International Journal of Educational Research 133 (2025) 102746

Contents lists available at ScienceDirect

International Journal of Educational Research

journal homepage: www.elsevier.com/locate/ijedures

On the contribution of parental expectations to the academic progress of youngsters

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ARTICLE INFO

Keywords:
Expectations
Academic achievement
Census
Gender
Parents

ABSTRACT

This paper analyses whether parental expectations play a relevant role in determining students' progression from primary to secondary education in maths and reading. Taking advantage of longitudinal census data for the Spanish region of Andalusia, we propose alternative identification strategies to estimate the influence of expectations on students' academic success. We tackle the endogeneity problem of expectations by employing time fixed-effects and applying an instrumental variables procedure, which uses a proxy of students' ability. The results confirm that higher parental expectations positively associate with students' achievement. Expectations are found to be a more important predictor of children's performance in reading than in mathematics, while performance in mathematics depends to a larger extent on innate students' ability. Additionally, we have found that boys' academic performance is more sensitive to parental expectations, while parents have higher educational expectations for girls. This higher parental exigency for girls in comparison to boys may be a sign of the permanence of gender roles in society.

1. Introduction

During their compulsory education, students face challenges and difficulties which can influence their academic progression (Jindal-Snape et al., 2020). To the extent that such difficulties are assumed by students and perceived by their parents, they may be reflected on parents' expectations about the potential academic success of their children. This is the focus of the current research, which is aimed at analysing how the expectations that parents set about their children's future level of education influence students' progression in terms of achievement. This interest in parental expectations arises from their high influence on students' performance that researchers have found in many countries (including Spain); an influence which varies across cultures (Yamamoto & Holloway, 2010).

Additionally, the current research intends to go beyond previous research by analysing the influence of parental expectations on students' academic progression conditioned on the gender of the student. The study of this issue is relevant, to the extent that gender differences in academic achievement may have important consequences in society. For example, Cabeza-García et al. (2018) highlight

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https://doi.org/10.1016/j.ijer.2025.102746
Received 23 April 2025; Received in revised form 30 June 2025; Accepted 9 August 2025
Available online 15 August 2025

that the level of education of women can significantly influence the fertility rate of a country, to the extent that highly skilled women may have higher participation in the labour market, along with the fact that they may have a higher opportunity cost of leaving it. Furthermore, according to Cavalcanti and Tavares (2016), gender inequalities in education can associate with economic growth, to the extent that they reduce per capita income and reduce the expansion of education in the following generations.

In order to address the influence of parental expectations on gender-specific academic progress of students, we draw information from census data of the Spanish region of Andalusia. There are many characteristics of this region that make its study of particular interest: it is the largest populated region in Spain and one of the worst performing (within Spain) in terms of international large-scale assessments tests. Specifically, in PISA 2012, Andalusia obtained scores which were 11 points below the Spanish average and 19 below the OECD average, presenting gender differences in academic achievement, as girls scored 26 points higher than boys in reading but 16 points lower than boys in mathematics (OECD, 2014). It also presents very high repetition rates compared to other Spanish regions as around 36.7% of students have repeated a school year at least once before finishing compulsory education (OECD, 2014). Additionally, it has one of the highest gender gaps in dropout rates at the University level – 34.86% for boys and 22.74% for girls (MECD, 2018).

This study is novel in, at least, two different ways. First, we tackle the endogeneity problems associated with expectations when explaining students' academic achievement, which is based on the assumption that factors influencing students' performance may also condition parental expectations simultaneously. Secondly, we explore the influence of parental expectations on students' progression conditioned on children's gender and we try to identify the potential differential influence of parental expectations on boys' and girls' academic achievement.

The remainder of this paper is structured as follows: section 2 presents a review of the literature on the relationship of parental expectations with students' academic achievement; sections 3 and 4 discuss the data and methodology employed, followed by the results in section 5, and some final conclusions.

2. Literature review

Among the different dimensions measuring parental involvement in students' academic life (control over homework, school participation, parent-children communication, etc.), parental educational expectations have been found to be the strongest predictor of students' academic achievement, both directly and indirectly (Fan & Chen, 2001). Several meta-analyses have reached the same conclusion in different educational stages, in primary (Jeynes, 2005; Hill & Tyson, 2009), secondary (Jeynes, 2007) and tertiary education (Danisman, 2017).

