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RESEARCH ARTICLE

Socio-economic gradients in pupils' self-efficacy: evidence, evolution and main drivers during the primary school years in France

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Socio-emotional skills, vital for navigating life's challenges, significantly influence educational success and well-being. Thus, socio-economic disparities in these skills may contribute to broader inequalities in achievement. Despite their importance, research in certain contexts, like France, remains limited. Self-efficacy, a cornerstone of socio-emotional well-being, develops early and it is influenced by familial and contextual factors. The primary school years are central for self-efficacy development. During this period, socio-economic gaps in self-efficacy may emerge, influenced by family environments and experiences at school. Using data from the 2011 Panel of Pupils we find that French pupils have similar academic self-efficacy whatever their socio-economic background at the start of primary school. However, at the end of primary school, children coming from more disadvantaged socio-economic backgrounds exhibit lower academic self-efficacy as compared to more advantaged peers, and this socio-economic gap is particularly strong among girls. The findings of this work underscore the need for educational policies to focus on socio-emotional skills development alongside cognitive skills from an early age to reduce socio-economic inequalities.

Keywords self-efficacy • France • school • inequality • skills

Key messages

- The development of academic self-efficacy is a dynamic process and major shifts are particularly noticeable during the primary school years.
- The French school system struggles with supporting students' development during primary school.
- Children coming from more advantaged socio-economic backgrounds have higher academic self-efficacy than their more disadvantaged peers.

- The socio-economic gradient in self-efficacy at the end of the primary school years is much larger for girls than for boys.

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Introduction

Socio-emotional well-being and skills are linked both to concurrent and future individual educational success, as well as to future socio-emotional well-being (van Poortvliet, 2021). Hence, considering socio-emotional skills from childhood can be both important to understand individuals' trajectories, as well as population-level inequalities in achievement and well-being.

Socio-emotional skills, sometimes also referred to as 'soft skills', 'transversal skills' or 'character skills', refer to capacities that enable individuals to deal effectively with the demands and challenges of everyday life (OECD, 2015). These skills include goal setting, self-discipline, perseverance, responsibility, self-awareness, sociability, empathy, self-esteem and emotional control, among others. These skills have been linked to several outcomes, such as academic performance and educational attainment in childhood (Taylor et al, 2017), and employment outcomes such as wages in adulthood (Almlund et al, 2011). Socio-economic status (SES) inequalities in socio-emotional skills have been widely reported (Garcia, 2015), and the unequal distribution of socio-emotional skills can also contribute to observed inequalities in cognitive skills and, ultimately, educational achievement (Carneiro and Heckman, 2003) and occupational outcomes (Bonomi Bezzo et al, 2023).

These relationships are likely to vary across national and educational contexts. We may expect cross-country variation in the overall level and inequalities in socio-emotional skills depending on the school system, welfare provision, and so on (for example, Esping-Andersen and Cimentada, 2018; Waldfogel et al, 2023). There is still relatively little research in contexts such as France, which have relatively more generous welfare systems that other countries but also an educational system characterised by strong SES inequalities in child achievement (OECD, 2023).

Positive self-belief is a central construct in educational psychology, and is a key dimension of socio-emotional well-being that participates to children's overall development. Self-efficacy is defined as an individual's 'belief in his or her own capabilities to produce designated levels of performance' (Bandura, 1994: 71), and is one of the most widely used and theoretically important representations of positive self-belief (Marsh et al, 2019). Self-efficacy therefore does not refer to abilities per se but to a person's belief about what they can do with their abilities within a specific setting, such as school, work and relationships.

