The Burden of Comparison: Relative Socioeconomic Position and Adolescent Socioemotional Development

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ABSTRACT

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This paper examines how an adolescent's relative socioeconomic status (SES) within their school influences their socioemotional development and well-being. Although peer effects on academic outcomes are well-documented, less is known about how an individual's socioeconomic rank among peers shapes non-cognitive skills. Using PISA 2022 data and a school fixed effects model, we investigate the relationship between two measures of relative SES—Socioeconomic Rank and Socioeconomic Gap—and a range of outcomes, including socioemotional skills, self-esteem, and attitudes toward school. Our results show that higher within-school SES rank is significantly associated with better socioemotional skills, greater well-being, and stronger academic motivation. We also find important heterogeneity by gender and migrant background. These findings highlight that an individual's relative socioeconomic position, beyond absolute resources, plays a critical role in shaping adolescent non-cognitive development.

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1 Introduction

Non-cognitive competencies such as socioemotional skills, are gaining growing recognition in influencing youth development and long term outcomes. These skills are closely linked to different life domains, including academic achievement, labor market participation, health and overall well-being. In the context of education, socioemotional competencies support students in building relationships, regulating emotions, staying motivated and coping with challenges which are all factors that are essential for both learning and future success. Beyond schooling, these skills also influence broader economic behaviors such as job choices, earnings and overall labor market productivity (Heckman et al., 2006, 2019). While these skills start to develop in early life, adolescence is a key period of change and growth. It is a stage where emotional regulation, social behavior and decision making evolve and where individuals become especially sensitive to the environment surrounding them (Crone and Dahl, 2012; Blakemore and Mills, 2014). In particular, the influence of home and school settings are crucial, with peer effects becoming more pronounced playing a central role in both cognitive and non-cognitive development.

A substantial literature has examined the effects of peer ranks (usually based on academic performance) on beliefs, expectations, test scores and overall life outcomes (Black et al., 2013; Elsner et al., 2021; Elsner and Isphording, 2017; Denning et al., 2023; Azmat and Iriberri, 2010; Bertoni et al., 2020; Pagani et al., 2021; Bertoni and Nisticò, 2023). However, much less is known about how peers' socioeconomic status (SES) shape adolescents' socioemotional development and overall well-being. This paper aims to address this gap by exploring how a student's relative SES positioning within the school, over and above the absolute level of SES, relates to different outcomes: social and emotional competencies, self esteem, social integration and attitudes toward school. Our motivation is to understand not just the influence of socioeconomic traits in isolation, but how they intersect within peer contexts during a critical stage of life development.

Using PISA 2022 data, we focus on two key indicators of students' relative socioeconomic position among peers, both derived from PISA's Economic, Social and Cultural Status (ESCS) index. The Socioeconomic Rank captures each student's relative ESCS position within their school, while the Socioeconomic Gap quantifies how far a student falls below the socioeconomic elite in their immediate educational context. We examine the relationship between these measures and a range of outcomes using a school fixed effects model, controlling for a rich set of demographic and contextual characteristics. Our analysis encompasses different students' outcomes: social and emotional skills, subjective well-being (e.g. body image) and attitudinal measures toward school (motivation and nervousness toward studying).

The results reveal that students' relative socioeconomic status within their school is a significant predictor of socio-emotional development and well-being. Specifically, a higher within school SES rank is positively associated with most of our outcomes, including social and emotional skills. We find stronger associations with specific non-cognitive outcomes, particularly with assertiveness and curiosity. Moreover, students with higher SES rank tend to show greater sociability, higher self-esteem (measured through the body image index) and overall life satisfaction. SES rank also influences students' attitudes toward schoolwork: those who rank higher in the SES distribution show greater academic motivation, while those with lower SES positions exhibit negative emotional engagement toward studying. Conversely, greater distance from the school's elite is linked to diminished non-cognitive skills, lower well-being, reduced academic motivation and less academic stress resistance. Interestingly not all patterns align: for instance, lower ranked students tend to report higher growth mindset, suggesting a potential compensatory belief in self improvement and effort over innate ability.

Moreover, to explore whether these effects vary across different groups, we conducted a heterogeneity

analysis by gender and migrant background. We observe that girls benefit more in emotional domains, while boys' well-being and sociability appear to be more sensitive to their relative SES rank. We also find that first generation boys appear particularly affected by higher SES rank, showing larger gains in social skills and life satisfaction. While first generation girls benefit most in terms of emotional skills and stress resistance. Interestingly, we observe that second generation boys with a high SES rank report increased motivation toward learning. These findings highlight that relative SES, beyond absolute socioeconomic resources, plays a fundamental role in shaping adolescents' non-cognitive development.

This study contributes to different strands of literature. Firstly, it contributes to the growing economic and psychological research on socioemotional skills and their formation (Moroni et al., 2019; Fiorini and Keane, 2014; Dooley and Stewart, 2007; von Hinke et al., 2022; Attanasio et al., 2022; Macmillan and Tominey, 2023; Cunha and Heckman, 2008; Alan and Ertac, 2018). Secondly it complements the literature on peer effects (Black et al., 2013; Bertoni et al., 2020; Pagani et al., 2021) specifically on the effects of relative rank (Elsner et al., 2021; Elsner and Isphording, 2017; Denning et al., 2023; Azmat and Iriberri, 2010; Bertoni and Nisticò, 2023; Pagani et al., 2021; Elsner and Isphording, 2018; Kiessling and Norris, 2023) by focusing on socioeconomic rank, rather than academic achievement or absolute levels of SES.

There are two studies that follow a similar analysis: Inoue and Tanaka (2024) and Paffenholz (2023) which have examined socioeconomic rank in relation to school well-being and mental health. However, our analysis extends this small body of work by using precise measures of socio-emotional skills while using cross-country data. This allows us to have a sample of adolescents coming from different countries broadening our perspective of analysis.

The paper is structured as follows. Section 2 reviews the existing literature. Section 3 describes the data and construction of our measures. Section 4 outlines the empirical strategy. Section 5 presents the main results, including the heterogeneity analysis by gender and migration background. Section 6 concludes the paper.

2 Literature Review

In recent years increasing attention has been devoted to the role of non-cognitive skills in shaping individual outcomes and broader social dynamics. Often referred to as socio-emotional skills, these competences include a set of non-cognitive capacities that manifest through consistent patterns of thoughts, feelings and behaviors (OECD, 2021). They support individuals regulate their emotions, maintain social ties and pursue long term goals across multiple domains such as academic achievement, employment, health and overall well-being (Del Bono et al., 2024; OECD, 2021; Sorrenti et al., 2025).

This growing interest reflects a broader shift in the understanding of human capital formation. While cognitive abilities such as IQ and test scores have traditionally been central in explaining educational and economic success, there is now comprehensive evidence that non-cognitive abilities play an equal crucial role. In particular, the intersection between psychology insights on personality traits and economic research has highlighted the importance of non-cognitive skills in influencing economic outcomes (Heckman et al., 2006; Cunha and Heckman, 2008; Almlund et al., 2011; Deming, 2017). These skills influence how individuals face challenges, interact with others and engage in tasks, all of which are essential for educational achievement, labor market performance and broader life satisfaction. In this sense, socio-emotional skills are key components in the human capital production function, influencing learning and development across the life cycle (Cunha and Heckman, 2008).

Social and emotional skills are particularly relevant in the context of education. They may contribute to students' ability to form meaningful relationships both inside and outside of school, support goal achievement and foster a sense of belonging and well-being, all factors that are essential for academic success and future outcomes (Cerna et al., 2021; De Paola and Skatova, 2024). For instance Conscientiousness, one of the Big Five personality traits, has been shown to predict years of schooling as strongly as cognitive skills (Almlund et al., 2011). Similarly, skills such as locus of control and self esteem are linked not only with educational success but also to occupational choices, income and skill acquisition (Heckman et al., 2006, 2019). Beyond education and employment, socio-emotional skills have been associated with broader life outcomes, such as health, life satisfaction and longevity (Heckman et al., 2019; Del Bono et al., 2024).

Importantly, non-cognitive skills are not fixed traits. Rather they are malleable, evolve across life cycle and are shaped by a range of environmental factors, including parental investment, peer interactions, schooling and overall life experiences (Heckman et al., 2019, 2023). While early childhood is a critical period for skill formation, adolescence emerges as a particularly dynamic phase for socio-emotional development. Non-cognitive skills have been shown to be especially responsive to environmental inputs particularly during this stage (Cunha and Heckman, 2008; Akee et al., 2018). In fact, research evidences that during this period individuals experience significant changes in emotional regulation, social behavior and decision making, driven also by neuro maturational changes (Dahl et al., 2018; Crone and Dahl, 2012; Blakemore and Mills, 2014). Adolescents start to form personal goals, develop their identity and increasingly rely on cognitive control to manage emotions and actions in pursuit of long term aspirations (Crone and Dahl, 2012). This makes them especially sensitive to external influences such as family, peers and school environments.

In this scenario, environmental factors play a crucial role. Family background and home environment, including parental education, mental health and socioeconomic resources have substantial impact on children's socio-emotional development. Numerous studies have emphasized the impact of family background on children's psychological and emotional well-being (Pietropoli and Gracia, 2025; Moroni et al., 2019; Fiorini and Keane, 2014; Dooley and Stewart, 2007; von Hinke et al., 2022; Attanasio et al., 2022; Macmillan and Tominey, 2023; Cunha and Heckman, 2008). Socioeconomic status, in particular, plays a crucial role in shaping emotional well-being and personality traits. Households with higher income and education levels are better positioned to invest in terms of both material resources (such as access to books or additional educational material) and relational inputs (e.g. quality time and parental involvement), which in turn support the development of socio-emotional skills (Attanasio et al., 2022; Akee et al., 2018; Fletcher and Wolfe, 2016). In this sense, children raised in more resourceful environments may benefit from better educational, psychological and behavioral outcomes.

