	0.094	0.093	0.088	0.089
	Type of school at 10	0.090	0.083	0.091	0.085	0.095	0.094	0.089	0.090
	Score at 10	0.347	0.334	0.342	0.332	0.349	0.346	0.339	0.342
	Score at 12	0.429	0.420	0.432	0.416	0.432	0.430	0.426	0.419
	Type of school at 14	0.433	0.423	0.436	0.420	0.436	0.433	0.429	0.423
	Type of school at 16	0.438	0.428	0.440	0.426	0.442	0.438	0.433	0.427
	Bicentennial School at 16	0.446	0.435	0.450	0.435	0.449	0.448	0.441	0.435

Math Regressions 2018		Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6	Reg 7	Reg 8	Reg 9
Number observations		11160	11146	11060	11243	11033	11220	11252	11179	11066
R^2	Born characteristics	0.036	0.037	0.037	0.033	0.038	0.036	0.036	0.036	0.033
	SES	0.092	0.103	0.098	0.091	0.097	0.096	0.093	0.097	0.099
	Type of school at 10	0.098	0.108	0.103	0.096	0.101	0.101	0.097	0.100	0.104
	Score at 10	0.393	0.401	0.391	0.381	0.394	0.392	0.387	0.386	0.398
	Score at 12	0.493	0.504	0.496	0.484	0.491	0.497	0.496	0.485	0.503
	Type of school at 14	0.498	0.510	0.500	0.489	0.496	0.503	0.500	0.490	0.508
	Type of school at 16	0.499	0.511	0.502	0.491	0.498	0.504	0.501	0.491	0.509
	Bicentennial School at 16	0.517	0.529	0.522	0.509	0.516	0.523	0.520	0.513	0.529

Math Regressions 2018		Reg 10	Reg 11	Reg 12	Reg 13	Reg 14	Reg 15	Reg 16	Reg 17
Number observations		11102	11217	11189	11087	11189	11165	11159	11149
R^2	Born characteristics	0.038	0.041	0.035	0.034	0.040	0.040	0.037	0.039
	SES	0.092	0.100	0.091	0.089	0.096	0.097	0.096	0.100
	Type of school at 10	0.097	0.104	0.096	0.093	0.100	0.103	0.100	0.104
	Score at 10	0.390	0.394	0.390	0.385	0.387	0.392	0.398	0.390
	Score at 12	0.490	0.500	0.492	0.485	0.489	0.496	0.499	0.490
	Type of school at 14	0.496	0.505	0.496	0.490	0.494	0.502	0.505	0.496
	Type of school at 16	0.497	0.506	0.497	0.492	0.496	0.503	0.507	0.498
	Bicentennial School at 16	0.517	0.523	0.517	0.514	0.516	0.524	0.526	0.518

Language Regressions 2018		Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6	Reg 7	Reg 8	Reg 9
Number observations		11035	11061	10938	11102	10919	11045	11124	11049	10978
R^2	Born characteristics	0.047	0.052	0.050	0.048	0.044	0.045	0.048	0.047	0.050
	SES	0.077	0.090	0.085	0.082	0.079	0.082	0.084	0.084	0.094
	Type of school at 10	0.080	0.092	0.087	0.084	0.080	0.085	0.085	0.085	0.095
	Score at 10	0.313	0.331	0.329	0.326	0.330	0.325	0.321	0.322	0.334
	Score at 12	0.395	0.412	0.407	0.398	0.411	0.409	0.401	0.402	0.413
	Type of school at 14	0.396	0.413	0.409	0.400	0.413	0.410	0.403	0.403	0.414
	Type of school at 16	0.398	0.416	0.412	0.403	0.416	0.413	0.405	0.406	0.416
	Bicentennial School at 16	0.405	0.422	0.419	0.409	0.422	0.419	0.411	0.412	0.423

Language Regressions 2018		Reg 10	Reg 11	Reg 12	Reg 13	Reg 14	Reg 15	Reg 16	Reg 17
Number observations		11001	11065	11086	10943	11028	11096	11020	11039
R^2	Born characteristics	0.051	0.051	0.047	0.049	0.049	0.051	0.046	0.047
	SES	0.086	0.087	0.081	0.083	0.086	0.085	0.083	0.085
	Type of school at 10	0.087	0.089	0.082	0.084	0.087	0.088	0.084	0.086
	Score at 10	0.323	0.339	0.322	0.317	0.326	0.327	0.324	0.328
	Score at 12	0.403	0.422	0.398	0.399	0.403	0.403	0.403	0.402
	Type of school at 14	0.405	0.423	0.399	0.400	0.404	0.405	0.405	0.403
	Type of school at 16	0.407	0.426	0.402	0.403	0.407	0.407	0.407	0.405
	Bicentennial School at 16	0.414	0.431	0.409	0.409	0.413	0.413	0.415	0.412

Math Regressions 2022		Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6	Reg 7	Reg 8	Reg 9
Number observations		8892	9131	8793	8990	8931	8916	8905	8782	8876
R^2	Born characteristics	0.026	0.018	0.022	0.026	0.023	0.023	0.022	0.026	0.026
	SES	0.079	0.079	0.078	0.085	0.086	0.082	0.083	0.082	0.090
	Type of school at 10	0.081	0.082	0.082	0.088	0.089	0.084	0.087	0.085	0.094
	Score at 10	0.354	0.360	0.355	0.361	0.360	0.357	0.355	0.357	0.353
	Score at 12	0.460	0.464	0.457	0.459	0.464	0.462	0.459	0.457	0.455
	Type of school at 14	0.463	0.466	0.460	0.462	0.466	0.464	0.460	0.459	0.458
	Type of school at 16	0.465	0.468	0.462	0.463	0.468	0.466	0.463	0.461	0.460
	Bicentennial School at 16	0.468	0.471	0.465	0.466	0.470	0.468	0.465	0.466	0.463

Math Regressions 2022		Reg 10	Reg 11	Reg 12	Reg 13	Reg 14	Reg 15	Reg 16	Reg 17
Number observations		8934	8919	8951	8863	8972	8924	8990	8963
R^2	Born characteristics	0.021	0.019	0.023	0.023	0.024	0.020	0.025	0.023
	SES	0.083	0.088	0.081	0.078	0.082	0.080	0.083	0.073
	Type of school at 10	0.086	0.091	0.083	0.081	0.085	0.083	0.085	0.077
	Score at 10	0.356	0.365	0.354	0.364	0.361	0.358	0.357	0.355
	Score at 12	0.459	0.466	0.459	0.462	0.467	0.465	0.462	0.460
	Type of school at 14	0.462	0.469	0.461	0.465	0.471	0.468	0.466	0.462
	Type of school at 16	0.464	0.471	0.462	0.467	0.472	0.470	0.468	0.465
	Bicentennial School at 16	0.466	0.473	0.466	0.470	0.476	0.472	0.470	0.468

Language Regressions 2022		Reg 1	Reg 2	Reg 3	Reg 4	Reg 5	Reg 6	Reg 7	Reg 8	Reg 9
Number observations		8816	9022	8667	8899	8878	8800	8807	8704	8779
R^2	Born characteristics	0.047	0.045	0.045	0.045	0.046	0.058	0.040	0.051	0.047
	SES	0.089	0.092	0.095	0.095	0.097	0.102	0.090	0.094	0.101
	Type of school at 10	0.090	0.093	0.097	0.096	0.099	0.103	0.091	0.095	0.102
	Score at 10	0.379	0.393	0.391	0.385	0.401	0.397	0.384	0.386	0.381
	Score at 12	0.473	0.477	0.483	0.470	0.484	0.488	0.466	0.473	0.472
	Type of school at 14	0.476	0.478	0.486	0.473	0.486	0.491	0.468	0.476	0.474
	Type of school at 16	0.477	0.480	0.489	0.475	0.488	0.493	0.471	0.478	0.477
	Bicentennial School at 16	0.478	0.480	0.490	0.475	0.488	0.493	0.472	0.479	0.477

Language Regressions 2022		Reg 10	Reg 11	Reg 12	Reg 13	Reg 14	Reg 15	Reg 16	Reg 17
Number observations		8836	8807	8867	8746	8885	8814	8870	8886
R^2	Born characteristics	0.049	0.049	0.041	0.053	0.049	0.043	0.049	0.049
	SES	0.101	0.099	0.087	0.096	0.092	0.090	0.092	0.090
	Type of school at 10	0.102	0.101	0.088	0.096	0.093	0.091	0.093	0.091
	Score at 10	0.394	0.392	0.391	0.394	0.390	0.384	0.391	0.382
	Score at 12	0.475	0.474	0.480	0.480	0.477	0.474	0.478	0.474
	Type of school at 14	0.477	0.476	0.482	0.482	0.480	0.476	0.480	0.476
	Type of school at 16	0.479	0.479	0.484	0.485	0.482	0.479	0.482	0.478
	Bicentennial School at 16	0.480	0.479	0.484	0.485	0.483	0.479	0.483	0.479

Appendix 3. Variables Coefficients for each regression.

Variables Coefficients Math Regressions 2016

Variable:	Regressions:																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Female	-1.5	-1.9	-2.4	-2.0	-1.7	-1.9	-1.5	-2.0	-2.0	-3.3	-2.3	-1.9	-2.2	-2.4	-1.9	-2.2	-1.5
Born 1999-1	-16.2	-18.3	-20.2	-13.6	-19.9	-16.1	-14.5	-19.0	-17.8	-21.1	-18.5	-21.9	-15.7	-15.9	-19.7	-15.0	-17.3
Born 1999-2	-13.6	-10.9	-14.2	-15.5	-13.9	-13.7	-12.1	-12.1	-11.3	-13.4	-12.5	-14.1	-10.4	-15.4	-16.8	-13.3	-13.4
Born 2000-1	-8.0	-5.7	-6.6	-6.1	-6.3	-7.2	-6.6	-7.4	-8.4	-8.4	-6.5	-7.2	-5.9	-6.6	-6.1	-6.6	-6.7
Born 2000-2	-3.9	-1.4	-3.1	-3.3	-3.5	-3.6	-3.9	-3.8	-2.9	-3.0	-3.1	-2.9	-3.8	-3.0	-3.4	-3.6	-2.3
Mother Secondary Inc	0.9	2.4	0.7	1.2	1.4	0.4	2.5	2.1	0.6	1.5	1.5	3.0	2.0	1.5	1.7	2.1	3.0
Mother Secondary Com	1.4	3.1	1.6	2.0	2.5	1.4	2.8	3.6	1.3	1.9	2.0	4.2	2.6	2.3	1.9	2.5	2.4
Mother No Info	-2.2	-4.9	-0.9	-0.2	-13.0	0.5	-0.3	9.0	12.8	-5.4	-9.5	-10.2	-7.9	1.9	9.4	1.8	1.7
Father Secondary Inc	-0.4	0.0	-0.9	-0.2	0.0	0.9	0.2	0.6	1.2	1.2	2.1	0.4	0.9	0.3	1.0	-1.3	0.7
Father Secondary Com	1.9	2.2	1.2	1.2	1.9	3.1	2.7	2.2	2.9	3.7	3.9	1.3	2.5	3.6	2.3	-0.7	1.7
Father No Info	0.5	4.8	-5.8	3.6	4.3	2.9	-4.0	-2.6	3.9	5.9	4.9	1.7	2.4	1.1	-0.1	-2.0	0.2
Income 1	4.8	-2.5	-1.7	0.5	-0.7	-1.2	3.0	6.3	2.3	-1.8	-3.2	2.9	0.7	5.5	0.2	-8.9	0.3
Income 2	7.7	0.5	-0.7	2.3	2.2	0.6	6.4	7.4	5.6	0.9	-1.9	6.4	3.2	8.1	4.3	-2.8	2.4
Income 3	6.7	0.8	0.4	2.5	2.4	0.0	5.2	8.1	4.8	0.3	-1.2	6.2	4.5	7.7	3.7	-2.1	1.8
Income 4	9.1	2.6	1.0	3.9	1.7	2.7	6.8	9.0	6.5	0.0	-2.6	6.0	6.2	8.4	4.6	-2.5	3.4
Income 5	9.0	3.6	1.2	3.7	2.8	1.1	5.3	9.0	4.9	2.4	0.6	8.5	5.4	9.0	4.9	-1.0	2.7
Income 6	9.1	4.3	2.4	5.2	4.0	3.5	7.3	9.3	8.7	4.6	0.5	8.1	6.0	10.8	5.8	-0.4	6.1
Income 7	10.8	2.0	2.0	5.9	3.9	3.0	7.5	10.7	8.0	4.1	-0.5	7.1	6.8	11.6	6.0	-0.7	4.4
Income 8	10.9	4.8	1.8	4.4	5.3	2.8	5.9	10.7	8.3	6.0	-0.9	8.4	7.2	11.7	6.4	0.0	6.8
Income 9	10.2	3.4	1.5	4.2	6.1	3.4	7.1	10.5	5.2	3.9	2.2	9.9	3.2	8.4	6.3	-2.8	4.1
Income 10	13.2	4.3	-0.6	5.0	3.0	4.5	8.5	12.6	7.1	3.7	-0.2	11.2	8.6	8.5	8.8	7.0	6.1
Income 11	10.5	3.6	3.3	9.5	5.1	3.1	10.2	11.0	6.9	10.5	1.2	15.8	11.7	7.4	7.6	3.0	4.8
Income 12	12.0	7.4	2.3	5.2	6.4	2.9	6.1	17.1	3.9	4.4	5.7	6.7	10.1	12.6	4.5	2.9	2.9
Income 13	0.1	-5.7	1.8	-0.9	2.8	-5.0	-0.3	1.9	0.2	-6.4	-7.7	5.4	-1.6	8.5	-5.4	-5.6	-3.1
Income 14	16.8	11.5	11.4	15.0	12.3	11.8	15.0	17.5	15.5	12.0	10.1	12.0	13.3	15.1	14.9	7.8	16.4
Income No Info	6.4	0.6	-6.7	-2.7	25.3	-2.0	0.0	-8.9	-12.1	6.2	14.4	15.1	2.3	9.3	-22.1	-13.8	4.7
Years Prioritario	0.1	0.2	0.2	0.1	0.2	0.2	0.2	0.3	0.2	0.3	0.0	0.0	0.2	0.3	0.3	0.1	0.2
Years Extra Support	-0.1	-0.1	-0.2	-0.1	-0.1	-0.1	-0.1	-0.3	-0.1	-0.3	0.0	0.0	-0.1	-0.2	-0.4	-0.3	-0.3
Municipal 2010	1.2	0.5	-0.4	1.3	1.3	-0.7	-1.1	2.2	0.8	1.4	-0.2	1.7	0.4	2.3	-0.5	0.7	-0.6
Private subs 2010	0.4	0.6	-0.8	0.8	0.8	-0.1	1.4	1.4	1.1	1.4	0.6	1.1	0.5	1.7	1.0	-0.1	0.3
No info school 2010	3.5	1.7	-5.4	3.7	14.3	-4.8	-4.6	0.1	-0.1	-0.7	5.8	2.7	0.5	0.6	5.3	-3.8	3.7
Rural 2010	-0.7	-0.3	-0.6	0.1	-0.6	0.4	0.0	-1.2	1.0	1.7	-0.1	-0.5	-0.2	-1.0	1.6	-0.4	1.1
Language 10 years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Math 10 years	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.3	0.2