Self-efficacy is a malleable, dynamic construct that starts developing from an early age (Davis-Kean et al, 2008; Peura et al, 2021). Predictors of self-efficacy also change over time. For example, research has shown that when children are very young, parents' self-efficacy level is an important predictor of child's self-efficacy

(Jones and Prinz, 2005), while for adolescents, peer networks become increasingly important (Wentzel et al, 2004). Academic self-efficacy could also vary across individual characteristics, such as gender. In many countries, girls report more school-related anxiety and less self-confidence, particularly in maths skills, than boys (Núñez-Peña and Bono, 2019). Empirical results about gender differences in academic self-efficacy are heterogeneous. While Huang's (2013) meta-analysis shows a small advantage for boys, especially for maths, a more recent meta-analysis finds no differences according to child gender (Talsma et al, 2018), suggesting either null effects or very small effects. Later on, gender effects during adolescence are clearer, especially for confidence in maths abilities: girls feel less confident (OECD, 2023). Overall, gendered differences in academic self-efficacy typically begin to emerge during late elementary school and become more pronounced during middle school and high school.

The development of self-efficacy during the primary school years is key to understand its overall development over childhood, for two reasons: developmental stages and educational system stages. First, the ages around six to eight appear to be particularly crucial for children's development of their ability to process certain information (such as future expectations, predictions of others' behaviours, and so on), the use of symbolic concepts, and to reason about themselves and others, making this an important period for self-efficacy development (Davis-Kean et al, 2008). Second, previous works have emphasised the role of formal care and schooling on several cognitive or non-cognitive outcomes, with sometimes heterogeneous effect by socio-economic background (for example, Felfe Lalive, 2018; Berger et al, 2021). The primary school period is when many children first encounter a more formal educational system. It is generally observed that students' perception of academic competence declines as they advance in the educational system, due to greater competition between students, more norm-referenced grading and less teacher attention (Schunk and Pajares, 2002).

This period might also be crucial for the emergence of SES inequalities, in self-efficacy itself and in the role of self-efficacy in creating inequalities in academic achievement. First, in social cognitive theory, efficacy beliefs are considered predictive of future behaviours (such as academic performance; Bandura, 1986), and this appears to happen during the primary school years: empirical work has shown that during this period self-beliefs become an increasingly important predictor of actual behaviour (Davis-Kean et al, 2008). Therefore, academic self-efficacy could become an important mechanism in the development of socio-economic inequalities in educational achievement from primary school. Second, theory suggests that academic self-efficacy is particularly sensitive to the family environment (Hall, 2003), making it vulnerable to socio-economic inequalities. The academic self-efficacy of children from disadvantaged backgrounds is likely to be more affected by school-related factors (for example, a decrease in teacher–child ratios) as they enter primary school than better off peers, as they may receive relatively less family support at home, and tend to have lower grades on average. There is, however, relatively little empirical evidence of whether academic self-efficacy is indeed patterned across socio-economic groups, and when these inequalities emerge during the life course. Limited research shows associations between background disadvantage and academic self-efficacy in adolescence, including in France (Tan et al, 2023), but we are not aware of work during primary school.

In this article, we explore the emergence of socio-economic inequalities in academic self-efficacy across the primary school years. Since specific measures of self-efficacy tend to be more precise than global and generalised ones (Maddux, 2009), we focus on academic self-efficacy, that is, self-confidence in one's own academic skills. This dimension is closely related to other socio-emotional skills, such as motivation, and to students' learning strategies, and therefore it is a strong predictor of academic achievement (Yusuf, 2011; Ghaleb et al, 2015).

We may expect cross-country variation in the overall level and inequalities in socio-emotional skills depending on the school system, welfare provision, and so on (Waldfogel et al, 2023). However, it is notable that even in nations perceived as more egalitarian than others, like Denmark, students from more affluent backgrounds appear to exhibit greater well-being at school compared to their less privileged counterparts (Loft and Waldfogel, 2021). In France, there is evidence that self-efficacy has a positive effect on school attainment (Darnon et al, 2012). At the same time, French pupils are also the most anxious and have the worst perceptions of their mathematical ability during adolescence among Organisation for Economic Co-operation and Development countries (Algan et al, 2018). During primary school, their attitude towards mathematics (whether they like learning it or not) is above the international average in grade 4, but far below in grade 8 (Mullis et al, 2020, using TIMSS 2019 data[1]). While the decline in these attitudes towards mathematics is very common, the magnitude of the decline along primary school is among the strongest observed.