Alongside family, the school environment where adolescents spend a large part of their time, serves as another crucial context for socio-emotional development. Peer interactions and school composition influence students' outcomes. A robust literature shows that school characteristics and peer dynamics affect both cognitive (Black et al., 2013; Elsner et al., 2021; Elsner and Isphording, 2017; Denning et al., 2023; Azmat and Iriberri, 2010; Bertoni et al., 2020; Pagani et al., 2021; Bertoni and Nisticò, 2023; Carneiro et al., 2025) and non-cognitive skills (Pagani et al., 2021; Kiessling and Norris, 2023; Elsner and Isphording, 2018; Carneiro et al., 2025), with consequences for academic performance, well-being and long term outcomes. For instance, exposure to high achieving peers improves later academic achievement and influences educational choices (Pagani et al., 2021), while classmates coming from disruptive families can negatively impact both academic performance and classroom behavior (Carrell and Hoekstra, 2010). Peer effects, particularly those associated with relative academic or socioeconomic rank, have been shown to affect a range of long term

outcomes including the likelihood of finishing school, attending college, occupational aspirations and future earnings (Elsner and Isphording, 2017; Elsner et al., 2021; Denning et al., 2023). Relative academic rank within school or class also affects non-cognitive development: higher ranked students report better mental health, greater conscientiousness and lower engagement in risky behaviors often through mechanisms such as perceived ability, social comparison, academic motivation and expectations (Pagani et al., 2021; Kiessling and Norris, 2023; Elsner and Isphording, 2018). A small and recent body of research has further explored the interaction between peer effects and socioeconomic status, emphasizing how an individual's socioeconomic rank affects both short and long term outcomes. For instance, Inoue and Tanaka (2024) find that students with higher socioeconomic rank within their class may face greater difficulties, as they are more likely to report school bullying and absenteeism despite benefiting from higher absolute SES levels. At the same time, SES rank appears to positively influence students' outcomes. Paffenholz (2023) finds that students who are ranked higher in the SES distribution of their high school cohort tend to report better outcomes in terms of mental health and cognitive development: they show lower levels of depression and higher academic performance, with these benefits persisting in the long run.

Overall, this body of research highlights the central role of non-cognitive skills in shaping students' trajectories and points to the importance of considering peer dynamics and socioeconomic status when examining socio-emotional outcomes.

3   Data

For the scope of this study, we will use survey data from the 2022 wave of the Programme for International Student Assessment (PISA). PISA measures the cognitive achievement of 15 year olds every three years in three main areas: reading, science and mathematics literacy. PISA is not limited to the measurement of academic achievement. It also includes background questionnaires designed to assess individual demographic characteristics, such as gender, socioeconomic status and migrant background, as well as school related outcomes, including students' perception of school and study habits. In recent years, the focus has increasingly shifted towards non-cognitive capacities, such as motivation, aspirations, and socio-emotional skills, which are equally essential for academic achievement and future labor market participation as cognitive abilities (OECD, 2021). The PISA 2022 student questionnaire includes a comprehensive set of measures for eight core socio-emotional skills: Growth Mindset, Assertiveness, Cooperation, Empathy, Curiosity, Perseverance, Stress resistance and Emotional control. Additionally, PISA includes a Well-Being Questionnaire, administered to a subsample of students which covers topics related to mental health, life satisfaction and overall student well-being.

The sample consists of over 580,000 students, with some variation in the number of observations across variables due to non responses or differences in questionnaire administration (as mentioned, the Well-Being Questionnaire is administered only to a subsample of students). Descriptive statistics show an almost equal gender distribution, with females representing approximately 50% of the sample. In addition, 12.15% of the students report a migrant background. Table 1 presents summary statistics of the variables implemented for the scope of our analysis.

3.1   Socioeconomic status: Rank and Gap

To analyze the influence of one's own socioeconomic status positioning within a group on the development of socioemotional skills, we identify two primary socioeconomic indicators: (1) Socioeconomic Rank and (2)

Socioeconomic Gap. These indicators are derived from PISA's Economic, Social and Cultural Status Index (ESCS), which is based on students' family background: parents' highest level of education, parents' highest occupational status and the number of household possessions, such as books and digital devices. Generally, students classified as disadvantaged by PISA are those at the bottom quartile of the ESCS distribution within their school or country, while advantaged students fall into the top quartile.

Our first indicator, (1) Socioeconomic Rank, is a standardized percentile measure ranging from 0 (lowest) to 1 (highest) with a mean of 0.50 and a standard deviation of 0.30. The variable is constructed by ranking students' ESCS scores within each school, and then dividing the rank (minus 1) by the total number of students in the school (minus 1). By doing so, it captures each student's within-school percentile rank based on their ESCS level. Therefore, this measure reflects a student's relative socioeconomic position compared to their school peers and it allows us to investigate how a student's position among peers relates to the development of socioemotional skills.

The second indicator, (2) Socioeconomic Gap, measures a student's relative distance from the 90th percentile of ESCS within their school. This measure quantifies how far a student falls below the socioeconomic elite in their immediate educational context. To reduce the risk of collinearity with the rank and absolute ESCS variables (Table 7 in Appendix), we perform a transformation from the absolute distance fro the 90th percentile. First the ESCS variable is linearly transformed adding its lower value such to avoid negative numbers. The individual gap is then calculated as the difference between this elite threshold and each student's ESCS value, with negative differences (the students above the 90th percentile) set to zero. Then we calculate the relative distance by dividing the individual gap by the school threshold level and apply a logarithmic transformation to the relative gap: $\ln(\frac{gap_i}{top10_s})$. For students with no gap, i.e. a value of 0, the logarithmic value is set to -11.5, representing the lower bound of the transformed distribution. This variable serves as a proxy for relative deprivation enabling us to examine whether disparities between students and their most advantaged peers proportionally influence socioemotional outcomes, beyond the effects of their absolute socioeconomic status.

3.2   Outcome Variables: Socioemotional skills and Well-Being

To measure for students' socioemotional skills and well-being, we use data from both the Student Questionnaire and the Well-Being Questionnaire. To assess socioemotional skills specifically, we extract eight main non-cognitive skills from the Student Questionnaire: Growth Mindset, Assertiveness, Cooperation, Empathy, Curiosity, Perseverance, Stress Resistance and Emotional Control.

Most of the PISA outcome measures are based on Weighted Likelihood Estimates (WLE), which are subsequently standardized to facilitate interpretation. WLE enables the evaluation of construct invariance across groups through concurrent calibration. In addition, several other outcome variables developed by PISA and based on item response theory (IRT) scaling are included, particularly those related to mental health and social skills. These IRT-based scales are calibrated using maximum likelihood estimation, which iteratively adjusts the parameter of the item between the respondents and the parameter of the respondent between the items. This approach provides a robust evaluation of the latent traits associated with the underlying abilities of the students.

Socioemotional skills are analysed both individually and through two constructed composite indices: the (1) Social Skills Index derived from student's responses on Assertiveness, Cooperation, Empathy, Curiosity and Perseverance; and (2) the Emotional Skills Index based on measures of Stress Resistance and Emotional Control. Both indices are derived from Likert-scale items (ranging from 1, "Strongly disagree", to 5,

"Strongly agree") and are also analyzed individually as separate outcome variables.

We also aim to explore the effect of socioeconomic status on additional outcomes related to adolescents' mental health and psychological well-being, which are increasingly recognized as important for both academic achievement and future labor market success. From the Well-Being Questionnaire we selected several indicators to better capture dimensions of students' mental health, social functioning and attitudes toward learning, factors that are increasingly recognized as critical for academic success and well-being. As a first step, we select the "Body image" Index, a 4-point Likert scale (from "Strongly disagree" to "Strongly agree") based on students' responses to statements about their bodies (e.g. *I like my look just the way it is*, *I like my body*). This index is used as a proxy for students' self-esteem. Another relevant indicator that we deploy in our analysis, is the "Students' Life Satisfaction Across Domains" index. Students had to indicate their level of satisfaction with different areas of their lives (e.g. *Your life*, *The neighbourhood you live in*) on a 4-point Likert scale ranging from 1 ("Not at all satisfied") to 4 ("Totally satisfied").

We also use the "Social connections: Ease of communication about worries and concerns" index. This measure assesses how easily students feel they can communicate with different people in their lives (e.g. *Your father*, *Your brother(s)*) about personal concerns, using a 4-point Likert scale from "Very difficult" to "Very easy". Finally, we created two different measures of attitude towards studying: (1) Motivated/Inspired and (2) Challenged/Nervous, based on student responses to how they feel when studying Math, Languages and while doing homework. Respondents had to answer on a 4-point Likert scale where 1 = "Not at all", 2 = "A little", 3 = "Quite a bit" and 4 = "Extremely". The Motivated/Inspired index is built on the reversed scale of feeling bored and feeling motivated, which may be interpreted as a positive attitude toward learning. The Challenged/Nervous index includes the answers of feeling challenged and feeling nervous or tense, which may be interpreted as a negative attitude towards studying. These indices are used to assess students' emotional and motivational engagement towards school and learning, which can affect how students perceive academic achievement, the effort they invest in schoolwork and their overall educational outcomes. Additional details on how these indexes were created are provided in Appendix C.

3.3 Control Variables

To ensure that our analysis accurately captures the relationship between socioeconomic positioning and socioemotional outcomes, we include a range of control variables across three domains: individual characteristics, academic performance, and socioeconomic status.

The two main individual's characteristics selected for controls are gender (0 = "Male", 1 = "Female") and Immigration background, a categorical variable where 0 is for native students, 1 for students of second-generation, and 2 for students of first-generation. We also set to control for academic performance, we did so by using the first plausible value for Math. This is a measure of proficiency derived from the normal approximation of the posterior distribution estimated from multivariate regression model.

We also used the students' expectation on education, a variable that captures the highest level of education that a student aspires to complete, while also distinguishing between certain expectations and uncertainty ("maybe") for each school-level attainable (0 = "No expectations" to 16 = "Highest expectation"). Another control related to the students' school life was the "Being bullied" index, indicating how often they had a range of experiences at school that were indicative of being bullied during the past 12 months (e.g. *Other students left me out of things on purpose*, *Other students made fun of me*).

Lastly, we control for socio-economic status to ensure that our results isolate the relative effect of socioeconomic positioning within schools (rank or gap) from the absolute level of SES. We use the PISA Index of

Economic, Social, and Cultural Status (ESCS), a standardized composite measure based on parental occupational status, educational attainment, and household possessions. The ESCS ranges from -6.84 to 7.38 in our sample.

To reduce possible multicollinearity concerns arising from the inclusion of the composite ESCS index as a control, we decided to include separately its key components: the highest parental occupational status and the highest parental educational attainment. Parental occupational status is measured using the highest ISEI (International Socio-Economic Index of Occupational Status) score reported by either parent, or the only available score when necessary. ISEI is a standardised measure obtained through optimal scaling that seeks to capture the indirect effects of education on income through occupation. The aim is to reflect the family's overall SES position by combining information on both qualifications and potential earnings. In our sample, the index ranges from 11.01 to 88.96 with a mean of 50.78 and a standard deviation of 23.61.

Similarly, the highest level of parental education refers to the highest educational attainment reported by either parent. While the ESCS considers education through years of schooling, our control variable uses categorical ISCED (International Standard Classification of Education) levels. In our sample, this measure ranges from 0 (less than ISCED 1) to 9 (ISCED 8, corresponding to doctoral education), with a mean of 5.95 and a standard deviation of 2.33. This allows us to account for the influence of parental education on students outcomes without directly conflating it with the broader ESCS measure.