Private subs 2014	-1.0	-2.5	0.9	-2.3	-2.8	-1.4	-1.1	-3.3	-1.0	-1.8	-0.9	-0.5	-1.5	-2.9	1.2	-0.5	0.6
No info school 2014	-0.5	-1.8	-0.8	-1.3	-2.7	-0.6	-1.5	-0.7	-1.0	-1.6	-2.0	-2.6	-2.0	-3.9	-0.8	-1.4	-1.5
School fee 1 2014	-2.8	0.5	-5.7	-1.9	-1.4	0.6	-5.4	-2.6	-2.4	-1.7	-0.8	-4.8	-2.3	0.4	-2.6	-4.0	0.2
School fee 2 2014	-2.1	0.9	-2.2	-1.0	-1.1	0.0	-1.9	0.1	-0.7	0.0	-1.5	-0.8	-2.1	-0.4	-0.8	-0.6	-0.7
School fee 3 2014	-0.7	-1.2	-1.3	-2.3	-1.6	-2.1	-3.7	-0.7	0.0	0.1	-2.5	-1.0	-2.4	-1.5	-2.7	-0.9	-1.0
School fee 4 2014	-0.9	1.9	-0.7	-0.9	-0.8	-1.5	-2.5	-1.8	-2.0	-1.1	-1.2	-0.5	-0.4	0.8	-1.2	-1.3	0.4
School fee 5 2014	2.7	2.3	3.4	2.2	-0.4	-4.7	1.6	-2.1	0.2	-0.7	2.6	1.3	-2.7	2.3	1.6	3.1	0.6
School Catholic 2014	-0.9	-0.6	0.2	-1.6	-1.0	-0.8	-1.2	-2.3	-0.5	0.5	0.4	-1.1	-1.2	-1.8	-0.7	-1.4	-0.5
School Evangelic 2014	0.0	2.6	3.7	1.7	1.4	1.0	0.0	-0.7	1.4	1.6	3.8	5.2	7.0	3.6	0.8	1.0	2.7
School other 2014	0.8	1.4	1.7	2.4	2.3	2.6	1.3	-0.6	4.1	3.5	4.3	2.7	2.4	1.4	2.8	0.0	0.3
School no info 2014	0.9	-5.8	14.1	5.4	-0.5	-13.0	14.3	1.6	-5.1	-2.6	-6.2	6.7	-0.4	-5.3	-7.4	3.3	-7.4
Rural 2014	-1.3	0.4	-1.8	-0.8	-3.8	-2.7	-1.3	0.6	-0.7	-2.9	-1.5	0.9	0.4	-1.0	-1.6	-3.3	-1.6
Language 14 years	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Math 14 years	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Municipal school 2016	1.2	1.8	1.3	2.5	3.0	1.8	2.6	2.5	0.7	2.5	2.5	0.7	2.4	2.1	1.0	2.2	1.1
Private subs 2016	3.5	6.4	6.6	6.5	7.3	3.9	5.2	5.9	4.7	6.3	6.4	4.9	6.2	7.4	8.0	7.1	3.7
Delegated Admin 2016	10.8	8.8	9.0	10.5	9.7	7.0	5.9	10.5	6.6	10.7	9.2	9.8	8.1	9.8	9.7	10.0	8.3
School fee 1 2016	-3.1	-2.5	-2.0	-2.3	-1.9	-1.4	-2.3	-2.8	-2.1	-2.6	-2.5	-2.1	-1.9	-1.7	-1.9	-2.5	-4.1
School fee 2 2016	5.1	2.3	1.5	-1.4	3.9	4.5	5.8	1.9	3.1	3.1	5.1	4.2	2.8	1.8	1.6	2.3	3.8
School fee 3 2016	9.2	9.7	6.6	5.5	11.2	5.4	8.0	5.6	10.2	5.3	7.3	8.3	7.2	6.9	5.5	6.5	9.5
School fee 4 2016	14.3	8.7	7.8	9.8	13.4	16.8	13.0	11.5	13.6	10.3	10.7	10.9	12.9	11.1	9.5	11.4	12.3
School fee 5 2016	7.5	14.3	6.1	10.9	6.1	29.5	13.9	-4.2	12.5	16.8	13.7	0.4	6.4	3.5	16.3	8.9	13.9
School fee info 2016	-3.3	-4.0	-1.1	-4.3	-3.6	-3.1	1.5	-2.1	-0.5	-4.3	-5.9	-1.2	-3.7	-4.8	-1.5	-1.3	-5.5
School Catholic 2016	6.5	8.2	6.1	6.3	6.0	7.6	8.2	7.8	7.3	6.2	6.7	6.9	7.0	6.2	7.1	6.8	7.2
School Evangelic 2016	1.8	2.9	-5.0	-0.8	1.1	-2.4	2.1	-0.1	4.0	4.1	0.8	-10.7	-4.7	-3.3	-2.9	3.1	1.8
School other 2016	-1.0	-0.1	-1.6	-3.9	-2.9	-4.5	-0.1	-1.5	-1.2	-3.4	0.0	-1.6	-4.5	-2.2	-3.2	-3.1	-1.4
School no info 2016	21.2	-1.6	-5.0	0.9	9.8	11.1	-2.5	2.5	4.7	-6.4	-10.8	0.4	5.5	4.2	-2.5	-8.1	5.1
Rural 2016	-0.2	-3.8	-1.4	-1.6	1.0	-3.5	-2.1	-2.6	-2.4	-3.0	-0.3	-2.8	-3.3	-2.9	-1.3	-2.2	-2.5
Bicentennial School	20.9	21.4	20.3	19.6	21.6	19.7	20.9	19.8	20.8	20.5	21.4	19.8	21.0	19.9	20.5	21.8	19.8
Constant	5.2	3.5	13.9	8.2	12.1	10.9	2.0	-5.0	0.9	9.0	15.7	7.9	5.6	-1.7	6.6	12.2	10.1

Variables Coefficients Language Regressions 2016

Variable:	Regressions:																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Female	10.3	9.0	9.9	9.9	9.5	10.2	8.8	10.4	9.1	9.3	9.6	10.0	10.5	10.1	8.9	9.0	9.9
Born 1999-1	-8.4	-6.7	-9.8	-4.3	-10.5	-7.7	-3.9	-6.5	-4.9	-5.4	-9.1	-5.8	-5.0	-10.1	-10.6	-5.0	-12.1
Born 1999-2	-6.3	-6.5	-7.7	-4.9	-8.0	-8.8	-7.5	-7.0	-6.4	-6.3	-8.0	-7.2	-4.5	-8.1	-11.9	-7.1	-8.4
Born 2000-1	-3.6	-4.1	-2.7	-1.2	-2.6	-1.2	-4.9	-2.0	-2.9	-3.8	-4.2	-2.9	-2.4	-3.4	-4.2	-3.7	-2.1
Born 2000-2	-0.8	-0.3	-0.7	-0.6	-1.9	-0.4	-0.9	-0.5	0.0	-0.1	-2.1	-0.3	-1.1	-1.7	-2.0	-0.5	-0.2
Mother Secondary Inc	0.3	1.5	0.7	0.2	1.3	0.4	1.4	1.5	3.1	0.9	0.6	0.7	0.8	1.8	1.5	1.0	1.3
Mother Secondary Com	0.6	1.7	1.0	1.4	2.8	1.2	1.8	2.0	3.3	1.7	2.1	2.9	1.9	1.7	2.4	2.2	1.4
Mother No Info	-5.5	-22.0	2.6	-4.6	-9.5	-30.1	-2.5	-11.7	-2.7	-7.8	-15.1	-6.5	-6.6	8.7	-15.2	-7.7	-10.4
Father Secondary Inc	0.1	-0.8	0.0	0.0	-0.1	1.2	0.6	-0.2	0.4	0.7	1.1	1.2	0.7	0.9	1.8	-0.4	0.7
Father Secondary Com	0.7	0.1	0.8	0.0	-0.1	1.3	2.7	1.3	0.6	1.0	2.0	2.3	0.9	1.8	1.6	0.2	0.8
Father No Info	-2.5	-1.0	-2.0	-1.8	1.9	-5.2	-1.8	0.4	-0.2	2.9	1.3	0.5	3.0	-2.1	1.8	-1.6	-2.8
Income 1	0.9	-0.9	-1.9	-6.8	-2.7	-7.9	2.6	-3.9	1.4	0.6	-5.6	-3.5	-1.7	1.5	-1.0	-4.8	2.0
Income 2	1.5	-1.3	-2.4	-9.3	-3.1	-8.2	3.2	-4.2	0.7	1.7	-5.2	-2.9	-1.5	0.4	-0.4	-4.4	1.6
Income 3	1.2	-1.2	-1.4	-7.4	-1.6	-8.3	2.5	-4.5	1.7	1.4	-5.4	-4.1	0.1	1.7	0.3	-3.7	0.7
Income 4	5.4	0.8	-0.5	-4.7	-1.3	-6.1	3.4	-1.8	3.5	1.8	-2.5	-1.0	3.1	3.4	2.2	-2.7	3.2
Income 5	2.3	0.3	1.2	-6.9	-1.2	-7.4	2.0	-3.4	1.9	3.1	-3.1	-2.6	1.4	0.8	0.9	-2.2	2.7
Income 6	2.5	1.6	-1.2	-7.5	-0.7	-5.0	4.9	-3.5	4.2	2.8	-3.2	-0.7	0.8	1.7	1.1	-2.4	4.7
Income 7	4.1	1.2	-0.2	-4.9	-0.5	-6.4	3.1	-0.9	3.7	5.4	-5.6	-1.3	2.7	4.1	3.5	-2.2	3.0
Income 8	5.1	4.0	0.4	-6.1	2.4	-4.8	2.9	-1.6	4.7	7.6	-6.5	-1.5	2.7	4.3	3.0	-0.6	5.3
Income 9	4.2	0.4	2.6	-6.2	1.3	-6.0	6.0	-1.4	4.2	4.1	-4.3	-3.9	-0.3	-2.2	0.3	-2.5	0.2
Income 10	1.8	-5.7	-1.1	-9.2	-7.0	-9.6	0.2	-8.6	-1.9	-6.1	-8.0	-3.7	-2.4	-0.9	-4.5	-0.7	-5.1
Income 11	7.8	3.8	-0.6	-1.0	6.1	-4.6	7.6	-2.1	-1.4	6.5	0.6	3.5	0.6	5.1	1.2	1.0	5.3
Income 12	9.7	7.5	-0.8	-1.1	2.1	-1.9	5.6	2.6	11.4	3.3	0.4	0.7	3.8	9.8	4.6	-3.0	3.0
Income 13	-2.3	-7.6	4.0	-11.2	1.0	-4.6	0.3	-2.1	1.8	1.8	-7.8	-1.3	4.1	0.3	2.7	2.7	5.1
Income 14	10.5	3.7	7.3	-0.6	2.8	-0.9	8.0	3.3	9.3	7.4	2.2	2.2	7.2	7.3	6.5	5.9	9.8
Income No Info	2.8	10.6	-14.1	-17.6	15.0	19.2	5.9	-6.6	1.2	0.1	4.2	-7.6	-0.6	1.3	10.6	-0.1	12.5
Years Prioritario	-0.2	-0.1	-0.1	-0.2	0.0	-0.1	-0.1	-0.1	-0.2	-0.1	-0.2	-0.2	-0.1	-0.2	-0.1	0.0	-0.1
Years Extra Support	0.1	0.0	-0.1	0.0	0.0	0.1	-0.1	-0.1	0.2	0.0	0.0	0.0	0.0	0.1	-0.1	-0.2	-0.1
Municipal 2010	-1.7	1.1	-2.0	-0.9	0.5	-2.0	-1.5	-0.9	0.4	-1.0	-1.5	0.0	-1.9	-0.7	1.0	-1.0	-2.5
Private subs 2010	-1.8	1.2	-1.6	-1.7	-1.3	-0.6	-1.9	-1.1	-2.1	-1.0	-0.1	0.3	-1.4	-1.6	0.3	-0.8	-1.1
No info school 2010	-3.3	4.4	-4.2	4.5	2.3	3.4	-7.4	4.1	3.4	-1.6	-9.3	-9.1	-5.5	-10.2	7.7	-7.6	3.0
Rural 2010	-0.7	-2.6	-1.5	-2.8	-1.5	0.0	-1.5	-2.9	-0.4	-0.6	-1.6	-0.1	-0.4	-0.6	-1.8	-2.6	-1.1
Language 10 years	0.2	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Math 10 years	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
municipal 2014	-2.4	-6.2	-2.3	-4.7	-4.8	-3.0	-3.2	-3.1	-2.8	-6.1	-2.0	-3.2	-3.0	-4.2	-4.4	-2.9	-2.0
Private subs 2014	-2.9	-6.1	-2.5	-3.1	-4.6	-2.8	-2.4	-2.4	-1.7	-3.5	-5.0	-4.1	-4.0	-3.5	-4.6	-3.7	-1.8