From a theoretical point of view, our study relates to two approaches. First, social constructionism posits that children's perceptions of 'social reality' (in the context of the present article, their academic self-efficacy) are socially formed through interactions with other members of the society (for example, teachers and other pupils coming from different social backgrounds) (Berger and Luckmann, 2016). The resulting perceptions are actually the outcome of a dynamic process of construction influenced by social conventions and structures, here the school system, the family background (social class) and the gender identity. Second, Bourdieu and Passeron's (1970) theory explains how schools contribute to reproducing social inequalities through teaching methods and content that implicitly privilege a form of culture specific to the dominant classes, and might result in disadvantaged children losing confidence in academic performance during primary school.

In this article, we exploit rich, longitudinal information for a large, representative sample of children in primary school in France to explore the evolution of academic self-efficacy over the primary school years. We propose four research questions:

1. Is there evidence of a socio-economic gradient in self-efficacy at entry into primary school?
2. How does it evolve over primary school?
3. What are the drivers of differences in academic self-efficacy across socio-economic groups during primary school?
4. Does this process differ for boys and girls?

Data and methods

We use data from the 2011 Panel of Pupils, carried out by the French Ministry of Education, a longitudinal dataset nationally representative of children starting primary

school (at about age six) in France in September 2011, excluding overseas territories (DEPP, 2016).[2] Sample selection is randomly based on both levels of schools and classrooms. Nine cognitive tests covered pupils' familiarity with numeracy and literacy, and concepts of place and time. Additionally, children answered questions regarding their own perceived self-efficacy in various settings. Both cognitive tests and self-efficacy were collected in two waves: at the start of primary school in September 2011 (corresponding to the first grade of primary school, when children are about six years of age), and during their last year of primary school, in 2016 (fifth grade, when children are about ten years old).[3] We focus here solely on the measurement of self-efficacy in the school environment. Finally, two detailed surveys on the child's family environment were filled in at both waves of data collection by the child's main carer, which allows observing a variety of family characteristics.

The key variable of interest for our analysis is the measure of academic self-efficacy. It is the normalised Z-score sum of four variables related to self-efficacy in the school context ('I am doing well in school'; 'In class, I'm as successful as the rest of the students/children'; 'It is easy for me to remember what I learn in school'; 'I find the answers to questions asked'; Cronbach Alpha is 0.55 in 2011 and 0.74 in 2016). Each of the four underlying variables ranges from one to four (strongly disagree, disagree, agree, strongly agree) and we calculate the total algebraic sum over the four variables. If only one item is missing, we impute the mean of the three other items to keep internal coherence at the individual level. We drop cases with more than one missing item (this represents about 4.3% in the first wave and 2.1% in the second wave).[4]

We use two alternative and complementary SES stratifiers, parental education and total equivalised household after tax income terciles[5] (in monetary constant value). Parental education (high for a university degree or equivalent, medium for high school and professional degree, low for below high school diploma) is obtained as the highest diploma between the co-resident child carer (who filled in the family questionnaire) and the co-resident partner of the child carer (who might be the child parent or step-parent).

At the individual level we control for child gender, type of school attended, type of previous childcare attended, whether the pupil started childcare earlier or later than expected, whether the pupil has already repeated one or more years or has been upgraded during primary school, whether the pupil lives in an urban environment or in a rural area. Moreover, we also include a set of household covariates, namely: family structure, number of siblings, parental migrant status, languages used at home, whether the child receives help with homework or not at home.

We perform both cross-sectional and longitudinal analyses using, respectively, OLS models with robust standard errors, and individual fixed effect models. Finally, we use the Blinder-Oaxaca decomposition method to decompose the differences in mean academic self-efficacy between groups of students as defined by their parents' educational group.

Our OLS cross-sectional analyses are based on a sample of children, for which the family form has been filled at both waves. In the first wave we have 10,770 children with a self-efficacy score (at least three out of four components), while in the second wave we have 11,050 children. The longitudinal fixed effects analyses are based on a sample of 10,154 children for which math and literacy scores[6] are available. Our decomposition analyses are based on 7,016 children who have either low or high educated parents. All analyses are weighted. The DEPP panel provides longitudinal weights that account for the sampling design, selective participation and selective attrition. The weights are estimated with logistic regressions using main demographic and socio-economic characteristics.