4   Empirical Strategy

Our analysis leverages cross-sectional micro-level data, where each observation corresponds to an individual student, nested within schools and countries. Given the structure of the data, we estimate a series of Ordinary Least Squares (OLS) regressions, including school fixed effects, to account for unobserved heterogeneity at the school and country level. Our primary objective is to assess whether students' relative socioeconomic position within the school influences the development of key socioemotional outcomes.

To this end, we estimate the following model:

$$skills_{csi} = \alpha + \beta_1 \, rank_{csi} + \beta_2 \ln(gap_{csi}) + \gamma_{csi}\mathbf{X}_{csi} + \delta_{cs} + \epsilon_i \tag{1}$$

Where $skills_{csi}$ is the dependent variable of socio-emotional skills, $rank_{csi}$ is the independent variable indicating the socio-economic ranking positions for individual i within country c and school s. Hence, we first directly measure the difference in skills across different levels of socio-economic status (β_1). $\ln(gap_{csi})$ is the logarithmic transformation of the relative distance d of the individual i from the top 10% highest socioeconomic status T within the country c and the school s ($gap_{csi} = \frac{d_{csi}}{T_{cs}}$), from which we can calculate the proportional effect of the relative socioeconomic distance of the students from the elite on skills (β_2). Vector γ_{csi} indicates the coefficients of the included control variables X_{csi}. Finally, $\delta_c s$ is the school-fixed effect and ϵ_i is the error term.

In the second part of the empirical analysis, we explore whether the effects of both $rank_{csi}$ and gap_{csi} may vary within different groups in our sample, in this case gender ($gender_i$) and immigration background ($immig_i$). Hence, we conducted an heterogeneity analysis by interacting the key predictors with subgroup indicators. Here, we further investigate how socioeconomic inequality intersects both gender and immigration background, for example, the effect of socioeconomic position would differ between first-generation females and native males.

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Table 1: Descriptive statistics

Measure	Mean	Std. Dev.	Min	Max	N
Independent Variable: Relative position					
Socio-economic Ranking	0.50	0.30	0	1	588,034
Socio-economic Gap from 10%	1.04	0.845	0	7.095	588,034
Logarithm relative SES gap from 10%	-3.26	3.11	-11.5	0	588,034
Dependent Variable: Socio-emotional skills					
Social Skills	0	1	-8.67	7.58	219,006
Growth Mindset	0	1	-2.23	1.95	510,876
Assertiveness (WLE)	-0.016	0.994	-8.23	7.26	309,361
Cooperation (WLE)	0.023	1.017	-7.49	6.13	280,604
Empathy (WLE)	0.026	1.013	-6.49	5.05	319,148
Curiosity (WLE)	0.055	1.026	-5.08	5.09	503,175
Perseverance (WLE)	0.006	0.993	-6.00	4.90	347,150
Emotional Skills	0	1	-6.14	6.54	275,778
Stress resistant (WLE)	-0.025	0.984	-5.30	5.73	292,466
Emotional control (WLE)	-0.004	0.972	-9.13	7.95	430,289
Body Image (WLE)	-0.070	1.070	-2.63	2.08	102,540
Social Connections (WLE)	0.051	1.064	-3.09	2.59	109,318
Life Satisfaction (WLE)	0.0407	1.127	-3.42	2.76	106,752
Motivated/Inspired (Studying)	0	1	-2.30	2.60	96,229
Challenged/Nervous (Studying)	0	1	-1.11	3.40	95,631
Individual Controls					
Immigration Background	0.180	0.514	0	2	569,045
Gender	0.498	0.500	0	1	613,665
Academic Controls					
Math proficency (Plausible value)	440.87	101.84	0	943.041	613,744
Expectation on Education (Children)	13.520	3.025	0	16	311,946
Being bullied	-0.268	1.047	-1.23	4.69	567,981
Socio-Economic Status Control					
Index of Economic, Social and Cultural Status (ESCS)	-0.310	1.130	-6.84	7.38	588,276
Index of ESCS linearly transformed	6.53	1.129	0	14.22	588,276
Highest parental occupational status (ISEI)	50.78	23.61	11.01	88.96	540,901
Highest level of education of parents (ISCED)	5.95	2.334	0	9	584,048

5 Results

This sections presents the regression estimation results from the two independent variables: SES Rank and SES Gap. The analysis is conducted increasing the set of covariates and including alternative specifications of the absolute value of socioeconomic status. In the second part of the analysis, we explore whether the effects of relative socio-economic status vary by gender and migration background, examining potential heterogeneity in how social position shapes socioemotional development across subgroups of our sample. Finally, we assess the robustness of our findings by applying Romano-Wolf stepdown corrections to account for multiple hypothesis testing across a large set of outcomes.

5.1 Effect of Socioeconomic Rank and Gap

The empirical findings, presented in Table 4 in Appendix and Figures 1-2, indicate a significant relationship between the relative socioeconomic status (SES) of the students and a variety of socioemotional, cognitive, and well-being outcomes. Drawing on within-school variation in both SES rank and distance from the top

decile (SES gap), the analysis investigates how relative position among peers predicts individual-level competencies. Model 6 serves as the preferred specification, as it includes school fixed effects and a comprehensive set of individual, academic, and family background controls. This specification allows us to isolate the association between students' relative SES and developmental outcomes while accounting for contextual and background heterogeneity and absolute SES level.

Results indicate that within-school SES rank is positively and significantly associated with nearly all outcomes examined. For socio-emotional skills in particular, higher SES rank is overall strongly correlated with improved emotional skills ($\beta = 0.095$, $p < 0.01$) and social skills ($\beta = 0.509$, $p < 0.01$), with effect sizes increasing after the inclusion of controls. Notably, we observe strong associations between SES rank and specific social-emotional skills, including perseverance ($\beta = 0.268$, $p < 0.01$), assertiveness ($\beta = 0.431$, $p < 0.01$), empathy ($\beta = 0.308$, $p < 0.01$), and curiosity ($\beta = 0.362$, $p < 0.01$).

Conversely, the distance from the top 10%, measured as the logarithmic transformation of the SES gap relative to the top decile within each school, is negatively associated with the same socio-emotional skills. Specifically, a 1% increase in this gap is associated with a decrease of 0.003 in emotional skills ($p < 0.01$) and 0.005 in social skills ($p < 0.01$). Although these marginal effects appear small in absolute terms, they are statistically significant, and consistent across models. This suggests that even modest increases in social distance from peers at the top 90th percentile of the distribution are meaningfully associated with reduced socio-emotional outcomes.

Overall, these findings underscore the importance of relative SES, beyond absolute socio-economic measures, in shaping students' socio-emotional development within school contexts. While SES rank captures the effects of an individual's position relative to peers within the same environment, SES gap reflects broader inequalities by measuring the distance from the most advantaged. Together, these two dimensions of socio-economic positioning reveal that both relative status and perceived inequality within a restricted setting have a significant influence on students' socio-emotional outcomes.

Interestingly, growth mindset, a non-cognitive trait linked to academic resilience, displays a divergent pattern from other socio-emotional outcomes. It is positively associated with the SES gap ($\beta = 0.002$, $p < 0.05$) and negatively associated with SES rank ($\beta = -0.040$, $p < 0.01$). Unlike most traits that increase with higher relative SES, students who rank lower in their school's SES hierarchy, particularly those further from the top 10%, report higher levels of growth mindset. This pattern may reflect a compensatory mechanism, wherein lower-SES students are more inclined to endorse beliefs emphasizing effort and self-improvement over innate ability. These students may view education as a pathway to upward mobility, investing more in values that highlight dedication and personal development.

To further explore students' academic orientations, we examined two affective dimensions of engagement with schoolwork: motivation/inspiration and feeling challenged/nervous. A higher SES rank is positively associated with academic motivation ($\beta = 0.173$, $p < 0.01$), suggesting that students with higher relative SES positions experience greater positive emotional engagement toward studying. Conversely, SES rank is negatively associated with feelings of being challenged or nervous toward learning ($\beta = -0.055$, $p < 0.10$), though this effect is marginally significant. This suggests that students with a lower SES position may experience greater academic pressure or performance anxiety, potentially shaped by their perceived social position among peers.