School fee 1 2014	-9.3	-10.8	-11.6	-13.5	-13.4	-10.2	-9.7	-10.3	-12.1	-8.8	-10.2	-11.4	-10.4	-10.5	-10.9	-9.9	-9.6
School fee 2 2014	-3.9	-3.6	-2.6	-3.6	-4.5	-1.3	-1.9	-3.1	-0.9	-1.5	-4.2	-3.6	-6.1	-2.3	-2.6	-2.1	-3.0
School fee 3 2014	-1.3	-4.0	-0.8	-3.7	-1.9	0.2	-0.5	-1.7	1.9	-0.8	-4.2	-3.6	-3.6	-1.4	-1.2	-1.3	-1.4
School fee 4 2014	-3.4	-2.4	-1.2	-2.6	-3.2	-1.5	-2.8	-4.9	-0.8	-3.1	-2.6	-4.9	-4.3	-1.2	-0.9	-2.6	-4.5
School fee 5 2014	-4.1	-5.5	-3.5	-2.0	-2.7	-2.3	-1.4	-2.4	-1.6	0.4	-3.5	-5.4	-7.5	-5.1	0.3	-2.8	-2.9
School Catholic 2014	0.1	-1.0	-0.6	-1.0	-1.7	-0.9	-0.3	-2.3	0.7	0.3	-0.7	-0.8	-1.5	-1.1	-0.7	-0.3	-1.7
School Evangelic 2014	0.5	0.8	1.1	-2.1	2.7	-1.0	-2.2	1.2	1.1	1.5	-1.3	0.3	-0.7	0.4	-1.4	0.6	-2.8
School other 2014	-2.2	-2.1	-0.9	-0.2	-2.0	0.5	-0.1	-3.0	-0.8	-2.1	-0.3	0.4	-2.5	-2.2	-1.9	-2.3	-0.6
School no info 2014	4.2	-0.2	10.8	4.7	1.6	-7.0	-6.1	-7.5	9.0	4.7	-11.5	3.6	-15.7	3.7	-2.5	-0.6	4.5
Rural 2014	-1.1	0.5	0.1	0.7	-2.0	-2.1	0.4	-0.1	-0.3	-2.3	0.9	-1.0	-0.7	-0.9	0.5	-1.2	0.8
Language 14 years	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Math 14 years	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Municipal school 2016	1.8	3.0	2.6	2.8	2.4	1.8	2.7	2.3	1.7	4.9	0.9	1.5	3.3	2.1	2.5	2.1	1.4
Private subs 2016	2.7	3.9	0.8	3.4	4.4	2.0	1.9	2.2	2.3	5.2	1.3	2.8	4.6	2.3	4.2	3.5	2.3
Delegated Admin 2016	8.2	7.4	2.9	5.9	4.9	6.6	7.2	9.1	5.7	10.9	5.7	8.0	7.3	2.8	6.8	5.4	8.1
School fee 1 2016	-7.4	-5.5	-5.9	-5.2	-6.4	-5.8	-6.2	-5.4	-6.7	-5.2	-7.0	-6.1	-6.0	-7.0	-4.8	-6.5	-7.0
School fee 2 2016	1.9	2.2	2.6	0.5	1.2	0.6	2.4	0.7	-0.9	1.1	0.7	2.2	-0.2	-0.9	2.6	1.1	1.8
School fee 3 2016	0.3	-0.9	0.0	-1.7	-2.1	0.9	0.8	-0.8	0.8	-1.5	-1.8	-2.7	-4.0	-1.3	0.8	-0.3	-2.3
School fee 4 2016	3.5	-1.2	2.1	-0.6	0.1	0.3	2.2	-1.5	2.7	-1.2	1.8	-1.1	-0.3	1.7	0.3	-0.5	0.5
School fee 5 2016	8.4	-13.2	4.9	1.6	0.9	0.8	-8.4	-14.5	6.6	-14.5	-10.3	-10.1	13.8	-7.3	-2.9	-3.3	-0.5
School fee info 2016	9.2	11.2	12.3	14.2	13.2	12.9	11.4	10.3	14.2	11.1	10.2	10.2	9.5	11.3	12.6	11.1	12.1
School Catholic 2016	2.3	3.1	3.0	1.3	3.0	1.7	3.9	2.6	1.6	1.6	3.5	3.1	2.9	3.7	2.2	1.5	2.3
School Evangelic 2016	1.6	-0.3	-7.3	6.9	0.9	-2.3	2.4	0.5	-0.3	2.8	2.3	2.4	1.1	-0.1	1.0	-1.5	7.4
School other 2016	1.9	-0.3	-4.4	-3.7	-3.6	-2.4	-3.0	-1.6	-2.9	-4.1	-2.5	-3.5	-4.2	-2.3	-2.8	-0.6	-1.6
School no info 2016	-7.2	-11.6	-17.0	-11.7	-8.7	-19.9	-16.3	-15.2	-18.4	-15.4	-9.5	-14.1	-6.9	-11.5	-3.2	-10.6	-21.5
Rural 2016	8.1	3.0	5.4	4.7	7.4	3.5	4.1	3.3	5.3	8.8	5.4	6.4	2.3	5.4	2.5	3.8	4.8
Bicentennial School	12.0	11.5	9.6	10.3	10.8	10.5	11.0	9.5	10.4	10.9	10.5	9.8	10.3	9.3	11.4	10.8	11.1
Constant	37.0	42.5	42.8	47.6	44.5	45.8	41.7	42.9	36.5	34.2	49.8	44.4	44.2	40.5	42.2	45.1	42.0

Variables Coefficients Math Regressions 2017

Variables	Regressions:																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Female	-1.8	-0.9	-0.6	-0.3	-0.5	-1.5	-1.0	-1.2	-1.9	-1.4	-0.8	0.2	-1.7	-0.5	-0.1	0.3	0.0
Born 2000-1	-14.8	-18.5	-9.3	-15.3	-17.1	-15.5	-17.3	-9.9	-16.1	-16.6	-10.0	-12.2	-15.9	-17.5	-17.3	-8.5	-22.1
Born 2000-2	-16.5	-15.1	-14.3	-14.5	-11.7	-11.2	-16.7	-5.9	-13.1	-16.7	-14.4	-15.0	-13.0	-14.1	-18.0	-12.7	-12.9
Born 2001-1	-8.9	-8.5	-7.1	-8.8	-9.0	-7.9	-9.2	-9.4	-9.8	-8.5	-8.6	-7.2	-8.4	-7.0	-9.5	-9.0	-10.4
Born 2001-2	-2.6	-3.0	-3.0	-1.9	-2.9	-3.3	-4.6	-3.3	-3.6	-3.3	-3.6	-2.2	-3.1	-3.9	-3.3	-4.1	-3.2
Mother Secondary Inc	2.0	1.7	2.7	2.6	3.1	2.4	2.2	1.9	2.5	1.5	1.0	2.7	2.7	3.9	3.9	3.0	2.3
Mother Secondary Com	4.1	1.5	3.6	2.4	4.8	2.6	3.9	4.2	2.6	3.1	2.7	2.3	4.3	4.3	5.8	3.4	3.2
Mother No Info	18.8	30.6	18.0	17.4	1.0	14.6	33.6	1.2	11.9	-4.1	14.0	-17.0	6.9	-6.0	7.0	16.1	1.2
Father Secondary Inc	2.4	1.2	2.3	2.1	1.8	3.2	1.0	0.9	1.3	1.6	2.5	2.8	3.9	0.6	2.8	2.3	2.2
Father Secondary Com	3.1	3.3	3.0	4.8	3.1	3.7	2.1	1.3	3.3	2.6	3.4	5.0	5.4	1.3	3.6	2.9	4.4
Father No Info	-3.8	-8.1	-6.0	-6.2	-0.2	-2.4	-3.1	-10.6	-4.3	0.0	3.4	1.2	-2.6	-5.1	-6.3	-1.2	-2.0
Income 1	-6.5	-9.7	-11.8	-2.8	-7.5	-5.5	-4.1	-3.9	-5.6	-14.9	-5.3	-4.6	-8.4	-8.3	-4.2	-3.2	-6.2
Income 2	-2.9	-3.5	-7.2	-2.5	-4.4	-3.7	-2.3	-0.2	-2.2	-13.1	-4.3	-1.0	-6.6	-4.8	-5.1	0.3	-3.7
Income 3	-1.5	-3.1	-5.9	0.7	-2.9	-1.3	0.4	2.3	0.3	-10.3	-3.2	0.9	-4.2	-2.3	-3.4	2.3	-2.3
Income 4	-0.7	-2.4	-6.0	0.0	-2.4	-1.7	0.8	1.6	1.0	-10.3	-3.3	0.1	-2.1	-1.5	-4.8	1.7	-1.8
Income 5	-1.4	-3.4	-6.1	0.7	-2.8	-0.5	0.1	2.3	0.8	-9.0	-4.1	0.4	-4.1	-1.6	-4.0	1.5	-2.3
Income 6	-2.8	-3.2	-6.6	-0.1	-3.5	-0.6	-0.1	0.3	-0.8	-11.1	-4.5	-0.1	-4.5	-2.2	-6.2	1.7	-3.8
Income 7	-0.6	-2.2	-4.8	2.0	-2.7	0.7	0.1	4.2	-1.2	-8.9	-5.0	0.6	-4.4	-1.9	-3.6	1.9	-1.4
Income 8	1.7	0.7	-4.7	4.6	-0.6	5.5	3.5	3.7	2.6	-5.9	-1.0	3.0	-1.4	0.9	0.4	6.9	2.8
Income 9	0.8	1.2	-3.6	3.0	3.3	3.7	3.3	2.1	3.7	-4.6	-0.2	3.3	-0.7	0.1	1.9	6.8	1.1
Income 10	1.5	2.6	-5.4	1.3	0.1	4.1	2.4	1.6	8.2	-3.5	-0.7	1.2	1.4	2.5	-1.2	1.9	2.2
Income 11	4.3	3.0	-2.3	2.0	-1.8	4.8	1.9	6.2	3.1	-6.4	1.3	3.9	-3.9	-0.3	3.3	6.6	6.1
Income 12	4.5	1.0	-2.4	6.5	3.8	3.8	3.8	7.1	2.6	-7.2	2.7	0.7	1.5	-0.6	2.6	9.0	2.6
Income 13	5.9	14.8	-0.3	10.9	0.5	13.0	7.5	12.7	8.5	0.5	1.0	11.6	-0.5	6.4	2.0	6.9	2.5
Income 14	6.7	4.5	0.2	4.3	2.7	8.4	8.7	6.6	7.2	-0.7	2.7	4.5	1.8	5.8	3.7	9.3	1.7
Income No Info	-51.7	-41.2	-38.5	-47.9	-43.6	-39.8	-48.8	-9.2	-38.2	-7.4	-37.1	10.2	-0.6	-6.6	-12.0	-16.7	2.7
Years Prioritario	-0.2	-0.1	-0.3	-0.4	-0.3	-0.2	-0.3	-0.1	-0.3	-0.4	-0.3	-0.5	-0.1	-0.3	-0.4	-0.3	-0.3
Years Extra Support	0.2	-0.2	0.2	0.2	0.1	0.2	0.2	-0.2	0.2	0.1	0.0	0.2	0.1	0.1	0.2	0.1	0.1
Municipal 2011	-2.9	-3.1	-2.4	-1.4	-2.6	-3.6	-2.4	-3.6	-1.8	-4.3	-3.4	-3.1	-5.2	-5.5	0.0	-2.8	-2.1
Private subs 2011	6.3	6.2	6.6	5.7	4.7	4.6	5.9	5.8	5.9	4.9	5.9	4.4	4.9	4.4	5.3	5.4	5.7

No info school 2011	8.4	-2.1	5.2	0.4	-1.3	5.3	1.9	-11.8	4.3	6.2	4.2	1.0	7.5	-3.0	6.8	-0.4	1.5
Rural 2011	0.6	-0.3	-0.6	-2.1	0.7	0.3	2.6	-1.3	-1.5	0.3	2.4	2.1	-1.9	-0.5	0.0	0.3	0.3
Language 10 years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Math 10 years	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Language 12 years	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Math 12 years	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Municipal 2015	2.9	5.9	2.1	4.3	4.9	3.0	2.1	3.2	3.4	4.3	3.4	5.1	5.7	8.2	-0.4	5.1	7.1
Private subs 2015	-2.9	-1.8	-2.4	-2.2	-1.0	-1.7	-1.6	-3.3	-2.4	-2.4	-3.0	-0.6	-2.7	-0.3	-3.2	-3.4	0.4
School fee 1 2015	2.4	4.6	5.3	4.4	6.0	3.9	5.5	4.6	4.3	5.0	4.6	4.1	6.6	5.0	3.5	7.3	4.5
School fee 2 2015	2.2	-1.6	0.4	2.0	-0.2	-0.6	-2.5	0.9	-0.4	1.0	0.9	-1.6	3.9	1.0	3.3	1.1	0.0
School fee 3 2015	6.3	2.8	6.1	3.7	1.5	1.4	0.6	3.2	3.6	2.9	5.6	4.4	3.1	2.5	0.4	4.0	1.5
School fee 4 2015	-2.8	-0.6	0.5	2.6	-2.4	-2.4	-3.2	3.7	1.7	4.2	1.9	2.6	5.4	0.9	-0.9	1.0	-0.8
School fee 5 2015	-16.1	-17.3	3.6	-17.4	-9.0	-45.7	-0.5	18.4	4.2	1.3	10.4	-8.3	-26.8	5.0	1.7	-15.6	-2.6
School Catholic 2015	-0.6	0.0	-0.4	-0.2	0.7	1.1	0.1	0.2	-1.6	-0.2	0.8	-2.0	0.0	-0.6	-0.7	0.5	0.4
School Evangelic 2015	3.2	6.3	-1.9	-1.3	1.7	4.8	2.9	1.0	1.1	1.9	4.2	3.6	3.4	3.3	5.8	4.7	1.7
School other 2015	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
School no info 2015	-0.9	1.4	-0.3	0.2	-0.1	-0.6	1.8	1.6	-0.9	0.8	0.2	0.9	0.7	0.6	0.6	3.4	3.5
Rural 2015	-5.0	-4.4	-1.3	-1.0	-3.4	-3.6	-4.8	-2.8	-1.3	-2.8	-4.4	-3.2	-0.9	-4.1	-1.9	-4.7	-3.0
Municipal school 2017	-2.4	-3.9	-1.4	-3.8	-3.7	-2.0	-1.8	-1.2	-3.8	-3.1	-1.1	-2.7	-2.6	-4.4	-0.9	-2.6	-6.3
Private subs 2017	4.1	6.9	5.7	4.6	6.3	6.4	5.5	6.5	3.5	3.5	6.9	7.9	6.8	1.3	7.0	6.5	0.8
Delegated Admin 2017	7.0	6.1	6.4	3.9	6.5	8.2	7.4	4.3	4.2	4.3	5.8	7.2	5.6	2.4	9.4	3.7	3.1
School fee 1 2017	-7.9	-8.9	-10.0	-6.6	-5.7	-8.6	-5.4	-4.8	-6.4	-5.4	-4.3	-5.7	-6.0	-11.1	-6.6	-5.6	-8.8
School fee 2 2017	11.6	6.4	8.0	8.2	7.2	7.1	7.5	9.1	10.6	8.9	8.3	9.3	4.5	7.8	7.2	8.5	10.2
School fee 3 2017	7.1	5.8	5.1	7.3	5.4	8.4	7.8	7.7	9.6	6.3	3.9	4.9	5.6	8.2	7.8	9.7	10.0
School fee 4 2017	14.9	10.6	16.8	11.8	10.3	12.0	14.1	9.8	11.1	9.7	10.4	9.8	10.7	12.9	13.4	13.9	12.8
School fee 5 2017	33.9	18.3	26.7	32.0	25.2	40.3	24.5	22.9	14.1	28.9	18.8	18.6	24.1	23.6	34.5	27.6	22.9
School fee no info 2017	6.1	0.0	4.9	2.2	0.2	2.3	6.0	2.5	2.5	3.5	1.8	1.0	3.2	2.1	2.0	1.5	3.0
School Catholic 2017	3.1	3.4	3.9	3.7	4.1	2.6	3.4	1.6	2.4	3.4	2.5	3.5	3.3	6.2	2.9	3.9	4.5
School Evangelic 2017	-5.1	-8.4	-5.4	-5.0	-3.6	-4.8	-4.1	-1.2	-4.0	6.1	-8.7	-6.7	-0.7	4.1	-7.9	4.0	-5.6