Boonk et al. (2018), which reviews 75 articles about different ways of parental involvement, notes that holding high educational expectations is the most effective form of parental involvement. This result is also observed in the meta-analysis of Castro et al. (2015), who exclusively analysed quantitative research from kindergarten to secondary school. Such is the predictive power of parental expectations on academic achievement, that some studies highlight that they are more relevant than students' own educational expectations (Ma, 2001; Rubie-Davies et al., 2010). Jeynes (2010) mentions that parental educational expectations create a supportive school environment at home, given that they are present in children's daily lives, and form the basis for other aspects of parental involvement to be developed. According to a recent quantitative meta-analysis by this author (Jeynes, 2024), the average effect size of parental expectations on test scores was 0.37 standard deviations. He also analysed the effect of expectations on behavioural outcomes, finding a lower effect compared to the effect on academic achievement.

The Wisconsin Model of Status Attainment, first introduced by Sewell and colleagues (1969), was among the earliest frameworks to highlight the role of educational expectations in shaping individuals' future life outcomes – particularly the social status they ultimately attain. Factors related to family characteristics determine expectations and these in turn determine achievement. Expectations were seen in part as one of the mechanisms through which socioeconomic differences between families operate. In this sense, Tomaszewski et al. (2021) found a significant and consistent gap in higher education expectations between low and high socioeconomic status students. Despite this, previous literature has indicated that parental expectations may have a mediating role for the influence of family socioeconomic status on students' academic achievement (Malone, 2017; Tan et al., 2020). In this way, educational expectations attenuate the effect of socioeconomic status on educational attainment (Gubbins & Otero, 2020). This association between parental expectations and academic achievement was also established through students' self-concept and child academic engagement (Choi, 2018; Pinquart & Ebeling, 2020).

Although most of the existing literature has evidenced the positive link between parental expectations and academic achievement (Danişman, 2017), authors such as Yamamoto and Holloway (2010) indicated that "while most of the research conducted to date has been cross-sectional, a few longitudinal studies offer particularly powerful evidence that parental expectations are a causal determinant of student expectations and academic outcomes" (p. 190). From that date, the number of longitudinal analyses in the field of educational expectations has increased, but as Pinquart and Ebeling (2020) note in their meta-analysis of 261 studies, cross-lagged effects of parental expectations in child achievement remain unaddressed. For this reason, we position our research in the latter longitudinal field, in an attempt to advance further than mere association and get as close as possible to a causal estimate.

Despite the volume of literature on parental expectations, gender-specific expectations are less explored, and may potentially condition students' academic achievement and their future career choices in a significant way. A relevant research work in this subject is that of Eccles et al. (2000), who indicated that parents distorted their perceptions based on gender role stereotypes, so their expectations on their children's competencies in English, maths or sports could be gender-biased. In this sense, Chhin et al. (2008) indicated that the occupational choices that men and women made were not necessarily independent, as parents' gender role beliefs could be shaping their children's choices. Similarly, the interaction between parents' and children's gender in the influence of expectations was also underlined by Jacobs et al. (2006) – following a sample of students from 15 to 28 years in the United States – who

found that parents' gender-typed expectations about their children's occupation were highly related to the final occupation they chose and also to their levels of satisfaction with their occupation. One possible explanation for differences in parental expectations by students' gender is that the socioeconomic level of families influences differently parental expectations of their sons and daughters (Kleinjans, 2010).

Koshy et al. (2019) also highlighted the existence of these gender differences in expectations as mothers' educational expectations were found to be higher for their daughters when considering 15-year-old Australian students. They argue that one reason could be that in Australia there are limited vocational education and training options for girls compared to boys, making parents more likely to have higher university expectations for girls. Following this study, Dockery et al. (2022) presented the evolution of parental expectations of Australian children during a 4-year span. They found that both mothers and fathers tend to believe that boys were less likely to attend university than girls, and this gap was more pronounced for mothers. Similarly, Freeman et al. (2024) found that female students and their parents in the United States had higher expectations of advanced degree attainment. Indeed, the growing gender gap in educational attainment could be explained by this gender gap in educational expectations (Reynolds & Burge, 2008). In this regard, Mead (2023) attributed the differential gender enrolment rate in British Universities to differences in educational expectations. Lastly, the cross-country study of Wiseman and Zhao (2022), using PIRLS data, revealed that although parents generally expect higher levels of education for their daughters than for their sons, regional differences were identified. Indicatively, in Western Europe parents have higher educational expectations for their daughters than do for their sons, while in the Middle East, East Asia and the Pacific the opposite holds true.

The aforementioned literature seems to indicate the possible existence of a gender-typed influence of parental expectations on students' academic performance but, to the best of our knowledge, this expectations' subject has not been analysed, at least in the case of Spain as of yet.