In contrast, students further from the most advantaged peers report lower academic motivation ($\beta = -0.004$, $p < 0.05$) and less academic stress ($\beta = -0.004$, $p < 0.05$). This may indicate a degree of disengagement from school, where students with fewer socioeconomic resources report lower emotional investment in
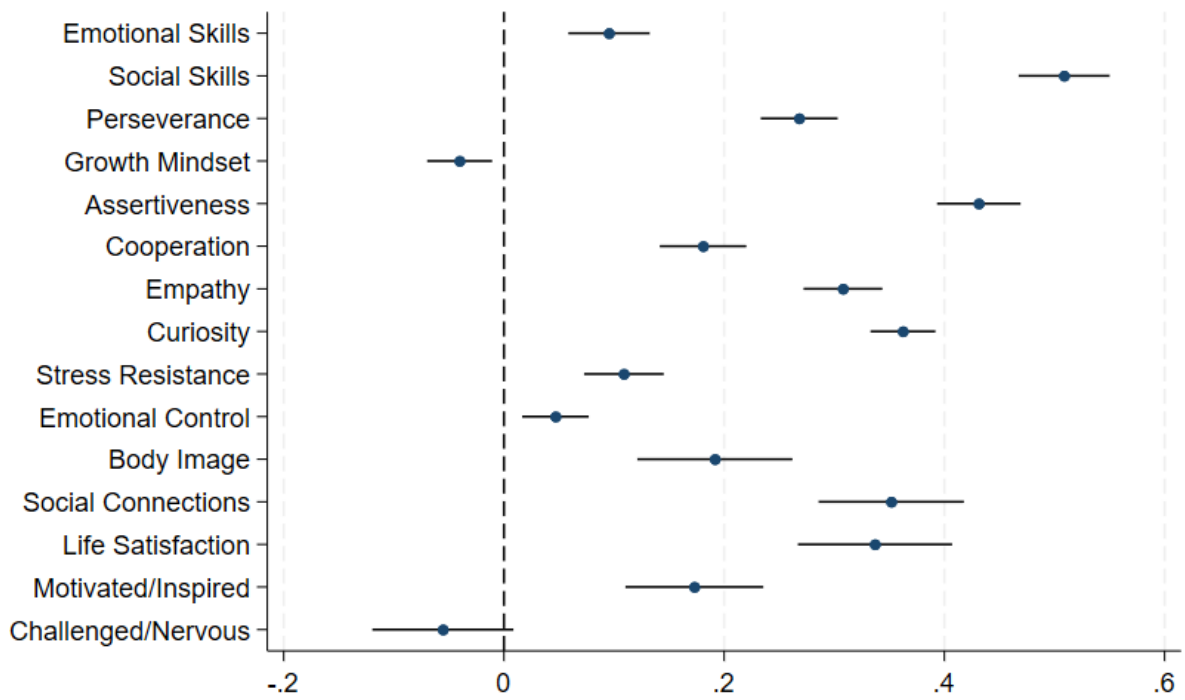
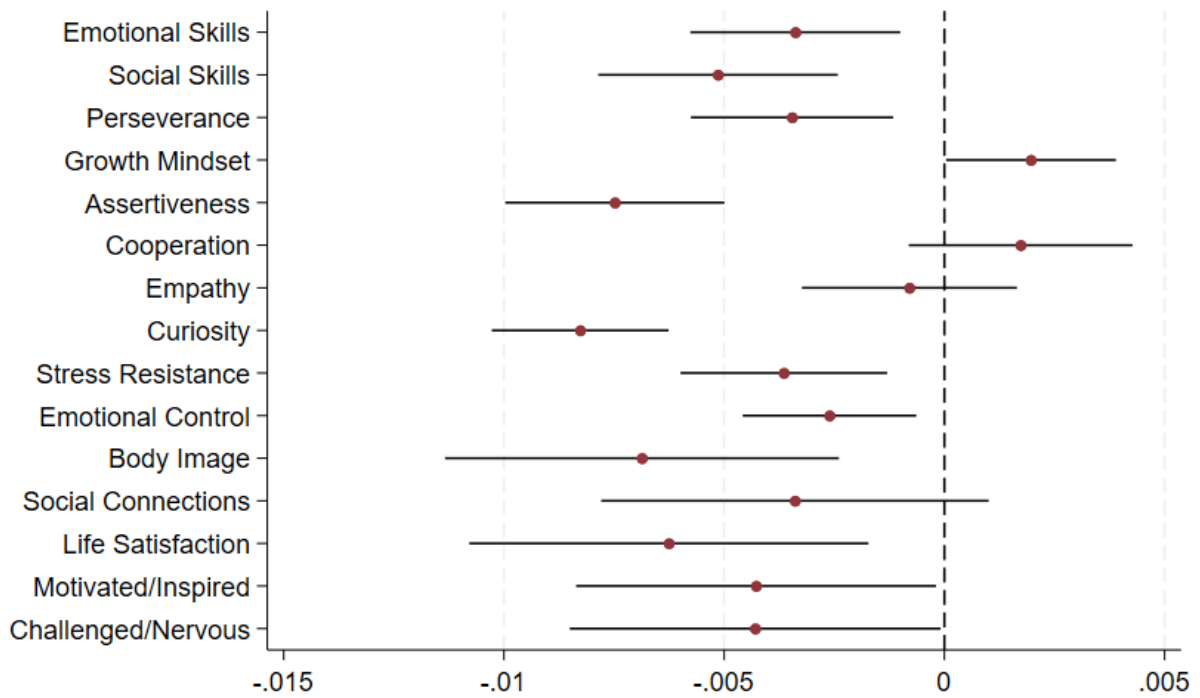Figure 1: Coefplot results for SES Ranking with School Fixed Effects

Figure 2: Coefplot results for SES Gap from Top 10% with School Fixed Effects

academic success. These findings illustrate that socioeconomic positioning, both in terms of relative rank and perceived inequality, also influences students' relationship with learning. Such effects have implications for long-term educational outcomes and aspirations, highlighting the subtle but powerful role of peer environments and relative status in shaping academic attitudes.

Moreover, we find that both SES rank is strongly associated with students' social life and psychological well-being. In particular, students with higher SES rank show greater sociability, as reflected by marginally stronger social connections ($\beta = 0.352$, p < 0.01). These findings evidence that the relative socioeconomic position has an important impact on adolescents' openness with others, which is an essential component of socioemotional skills. Being at the top of the SES distribution within a school not only enhances students' ability to form and maintain meaningful peer relationships, but it may also improve their capacity to communicate effectively personal concerns and receive support from others. In contrast, we do not find statistically significant associations between the SES gap and this outcome, suggesting that relative status, rather than perceived distance from the elite, may be more salient in shaping adolescents' social integration.

We also find that both SES rank and SES gap are associated with students' perception of themselves and their life. Higher SES rank is positively correlated with both body image index, used here as a proxy for self esteem ($\beta = 0.192$, p < 0.01) and life satisfaction ($\beta = 0.337$, p < 0.01). This suggests that adolescents who rank higher in their school's socioeconomic distribution not only perceive themselves more positively but they also report greater satisfaction with multiple dimensions of their life such as personal relationships, school experience, living environment and health.

In line with these findings, greater SES gap is negatively and significantly associated with both body image ($\beta = $ -0.007, p < 0.01) and life satisfaction ($\beta = $ -0.006, p < 0.01), meaning that students who are relatively deprived within their school report lower self esteem and negative perception of one's worth, consequently reducing their subjective well-being. Overall, these results indicate that relative socioeconomic status shapes not only adolescents' external social relationships but also their internal sense of worth and satisfaction towards their own life. In particular, social inequality within the school environment contributes to the students' perception of themselves and the evaluation of their life which can have potential long term implications for mental health, confidence and future aspirations.

5.2 Heterogeneous effects: Gender and Immigration Background?

To further investigate the effects of relative socioeconomic status, we explore whether the impact of within school SES rank and relative deprivation differs across subgroups within the student population. Specifically, we examine heterogeneity by gender and migration background to assess whether students experience the effects of socioeconomic inequality differently depending on their demographic background and lived experiences. In Table 2, we present the interaction coefficients between SES rank/gap and gender, while Table 5 (in Appendix) reports interactions by migration background (dividing our sample in natives, second generation and first generation students). This model helps us identify whether the associations observed in the previous section are uniform across different subgroups or whether certain students are more sensitive to their relative socioeconomic position. The results are visually summarized in Figures 3 and 4. Finally, Table 6 in the appendix presents interaction effects by both gender and migration background.

Starting with gender differences, Table 2 presents interaction effects between gender and both SES rank and SES gap across socioemotional and well-being outcomes. While the overall effect of SES rank is positive for both genders, the findings show that girls tend to benefit more especially in the emotional dimensions. Indeed, female students report a higher interaction coefficient for emotional skills ($\beta = 0.104$, p < 0.01) and

Table 2: Interaction Coefficients for Gender

	Rank	Gap		Rank	Gap
Emotional Skills			Social Skills		
Male × ESCS	0.086***	-0.003**	Male × ESCS	0.488***	-0.005***
	(0.022)	(0.002)		(0.025)	(0.002)
Female × ESCS	0.104***	-0.003*	Female × ESCS	0.528***	-0.005***
	(0.023)	(0.002)		(0.025)	(0.002)
N	151,926	151,926	N	132,563	132,563
Growth Mindset			Stress Resistance (WLE)		
Male × ESCS	-0.036**	-0.002	Male × ESCS	0.116***	-0.004**
	(0.018)	(0.001)		(0.021)	(0.002)
Female × ESCS	-0.042**	0.006***	Female × ESCS	0.102***	-0.003**
	(0.018)	(0.001)		(0.022)	(0.002)
N	259,378	259,378	N	160,146	160,146
Body Image (WLE)			Social Connections (WLE)		
Male × ESCS	0.220***	-0.007**	Male × ESCS	0.357***	-0.003
	(0.042)	(0.003)		(0.042)	(0.003)
Female × ESCS	0.166***	-0.007**	Female × ESCS	0.346***	-0.004
	(0.043)	(0.003)		(0.039)	(0.003)
N	53,733	53,733	N	55,449	55,449
Motivated/Inspired (Studying)			Challenged/Nervous (Studying)		
Male × ESCS	0.189***	-0.001	Male × ESCS	-0.056	-0.004
	(0.040)	(0.003)		(0.039)	(0.003)
Female × ESCS	0.156***	-0.008***	Female × ESCS	-0.055	-0.005
	(0.038)	(0.003)		(0.040)	(0.003)
N	51,333	51,333	N	51,119	51,119
Life Satisfaction (WLE)					
Male × ESCS	0.380***	-0.005			
	(0.044)	(0.003)			
Female × ESCS	0.296***	-0.007**			
	(0.041)	(0.003)			
N	56,259	56,259			
School FE	Yes	Yes	School FE	Yes	Yes
Individual Controls	Yes	Yes	Individual Controls	Yes	Yes
Academic Controls	Yes	Yes	Academic Controls	Yes	Yes
ESCS Index	No	No	ESCS Index	No	No
SES-level Controls	Yes	Yes	SES-level Controls	Yes	Yes

Notes: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

social skills ($\beta = 0.528$, p < 0.01) compared to males ($\beta = 0.086$ vs $\beta = 0.488$, p < 0.01). Interestingly, male students exhibit a greater effect of socio-economic rank on stress resistance compared to females ($\beta = 0.116$ vs $\beta = 0.102$, p < 0.01). These results suggest that within-school SES hierarchies may exert a stronger influence on girls' socioemotional development.

In contrast, we do not observe meaningful gender differences in the effects of SES gap on socioemotional outcomes. Both boys and girls show similar negative impacts from being distant from their school's elite, for both social skills ($\beta = -0.005$, p < 0.01 for both) and emotional skills ($\beta = -0.003$), the latter of which is marginally statistically significant for females. Hence, the psychosocial cost of relative deprivation seems to be equally shared across groups.

In terms of well-being, a contrasting pattern emerges: boys show stronger associations between SES rank

and both self esteem (as measured by body image) and life satisfaction. As shown in Table 2, a one unit increase in SES rank predicts an increase of 0.220 in body image's standard deviation for boys compared to 0.166 for girls. Similarly, the effect of SES rank on life satisfaction higher for boys ($\beta = 0.380$, p < 0.01) than for girls ($\beta = 0.296$, p < 0.01). In contrast, SES gap does not reveal significant gender disparities: both genders show a small negative effect on body image ($\beta = $ -0.007, p < 0.05), while the effect on life satisfaction is non-significant for males. These results suggest that higher relative SES position has a greater positive impact on boys' well-being, potentially reflecting the heightened relevance of hierarchical comparisons among male adolescents, whose self-worth and life satisfaction may be more closely tied to perceived social status than to perceptions of inequality. This pattern is further supported by the observation that boys benefit slightly more from high SES rank in terms of the quality of social connections ($\beta = 0.357$ vs. $\beta = 0.346$, p < 0.01). No statistically significant effects were found for SES gap across these well-being indicators.