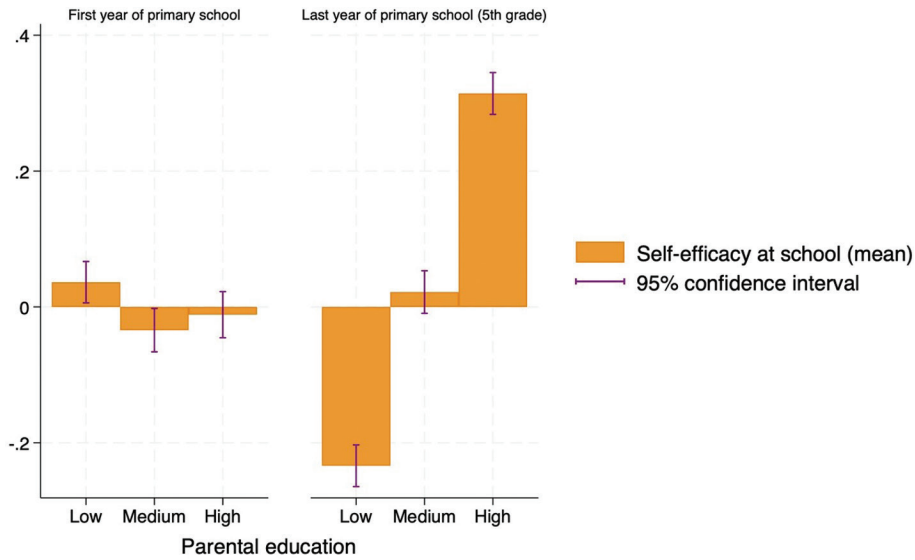
Results

Figure 1 descriptively shows that self-efficacy in school is not very socially marked at entry into primary school, when children are around six years old. If anything, children with higher educated parents score slightly lower compared to children of low educated parents but the difference is not significant. However, at the end of primary school, the gradient is both reversed and amplified and children from disadvantaged backgrounds have lower academic self-efficacy scores than those from advantaged backgrounds. This is in line with the results usually observed for cognitive outcomes. Results are substantially similar when we use parental income as a social stratifier[7] instead of parental education.

Table 1 presents the results for the cross-sectional regression analysis and confirm the trends of the descriptive analyses. Children of medium or high educated parents have lower academic self-efficacy at the beginning of primary school compared to those of low educated parents; while by the end of primary school, there is a strong positive correlation between parental education and children's academic self-efficacy, with an additional positive effect of belonging to wealthier households.

Concerning gender, as compared to boys, girls report having higher self-efficacy in their school abilities at the beginning of primary school but, by the end of it, they tend to lose self-confidence, so that there are no more gender differences at the end of primary school. To further investigate whether there is a difference between boys and girls, we ran a model including an interaction between parental educational background and child gender (Figure 2). The results show that, while in the first year of primary school there is almost no SES gap in academic self-efficacy among girls and among boys, at the end of primary school, the SES gap becomes large for both genders, especially for girls.

Figure 1: Mean self-efficacy scores by parental education at the start (first year) and end (fifth year) of primary school, empirical sample



Source: Authors' elaboration on DEPP data. Weighted results. Without controls.