School other 2017	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
School no info rel 2017	4.5	4.0	3.7	4.5	5.1	3.9	4.6	4.0	4.4	4.2	4.7	4.2	3.0	3.5	4.6	3.8	3.9
Rural 2017	3.9	0.0	-1.3	-0.8	2.1	1.0	0.1	-0.9	0.7	3.2	-1.3	-1.5	-3.7	-0.9	2.4	-1.3	-1.7
Bicentennial School	25.0	25.8	25.6	24.5	24.8	25.9	25.0	24.7	23.9	23.7	24.0	25.9	25.2	23.9	26.2	25.8	24.8
Constant	41.8	40.2	43.2	35.3	40.2	37.7	37.0	35.9	36.5	50.0	41.1	36.4	37.7	41.2	40.6	34.0	39.5

Variables Coefficients Language Regressions 2017

Variables	Regressions																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Female	11.4	10.8	12.1	10.6	11.4	10.6	11.8	11.1	10.9	11.4	11.5	12.5	10.8	11.5	10.8	12.5	11.1
Born 2000-1	-8.9	-4.2	-9.1	-9.3	-0.8	-9.8	-5.4	-4.0	-9.8	-13.7	-4.3	-10.7	-8.4	-6.5	-6.0	-7.2	-8.9
Born 2000-2	-8.4	-7.5	-9.7	-8.5	-6.3	-6.7	-8.7	-7.3	-7.1	-10.8	-6.1	-11.4	-8.8	-10.2	-9.4	-3.4	-9.8
Born 2001-1	-3.9	-3.8	-4.4	-4.7	-4.6	-6.1	-3.8	-3.4	-6.2	-4.4	-3.7	-5.8	-4.9	-5.3	-4.0	-5.0	-4.6
Born 2001-2	-1.2	-0.1	-1.0	-0.7	-0.2	-1.9	-2.5	-1.8	-2.5	-1.8	-2.6	-1.2	-1.6	-2.3	-0.9	-2.1	-1.3
Mother Secondary Inc	0.8	1.5	1.8	1.8	3.4	1.3	1.9	1.7	2.3	1.2	-0.1	0.6	0.6	3.2	2.1	1.4	1.5
Mother Secondary Com	2.5	2.4	2.5	2.8	4.1	2.8	4.0	2.4	2.6	2.0	1.2	0.7	2.2	4.8	2.1	2.3	2.6
Mother No Info	13.9	29.7	2.0	15.1	28.0	18.8	21.1	-5.0	22.9	-9.5	12.1	-1.7	21.8	12.4	13.1	19.7	11.3
Father Secondary Inc	2.8	1.7	0.9	2.2	1.6	2.0	2.4	1.2	1.8	1.7	2.3	3.4	3.3	1.8	1.9	1.4	2.4
Father Secondary Com	4.9	4.1	2.9	4.5	4.1	4.1	3.9	2.0	4.5	3.3	3.1	5.5	4.7	3.7	3.8	2.6	5.0
Father No Info	2.7	-7.5	-7.4	-5.6	-6.4	-3.6	2.1	-4.0	1.5	-1.5	-5.6	-0.4	-5.8	0.2	-1.0	-3.9	4.2
Income 1	-4.1	-5.3	-6.2	-5.1	-4.9	-5.1	4.9	-2.8	-7.2	-5.9	-6.1	-3.3	-2.4	-11.1	-3.7	-5.5	-4.9
Income 2	-3.3	-5.1	-4.6	-4.5	-5.5	-4.7	4.6	-1.6	-7.3	-6.2	-6.0	-0.5	-3.9	-9.7	-3.0	-3.0	-3.5
Income 3	-0.3	-3.2	-1.3	-2.5	-3.2	-3.2	6.6	2.2	-4.7	-2.9	-3.8	0.1	-2.6	-8.8	-1.8	-0.7	-3.7
Income 4	-2.6	-4.2	-2.3	-4.6	-5.1	-5.0	6.5	0.1	-6.5	-5.4	-5.0	0.2	-3.2	-10.9	-4.8	-3.1	-4.8
Income 5	-3.7	-6.5	-3.4	-4.7	-4.6	-4.1	5.2	-0.2	-6.6	-4.5	-5.8	-2.1	-4.6	-9.1	-1.2	-3.7	-4.0
Income 6	-2.7	-3.9	-1.7	-3.9	-5.1	-2.9	6.5	1.2	-6.8	-4.1	-5.3	-0.7	-3.5	-8.2	-2.7	-1.3	-4.7
Income 7	-2.4	-5.0	-2.5	-3.9	-4.9	-3.2	5.2	1.3	-7.1	-2.8	-3.8	-1.6	-3.6	-8.9	-1.1	-2.1	-3.7
Income 8	-3.1	-1.9	-2.5	-3.4	-4.3	-4.4	5.2	2.0	-5.7	-4.5	-3.4	-0.9	-4.5	-7.7	-2.6	-1.3	-5.2
Income 9	-3.1	-3.1	-2.6	-1.2	-0.7	-2.9	7.2	2.3	-5.1	-2.2	-5.0	-4.0	-3.7	-11.7	-1.4	-2.6	-5.3
Income 10	-2.4	-5.7	-5.8	-3.9	-4.8	-5.1	6.7	2.9	-5.3	-2.3	-3.9	-0.2	-1.8	-8.2	-2.5	-0.4	-4.8
Income 11	-3.1	-1.8	1.2	2.8	-1.5	2.0	6.8	2.1	-0.9	-0.6	0.9	2.2	-1.8	-6.5	-0.1	2.7	0.5
Income 12	-7.1	-5.9	-1.4	-3.8	-3.8	-1.3	5.5	3.7	-8.3	-1.9	-3.4	0.3	-2.1	-13.9	-0.9	0.2	-4.3
Income 13	-1.7	-6.8	0.0	-0.8	-3.1	6.4	5.2	2.7	3.8	0.6	-4.3	4.8	-1.6	-6.9	1.7	-0.6	-1.8
Income 14	-1.9	0.6	1.3	-5.4	-3.4	0.4	9.6	6.0	-1.6	-0.8	-1.5	2.2	2.5	-7.1	0.3	-1.5	-3.0
Income No Info	-7.2	-23.3	-9.6	-13.9	-26.3	-36.2	17.6	11.6	2.0	-2.1	11.2	1.8	6.2	-7.8	-5.9	-63.7	-18.8
Years Prioritario	0.0	0.0	0.0	0.0	-0.2	-0.1	0.0	0.1	0.0	-0.1	0.0	-0.2	-0.1	0.0	-0.2	0.0	-0.1
Years Extra Support	0.0	-0.1	0.1	0.0	0.2	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	-0.1	0.0
Municipal 2011	0.9	0.4	-0.8	0.2	-0.5	-1.4	-1.6	-0.7	0.6	-2.1	-1.9	1.8	-0.6	-0.9	0.9	1.2	-0.3
Private subs 2011	4.1	3.3	3.5	3.0	2.5	2.6	3.1	3.1	2.9	2.0	1.6	3.2	2.8	2.5	2.7	3.2	3.0

No info school 2011	-0.8	-13.4	5.5	-3.6	-4.4	-3.4	-0.5	-5.4	-1.3	-3.1	-8.8	-1.1	1.9	-4.7	-3.4	-14.4	-3.7
Rural 2011	0.3	-2.0	-4.2	-3.4	-1.8	-0.2	-2.9	-0.7	-2.8	-1.7	-0.7	-0.2	-3.0	-2.3	-3.2	-2.1	-0.4
Language 10 years	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Math 10 years	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Language 12 years	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Math 12 years	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Municipal 2015	-1.5	1.8	0.9	-0.2	1.8	0.7	-1.0	0.7	0.0	1.8	0.9	-0.4	1.6	1.8	-2.9	0.2	2.1
Private subs 2015	-2.8	-2.5	-2.4	-3.2	-2.0	-2.4	-4.4	-4.2	-2.7	0.0	-2.2	-3.5	-3.1	-1.0	-1.9	-2.1	-1.4
School fee 1 2015	-1.5	-0.2	0.3	-1.8	0.3	-0.9	-1.7	-1.4	-2.9	-1.4	-1.5	-1.1	-1.0	-1.5	-0.4	1.6	0.5
School fee 2 2015	2.2	-2.2	-3.3	-1.0	-3.0	-0.9	-0.8	1.6	-1.5	-2.0	-1.2	-1.4	1.2	-2.8	-1.8	-0.3	-1.9
School fee 3 2015	2.2	1.4	0.8	1.3	-0.2	0.3	2.1	0.7	-0.3	-2.5	2.5	1.5	2.1	-0.8	-1.1	0.4	0.7
School fee 4 2015	-2.4	-2.3	0.6	0.9	-5.2	-3.9	-0.1	3.5	-0.9	-0.7	1.8	-0.5	1.0	-3.7	-1.4	-2.2	-1.5
School fee 5 2015	34.0	10.3	6.6	8.5	-16.7	-13.5	-1.2	-8.9	11.6	3.2	4.7	13.1	-19.1	-17.1	9.2	-6.7	-12.0
School Catholic 2015	-1.9	-0.5	-0.8	-2.1	-0.3	-0.7	0.5	0.1	-1.7	-2.1	-1.1	-2.4	-2.1	-2.1	-1.3	-1.5	-0.7
School Evangelic 2015	-0.7	3.2	0.7	-0.1	2.2	2.4	1.2	0.2	0.5	-2.4	3.6	1.0	-0.5	-2.3	-2.4	0.2	-1.3
School no info 2015	1.7	5.3	1.0	3.7	-0.1	0.1	2.8	5.6	2.0	2.0	1.5	4.1	3.6	2.1	3.6	2.9	5.2
Rural 2015	-2.5	-2.0	0.5	0.4	-2.8	-1.4	-1.0	-2.5	-1.1	-3.1	-3.4	-2.1	-0.4	-2.4	0.2	-2.0	-3.4
Municipal school 2017	0.3	-0.9	-0.5	0.5	-0.2	-0.1	1.2	0.1	-0.8	-0.8	-0.1	0.1	-1.1	0.1	1.1	-0.5	-1.2
Private subs 2017	-2.8	-0.3	-2.6	-2.9	-0.5	-2.2	-2.7	-0.1	-3.2	-3.4	-2.0	0.2	-3.2	-4.2	-0.9	-3.4	-3.0
Delegated Admin 2017	4.0	5.0	4.3	2.6	6.1	5.1	4.1	2.6	1.0	3.5	5.3	5.9	0.0	2.0	6.4	1.4	5.0
School fee 1 2017	-6.6	-7.6	-7.7	-5.5	-6.8	-8.2	-3.4	-4.8	-4.0	-5.4	-3.7	-5.8	-6.7	-7.0	-8.0	-5.3	-7.3
School fee 2 2017	5.6	5.7	9.0	5.9	6.1	4.8	5.0	4.1	6.9	5.3	6.3	5.8	2.7	5.4	5.5	5.7	4.2
School fee 3 2017	1.9	2.2	2.6	3.9	-0.1	3.1	0.0	0.2	4.5	3.2	-0.4	1.8	0.1	2.1	5.2	5.3	3.6
School fee 4 2017	8.7	4.7	4.6	2.1	2.8	3.5	1.4	1.3	3.7	1.9	-0.1	1.9	4.5	8.9	6.0	6.4	3.3
School fee 5 2017	-14.4	-6.2	10.6	12.0	15.3	10.8	-5.5	18.9	3.3	14.1	8.4	-4.6	0.8	27.5	19.0	25.4	10.4
School fee no info 2017	0.3	-7.3	-1.6	-3.3	-5.8	-5.1	-3.4	-2.7	-4.3	-3.9	-4.8	-4.7	-2.0	-3.9	-5.1	-2.9	-3.0
School Catholic 2017	5.1	4.2	4.9	3.8	3.4	3.6	3.5	1.4	2.8	4.8	1.9	4.3	5.2	5.5	2.5	4.4	3.7
School Evangelic 2017	4.7	10.1	6.5	7.1	0.7	0.8	5.3	4.0	0.6	7.6	-3.4	5.3	9.2	5.8	3.7	8.4	-2.0
School no info rel 2017	-0.5	0.4	-1.2	-0.5	-1.0	-0.6	-0.6	0.7	-0.3	-1.5	-0.7	0.9	-2.1	-0.3	0.6	-0.4	0.4

Rural 2017	6.9	5.1	3.6	1.4	6.5	6.6	5.5	4.4	4.2	7.1	6.8	3.8	1.9	4.0	3.0	6.7	3.4
Bicentennial School	13.9	14.7	13.4	12.9	13.2	12.9	11.9	12.7	11.3	12.8	11.2	13.8	13.5	11.8	14.3	12.4	12.1
Constant	46.7	47.0	46.6	50.6	46.5	52.5	36.1	44.5	50.3	47.7	53.5	41.9	50.2	54.0	46.3	47.2	51.6