Finally, with regard to attitudes toward studying and growth mindset, girls show stronger effects. Social position is negatively associated with academic resilience, this effect is stronger for female students ($\beta = $ -0.042, p < 0.01) than for males ($\beta = $ -0.036, p < 0.01). This suggests that girls may place greater emphasis on dedication and personal development, potentially viewing education as a key avenue for upward mobility more so than boys. Additionally, regarding the SES gap, we observe a not significant negative effect of inequality on growth mindset for males, whereas for females, the effect is positive and statistically significant ($\beta = 0.006$, p < 0.01).

Conversely, SES rank is positively associated with motivation toward studying, with male students reporting higher levels of motivation ($\beta = 0.189$, p < 0.01) compared to females ($\beta = 0.156$, p < 0.01). In contrast, the SES gap shows no statistically significant effect for male students, while for females, the effect is negative, stronger, and statistically significant ($\beta = $ -0.008, p < 0.01). These findings suggest that social position can influence students' engagement with school, particularly among those who may perceive education more as a necessity than a choice, potentially leading to lower levels of positive emotional investment in studying. Notably, no statistically significant effects were found for negative emotional engagement with studying.

We proceed then by analyzing the interaction coefficients by migration background in Table 5 and Figures 3-4 to observe whether the effects of relative socioeconomic status differ across native, second generation and first generation students. Overall, higher SES rank is positively associated with better socioemotional outcomes across all groups, though students with a migration background appear to be more strongly affected, particularly in the social domain. Notably, the positive effect of higher hierarchical position on social skills is strongest among first-generation students ($\beta = 0.615$, p < 0.01), followed by second-generation ($\beta = 0.507$, p < 0.01) and native students ($\beta = 0.501$, p < 0.01). Additionally, second-generation students report greater positive effects on indicators such as the quality of social connections, and self-confidence, compared to both natives and first-generation peers. These findings suggest that relative social positioning within the school context plays a particularly important role in shaping social integration, peer relationships, and subjective well-being for students of migrant origin. In contrast, no statistically significant effects were found for SES gap for all three groups.

Regarding attitudes toward education and studying, second-generation students exhibit a stronger negative association between SES rank and growth mindset ($\beta = $ -0.084, p < 0.05) compared to native students ($\beta = $ -0.039, p < 0.05). At the same time, they report a more positive emotional response to studying ($\beta = 0.199$, p < 0.01) than both first-generation students ($\beta = 0.161$, p < 0.05) and natives ($\beta = 0.169$, p < 0.01). Conversely, SES rank has a strong and statistically significant negative effect on negative emotions related
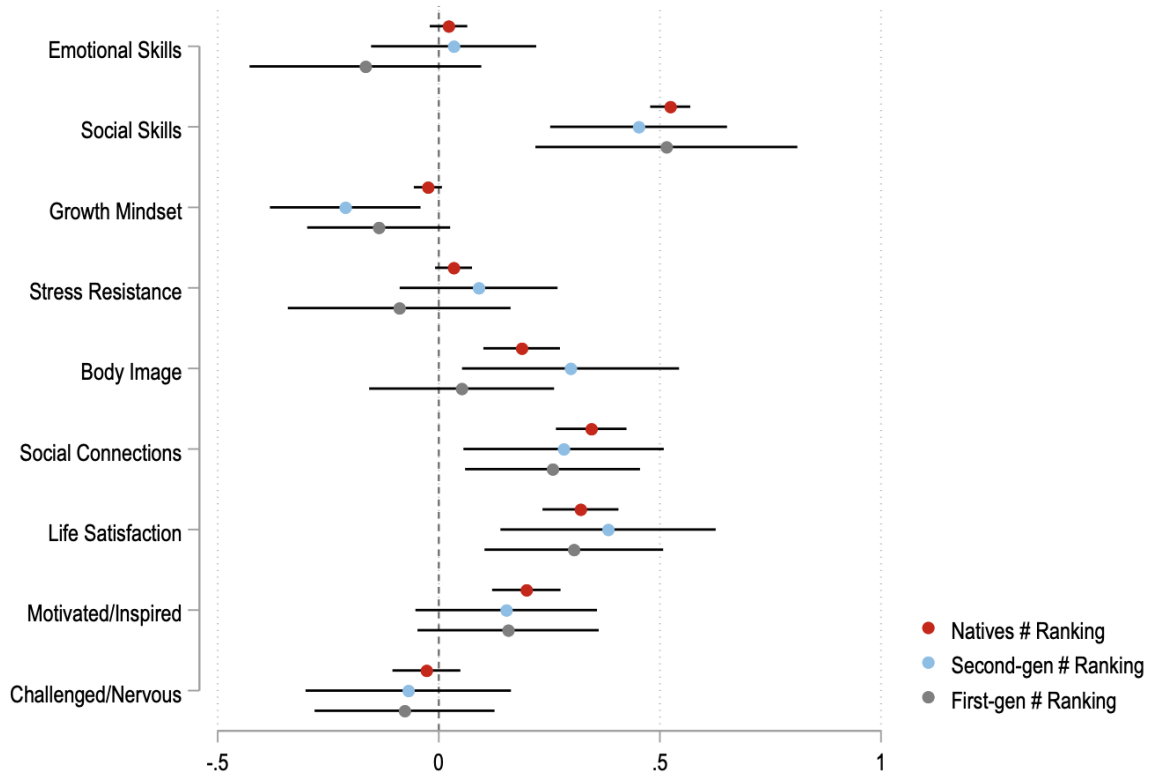
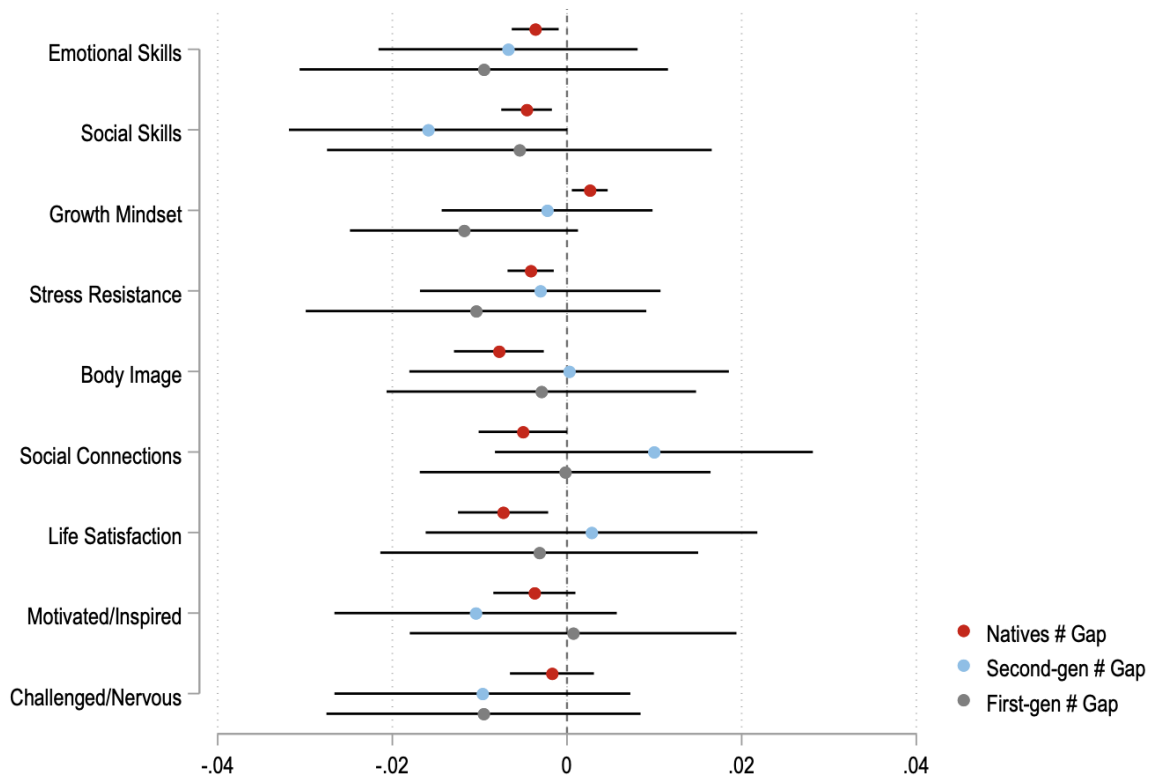Figure 3: Coefplot of interaction coefficients for SES Ranking with immigration background

Figure 4: Coefplot of interaction coefficients for SES Gap from Top 10% with immigration background

to studying for first-generation students (β = -0.187, p < 0.01), suggesting that higher social standing may reduce negative emotional experiences in this group. Additionally, the SES gap is negatively and significantly associated with feelings of being challenged or nervous in school for both first-generation (β = -0.013, p < 0.05) and second-generation students (β = -0.015, p < 0.05), indicating that perceived inequality may undermine emotional stability in the school environment among migrant-background youth. This suggests that students in this group may feel more pressure as they ascend the school's SES hierarchy.

Table 6 examines how socioeconomic inequality intersects with both gender and migration background among our sample of 15-year-old students. Overall, a higher SES rank within school is linked to stronger socioemotional outcomes, though the magnitude of these effects varies across subgroups. First-generation boys experience the largest gains in social skills (β = 0.659, p < 0.01) and life satisfaction (β = 0.526, p < 0.01). In contrast, high-ranked first-generation girls report the strongest effects on emotional skills (β = 0.163, p < 0.05) and stress resistance (β = 0.209, p < 0.01). Finally, second generation boys who rank highly within their school's SES distribution appear to show more positive emotions toward learning, reporting more motivation (β = 0.276, p < 0.01) in attending classes and studying. No statistically significant effects were observed for SES gap across any of the intersecting categories.

5.3 Multiple Hypotheses Testing

Owing to the high dimensionality of outcomes and the extensive number of hypothesis tests conducted, we implement a multiple hypothesis testing correction to mitigate inflated type I error rates. Specifically, we apply the Romano-Wolf stepwise p-value adjustment procedure (Romano and Wolf, 2005a,b), which controls the family-wise error rate (FWER) in finite samples. This approach relies on bootstrap resampling to approximate the joint distribution of test statistics and accommodates their dependence structure, thereby offering improved power relative to traditional Bonferroni-type corrections (Clarke et al., 2020).