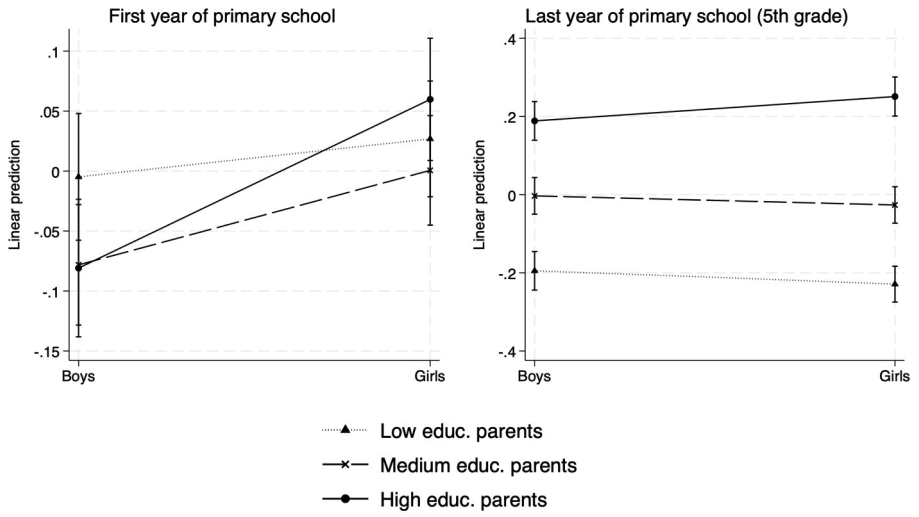
Table 1: Cross-sectional OLS results, academic self-efficacy, empirical sample

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	**Start of primary school**			**End of primary school**		
	All	**Girls**	**Boys**	**All**	**Girls**	**Boys**
Medium educ. parents	**–0.050** (–0.101–0.001)	–0.027 (–0.096–0.042)	**–0.071** (–0.147–0.005)	**0.197** (0.148–0.246)	**0.235** (0.167–0.302)	**0.237** (0.166–0.309)
High educ. parents	–0.022 (–0.083–0.038)	0.040 (–0.040–0.120)	**–0.084** (–0.174–0.006)	**0.431** (0.376–0.485)	**0.516** (0.439–0.592)	**0.458** (0.380–0.535)
Medium inc. parents	0.020 (–0.035–0.075)	0.015 (–0.058–0.088)	0.031 (–0.051–0.112)	0.020 (–0.031–0.070)	0.014 (–0.057–0.084)	0.059 (–0.015–0.133)
High inc. parents	0.032 (–0.031–0.095)	–0.005 (–0.089–0.080)	0.069 (–0.025–0.163)	**0.131** (0.077–0.186)	**0.151** (0.074–0.227)	**0.156** (0.076–0.237)
Girl	**0.079** (0.039–0.119)			–0.004 (–0.043–0.034)		
Constant	–0.059 (–0.189–0.070)	0.015 (–0.151–0.182)	–0.049 (–0.243–0.146)	–0.039 (–0.141–0.063)	–0.070 (–0.202–0.062)	–0.156 (–0.311–0.001)
Observations	10,770	5,390	5,380	11,050	5,526	5,524
R-squared	0.012	0.011	0.014	0.083	0.077	0.057

Notes: 95% confidence intervals in parentheses. Boldface indicates coefficient differs significantly from zero at $p < 0.05$ level. Reference categories are respectively low educ. parents and low inc. parents. We control for child gender; type of school attended; type of preschool attended; whether the pupil has started the preschool earlier or later than expected; whether the pupil has already repeated one or more years or has been upgraded during primary school; whether the pupil lives in an urban environment or in a rural area, family structure; number of siblings; parental migrant status; languages used at home; whether the child receives help with homework. Weighted results.

Source: Authors' elaboration on DEPP data.

Figure 2: Predicted values of academic self-efficacy, marginal effects of the interaction between gender and parental education along primary school, empirical sample



Notes: Authors' elaboration on DEPP data. We control for child gender; type of school attended; type of preschool attended; whether the pupil has started the preschool earlier or later than expected; whether the pupil has already repeated one or more years or has been upgraded during primary school; whether the pupil lives in an urban environment or in a rural area, family structure; number of siblings; parental migrant status; languages used at home; whether the child receives help with homework. Weighted results.

To limit endogeneity issues, in the cross-sectional analysis we did not include the school cognitive results (but solely whether the individual has been upgraded or has repeated one or more years) due to the ambivalent and bilateral relationship between educational attainment and academic self-efficacy. In fact, self-efficacy is potentially highly correlated with school results. Exploiting the longitudinal nature of our data, we implement an individual fixed-effect model with academic self-efficacy as our dependent variable. This model allows us to capture time-invariant unobserved heterogeneity that could potentially affect both indicators, reducing the risk of reverse causality. For instance, we can imagine that cognitive or social skills might affect both educational attainment and self-efficacy.