Variables Coefficients Math Regressions 2018

Variables	Regressions																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Female	-5.4	-3.8	-5.2	-5.4	-3.8	-4.7	-4.8	-4.9	-3.5	-4.7	-4.3	-5.0	-4.9	-4.1	-3.9	-5.3	-2.8
Born 2001-1	-10.7	-16.1	-12.8	-11.8	-17.8	-15.4	-15.7	-8.8	-13.4	-17.5	-11.5	-15.6	-12.8	-13.7	-9.0	-13.7	-5.5
Born 2001-2	-13.1	-15.7	-12.3	-13.0	-15.2	-14.0	-13.0	-13.2	-12.6	-10.1	-15.4	-10.0	-13.2	-11.4	-15.0	-12.5	-14.3
Born 2002-1	-5.7	-4.7	-5.7	-4.9	-8.1	-5.0	-4.8	-5.9	-5.2	-7.0	-5.4	-5.2	-3.2	-6.5	-5.5	-3.6	-7.2
Born 2002-2	-2.9	-3.9	-2.5	-2.5	-3.6	-2.2	-2.2	-2.0	-2.9	-2.3	-1.6	-1.7	-3.0	-1.8	-2.2	-2.6	-2.4
Mother Secondary Inc	1.6	0.8	1.3	2.4	2.9	2.1	3.0	2.3	3.3	1.9	2.6	0.9	2.1	2.1	2.2	2.0	2.0
Mother Secondary Com	1.9	1.0	2.1	3.5	2.7	3.3	3.9	1.5	3.7	1.7	2.9	1.7	3.1	2.1	3.6	3.4	3.5
Mother No Info	6.3	-4.8	-11.4	-3.6	11.3	-5.5	0.3	14.8	11.5	1.8	17.7	2.2	2.5	-13.8	10.8	4.5	9.2
Father Secondary Inc	2.0	2.3	0.4	-0.3	1.5	0.2	-0.2	1.5	0.8	2.2	-0.3	2.3	-0.6	0.7	1.2	-0.8	0.6
Father Secondary Com	4.1	5.2	3.4	1.9	4.8	1.2	2.1	4.4	3.4	4.9	2.3	5.0	1.6	3.6	4.3	1.7	3.5
Father No Info	-1.3	1.3	-5.8	0.4	-5.0	-6.2	-2.4	-3.3	-2.0	-4.7	-2.3	-2.1	-7.0	-2.3	-1.7	1.3	-1.3
Income 1	-1.8	-4.6	-5.0	1.0	3.9	0.7	4.4	4.1	0.6	-6.2	1.2	-1.3	-3.3	1.2	2.1	-0.9	3.4
Income 2	-1.5	-4.9	-5.7	2.5	1.3	2.7	3.5	4.2	1.5	-4.4	3.6	-0.1	-1.0	0.9	3.7	0.6	3.6
Income 3	1.6	-0.1	-1.2	7.8	6.4	5.3	9.7	8.6	5.1	-0.6	6.5	2.6	3.9	4.3	8.2	4.8	8.5
Income 4	3.6	0.6	-1.1	7.2	5.6	6.0	8.7	9.4	5.4	1.3	5.9	4.2	4.5	5.8	8.0	3.0	8.4
Income 5	2.9	-0.6	0.8	8.1	5.4	6.8	8.7	9.7	7.1	0.0	6.4	4.1	4.3	6.1	7.9	4.1	8.7
Income 6	1.8	-0.1	-2.1	6.1	4.8	6.6	6.7	9.6	4.5	-1.8	5.5	1.2	2.9	3.9	6.6	2.0	7.8
Income 7	4.3	0.7	-3.5	7.5	4.8	7.0	6.3	7.7	6.0	-1.8	5.9	1.5	1.9	5.7	6.1	4.1	6.9
Income 8	2.6	0.7	-2.4	7.4	5.7	4.6	6.1	7.1	3.4	-1.8	5.1	2.4	1.4	5.6	6.1	3.1	7.0
Income 9	2.2	3.5	1.1	11.1	8.3	8.0	11.4	13.3	9.2	-0.9	8.3	1.2	6.3	7.5	6.9	2.0	11.3
Income 10	2.7	3.1	6.3	13.0	12.4	10.9	9.9	12.5	9.1	0.7	13.3	2.2	10.6	11.2	8.2	11.5	13.3
Income 11	-4.9	-3.7	-8.9	5.9	3.3	2.9	5.5	4.1	5.4	-0.6	5.6	0.5	-0.8	2.8	6.4	5.4	7.1
Income 12	5.4	6.0	6.5	6.1	5.0	4.7	8.2	13.9	10.3	2.7	11.4	11.3	2.1	4.7	8.4	9.3	14.3
Income 13	0.3	-10.3	-0.6	12.1	0.7	3.4	6.7	11.8	2.7	-6.8	2.8	-0.8	3.7	1.7	0.3	0.3	6.4
Income 14	9.1	9.7	6.7	16.0	13.5	12.3	13.1	18.0	13.2	4.5	12.2	9.3	9.9	12.1	14.8	12.6	12.9
Income No Info	-11.9	5.6	12.1	6.5	-6.6	18.5	20.1	-8.5	-12.4	4.2	-16.0	-7.1	-8.0	13.7	11.1	-6.9	-8.5
Years Prioritario	-0.1	0.1	0.0	0.1	-0.1	0.0	-0.2	0.0	0.1	0.1	-0.1	-0.1	0.0	-0.1	-0.1	-0.1	0.1
Years Extra Support	-0.1	-0.2	-0.1	-0.2	-0.1	-0.2	-0.1	-0.1	-0.2	-0.2	-0.1	-0.2	-0.2	-0.2	0.0	0.0	-0.2
Municipal 2012	-5.4	-4.2	-4.0	-4.2	-2.0	-1.7	-2.4	-2.2	-2.1	-2.9	-3.7	-2.7	-3.4	-2.3	-3.9	-2.2	-3.1
Private subs 2012	4.5	5.8	4.6	4.4	6.0	7.8	5.0	5.5	6.7	5.4	6.1	4.9	4.9	5.4	6.3	6.4	5.8

No info school 2012	7.1	9.0	12.5	6.7	20.3	2.5	17.2	16.9	12.8	25.5	6.5	14.4	19.1	10.7	14.0	17.7	23.0
Rural 2012	2.5	-0.5	-0.8	0.8	1.0	0.8	0.5	-2.7	0.0	-0.2	-0.9	-1.1	-0.9	0.4	-0.1	1.8	-0.3
Language 10 years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Math 10 years	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Language 12 years	0.1	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Math 12 years	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Municipal 2016	1.2	0.8	2.7	2.6	-2.0	-0.5	3.3	1.1	1.5	1.3	3.8	-0.1	4.2	1.0	1.6	1.5	2.8
Private subs 2016	-4.5	-6.9	-4.1	-4.3	-7.2	-8.2	-3.9	-5.4	-7.1	-7.1	-5.5	-5.3	-5.1	-4.4	-6.5	-6.4	-5.6
School fee 1 2016	4.0	5.2	4.8	4.9	6.5	3.2	3.1	4.5	3.6	3.5	4.7	7.8	4.0	5.1	3.1	4.2	5.5
School fee 2 2016	-3.0	-1.9	-2.8	-3.0	-5.4	-1.5	-4.8	-4.2	-3.8	-3.6	-4.8	-3.8	-3.5	-4.7	-2.9	-3.9	-3.5
School fee 3 2016	-0.1	1.0	4.4	0.9	2.3	3.3	1.8	2.4	1.6	1.9	0.5	1.8	4.7	1.2	3.7	0.7	3.4
School fee 4 2016	3.8	2.7	1.9	-0.5	5.7	4.8	-4.9	4.2	3.8	1.9	2.5	0.2	3.6	2.4	4.2	2.5	5.0
School fee 5 2016	18.4	17.2	6.6	22.4	-6.1	-0.2	7.3	-5.1	11.9	-1.0	0.7	-5.5	10.8	-12.8	2.4	8.3	32.4
School Catholic 2016	-1.4	-1.1	-0.7	-1.3	-0.6	-0.8	-1.0	-1.6	0.1	1.0	0.1	-0.8	-1.2	-0.6	-1.5	-1.0	0.0
School Evangelic 2016	0.7	-1.6	1.0	4.2	-0.8	-1.6	-1.1	1.8	3.6	2.0	3.7	-1.3	1.5	0.4	2.1	2.6	-0.1
School other 2016	0.2	1.1	-0.5	-0.5	0.0	1.6	1.5	-1.7	5.0	1.9	3.8	2.0	0.5	2.7	2.3	2.2	1.5
School no info 2016	-12.4	-3.5	8.5	-11.1	-14.5	-2.7	-11.4	-8.0	-13.2	-23.4	-11.4	-5.0	-5.4	-11.0	9.5	-16.3	-16.0
Rural 2016	-7.2	-5.2	-5.9	-3.8	-5.7	-5.1	-3.9	-2.5	-5.2	-7.0	-5.2	-2.8	-6.9	-5.1	-3.7	-6.9	-5.8
Municipal school 2018	4.9	5.0	3.7	2.8	5.8	4.2	2.4	4.0	3.9	3.8	2.0	4.3	2.6	3.9	3.7	3.6	3.8
Private subs 2018	9.4	9.3	8.8	6.3	10.5	8.6	9.1	10.7	9.1	10.3	6.1	9.8	8.4	6.8	10.1	6.1	7.7
Delegated Admin 2018	11.9	12.9	13.8	10.5	12.7	11.1	11.1	11.6	15.9	12.6	10.1	12.4	10.0	15.5	10.7	13.7	11.6
School fee 1 2018	-1.4	0.1	1.6	-1.8	-2.9	1.5	1.7	2.6	-0.7	-8.0	-2.1	1.6	0.3	1.1	-0.2	-2.5	-2.0
School fee 2 2018	-0.3	2.1	2.0	6.2	4.2	2.3	6.3	0.4	5.2	-0.3	3.1	3.6	6.6	1.6	-0.8	7.8	0.5
School fee 3 2018	5.1	4.6	5.5	8.6	3.4	4.7	4.4	4.8	7.1	5.1	3.8	6.1	5.0	7.7	4.3	6.2	2.5
School fee 4 2018	6.5	9.8	7.6	9.5	8.1	10.8	12.4	8.6	10.5	8.3	10.4	11.1	9.0	9.4	8.7	9.9	8.4
School fee 5 2018	11.8	9.6	23.9	18.7	12.9	15.4	13.8	14.3	21.3	24.1	16.5	23.9	22.1	29.8	17.6	14.0	10.7
School fee no info 2018	-6.2	-6.6	-8.1	-6.2	-7.0	-6.8	-9.7	-8.0	-9.6	-9.3	-7.9	-7.1	-9.8	-8.6	-6.9	-6.9	-8.6
School Catholic 2018	2.2	2.7	3.3	2.9	1.4	2.9	2.6	2.1	2.6	1.2	3.7	3.1	2.5	3.6	1.4	5.7	3.4
School Evangelic 2018	1.9	1.6	0.6	-2.8	4.4	-1.5	-3.8	-3.5	-5.8	2.4	3.7	8.1	-2.9	0.7	1.1	1.8	-1.0

School other 2018	-3.5	-4.0	-2.1	-3.9	-4.0	-3.4	-2.9	-3.1	-3.5	-4.0	-4.1	-4.2	-3.6	-4.7	-2.7	-2.4	-3.6
School no info rel 2018	-1.2	-5.4	-18.9	8.0	-5.3	0.3	0.9	-3.4	0.3	-8.2	1.9	9.0	0.3	11.2	-5.6	4.1	-3.4
Rural 2018	8.3	5.4	5.9	4.1	7.1	6.5	3.6	3.7	4.0	9.0	6.0	3.3	5.4	4.9	4.4	8.8	6.5
Bicentennial School	23.7	23.4	25.0	24.2	23.4	24.5	24.1	26.0	24.8	24.5	22.4	24.5	25.6	24.9	25.3	24.4	24.8
Constant	18.2	18.9	23.1	16.7	14.8	15.7	12.5	9.8	10.6	19.6	16.2	16.2	20.7	18.3	11.4	18.3	8.7