Table 3 presents Romano-Wolf stepdown adjusted p-values for both SES Rank and SES Gap, using 250 bootstrap replications to correct for the family-wise error rate. This allows us to assess which associations remain statistically significant after accounting for multiple comparisons and the risk of false positives. The adjusted p-values confirm that the majority of our results are robust. Specifically, both SES Rank and SES Gap show statistically significant associations (at the 1% level) with a wide range of socioemotional and well-being outcomes, including emotional skills, social skills, life satisfaction, and other core measures.

While SES Gap is not significantly associated with certain outcomes, specifically cooperation, empathy, and social connections, SES Rank remains a consistently strong and significant predictor across all measured dimensions. They also suggest that relative socioeconomic position within schools (SES Rank) may be a more reliable predictor of students' emotional and social outcomes than absolute distance from the top 10% (SES Gap), although both measures demonstrate considerable predictive value.

6 Conclusions

This paper aims to understand the interplay between peer effects and socioeconomic status, beyond absolute SES measures, on adolescents' socio-emotional development. Using data from PISA 2022, we construct two main indicators: SES Rank capturing a student's position in their school's socioeconomic distribution and SES Gap measuring the distance between a student's SES and that of the school's top decile.

Our findings show that students' relative socioeconomic status within their school is a significant predictor of socio-emotional skills and well-being. Specifically, those who rank higher exhibit stronger emotional and

Table 3: Romano-Wolf Stepdown Adjusted p-values for SES Rank and SES Gap (250 replications)

Outcome	Variable	Model p-value	Resample p-value	Romano-Wolf p-value
Emotional Skills	Rank	0.0000	0.0040	0.0040
	Gap	0.0054	0.0040	0.0080
Social Skills	Rank	0.0000	0.0040	0.0040
	Gap	0.0002	0.0040	0.0040
Perseverance (WLE)	Rank	0.0000	0.0040	0.0040
	Gap	0.0032	0.0040	0.0040
Growth Mindset	Rank	0.0075	0.0040	0.0080
	Gap	0.0457	0.0199	0.0359
Assertiveness (WLE)	Rank	0.0000	0.0040	0.0040
	Gap	0.0000	0.0040	0.0040
Cooperation (WLE)	Rank	0.0000	0.0040	0.0040
	Gap	0.1814	0.0518	**0.0837**
Empathy (WLE)	Rank	0.0000	0.0040	0.0040
	Gap	0.5237	0.3984	**0.3984**
Curiosity (WLE)	Rank	0.0000	0.0040	0.0040
	Gap	0.0000	0.0040	0.0040
Stress Resistance (WLE)	Rank	0.0000	0.0040	0.0040
	Gap	0.0023	0.0040	0.0040
Emotional Control (WLE)	Rank	0.0024	0.0040	0.0040
	Gap	0.0095	0.0040	0.0080
Body Image (WLE)	Rank	0.0000	0.0040	0.0040
	Gap	0.0026	0.0040	0.0040
Social Connections (WLE)	Rank	0.0000	0.0040	0.0040
	Gap	0.1306	0.0398	**0.0837**
Life Satisfaction (WLE)	Rank	0.0000	0.0040	0.0040
	Gap	0.0068	0.0040	0.0080
Motivated/Inspired	Rank	0.0000	0.0040	0.0040
	Gap	0.0403	0.0080	0.0359
Challenged/Nervous	Rank	0.0896	0.0040	0.0359
	Gap	0.0455	0.0080	0.0359

social skills, greater self esteem and higher life satisfaction. Conversely, students who are more distant from their school's socioeconomic elite tend to report lower socio-emotional competencies and reduced well-being. Social status seems to also to influence investment in education and attitudes towards studying.

We further examine whether these effects vary across subgroups in our sample. Results indicate that girls benefit more in emotional domains, meanwhile boys' well-being and social skills appear more sensitive to relative SES. Moreover, findings suggest that first generation boys tend to be more affected by their SES rank in terms of sociability and life satisfaction. While first generation girls tend to benefit most in emotional domains. In terms of attitudes toward schoolwork, we observe that second generation boys with a high SES rank report increased motivation toward learning.

Overall, our analysis underscores the importance of considering not only absolute socioeconomic conditions but also students' relative position with their immediate school environment when analyzing socio-emotional outcomes. These findings also suggest the need to take into account peer dynamics and social inequality when designing educational policies, particularly in support of disadvantaged and marginalized students who may be more vulnerable to the negative effects of low relative SES. While this study offers new evidence on the relevance of relative socioeconomic status during adolescence on socio-emotional skills, future research should investigate whether these effects persist over time and how they influence adult life outcomes.

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Appendices

Appendix A: Results

Table 4: Regression Results with School Fixed Effects

	(1)	(2)	(3)	(4)	(5)	(6)
Emotional Skills rank	0.147***	-	0.116***	0.085***	0.056**	0.095***
	(0.006)	-	(0.009)	(0.012)	(0.025)	(0.019)
Emotional Skills gap	-	-0.012***	-0.004***	-0.003**	-0.002**	-0.003***
	-	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
N	262864	262864	262864	161692	161692	151926
Social Skills rank	0.430***	-	0.363***	0.264***	0.127***	0.509***
	(0.007)	-	(0.011)	(0.013)	(0.030)	(0.021)
Social Skills gap	-	-0.035***	-0.009***	-0.006***	-0.006***	-0.005***
	-	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
N	221973	221973	221973	140742	140742	132563
Perseverance (WLE) rank	0.280***	-	0.231***	0.142***	0.065***	0.268***
	(0.006)	-	(0.009)	(0.011)	(0.024)	(0.018)
Perseverance (WLE) gap	-	-0.023***	-0.006***	-0.003***	-0.003***	-0.003***
	-	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
N	331305	331305	331305	191697	191697	180160
Growth Mindset rank	-0.106***	-	-0.087***	-0.052***	-0.125***	-0.040***
	(0.005)	-	(0.007)	(0.010)	(0.020)	(0.015)
Growth Mindset gap	-	0.009***	0.002***	0.002**	0.002***	0.002**
	-	(0.000)	(0.001)	(0.001)	(0.001)	(0.001)
N	483633	483633	483633	276668	276668	259378
School FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes
Academic Controls	No	No	No	Yes	Yes	Yes
ESCS	No	No	Yes	No	Yes	No
SES Controls	No	No	Yes	No	No	Yes

Table 4: Regression Results with School Fixed Effects (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)
Assertiveness (WLE) rank	0.371***	-	0.297***	0.255***	0.128***	0.431***
	(0.006)	-	(0.009)	(0.012)	(0.026)	(0.019)
Assertiveness (WLE) gap	-	-0.031***	-0.010***	-0.007***	-0.007***	-0.007***
	-	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
N	295121	295121	295121	176886	176886	166129
Cooperation (WLE) rank	0.078***	-	0.087***	0.109***	0.022	0.181***
	(0.007)	-	(0.010)	(0.013)	(0.028)	(0.020)
Cooperation (WLE) gap	-	-0.005***	0.001	0.001	0.002	0.002
	-	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
N	267027	267027	267027	159614	159614	150332
Empathy (WLE) rank	0.229***	-	0.208***	0.179***	0.096***	0.308***
	(0.006)	-	(0.009)	(0.012)	(0.025)	(0.018)
Empathy (WLE) gap	-	-0.018**	-0.003***	-0.001	-0.001	-0.001
	-	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
N	308928	308928	308928	187667	187667	175717
Curiosity (WLE) rank	0.297***	-	0.215***	0.123***	0.118***	0.362***
	(0.005)	-	(0.007)	(0.010)	(0.021)	(0.015)
Curiosity (WLE) gap	-	-0.026***	-0.011***	-0.008***	-0.008***	-0.008***
	-	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
N	481061	481061	481061	265504	265504	248986
Stress resistance (WLE) rank	0.123***	-	0.093***	0.076***	0.072***	0.109***
	(0.006)	-	(0.009)	(0.012)	(0.024)	(0.018)
Stress resistance (WLE) gap	-	-0.011***	-0.004***	-0.003***	-0.003***	-0.004***
	-	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
N	278775	278775	278775	170482	170482	160146
School FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes
Academic Controls	No	No	No	Yes	Yes	Yes
ESCS	No	No	Yes	No	Yes	No
SES Controls	No	No	Yes	No	No	Yes

Table 4: Regression Results with School Fixed Effects (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)
Emotional control (WLE) rank	0.091***	-	0.068***	0.048***	0.049**	0.047***
	(0.005)	-	(0.007)	(0.010)	(0.021)	(0.015)
Emotional control (WLE) gap	-	-0.008***	-0.003***	-0.002**	-0.002**	-0.003***
	-	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
N	411300	411300	411300	234345	234345	220468
Body Image (WLE) rank	0.169***	-	0.126***	0.149***	0.002	0.192***
	(0.012)	-	(0.017)	(0.023)	(0.046)	(0.036)
Body Image (WLE) gap	-	-0.015***	-0.006***	-0.007***	-0.006***	-0.007***
	-	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
N	98180	98180	98180	57250	57250	53733
Social Connections (WLE) rank	0.154***	-	0.129***	0.186***	0.066	0.352***
	(0.011)	-	(0.017)	(0.022)	(0.043)	(0.034)
Social Connections (WLE) gap	-	-0.013***	-0.003**	-0.004*	-0.004*	-0.003
	-	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
N	99928	99928	99928	59033	59033	55449
Life Satisfaction (WLE) rank	0.226***	-	0.186***	0.174***	0.078*	0.337***
	(0.012)	-	(0.017)	(0.023)	(0.047)	(0.036)
Life Satisfaction (WLE) gap	-	-0.019***	-0.005***	-0.007***	-0.007***	-0.006***
	-	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
N	102108	102108	102108	60032	60032	56259
Motivated rank	0.077***	-	0.054***	0.061***	0.087**	0.173***
	(0.011)	-	(0.016)	(0.021)	(0.042)	(0.032)
Motivated gap	-	-0.007***	-0.003**	-0.004*	-0.004*	-0.004**
	-	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
N	88949	88949	88949	54285	54285	51333
School FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes
Academic Controls	No	No	No	Yes	Yes	Yes
ESCS	No	No	Yes	No	Yes	No
SES Controls	No	No	Yes	No	No	Yes

Table 4: Regression Results with School Fixed Effects (Continued)

	(1)	(2)	(3)	(4)	(5)	(6)
Nervous rank	-0.054***	-	-0.065***	-0.020	-0.033	-0.055*
	(0.011)	-	(0.016)	(0.021)	(0.042)	(0.033)
Nervous gap	-	0.003***	-0.001	-0.004*	-0.004*	-0.004**
	-	(0.001)	(0.002)	(0.002)	(0.002)	(0.002)
N	88421	88421	88421	54060	54060	51119
School FE	Yes	Yes	Yes	Yes	Yes	Yes
Individual Controls	Yes	Yes	Yes	Yes	Yes	Yes
Academic Controls	No	No	No	Yes	Yes	Yes
ESCS	No	No	Yes	No	Yes	No
SES Controls	No	No	Yes	No	No	Yes