Table 2 interestingly shows that scores in maths and, to a less extent, literacy predict an important part of the evolution in self-efficacy across primary school in line with the complementary hypothesis between non-cognitive and cognitive skills (Cunha and Heckman, 2008). For a one-standard deviation increase in respectively math and literacy scores, academic self-efficacy increases by 0.17 and 0.05 standard deviations (that is, 3.3 and 1 percentage points). As children from low SES perform worse in cognitive tests, and especially in mathematics where the SES gradient increases over primary school, they may feel increasingly less confident throughout primary school.

Finally, to further investigate how academic self-efficacy evolves across primary school according to parental SES and whether it differs by gender, we run a Blinder-Oaxaca decomposition, separately for girls and boys, comparing children of the two extreme education groups (high versus low). Table 3 reports the overall difference

Table 2: Fixed effect model, academic self-efficacy, sample of children with cognitive scores in both waves

	(1)	(2)	(3)
Variables	**All**	**Girls**	**Boys**
Literacy score	**0.054** (0.030–0.078)	**0.068** (0.035–0.101)	**0.040** (0.005–0.076)
Maths score	**0.173** (0.145–0.201)	**0.127** (0.089–0.165)	**0.219** (0.179–0.260)
Constant	0.011 (-0.132–0.153)	0.094 (-0.084–0.272)	-0.090 (-0.326–0.145)
Observations	19,706	9,915	9,791
R-squared	0.033	0.025	0.037
Number of individual observations	10,154	5,096	5,058

Notes: 95% confidence intervals in parentheses. Boldface indicates coefficient differs significantly from zero at $p < 0.05$ level. Math and literacy scores are normalised using Z-scores. We control for child gender; type of school attended; type of preschool attended; whether the pupil has started the preschool earlier or later than expected; whether the pupil has already repeated one or more years or has been upgraded during primary school; whether the pupil lives in an urban environment or in a rural area, family structure; number of siblings; parental migrant status; languages used at home; whether the child receives help with homework. Weighted results.

Source: Authors' elaboration on DEPP data.

Table 3: Oaxaca decomposition, comparison for girls (left) and boys (right) of children of low versus high educated parents, with baseline scores in 2012 and change across primary school

	Low vs high educ. parents, all	Low vs high educ. parents	Low vs high educ. parents
Variables		**Girls**	**Boys**
Difference	**0.553** (0.512–0.602)	**0.601** (0.453–0.630)	**0.51** (0.441–0.517)
Explained	**0.264** (0.191–0.332)	**0.285** (0.196–0.375)	**0.234** (0.137–0.348)
Unexplained	0.293*** (0.224–0.376)	**0.322** (0.22–0.43)	**0.274** (0.163–0.389)
Observations	7,016	3,500	3,516

Notes: 95% confidence intervals in parentheses. Boldface indicates coefficient differs significantly from zero at $p < 0.05$ level.

Source: Authors' elaboration on DEPP data. Full results in the appendix, Tables A3–A5.

between children of low and high educated parents and show the increase in the magnitude of the SES gap during primary school for all pupils; disentangling the results in a component due to 'endowment' differences, that is, explained, and one component due to the differential effect that these differences have on the outcomes, that is, unexplained. We can see that less than half of the gap is explained by structural effects, and much more by behavioural aspects. The increase of the gap between children of low and high educated parents is larger for girls and with both a greater explained and unexplained component. Children, particularly girls from the low education group, lose self-confidence in their academic skills during the primary school years.

Discussion

In this nationally representative sample of French primary school pupils, socio-economic gradients in academic self-efficacy, which were not present at the start of schooling, become evident by the end of the primary school cycle. The analyses pursued in this article provides four main results.

First, this finding is in line with results showing that the development of academic self-efficacy is a dynamic process and that major shifts are particularly noticeable during the primary school years (Davis-Kean et al, 2008; Peura et al, 2021). This dynamic nature might make this period of life particularly prone to the development of socio-economic inequalities.