Variables Coefficients Language Regressions 2018

Variables	Regressions																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Female	8.3	9.4	8.9	8.6	8.4	8.9	8.7	8.9	9.8	9.1	8.3	9.0	9.1	9.1	8.5	9.1	8.9
Born 2001-1	-6.0	-8.8	-4.9	-7.5	-9.2	-10.9	-6.0	-6.2	-8.9	-8.7	-7.6	-8.4	-8.5	-4.7	-9.2	-7.2	-0.6
Born 2001-2	-7.9	-8.6	-8.8	-8.2	-7.6	-7.3	-8.7	-10.1	-9.1	-5.6	-10.0	-7.2	-8.0	-8.3	-8.5	-6.2	-8.2
Born 2002-1	-4.6	-4.0	-4.5	-4.4	-5.0	-4.4	-5.1	-5.1	-5.0	-5.5	-5.2	-4.2	-6.3	-6.5	-6.6	-5.1	-5.9
Born 2002-2	-0.7	-1.2	-0.1	-0.4	-1.2	-0.7	-0.6	-1.5	-0.7	-0.2	-1.3	-0.6	-1.1	-1.7	-1.0	-1.4	-1.8
Mother Secondary Inc	0.5	1.0	0.1	0.5	1.1	1.7	0.9	0.4	1.6	-0.1	0.2	0.4	0.5	1.8	1.3	0.8	0.7
Mother Secondary Com	1.6	1.9	1.6	2.1	3.1	2.9	2.2	2.3	3.0	1.7	1.2	2.2	2.4	2.9	3.3	4.1	3.0
Mother No Info	0.2	-6.3	-0.8	-9.1	3.8	-2.5	-4.2	10.1	-3.8	-6.7	4.6	-8.0	1.8	-16.0	-9.8	-11.8	12.9
Father Secondary Inc	0.6	0.9	1.0	0.8	1.1	0.8	1.3	1.5	1.0	0.8	0.5	1.5	0.5	1.0	1.1	0.1	-0.1
Father Secondary Com	0.7	2.0	2.4	1.1	2.9	0.4	2.5	1.7	2.4	2.0	1.6	2.4	0.6	3.1	2.2	0.6	1.1
Father No Info	6.3	1.4	8.2	1.8	0.0	-4.7	3.1	-0.9	3.1	0.5	4.8	5.9	-1.9	6.5	5.0	4.3	3.5
Income 1	0.8	-1.7	2.4	3.6	1.0	0.4	7.0	3.3	-3.6	0.7	4.0	1.8	4.3	4.1	-1.8	-0.8	2.7
Income 2	2.5	-2.5	1.9	4.7	0.8	1.7	7.4	4.0	-3.4	1.7	5.0	4.0	5.4	4.9	-2.0	2.2	3.1
Income 3	2.5	-1.7	3.0	5.4	2.6	2.0	8.6	4.2	-2.6	3.4	6.5	3.6	8.1	5.5	-1.1	2.8	3.6
Income 4	3.5	0.3	5.6	6.6	4.3	3.9	9.7	6.4	-1.1	5.5	7.0	5.4	8.6	6.8	0.6	3.4	5.6
Income 5	5.5	1.7	8.1	7.9	6.3	5.1	11.0	8.9	1.7	5.7	7.0	5.9	10.8	8.5	0.6	5.1	8.5
Income 6	4.3	-1.2	4.3	7.7	4.2	3.0	10.7	7.2	-0.8	6.7	9.3	5.5	8.1	6.5	0.9	3.7	6.2
Income 7	4.8	-0.3	2.6	5.4	0.9	0.4	7.7	3.3	-4.7	2.4	5.7	2.1	7.5	3.7	-0.9	4.7	4.6
Income 8	4.1	-0.4	4.3	3.0	3.0	3.2	9.6	6.6	-2.3	6.5	6.3	4.5	7.0	7.0	-0.8	5.1	5.8
Income 9	4.3	1.0	2.8	6.7	4.8	1.8	13.3	7.7	0.7	4.5	7.4	3.3	11.9	7.2	3.3	2.9	6.4
Income 10	4.7	2.0	8.0	11.1	6.0	1.9	10.8	5.4	2.1	8.2	12.5	4.9	14.1	5.9	-0.1	3.2	10.8
Income 11	1.6	-1.1	5.2	3.1	2.7	2.2	9.2	5.2	-3.6	8.6	4.8	4.7	2.2	5.6	2.6	2.6	3.3
Income 12	-1.3	2.6	7.4	2.8	2.9	-1.1	7.5	5.0	1.1	4.3	9.7	5.6	4.2	3.8	-4.3	1.1	5.3
Income 13	-3.2	-3.8	3.2	5.0	-3.6	-0.1	7.9	0.4	-2.9	-3.1	-3.9	0.7	8.2	3.4	-5.0	-3.5	8.2
Income 14	10.0	6.4	11.7	14.1	8.9	6.1	14.7	11.8	5.5	8.0	13.3	9.0	13.5	12.2	2.1	8.3	13.6
Income No Info	5.2	20.4	8.4	26.4	9.2	24.2	29.7	2.7	-2.2	19.9	2.9	26.7	8.8	31.5	9.9	26.7	-13.0
Years Prioritario	-0.1	0.0	0.0	0.1	0.2	-0.1	0.2	0.0	0.0	0.1	0.0	-0.1	0.0	-0.1	0.0	0.1	0.2
Years Extra Support	0.1	0.0	0.1	-0.2	-0.2	-0.1	-0.2	0.0	-0.1	-0.1	-0.1	0.0	-0.1	0.0	0.0	0.0	-0.2
Municipal 2012	0.0	0.1	0.6	0.2	0.3	-1.6	1.0	2.0	1.3	0.7	0.5	0.6	1.8	0.4	-0.2	-0.3	0.3
Private subs 2012	2.3	2.3	2.1	2.2	2.2	3.0	2.6	3.0	2.6	2.3	2.8	2.2	2.7	2.8	2.9	1.8	1.8

No info school 2012	16.7	11.0	5.9	4.7	7.4	0.2	10.9	13.6	-3.4	14.6	6.7	7.9	8.6	14.3	0.9	16.2	12.4
Rural 2012	-1.4	-1.7	-3.5	-3.3	-1.6	-2.4	-0.6	-1.5	-3.3	-2.7	-2.0	-2.9	-2.3	-2.3	-2.1	-1.2	-2.2
Language 10 years	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Math 10 years	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.1	0.1	0.1	0.1	0.0	0.0
Language 12 years	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Math 12 years	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Municipal 2016	-2.7	-4.5	-5.4	-2.8	-5.7	-1.6	-2.6	-4.8	-4.0	-2.4	-4.0	-4.7	-4.7	-3.8	-3.5	-2.5	-3.3
Private subs 2016	-1.8	-2.3	-1.9	-1.4	-3.9	-1.6	-1.9	-3.3	-3.4	-5.4	-0.9	-2.5	-2.1	-1.6	-1.4	-2.7	-3.8
School fee 1 2016	0.9	2.8	1.5	0.9	1.3	0.5	3.2	1.3	1.2	-0.1	1.7	2.0	1.4	1.7	0.2	1.5	3.1
School fee 2 2016	-2.3	-1.3	-4.5	-3.7	-3.2	-0.7	-2.7	-0.2	-0.4	1.0	-2.1	-2.7	-3.1	-2.5	-3.2	-2.3	-1.3
School fee 3 2016	1.2	1.3	1.9	1.0	0.6	0.2	1.5	1.6	1.4	1.0	-1.8	1.7	1.2	-1.5	0.3	0.6	0.8
School fee 4 2016	2.2	-1.1	1.0	0.8	-0.6	-1.0	-1.2	0.8	5.1	3.8	-1.1	-0.3	0.3	-0.3	0.4	1.0	0.7
School fee 5 2016	21.0	7.8	3.1	21.2	-0.5	-3.3	27.3	12.8	-9.2	-3.9	2.1	20.0	13.8	-9.4	10.0	6.3	20.4
School Catholic 2016	-2.3	-0.8	-1.2	-2.2	-0.5	-2.2	-0.6	-1.2	-0.9	1.3	-1.3	-0.8	-1.0	-0.6	-1.7	-0.9	0.7
School Evangelic 2016	0.2	1.5	1.8	-0.1	-0.7	-2.9	-0.3	-3.2	1.4	5.0	0.6	-1.2	-1.9	0.8	-2.8	-0.2	2.7
School other 2016	1.9	3.2	6.4	2.1	4.6	3.8	7.7	2.1	4.3	3.5	4.0	5.6	1.7	6.4	3.4	5.1	6.3
School no info 2016	-6.3	2.8	4.9	-17.0	-2.9	1.9	-4.7	-2.4	-3.1	3.7	-0.8	1.6	-5.2	5.2	-0.7	-6.3	-7.5
Rural 2016	-2.3	-3.7	-2.5	-0.6	-3.5	-3.1	-2.4	-1.9	-3.4	-4.0	-3.9	-2.1	-3.9	-2.6	-0.7	-5.5	-3.4
Municipal school 2018	2.6	5.3	5.4	3.1	6.8	3.4	4.5	5.1	5.2	2.8	5.2	5.2	6.3	4.9	4.5	4.2	4.1
Private subs 2018	7.5	5.8	5.5	4.6	6.1	4.7	5.7	5.1	5.1	8.0	4.5	5.4	5.8	4.1	4.4	6.1	7.2
Delegated Admin 2018	7.7	5.6	10.1	2.7	7.4	5.0	5.7	5.1	9.4	8.1	8.8	7.9	6.2	11.2	5.7	7.2	5.1
School fee 1 2018	4.6	6.6	6.5	8.0	7.6	10.3	5.7	7.8	4.8	3.2	7.5	4.4	5.8	8.7	6.7	6.8	2.6
School fee 2 2018	-6.5	-3.6	-3.2	-4.6	-1.2	-5.3	2.4	-5.1	-2.7	-7.7	-3.4	-3.5	-1.9	-2.8	-2.2	-1.6	-4.1
School fee 3 2018	-2.2	-1.1	-1.3	3.1	-1.7	0.7	-0.7	-0.2	0.3	-1.4	-1.3	-0.3	-1.8	2.4	0.6	1.5	-0.1
School fee 4 2018	-2.8	3.8	0.4	1.3	1.4	3.1	2.1	0.2	1.9	-2.1	-0.1	2.4	0.0	3.2	1.3	0.5	0.0
School fee 5 2018	-10.3	-4.0	-6.3	-2.4	13.9	16.7	3.5	-7.9	8.0	7.4	-4.3	-2.2	-1.2	11.2	-2.1	5.5	-12.9
School fee no info 2018	3.7	4.7	3.6	5.7	3.8	3.0	1.7	2.9	0.6	0.3	3.6	3.0	0.8	2.3	4.1	2.5	1.8
School Catholic 2018	1.3	2.5	3.7	2.0	3.2	2.6	1.8	3.4	1.2	1.7	3.3	1.7	1.8	1.4	1.3	3.7	0.3
School Evangelic 2018	2.9	5.6	1.5	2.1	6.5	7.2	2.7	2.0	-2.4	-3.1	1.0	9.5	8.2	9.8	11.9	4.8	5.3

School other 2018	-2.6	-3.0	-2.0	-2.6	-2.8	-2.1	-3.5	-2.6	-3.4	-2.9	-3.8	-2.8	-3.3	-3.2	-2.9	-2.1	-3.2
School no info rel 2018	5.3	-9.7	-12.8	6.0	-9.4	-11.2	6.3	7.4	-4.2	-8.6	-2.9	6.8	1.6	3.6	-7.2	-4.6	0.7
Rural 2018	3.3	6.0	5.8	0.1	4.5	5.5	2.2	3.2	3.4	6.1	4.6	1.4	1.4	4.0	3.9	6.4	5.3
Bicentennial School	10.3	9.9	10.6	10.3	10.2	10.5	10.3	9.7	10.3	10.8	8.9	11.3	9.7	10.2	9.7	12.0	10.4
Constant	63.1	62.4	58.7	58.5	55.7	61.2	54.9	57.4	63.1	58.5	54.7	57.6	58.4	55.6	64.5	59.1	58.0

Variables Coefficients Math Regressions 2022

Variables	Regressions																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Female	-7.4	-6.1	-6.9	-6.8	-6.7	-7.2	-6.4	-6.4	-7.9	-6.2	-6.1	-6.5	-7.3	-5.9	-6.4	-6.9	-6.4
Born 2005-1	-11.6	-13.2	-19.3	-14.1	-15.8	-12.3	-19.1	-17.1	-16.6	-10.7	-10.9	-20.4	-19.0	-14.9	-15.4	-9.4	-14.6
Born 2005-2	-12.6	-5.3	-9.4	-11.0	-13.7	-9.8	-5.8	-8.7	-9.3	-6.0	-6.3	-8.8	-6.5	-10.3	-6.4	-11.2	-8.1
Born 2006-1	-4.0	-4.0	-4.7	-3.9	-4.0	-5.8	-3.7	-5.2	-3.8	-4.8	-4.1	-4.4	-4.9	-5.0	-4.3	-2.5	-2.9
Born 2006-2	-3.2	-1.8	-2.4	-2.3	-2.5	-3.1	-1.7	-2.0	-1.1	-0.9	-1.3	-1.0	-2.6	-3.4	-3.5	-2.2	-1.2
Mother Secondary Inc	-0.7	0.7	-2.2	-0.3	-0.9	-3.0	0.8	0.7	2.5	-3.6	1.8	-2.9	-0.7	1.2	-3.8	1.1	0.0
Mother Secondary Com	-1.9	1.4	-2.0	-0.6	-2.2	-4.4	0.5	1.5	3.6	-3.5	1.5	-2.7	-1.5	2.7	-3.1	0.3	0.5
Mother No Info	-3.0	-3.2	-40.5	-18.1	-27.6	-20.2	-26.3	-15.5	-10.8	-32.3	-6.8	-18.1	-18.2	-10.1	10.0	0.4	-11.5
Father Secondary Inc	4.0	2.5	3.8	1.6	5.2	5.4	2.7	0.9	1.1	3.9	2.7	3.0	3.4	1.3	5.1	2.0	3.1
Father Secondary Com	6.7	4.1	5.7	3.3	7.4	7.1	3.9	1.9	1.4	5.9	5.2	5.3	5.9	2.2	6.9	3.9	3.7
Father No Info	-3.7	-15.1	-0.7	1.1	-3.5	6.6	-5.0	-3.6	-8.1	-4.9	-0.2	-1.3	-10.1	-13.7	-3.5	4.8	-5.6
Income 1	2.1	-6.7	-0.2	2.1	-3.3	6.5	19.0	4.3	4.7	-5.3	2.9	-2.7	-1.0	1.9	5.0	12.0	-9.4
Income 2	1.3	-4.8	2.4	-1.1	-2.7	6.3	18.8	-1.0	7.8	-5.9	3.5	-3.5	-0.8	1.3	4.5	14.4	-5.3
Income 3	-1.1	-5.2	5.0	-1.9	0.1	5.8	17.7	-0.4	7.1	-5.0	0.6	-3.4	-2.4	4.2	4.8	15.2	-7.1
Income 4	-0.7	-5.2	5.3	1.1	1.8	7.9	19.4	0.7	8.3	-5.3	3.0	-0.9	-0.8	4.1	5.1	14.3	-5.3
Income 5	1.2	-4.9	5.3	2.5	1.5	8.4	20.7	1.7	8.0	-3.7	2.2	0.3	-0.1	4.0	5.9	16.1	-4.7
Income 6	-1.1	-6.3	5.8	1.5	-0.6	8.2	19.2	1.3	8.3	-4.0	3.5	-0.5	0.1	3.0	5.0	15.7	-4.3
Income 7	0.2	-6.1	6.7	1.2	1.0	9.7	17.8	-0.8	8.2	-3.9	2.0	-1.2	-0.3	5.8	5.9	16.5	-6.1
Income 8	0.6	-3.2	8.6	1.4	2.7	8.2	20.6	1.0	8.7	-1.2	2.6	0.5	0.3	3.8	6.7	15.0	-6.0
Income 9	1.3	-4.3	5.6	2.3	0.6	9.8	19.0	1.6	6.4	-2.7	4.4	1.9	-1.0	5.1	6.9	15.4	-6.5
Income 10	1.2	-1.7	9.1	6.7	7.4	14.8	26.3	5.2	14.6	1.7	13.2	7.1	3.0	6.6	10.5	20.6	2.7
Income 11	3.0	-1.7	8.2	8.8	6.4	14.2	25.7	3.2	15.7	-1.0	8.4	-1.2	-3.8	7.5	5.6	15.1	-7.1
Income 12	-1.4	-4.3	8.7	2.1	2.7	9.7	21.0	0.4	12.5	1.3	9.7	3.2	2.9	3.7	12.6	19.0	-6.1
Income 13	4.7	0.0	13.8	1.5	-1.7	17.9	20.6	3.9	10.3	2.1	6.3	4.3	1.3	7.6	12.4	20.1	-5.0
Income 14	8.2	-0.8	9.0	7.8	10.6	16.5	25.3	6.6	12.8	2.0	10.4	4.7	5.0	10.3	11.6	21.0	-0.7
Income No Info	-14.9	13.4	38.9	34.2	0.0	29.1	0.0	-21.1	2.2	24.1	17.4	-11.7	32.0	12.9	-28.6	16.8	0.0
Years Prioritario	-0.4	-0.5	-0.3	-0.4	-0.3	-0.3	-0.4	-0.5	-0.2	-0.3	-0.3	-0.3	-0.3	-0.2	-0.5	-0.5	-0.3
Years Extra Support	0.0	0.2	0.1	0.0	0.1	0.0	0.1	0.2	-0.1	0.0	-0.1	0.1	-0.1	-0.1	0.1	0.1	0.1
Municipal 2016	-2.2	-1.0	-2.1	-1.2	-1.4	0.0	-3.7	-1.0	-1.7	-0.4	-3.1	0.4	-1.9	-1.6	-1.8	-1.0	-0.1