Note: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Table 5: Interaction Coefficients by Immigration Background

	Rank	Log Distance		Rank	Log Distance
Emotional Skills			**Social Skills**		
Native × ESCS	0.096***	-0.003***	Native × ESCS	0.501***	-0.005***
	(0.019)	(0.001)		(0.022)	(0.001)
2nd-gen × ESCS	0.113***	-0.002	2nd-gen × ESCS	0.507***	-0.010*
	(0.044)	(0.005)		(0.048)	(0.006)
1st-gen × ESCS	0.052	-0.006	1st-gen × ESCS	0.615***	-0.007
	(0.053)	(0.006)		(0.058)	(0.007)
N	151,926	151,926	N	132,563	132,563
Growth Mindset			**Stress Resistance (WLE)**		
Native × ESCS	-0.039**	0.002**	Native × ESCS	0.107***	-0.004***
	(0.015)	(0.001)		(0.019)	(0.001)
2nd-gen × ESCS	-0.084**	-0.000	2nd-gen × ESCS	0.159***	-0.000
	(0.040)	(0.004)		(0.043)	(0.005)
1st-gen × ESCS	-0.037	-0.004	1st-gen × ESCS	0.068	-0.008
	(0.045)	(0.005)		(0.051)	(0.005)
N	259,378	259,378	N	160,146	160,146
Body Image (WLE)			**Social Connections (WLE)**		
Native × ESCS	0.202***	-0.008***	Native × ESCS	0.328***	-0.005*
	(0.039)	(0.003)		(0.037)	(0.003)
2nd-gen × ESCS	0.298***	-0.001	2nd-gen × ESCS	0.485***	0.010
	(0.070)	(0.007)		(0.067)	(0.007)
1st-gen × ESCS	0.101	-0.003	1st-gen × ESCS	0.340***	-0.007
	(0.071)	(0.007)		(0.066)	(0.007)
N	53,733	53,733	N	55,449	55,449
Motivated/Inspired (Studying)			**Challenged/Nervous (Studying)**		
Native × ESCS	0.169***	-0.004*	Native × ESCS	-0.026	-0.002
	(0.036)	(0.002)		(0.036)	(0.002)
2nd-gen × ESCS	0.199***	-0.009	2nd-gen × ESCS	-0.088	-0.013**
	(0.063)	(0.006)		(0.065)	(0.007)
1st-gen × ESCS	0.161**	-0.002	1st-gen × ESCS	-0.187***	-0.015**
	(0.068)	(0.007)		(0.070)	(0.007)
N	51,333	51,333	N	51,119	51,119
Life Satisfaction (WLE)					
Native × ESCS	0.321***	-0.007***			
	(0.039)	(0.003)			
2nd-gen × ESCS	0.364***	-0.004			
	(0.072)	(0.007)			
1st-gen × ESCS	0.382***	-0.004			
	(0.072)	(0.007)			
N	56,259	56,259			
School FE	Yes	Yes	School FE	Yes	Yes
Individual Controls	Yes	Yes	Individual Controls	Yes	Yes
Academic Controls	Yes	Yes	Academic Controls	Yes	Yes
ESCS Index	No	No	ESCS Index	No	No
SES-level Controls	Yes	Yes	SES-level Controls	Yes	Yes

Notes: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.
"2nd-gen" refers to second-generation immigrant students; "1st-gen" refers to first-generation immigrant students.

Table 6: Interaction Coefficients by Gender and Migration Background

	Rank	Gap		Rank	Gap
Emotional Skills			**Social Skills**		
Male × Native	0.093***	-0.003*	Male × Native	0.476***	-0.005**
	(0.023)	(0.002)		(0.026)	(0.002)
Male × Second-gen	0.087	-0.002	Male × Second-gen	0.500***	-0.014*
	(0.055)	(0.007)		(0.066)	(0.008)
Male × First-gen	-0.059	-0.010	Male × First-gen	0.659***	-0.003
	(0.065)	(0.008)		(0.076)	(0.009)
Female × Native	0.098***	-0.004*	Female × Native	0.525***	-0.005**
	(0.023)	(0.002)		(0.026)	(0.002)
Female × Second-gen	0.136**	-0.003	Female × Second-gen	0.515***	-0.006
	(0.059)	(0.007)		(0.060)	(0.008)
Female × First-gen	0.163**	-0.001	Female × First-gen	0.572***	-0.010
	(0.070)	(0.009)		(0.074)	(0.009)
N	151926	151926	N	132563	132563
Growth Mindset			**Stress Resistance (WLE)**		
Male × Native	-0.037**	-0.001	Male × Native	0.121***	-0.004**
	(0.019)	(0.001)		(0.022)	(0.002)
Male × Second-gen	-0.053	-0.000	Male × Second-gen	0.169***	0.005
	(0.052)	(0.006)		(0.053)	(0.007)
Male × First-gen	-0.028	-0.011	Male × First-gen	-0.074	-0.017**
	(0.060)	(0.007)		(0.063)	(0.007)
Female × Native	-0.038**	0.007***	Female × Native	0.092***	-0.004**
	(0.018)	(0.001)		(0.023)	(0.002)
Female × Second-gen	-0.113**	0.000	Female × Second-gen	0.146**	-0.007
	(0.051)	(0.006)		(0.057)	(0.007)
Female × First-gen	-0.047	0.002	Female × First-gen	0.209***	0.001
School FE	Yes	Yes	School FE	Yes	Yes
Individual Controls	Yes	Yes	Individual Controls	Yes	Yes
Academic Controls	Yes	Yes	Academic Controls	Yes	Yes
ESCS Index	No	No	ESCS Index	No	No
SES-level Controls	Yes	Yes	SES-level Controls	Yes	Yes

Table 6: Interaction Coefficients by Gender and Migration Background (Continued)

	Rank	Gap		Rank	Gap
	(0.056)	(0.007)		(0.067)	(0.008)
N	259378	259378	N	160146	160146
Body Image (WLE)			**Social Connections (WLE)**		
Male × Native	0.266***	-0.005	Male × Native	0.339***	-0.004
	(0.045)	(0.003)		(0.046)	(0.004)
Male × Second-gen	0.194**	-0.005	Male × Second-gen	0.482***	0.008
	(0.090)	(0.010)		(0.088)	(0.010)
Male × First-gen	0.003	-0.011	Male × First-gen	0.324***	-0.010
	(0.089)	(0.011)		(0.087)	(0.010)
Female × Native	0.140***	-0.010***	Female × Native	0.317***	-0.006*
	(0.047)	(0.004)		(0.043)	(0.003)
Female × Second-gen	0.388***	0.003	Female × Second-gen	0.487***	0.012
	(0.088)	(0.010)		(0.083)	(0.009)
Female × First-gen	0.201**	0.004	Female × First-gen	0.357***	-0.005
	(0.095)	(0.010)		(0.083)	(0.009)
N	53733	53733	N	55449	55449
Studying: Motivated/Inspired			**Studying: Challenged/Nervous**		
Male × Native	0.176***	-0.001	Male × Native	-0.025	-0.001
	(0.044)	(0.003)		(0.043)	(0.003)
Male × Second-gen	0.276***	-0.006	Male × Second-gen	-0.080	-0.014
	(0.085)	(0.009)		(0.085)	(0.010)
Male × First-gen	0.194**	0.002	Male × First-gen	-0.194**	-0.019**
	(0.090)	(0.011)		(0.086)	(0.010)
Female × Native	0.162***	-0.008**	Female × Native	-0.026	-0.003
	(0.042)	(0.003)		(0.043)	(0.004)
Female × Second-gen	0.133*	-0.011	Female × Second-gen	-0.095	-0.013
School FE	Yes	Yes	School FE	Yes	Yes
Individual Controls	Yes	Yes	Individual Controls	Yes	Yes
Academic Controls	Yes	Yes	Academic Controls	Yes	Yes
ESCS Index	No	No	ESCS Index	No	No
SES-level Controls	Yes	Yes	SES-level Controls	Yes	Yes

Table 6: Interaction Coefficients by Gender and Migration Background (Continued)

	Rank	Gap		Rank	Gap
	(0.078)	(0.009)		(0.084)	(0.009)
Female × First-gen	0.128	-0.005	Female × First-gen	-0.180*	-0.012
	(0.088)	(0.010)		(0.092)	(0.010)
N	51333	51333	N	51119	51119
Life Satisfaction (WLE)					
Male × Native	0.361***	-0.006*			
	(0.048)	(0.004)			
Male × Second-gen	0.314***	-0.014			
	(0.102)	(0.012)			
Male × First-gen	0.526***	0.009			
	(0.107)	(0.012)			
Female × Native	0.282***	-0.008**			
	(0.045)	(0.003)			
Female × Second-gen	0.410***	0.007			
	(0.080)	(0.009)			
Female × First-gen	0.231***	-0.018*			
	(0.089)	(0.010)			
N	56259	56259			
School FE	Yes	Yes	School FE	Yes	Yes
Individual Controls	Yes	Yes	Individual Controls	Yes	Yes
Academic Controls	Yes	Yes	Academic Controls	Yes	Yes
ESCS Index	No	No	ESCS Index	No	No
SES-level Controls	Yes	Yes	SES-level Controls	Yes	Yes

Note: Standard errors in parentheses. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Appendix B: Diagnostics

To assess multicollinearity, we compared four model specifications. Results show that standad SES gap measure is high collinear with SES Rank and ESCS, yielding VIFs exceeding 5 even when controlling for highest parental occupational status and educational attainment. In contrast, the alternative SES gap measure created through logarithmic transformation demonstrates lower collinearity, with all VIFs below 3. These diagnostics support the use of the log-SES Gap measure for improved model stability and interpretability.

Table 7: Collinearity Diagnostics

Variable	(1)	(2)	Variable	(3)	(4)
SES Rank	4.27	4.27	SES Rank	2.89	2.91
SES Gap	8.02	7.07	**Log-SES Gap**	2.16	2.15
ESCS	4.53	-	ESCS	2.53	-
HISEI	-	2.22	HISEI	-	1.90
HISCED	-	2.12	HISCED	-	1.60
Immigration background	1.02	1.03	Immigration background	1.02	1.03
Gender	1.01	1.01	Gender	1.01	1.01
Math proficency	1.38	1.21	Math proficency	1.37	1.19
Expectation on Education	1.03	1.04	Expectation on Education	1.03	1.04
Being bullied	1.02	1.02	Being bullied	1.02	1.02
Mean VIF	2.79	2.33	Mean VIF	1.63	1.54
Condition Number	24.52	33.93	Condition Number	21.20	20.74

Appendix C: Factorial analyses

Socio-emotional skills

To measure socioemotional skills, we selected various dimensions reflecting both social and emotional domains. These dimensions were primarily operationalized as composite indexes derived from psychometric scales included in the Students' Questionnaire.