Second, our results echo data from large comparative studies such as PIRLS[8] 2021 and TIMMS[9] 2019, which suggest that French pupils lose much more confidence in their (mathematical) abilities than pupils from other counties between fourth and eighth grades. This low confidence in academic skills is also observed later for French adolescents (Algan et al [2018] using PISA data). Overall, these results, and our own, build a picture of a school system that struggles with supporting students' development throughout primary school.

Third, our results show that children coming from more advantaged backgrounds have higher academic self-efficacy than their more disadvantaged peers. This is in line with theoretical explanations of Bourdieu and Passeron (1970), who point to the crucial role of school institution cultural codes and norms for children coming from low SES. Children potentially 'internalize the SES achievement gap in the form of a lower/higher sense of school self-efficacy' (Wiederkehr et al, 2015).

Fourth, results are particularly striking for girls: the socio-economic gradient in self-efficacy at the end of the primary school years is much larger for girls than for boys. This result could be related to gender identity particularly in mathematics, a field in which negative stereotypes about girls are still strong, and a subject in which girls feel more anxiety (Goetz et al, 2013). This could be more salient in a country as France where mathematics holds an important place in the curriculum and later educational choices. There is a complex interplay between academic self-efficacy and literacy and numeracy that supports the idea that socio-emotional and cognitive skills cannot be considered in isolation from each other (Lee et al, 2014). Because of the positive and bi-directional relationship between non-cognitive and cognitive outcomes, our results suggest a rather virtuous relationship for most advantaged children and a vicious circle for children from disadvantaged backgrounds, which might be a vector for increasing inequalities over primary school, a usually less studied life period.

Since, as discussed, academic self-efficacy is a key component of children's socio-emotional well-being and is tied to educational attainment, educational policy should not only consider cognitive skills when addressing SES gaps in childhood, but more carefully look at the emergence of gaps in socio-emotional skills (Guyon and Huillery, 2021), which our results suggest happens from the primary school years. Effective interventions aimed at developing socio-emotional skills in school such as motivation and self-esteem (for example, Martins [2010] in Portugal) remain rare, especially in France, and tend to be considered for adolescents. Our results point to the importance for policy to consider these interventions at a much earlier point in children's schooling trajectories, given younger children are, indeed, particularly sensitive to mastery experience and stressful academic tasks (Phan, 2012; Peura et al, 2021).

Overall, this article calls for the broader inequalities research community to further focus on SES inequalities in socio-emotional development, and how they develop in different national contexts.

Notes

[1] https://timss2019.org/reports/wp-content/themes/timssandpirls/download-center/classroom/T19_Ch11-student-attitudes.pdf.

[2] Further information about the data can be found at https://www.education.gouv.fr/le-panel-d-eleves-2011-377924, 'Panel d'élèves du second degré, recrutement 2011'.

[3] For more details about the tests, a detailed description is available at https://data.progedo.fr/studies/doi/10.13144/lil-1311.

[4] We also run an alternative robustness check on the reduced sample of pupils who have filled all four items of the self-efficacy score; results are very similar to those obtained with the imputation.

[5] We opted for income terciles for comparability with the three categories of parental education. Before doing so we nonetheless checked that they really represented variation in the sample by using income quintiles and deciles. As shown in Table A2 in the appendix when using income quintiles and deciles the results mirror those using income terciles.

[6] Standardised for the empirical analysis, mean 0, standard deviation 1.

[7] See Figure A1 in the appendix.

[8] https://www.iea.nl/studies/iea/pirls/2021.

[9] https://www.iea.nl/studies/iea/timss/2019.

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Data availability statement

The DEPP panels are produced by the DEPP study team at the French Ministry of Education. We thank the study team for their help with data and documentation questions, and for providing additional variables at the school level. The authors take full responsibility for the integrity of the data and the accuracy of the analysis. Data are accessible without restrictions at https://www.education.gouv.fr/le-panel-d-eleves-2011-377924.

Conflict of interest

The authors declare that there is no conflict of interest.

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