Private subs 2016	1.8	2.5	2.2	1.6	2.6	2.3	2.2	3.5	2.4	2.6	2.1	2.9	1.8	2.8	2.4	3.0	2.6
Rural 2016	-1.4	-0.5	0.7	0.0	-1.3	-1.3	-0.8	0.0	0.5	-1.7	-0.1	-0.4	-0.1	-0.2	-0.5	-0.3	-1.1
Language 10 years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Math 10 years	0.2	0.2	0.3	0.3	0.2	0.2	0.2	0.3	0.2	0.2	0.3	0.2	0.3	0.2	0.3	0.2	0.2
Language 12 years	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Math 12 years	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Municipal 2020	1.6	2.0	2.4	3.5	2.2	0.4	0.9	0.0	3.3	-1.1	1.8	-0.8	0.0	1.2	0.2	2.4	1.0
Private subs 2020	-3.5	-2.0	-3.7	-2.7	-2.5	-4.2	-2.2	-4.2	-2.1	-3.9	-3.2	-5.0	-4.0	-4.5	-5.5	-4.7	-3.7
Local Serv 2020	-3.6	0.2	-3.5	-0.5	-0.6	-0.4	-2.2	-3.2	-0.7	-1.0	0.8	-2.2	-3.1	0.5	-3.2	-4.1	-3.7
School fee 1 2020	21.0	11.1	26.7	21.1	17.2	20.4	12.0	30.0	29.3	24.3	40.0	2.4	17.7	19.9	21.4	22.2	19.1
School fee 2 2020	5.6	-3.0	-3.2	-1.2	4.6	1.3	0.2	-3.7	-0.3	4.6	3.3	0.4	4.8	-0.1	2.0	4.7	-0.6
School fee 3 2020	4.2	-0.9	-3.1	2.4	-1.1	1.6	1.0	0.8	2.6	-0.1	-4.1	0.4	0.3	-1.8	2.4	3.5	3.4
School fee 4 2020	2.6	2.9	5.2	4.7	3.8	5.1	-0.1	2.7	2.4	0.9	2.9	3.0	-0.2	4.0	7.1	6.3	5.3
School fee 5 2020	12.7	-1.7	2.2	17.5	5.6	10.0	10.5	2.7	12.2	10.0	4.1	7.8	9.0	21.8	3.7	13.3	5.8
School fee NI 2020	-2.1	6.3	-9.9	-1.1	2.7	6.3	1.1	-4.1	-4.2	5.0	-8.4	4.3	-6.0	0.2	1.5	-3.8	0.5
School Catholic 2020	-1.9	-0.7	-0.7	-1.6	-3.0	-1.5	-1.1	-0.6	-1.4	-0.7	-0.5	-1.8	-2.1	-2.0	-2.1	-0.6	-2.6
School Evangelic 2020	-5.6	0.8	-1.5	-0.6	2.3	-1.2	3.6	0.4	-0.6	0.2	3.8	0.2	1.5	5.4	-0.9	1.7	-1.4
School other 2020	0.7	1.1	-0.3	-1.7	-0.9	-0.1	2.3	2.3	0.6	1.3	-0.1	-0.3	-1.6	-0.5	0.6	2.2	0.9
School no info 2020	10.8	-6.3	16.9	7.9	2.1	15.0	2.9	8.2	-3.2	-7.0	-1.7	-0.5	3.7	11.7	9.9	11.6	9.3
Rural 2020	-3.8	-8.4	-8.5	-4.9	-4.8	-6.6	-6.3	-6.6	-6.8	-5.6	-6.8	-4.6	-7.1	-7.2	-7.2	-6.0	-8.0
Municipal school 2022	2.6	2.9	1.8	1.3	2.0	2.4	4.8	4.7	3.2	5.9	4.1	3.3	4.7	4.2	4.6	2.0	2.6
Private subs 2022	5.6	5.7	8.2	4.6	6.3	6.1	5.9	9.5	8.1	5.7	4.9	8.8	6.9	6.4	8.0	5.2	3.5
Local Serv 2022	5.3	1.4	3.3	2.1	2.4	2.0	5.8	4.9	2.3	4.0	1.3	3.5	4.3	2.0	5.9	3.2	4.8
Delegated Admin 2022	3.7	1.4	5.2	2.5	2.2	3.2	5.7	7.1	-0.1	3.3	7.5	4.5	5.3	3.3	2.4	5.2	4.7
School fee 1 2022	5.0	3.8	2.6	3.9	0.4	0.9	-4.9	3.5	0.9	-7.7	-0.6	4.4	1.5	1.0	3.7	13.8	6.8
School fee 2 2022	-3.0	0.2	1.1	-2.0	-3.0	-2.6	0.4	3.9	-0.5	-0.2	1.1	-0.7	4.2	1.3	-2.8	-1.5	-2.4
School fee 3 2022	3.1	2.9	-0.1	1.4	4.0	0.5	6.1	6.8	4.0	5.1	1.4	4.4	6.4	4.1	-2.7	2.2	5.6
School fee 4 2022	2.6	4.0	1.6	2.4	6.6	-1.4	-1.9	6.4	4.0	7.9	4.6	3.4	8.8	-5.0	1.2	-1.3	2.6
School fee no info 2022	-7.2	-16.2	-4.3	-9.8	-11.7	-15.0	-8.7	-6.5	-6.5	-12.9	-4.8	-13.1	-4.9	-11.1	-12.4	-8.1	-10.6

School Catholic 2022	-0.9	-1.4	-2.3	1.8	0.1	-0.4	-1.8	-2.2	-1.4	-1.2	0.2	-0.4	-0.9	2.0	-1.3	-2.6	1.9
School Evangelic 2022	4.8	1.8	-6.7	5.4	-7.6	-7.3	-8.5	-0.3	1.3	-5.5	-3.9	-0.1	-6.1	-2.6	-1.5	-11.2	3.1
School other 2022	-4.3	-4.5	-4.5	-2.4	-3.3	-3.7	-6.2	-5.8	-5.5	-6.4	-4.6	-2.6	-3.9	-3.9	-4.6	-6.2	-5.0
School no info rel 2022	17.3	12.1	7.1	-4.9	17.4	10.6	9.9	7.7	15.5	18.7	14.3	18.6	-6.1	19.0	17.4	10.9	1.6
Rural 2022	8.6	8.3	14.8	11.9	8.7	13.7	11.1	11.5	12.4	7.1	11.8	10.9	11.4	11.7	10.3	10.4	13.5
Bicentennial School	9.2	9.1	9.2	8.0	7.9	7.6	8.2	11.9	9.9	8.6	7.8	10.6	8.7	10.1	7.5	7.7	9.0
Constant	30.2	31.5	25.0	30.9	28.2	25.6	9.7	28.0	23.2	31.9	23.2	30.0	29.0	22.9	26.4	14.1	33.1

Variables Coefficients Language Regressions 2022

Variables	Regressions																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Female	10.7	11.1	10.5	10.4	11.7	11.8	11.1	11.4	9.9	10.8	12.3	10.0	11.4	11.4	10.7	11.8	11.4
Born 2005-1	-10.5	-8.0	-11.6	-9.2	-10.2	-9.6	-8.7	-14.7	-12.8	-10.1	-12.1	-15.3	-16.7	-8.0	-9.7	-7.0	-13.2
Born 2005-2	-8.1	-8.7	-9.1	-7.9	-6.5	-12.3	-5.0	-8.0	-7.6	-8.4	-2.5	-6.6	-6.5	-8.0	-7.1	-7.1	-6.5
Born 2006-1	-2.4	-4.8	-2.7	-2.6	-2.4	-5.4	-3.1	-2.0	-3.2	-4.0	-2.8	-2.5	-2.8	-4.7	-4.0	-2.5	-2.1
Born 2006-2	-1.4	-1.0	-1.5	0.1	-0.6	-1.3	-0.6	-0.4	-0.1	-0.8	0.2	0.1	-0.8	-1.5	-0.9	-1.9	0.7
Mother Secondary Inc	-0.4	2.7	-1.0	1.8	-1.6	-0.4	1.4	0.5	2.3	-1.1	3.1	-3.7	-1.6	-1.8	-3.5	2.5	-1.0
Mother Secondary Com	-2.8	0.2	-2.2	-1.0	-3.2	-2.0	0.2	-0.4	0.9	-3.0	1.9	-4.8	-3.2	-2.1	-4.8	1.1	-3.3
Mother No Info	-11.8	8.8	-9.7	-13.0	-9.3	-8.2	-6.0	-32.5	-8.9	-10.7	2.7	-0.5	8.3	-2.5	-9.8	13.5	-19.9
Father Secondary Inc	6.3	2.3	7.2	4.0	8.5	5.2	6.2	2.8	2.8	5.9	2.0	7.0	4.9	8.0	7.6	3.8	4.6
Father Secondary Com	8.7	5.7	9.7	7.5	10.4	6.9	7.4	4.9	5.3	8.5	3.4	9.4	8.1	8.5	9.8	5.8	7.4
Father No Info	15.8	16.2	5.2	9.3	16.1	8.8	13.4	9.7	2.1	11.4	5.2	-2.9	16.2	10.5	17.6	10.4	4.8
Income 1	-8.9	0.5	-2.9	0.8	5.9	0.4	-6.3	0.5	-0.8	2.2	8.2	1.1	5.7	9.5	-6.2	1.6	-4.2
Income 2	-10.0	3.4	-3.8	2.9	3.5	1.4	-4.0	-3.4	-0.4	6.2	6.7	3.4	6.6	8.3	-5.6	4.8	-1.2
Income 3	-7.3	3.8	-1.8	4.8	7.0	2.5	-2.5	-1.0	0.6	6.2	9.0	6.6	5.7	12.2	-3.0	6.2	1.0
Income 4	-8.8	3.0	-2.0	5.6	6.7	1.9	-1.2	-0.9	1.2	5.2	9.5	7.9	8.3	10.8	-3.3	4.8	-0.8
Income 5	-8.0	1.7	-3.0	6.5	5.8	0.6	-3.7	-3.3	0.5	5.2	8.5	5.8	5.7	10.1	-2.7	3.6	-1.2
Income 6	-8.3	1.8	-3.5	4.6	5.0	1.2	-3.6	-2.5	0.2	4.3	8.5	6.2	6.4	11.3	-2.6	4.1	-0.4
Income 7	-7.2	2.7	-1.5	4.7	6.3	3.0	-2.3	-1.1	1.5	7.8	8.4	6.8	6.3	12.1	-2.2	6.1	-0.8
Income 8	-6.1	3.2	-1.6	8.5	9.3	3.1	-0.9	0.1	2.3	5.0	12.0	6.9	7.1	12.3	-0.1	7.0	0.9
Income 9	-9.3	1.2	-5.6	2.7	5.6	-3.9	-8.5	-3.5	-1.2	6.8	5.8	5.0	2.8	8.2	-5.4	2.8	-5.9
Income 10	-3.5	5.5	-1.0	9.8	12.7	7.3	5.0	3.3	6.0	7.6	14.4	10.0	10.5	12.8	0.2	6.5	4.0
Income 11	-6.8	1.7	-2.3	5.7	6.8	2.6	0.9	-5.4	-0.3	4.7	11.1	4.0	6.8	9.6	-1.8	6.6	-5.7
Income 12	-6.4	5.0	-3.8	3.3	6.1	3.2	-3.2	-7.1	0.8	6.4	11.0	7.2	8.0	5.8	-0.2	6.6	-0.6
Income 13	-6.2	5.6	2.8	3.9	5.7	4.8	-5.1	1.1	2.1	14.5	7.4	7.5	3.2	12.4	1.7	2.9	3.5
Income 14	-5.1	2.5	-1.3	7.1	10.9	4.0	1.1	1.9	1.1	6.3	11.8	7.6	5.3	11.2	-3.8	4.6	0.8
Income No Info	-31.8	-10.2	2.0	42.3	0.0	-13.1	0.0	2.8	-15.4	28.1	23.3	0.7	-26.5	22.2	-0.5	14.0	0.0
Years Prioritario	-0.5	-0.5	-0.3	-0.3	-0.5	-0.4	-0.4	-0.5	-0.4	-0.2	-0.3	-0.3	-0.3	-0.4	-0.3	-0.4	-0.4
Years Extra Support	0.2	0.2	0.1	0.2	0.3	0.1	0.1	0.2	0.0	-0.1	0.0	0.1	0.0	0.1	0.2	0.2	0.1
Municipal 2016	0.1	2.3	0.6	1.1	2.8	0.6	1.5	1.2	2.7	1.9	-0.5	3.0	1.6	2.1	1.6	0.8	3.4