Table 8: Socioemotional variables

Measure	Battery	Scale	Questions
Assertiveness (WLE)	ST305	5-point Likert	· I am comfortable with taking the lead role in a group. · I know how to convince others to do what I want. · I enjoy leading others. · I keep my opinion to myself in group discussions. (R) · I speak up to others about things that matter to me. · I take initiative when working with my classmates. · I wait for others to take a lead. (R) · I find it hard to influence people. (R) · I want to be in charge. · I like to be a leader in my class.
Cooperation (WLE)	ST343	5-point Likert	· I like to help others. · I get annoyed when I have to compromise with others. (R) · I work well with other people. · I start arguments with others. (R) · I avoid working together with other students. (R) · I am ready to help anybody. · I tend to be selfish. (R) · I work better when I am part of a team. · I enjoy cooperating with my classmates. · I argue a lot. (R)
Empathy (WLE)	ST311	5-point Likert	· I do not care what happens to other people. (R) · I can sense how others feel. · It is important to me that my friends are okay. · I can see situations from my friend's perspectives. · I ignore the feelings of others. (R) · I am more compassionate than most people I know. · It is difficult for me to sense what others think. (R) · I predict the needs of others. · I get upset if bad things happen to other people. · I understand what others want.

Measure	Battery	Scale	Questions
Curiosity (WLE)	ST301	5-point Likert	· I am curious about many different things. · I like to ask questions. · I get frustrated when I have to learn the details of a topic. (R) · I like to know how things work. · I love learning new things in school. · I am more curious than most people I know. · I like to develop hypotheses and check them based on what I observe. · I find learning new things to be boring. (R) · I spend time to find more information about things that interest me. · I like learning new things.
Perseverance (WLE)	ST307	5-point Likert	· I keep working on a task until it is finished. · I apply additional effort when work becomes challenging. · I finish tasks that I started even when they become boring. · I stop when work becomes too difficult. (R) · I am more persistent than most people I know. · I give up after making mistakes. (R) · I quit doing homework if it is too long. (R) · I complete tasks even when they become more difficult than I thought. · I finish what I start. · I give up easily. (R)
Stress Resistance (WLE)	ST345	5-point Likert	· I get nervous easily. (R) · I am more relaxed than most people I know. · I worry about many things. (R) · I panic easily. (R) · I am able to work under pressure. · I remain calm under stress. · I feel nervous about approaching exams. (R) · I can recover quickly after something bad has happened. · I handle stress well. · I am afraid of many things. (R)

Measure	Battery	Scale	Questions
Emotional Control (WLE)	ST313	5-point Likert	· I keep my emotions under control.
			· I get mad easily. (R)
			· I change my mood a lot. (R)
			· I overreact to every little thing in life. (R)
			· I stay calm even in tense situations.
			· I am easily upset. (R)
			· I know how to control my feelings.
			· I have unpredictable emotions. (R)
			· I am moody. (R)
			· I get frustrated quickly. (R)

To assess the suitability of the data for factor analysis, we first examined the correlation matrix (Table 9), which revealed two meaningful clusters of interrelated variables, an initial indication of factorability. In particular, emotional control and stress resistance were found to be positively correlated, suggesting the existence of underlying latent dimensions within the socioemotional domain. This was further supported by the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy, which at 0.65 exceeded the commonly accepted threshold of 0.6, and Bartlett's Test of Sphericity, which was statistically significant $\left(\chi^2(21) = 2.25 \times 10^5, \ p < .001\right)$, indicating that the correlation matrix is not an identity matrix and that factor analysis is appropriate for this dataset.

Table 9: Correlation Matrix of Socioemotional Skills

Variables	Assert.	Coop.	Empathy	Curiosity	Persever.	Stress Res.	Emo Ctrl.
Assertiveness	–						
Cooperation	0.120*	–					
Empathy	0.177*	0.379*	–				
Curiosity	0.269*	0.269*	0.310*	–			
Perseverance	0.206*	0.292*	0.221*	0.386*	–		
Stress Resistance	0.170*	0.090*	-0.076*	0.068*	0.188*	–	
Emotional Control	0.026*	0.213*	0.013*	0.078*	0.229*	0.503*	–

Note: * indicates statistical significance at the 5% level.

To identify the latent dimensions underlying socioemotional skills, we conducted a principal factor analysis and computed composite scores for the extracted factors. The analysis yielded two factors with eigenvalues greater than one, accounting for 32% and 20% of the total variance, respectively. Given the lack of a clearly interpretable initial pattern, we applied both varimax and promax rotations to the factor loading matrix. As both methods produced comparable and interpretable structures, we opted for the varimax rotation. All items exhibited primary loadings above 0.4, and thus no items were excluded from the final factor structure.

Based on established theoretical frameworks, we labeled the first factor as *Social Skills* and the second as *Emotional Skills*. Standardized composite scores were then created for each factor, with higher scores reflecting greater levels of social and emotional competencies. In our sample, students reported higher levels of

Table 10: Rotated Factor Loadings and Uniqueness (Orthogonal Rotation)

Variable	Factor 1	Factor 2	Uniqueness
Assertiveness	0.477		0.749
Cooperation	0.633		0.576
Empathy	0.726		0.436
Curiosity	0.697		0.507
Perseverance	0.594		0.520
Stress Resistance		0.860	0.261
Emotional Control		0.832	0.300

Note: (blanks represent abs(loading)<.4)

emotional skills, which showed a negatively skewed distribution compared to social skills. While the skewness remained within acceptable limits, the sample exhibited relatively high kurtosis, indicating a heavier tail than a normal distribution. Finally, Cronbach's alpha values for both indices exceeded the commonly accepted threshold of 0.6, suggesting moderate internal consistency and acceptable item correlation within each factor.

Attitudes towards studying

To measure students' attitudes toward education and specific subjects, we drew on several batteries from the Well-Being Questionnaire. These included items assessing students' emotional responses to mathematics, language subjects, and homework or studying at home. For each subject area, students were asked to indicate how often they felt bored, challenged, nervous or tense, and motivated or inspired. Responses were recorded on a 4-point Likert scale (1 = Not at all, 2 = A little, 3 = Quite a bit, 4 = Extremely). After reversing the scale for the response to the *bored* item, we proceeded to assess the suitability of the data for factor analysis by first examining the correlation matrix.

Table 11: Correlation Matrix of Emotional Responses by Subject

	Maths-Bor	Maths-Chal	Maths-Ner	Maths-Mot	Lang-Bor	Lang-Chal	Lang-Ner	Lang-Mot	HW-Bor	HW-Chal	HW-Ner	HW-Mot
Maths-Bored (R)	–											
Maths-Challenged	-0.1093	–										
Maths-Nervous	-0.2593	0.3647	–									
Maths-Motivated	0.3918	0.1930	0.0142	–								
Lang-Bored (R)	0.3301	-0.0634	-0.0775	0.0986	–							
Lang-Challenged	-0.0714	0.3974	0.2171	0.1705	-0.1166	–						
Lang-Nervous	-0.1020	0.1987	0.4223	0.1176	-0.2452	0.4591	–					
Lang-Motivated	0.0910	0.1688	0.1592	0.4135	0.3479	0.2948	0.1469	–				
HW-Bored (R)	0.4324	-0.0598	-0.1298	0.2302	0.3609	-0.0530	-0.1059	0.1521	–			
HW-Challenged	-0.0629	0.4729	0.2483	0.1343	-0.0678	0.4120	0.2415	0.1745	-0.1237	–		
HW-Nervous	-0.1659	0.2049	0.4768	0.0082	-0.1122	0.2096	0.4071	0.1039	-0.2378	0.4081	–	
HW-Motivated	0.1880	0.1368	0.0843	0.4776	0.1322	0.1921	0.1416	0.4396	0.2734	0.2969	0.1507	–

We observe consistent correlations between boredom and motivation across all subjects, suggesting that students who feel more bored tend to report lower motivation. Similarly, feelings of being challenged appear positively correlated with nervousness, indicating that students who perceive tasks as more challenging may also experience higher levels of nervousness. Furthermore, the sample was deemed adequate for factor analysis, as the Kaiser-Meyer-Olkin (KMO) measure was 0.68, exceeding the recommended threshold of 0.6, and Bartlett's Test of Sphericity was statistically significant $\left(\chi^2(66) = 3.08 \times 10^5, \ p < .001\right)$, supporting the

factorability of the data.

Table 12: Rotated Factor Loadings and Uniqueness (Orthogonal Rotation)

Variable	Factor 1	Factor 2	Factor 3	Uniqueness
Maths-Bored (R)		0.6850		0.4552
Maths-Challenged	0.6312			0.5854
Maths-Nervous	0.6194			0.3697
Maths-Motivated		0.6528		0.3698
Lang-Bored (R)		0.5902	0.6142	0.2574
Lang-Challenged	0.6690			0.4680
Lang-Nervous	0.6362			0.5537
Lang-Motivated		0.5481		0.4110
HW-Bored (R)		0.6825		0.5126
HW-Challenged	0.6902			0.5104
HW-Nervous	0.6217			0.4530
HW-Motivated		0.5909		0.4692

Note: (blanks represent abs(loading)<.45)

We conducted a principal component analysis and computed composite scores for the extracted factors. The analysis yielded three factors with eigenvalue greater than one, accounting for 25%, 21% and 0.8% of the total variance, respectively. Given the lack of a clearly interpretable initial pattern, we applied both varimax and promax rotations to the factor loading matrix. Finally, we opted for the varimax rotation as it offered the clearer pattern. All items exhibited primary loadings above 0.4, and thus no items were excluded from the final factor structure. Based on the items selected, we created two indexes one related to positive emotional attitude towards studying, *Motivated/Insipired*, and negative emotions towards studying *Challenged/Nervous*.

Standardized composite scores were created for each factor, with higher scores indicating stronger positive or negative attitudes toward education. In our sample, students reported lower levels of nervousness, which displayed a positively skewed distribution compared to motivation. Nevertheless, both scores approximated a normal distribution. Finally, Cronbach's alpha values for both indices exceeded the commonly accepted threshold of 0.7, indicating acceptable internal consistency and good item correlation within each factor.