Private subs 2016	1.6	1.3	2.1	1.9	3.2	3.2	2.8	3.4	1.8	2.4	1.5	2.9	2.1	2.1	2.1	2.3	3.0
Rural 2016	-3.0	-3.0	-3.0	-1.7	-1.5	-3.1	-2.3	-3.0	-3.1	-3.1	-3.3	-2.9	-2.5	-2.2	-1.9	-3.3	-4.2
Language 10 years	0.2	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Math 10 years	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Language 12 years	0.4	0.4	0.4	0.4	0.3	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4	0.4
Math 12 years	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1
Municipal 2020	-3.3	-3.4	0.3	0.1	-3.5	-1.4	-2.3	-3.0	-1.4	-1.9	-0.6	-3.1	-2.6	-3.5	-2.6	-1.2	-5.6
Private subs 2020	-4.9	-3.0	-3.1	-5.1	-3.7	-3.5	-2.9	-3.8	-1.2	-3.4	-1.7	-5.2	-3.0	-3.7	-2.5	-4.5	-5.5
Local Serv 2020	-2.0	1.1	0.0	2.5	3.4	-0.2	-0.3	0.5	1.2	1.6	2.8	-1.7	0.3	0.5	0.9	-0.9	-2.0
School fee 1 2020	7.8	-1.1	19.3	21.5	6.8	6.3	14.9	24.3	8.7	30.4	16.0	-6.5	3.5	6.1	7.0	10.0	5.3
School fee 2 2020	3.0	6.6	-0.5	3.7	5.0	1.8	2.1	-5.8	2.4	4.9	3.0	4.5	2.0	5.4	2.2	3.5	-3.2
School fee 3 2020	2.4	2.1	-1.8	6.0	3.6	1.9	-0.2	-3.0	2.3	2.4	-1.1	3.5	0.0	0.3	0.4	0.9	5.7
School fee 4 2020	2.1	1.0	1.0	10.8	1.6	4.4	1.4	3.6	5.1	1.1	2.3	4.5	-0.8	2.4	6.1	3.1	1.9
School fee 5 2020	10.9	3.3	6.8	15.5	0.6	12.0	10.0	2.3	7.2	-4.3	7.7	11.3	9.4	18.7	19.9	9.5	15.1
School fee NI 2020	0.6	2.5	-4.2	8.7	2.8	6.1	6.5	-1.0	4.4	1.3	2.2	3.6	-0.8	8.4	6.6	-0.2	4.1
School Catholic 2020	-0.2	-0.6	-0.9	-0.7	-3.0	-1.5	-1.8	-1.2	-3.5	-2.0	-2.2	0.2	-1.7	-2.1	-2.8	-0.8	-1.4
School Evangelic 2020	-3.3	-1.4	0.4	0.8	-0.9	-4.9	2.3	-0.6	-2.4	-0.8	1.7	3.4	-4.0	1.6	-4.2	0.8	-0.3
School other 2020	-1.7	0.1	-2.6	-1.3	-2.9	-0.8	1.0	0.1	-1.7	-1.6	-0.8	0.0	-0.4	-1.1	-2.0	2.2	-1.2
School no info 2020	-3.0	3.2	-1.1	3.6	0.7	-4.1	-1.1	-7.3	-8.2	2.3	-4.9	3.7	5.5	-17.9	-9.2	10.0	-0.6
Rural 2020	-1.9	-3.0	-5.3	-1.4	-0.4	-2.5	-2.5	-1.4	-1.4	-1.9	-2.1	-2.0	-3.1	-3.9	-5.0	-2.8	-2.7
Municipal school 2022	3.0	2.4	-1.0	-0.6	1.6	1.2	0.4	2.6	0.5	-0.1	-1.1	1.1	2.2	2.4	0.5	0.5	3.4
Private subs 2022	-0.7	-1.9	-3.1	-1.6	-0.7	-3.7	-4.4	-2.3	-3.6	-3.5	-3.7	-0.9	-4.9	-1.5	-3.5	-1.9	0.0
Local Serv 2022	-3.7	-5.2	-7.7	-5.2	-8.0	-4.9	-5.2	-5.9	-7.5	-4.7	-8.7	-4.4	-6.4	-5.0	-6.2	-3.9	-4.4
Delegated Admin 2022	2.9	-2.8	1.9	-5.3	-0.5	-3.3	1.3	-1.8	-3.5	-4.3	-1.9	2.3	-4.2	-2.7	-2.9	-3.1	2.2
School fee 1 2022	6.5	-5.1	12.0	-10.3	-7.9	2.3	-18.0	4.4	-1.3	1.3	1.7	-4.0	-2.8	4.1	-8.6	-7.2	7.1
School fee 2 2022	0.1	-0.1	1.1	-2.1	-3.2	1.6	2.1	4.9	0.2	0.5	-0.7	-0.8	1.1	-1.0	-1.6	-0.5	-3.9
School fee 3 2022	0.8	1.8	4.9	-2.8	4.0	-1.9	1.9	1.9	3.8	5.4	-0.4	1.8	7.4	1.8	-2.7	1.2	4.1
School fee 4 2022	-2.6	0.3	1.0	-6.6	-2.8	-3.0	-4.8	-2.7	-2.2	4.4	1.6	-6.0	0.4	-11.3	-10.3	-2.2	-3.4
School fee no info 2022	-0.6	-3.3	2.6	-7.3	-3.7	-2.3	-5.6	2.1	-6.1	-0.1	-0.1	-2.9	0.1	-7.6	-5.3	-0.4	-2.8

School Catholic 2022	0.5	2.0	3.7	2.7	1.2	3.3	4.0	2.7	3.7	3.4	3.4	1.9	4.5	2.9	3.6	4.6	0.2
School Evangelic 2022	5.2	0.3	4.1	6.2	1.6	0.3	-6.7	10.1	5.3	7.4	9.5	5.3	1.3	-3.7	1.1	0.9	1.1
School other 2022	-1.4	-2.6	-0.6	-1.0	-0.1	-2.0	-3.4	-2.4	-1.4	-3.0	-1.2	-2.4	-1.5	-3.1	-1.3	-4.3	-2.2
School no info rel 2022	9.1	12.0	8.7	11.0	8.5	9.0	8.7	7.3	13.8	15.1	11.0	-1.8	-4.7	13.3	16.0	1.5	12.5
Rural 2022	3.2	3.5	9.6	3.1	5.2	5.1	5.1	2.7	5.8	2.7	6.3	5.0	6.3	6.6	8.4	3.2	5.9
Bicentennial School	3.8	2.5	4.2	3.1	3.2	2.8	2.5	4.2	3.8	4.9	3.3	3.9	1.3	3.4	1.9	3.8	4.0
Constant	39.9	27.3	30.4	24.9	20.3	27.4	32.9	29.7	31.2	22.3	19.2	23.3	25.8	19.2	35.2	19.9	31.2

Appendix 4. Consent form sent to Parents for Interviews

Durham University
Evidence Centre for Education

Research Information

Research Team:

Carolina Gazmuri
Prof. Nadia Siddiqui
Prof. Stephen Gorard

Study:

Your child is invited to participate in a study that will be conducted by a PhD researcher at Durham University, UK, in April of 2025. Before deciding if your child can participate, it is essential that you understand the purpose of the research and what it involves. Please read the following information carefully and get in touch if anything is unclear or you want more information.

What is the purpose of the study?

The purpose of the study is to gain a deeper understanding of young people's skills, circumstances, and attitudes towards their education. It aims to identify the factors that have influenced their academic progress and to explore the role that various individuals and institutions have played in shaping their educational journey throughout their school years.

Why have I been invited to participate?

Your son or daughter has been invited to participate because they attend XXXXX a school whose students have shown significant academic progress throughout their educational journey.

Should my son or daughter participate?

Participation is voluntary, and your child is under no obligation to take part. They will only participate if you give your consent.

What will happen if child participates?

If you consent to your child's participation, they will be interviewed remotely (via the internet). The interview will last around 15 minutes, and your child's school will provide both the computer, and the time required to take part in the interview.

All information gathered during the study will be treated as confidential. Any data presented for analysis will be entirely anonymous and will not be identifiable as belonging to your child. The results of the project will be published in a public report and in academic outputs. Neither the school, students, nor staff involved will be identifiable in the report or the academic publications. If you or your child wish to erase the interview answers, you can do so at any time before the interview concludes upon request.

Who do I contact if I have any questions about this study?

If you have any questions or concerns about the study, contact Carolina Gazmuri at carolina.gazmuri@durham.ac.uk.

Please discuss the study with your child so that he or she can give informed consent to participate at the interview.

Please fill out this form to confirm that you agree to have your child participate.

Please tick each ✓ box to indicate your agreement:

I confirm that I have read and understand the information in the study.	
I understand that my child's participation is voluntary, and I am free to withdraw my child at any time.	
I agree that my son or daughter participates in the aforementioned project	

Parent/Parent/Guardian Signature: _____

(NAME IN CAPITAL LETTERS):

_____

Appendix 5. Ethics Committee Approval

Durham University

Inspiring the extraordinary

Education Ethics Committee
Durham University, Confluence Building
Lower Mountjoy, Stockton Road
Durham
DH1 3LE

CAROLINA GAZMURI
Ustinov College

14 March 2025

Dear CAROLINA GAZMURI ,

Thank you for your ethics submission. The Education Ethics Committee has granted ethical approval for the following project, subject to specified conditions.

Title: Succeed Against the Odds Students
Dates: 01/04/2025 - 31/05/2025
Supervisor / Project Team Members: Professor NADIA SIDDIQUI, STEPHEN,ANTHONY GORARD ,
Project ID: 5694
Review Reference: EDU-2025-5694-5577

Title	Comment
Please upload your information sheet(s)	In the information sheet you need to add a sentence clarifying when the withdrawal can take place. Since you have stated that there is no identifiable data this would presumably be anytime within and to the end of the interview, after this is would not appear to be possible. Please add a sentence to this effect. Also given that consent by the students will be obtained orally during at the beginning of the interview, it would be reasonable that the participants know what they are going to participate in. Can you please add a sentence in the information sheet that parents would be expected to socialise this information and consent with their son/daughter. In this way, the signature of the parents would be sufficient together with the oral consent from the minors.

Please use the 'Correspond' action to send a message to the committee / department to confirm how the conditions of approval will be met. This must take place before you begin work on the project.

General conditions of ethics approvals

It is expected that you will begin work on the project within one year of the date approval is given. Ethics approval is normally granted for the stated duration of the project, up to a maximum of five years. Beyond this, you should apply for extension or re-approval.

If you make any significant changes to the design, duration or delivery of your project, you should submit an amendment form for further consideration and approval as required.

If any significant ethical issues arise (i.e. a risk, foreseen or unforeseen, becomes a live issue), you should notify Education Ethics Committee. If you have received approval from an external body, you will also need to check their requirements regarding notification of adverse events.

If you have any questions regarding this outcome, please contact ed.ethics@durham.ac.uk.

Dr Antonia Manresa

On behalf of Education Ethics Committee of Durham University

Appendix 6. Logistic Models Details for Students Succeeding Against the Odds (1st Identification Strategy).

The following tables summarise key details of the logistic models for students Succeeding Against the Odds, including the number of students in each group, the variables included, and the percentage of correct predictions at each step. The third model was selected as the final one because it achieved the highest prediction accuracy using the fewest variables. All nine models demonstrated nearly identical predictive accuracy at each block level.

After selecting the third model, it was replicated across all nine subgroups of the comparison group. Independent variables were incorporated using the Enter Method within the biographical blocks, and the average percentage of correct predictions at each stage was calculated across the nine subgroups.

Binary Logistic Regressions for High-Improvement Students

Model	1	2	3	4	5	6	7	8	9
Comparison group	1,428	1,369	1,384	1,401	1,460	1,416	1,453	1,446	1,412
SAO students	1,437	1,437	1,437	1,437	1,437	1,437	1,437	1,437	1,437
Variables	22	22	19	22	22	19	21	20	24

Percentage of Correct Predictions by Step

Model	1	2	3	4	5	6	7	8	9
Base	50.16	51.21	50.94	50.63	50.40	50.37	50.28	50.16	50.44
Step 1: Birth	52.84	53.88	53.31	52.64	52.78	52.61	52.35	52.90	53.56
Step 2: SES	54.07	55.70	55.16	55.25	55.61	54.85	54.26	56.12	54.05
Step 3: 10-year score	54.73	56.27	56.93	56.91	57.23	55.06	57.72	57.75	56.83
Step 4: 10 years	59.02	59.59	60.48	59.83	59.20	58.36	58.82	60.39	59.35
Step 5: 12 years	63.28	63.29	62.18	63.71	63.10	61.83	63.36	63.06	63.39
Step 6: 14 years	65.34	64.40	63.70	65.57	64.34	64.42	64.53	66.08	65.36
Step 7: 16 years	67.78	67.96	68.91	68.29	67.73	67.19	67.30	68.47	68.52

Percentage of Correct Predictions by Step

Model	1	2	3	4	5	6	7	8	9
Base	50.16	51.21	50.94	50.63	50.40	50.37	50.28	50.16	50.44
Step 1: Birth	52.84	53.88	53.31	52.64	52.78	52.61	52.35	52.90	53.56
Step 2: SES	53.51	54.35	55.16	54.58	54.54	54.57	53.70	55.50	55.07
Step 3: 10-year score	54.69	56.27	56.93	56.31	55.37	55.38	56.68	56.40	56.65
Step 4: 10 years	58.12	59.19	60.48	59.13	58.65	58.99	59.27	60.08	59.85
Step 5: 12 years	61.29	62.44	62.18	61.95	62.03	61.44	61.45	62.43	62.48

Step 6: 14 years	63.53	63.79	63.70	64.55	63.86	63.55	63.15	65.18	64.79
Step 7: 16 years	67.23	69.00	68.91	66.91	68.52	66.60	67.02	68.44	67.85

Appendix 7. Logistic Models Details for Students Enrolled in Prestigious Universities (3rd Identification Strategy).

The following tables summarise key details of the logistic models for students enrolled in prestigious universities, including the number of students in each group, the variables included, and the percentage of correct predictions at each step.

Among the four models tested, the fourth model was selected as the final version because it achieved the highest prediction accuracy and had one of the fewer number of variables. This model was then replicated across all four subgroups using the Enter Method, incorporating the independent variables consistently.

Binary Logistic Regression of Enrolment in Prestigious Universities

Model		1	2	3	4
Students	Comparison group	2,807	2,784	2,847	2,819
	Best Universities	2,949	2,949	2,949	2,949
Percentage predicted correctly by each step	Base	51.23	51.44	50.88	51.13
	Step 1: Birth	55.73	56.51	55.73	56.59
	Step 2: SES	56.86	56.95	56.38	57.35
	Step 3: 10-year-old score	65.97	66.51	65.73	66.56
	Step 4: 10 years	66.33	67.02	66.75	66.80
	Step 5: 12 years	67.53	68.22	68.01	67.96
	Step 6: 14 years	68.33	69.39	69.15	69.05
	Step 7: 16 years	71.07	72.53	71.36	72.07
Number of variables included		17	23	19	19

Final Binary Logistic Regression of Enrolment in Prestigious Universities

Model		1	2	3	4
Students	Comparison group	2,814	2,788	2,855	2,826
	Best Universities	2,958	2,958	2,958	2,958
Percentage predicted correctly by each step	Base	51.25	51.48	50.89	51.14
	Step 1: Birth	55.70	56.51	55.72	56.59
	Step 2: SES	56.86	57.10	56.58	57.33
	Step 3: 10-year-old score	66.34	66.32	66.14	66.60
	Step 4: 10 years	66.77	66.83	66.68	66.80
	Step 5: 12 years	67.97	68.36	67.62	67.86
	Step 6: 14 years	68.43	69.16	68.73	69.10
	Step 7: 16 years	71.05	72.76	71.72	72.08