3. Data

The census dataset used in this research was provided by the *Agencia Andaluza de Evaluación Educativa* (AGAEVE) of the *Consejería de Educación – Junta de Andalucía*. AGAEVE was responsible of conducting a "Diagnostic Assessment" (*Evaluación de Diagnóstico*) – DA from now on – for the whole Andalusian population of students on an annual basis. The DA was regulated by the education law which was applicable for the courses under analysis (*Ley Orgánica 2/2006, de 3 de mayo, de Educación* – LOE; BOE, 2006, art. 21, for the application of DA in primary education; art. 29, for secondary education). The aim of this assessment was to improve knowledge of the Andalusian education system and students' learning by assessing students' basic curricular competences.

We study the 2008-09, 2011-12 and 2012-13 waves. We follow students who were in the 5^{th} course of primary education (5^{th} grade) in 2008-09, and then during the 2^{nd} course of secondary education (8^{th} grade) in 2011-12. The 2012-13 wave (8^{th} grade) was used to track those students who repeated a school year between 2008-09 and 2011-12. From the total 78,413 Andalusian students in grade 5, we continue following 70,131 in grade 8. We focus on the assessed competences of linguistic communication in Spanish language and mathematic reasoning (henceforth "reading" and "maths" respectively). Reading competence is defined as "the use of language as an instrument of oral and written communication, of presentation, interpretation and comprehension of reality; to construct and communicate the knowledge, to organize and to auto-regulate thinking, emotions and behaviour" (AGAEVE, 2009: page 7). Competence in maths is defined as "the ability to use and relate numbers, their basic operations, symbols and expression forms and mathematic reasoning, to produce and interpret different types of information and to increase knowledge on quantitative and spatial aspects of reality and to solve problems related to daily life and to the labour world" (AGAEVE, 2009: page 7).

The DAs also gathered contextual information about students, families, schools and teachers. The 5^{th} and 8^{th} grade student questionnaire contained the following question for parents, which is the focus of our analysis: "*What level of education do you expect your child to obtain?*" The options were:

- Secondary education (lower secondary education)
- Medium grade vocational education
- High school (upper secondary education)
- High grade vocational education
- University degree

In Spain, after finishing secondary education (compulsory education), students can decide if they want to continue their studies. In case that they want to obtain further qualification, they can take a medium grade vocational course or complete high school, which is the main path to university studies. After finishing any of these academic tracks, students can continue their education either in high grade vocational education or, if they have completed high school or high grade vocational education, they may access university. Compared to other countries, in Spain, vocational education is not very popular. In some OECD countries such as the Czech Republic or the Slovak Republic, around 70% of the adult population has attained vocational and technical upper secondary education (equivalent to high grade vocational education), while in Spain the equivalent is about the 8% of the population (OCDE, 2012). University studies seem to be a more popular option among Spanish students. For the 2012-2013 academic year, 328,552 students received vocational

training (high vocational education) and 1,046,570 studied towards a university degree[1].

Out of 70,131 students that we follow from the 5th to the 8th grade, 49,141 of parents answered this question in both years. In the 5th grade, 54,179 parents reported their expectations while 55,300 parents answered at the 8th grade. Most parents expected that their child would achieve a high level of education. For example, in the 8th grade, 61% of parents had the expectation that their child would attain university studies. Nevertheless, there is enough variability of expectations during the period, as 47.5% of parents changed their expectations from primary to secondary education, with 21.7% of parents increasing their expectations and 25.9% decreasing them.

Table 1 shows the distribution of parental expectations according to students' gender in grades 5 and 8. Results show that parents hold higher educational expectations for girls than for boys. For instance, in 8th grade 68.56% of parents expected that their son would achieve University studies while this figure reaches the 77.59% for daughters. Regarding the evolution of educational expectations between 5th and 8th grade, results show that parents tended to lower their expectations as children got older.

The lack of response in parental expectation variables, as well as other variables included in the estimations, has been controlled with a missing flag variable. In the case of the socioeconomic level, the difference of response rates is notable, with 17% and 7% of individuals failing to answer in the 5th and 8th grade, respectively. The variable which gathers the socioeconomic level of students is created by the AGAEVE using information from the parental questionnaire; concretely, the highest parental occupation, the highest socioeconomic status of the parents, the number of books at home and the level of home resources. The socioeconomic index variable has mean 0 and standard deviation 1.

The main descriptive statistics for these expectation variables and additional background characteristics are presented in Table A1 of the Appendix. The statistics show that the average reading score has grown along the period analysed, in contrast to maths. Students' scores have been standardised (to mean 0 and standard deviation of 1) to facilitate the interpretation of the results as effect sizes. For the purpose of interpreting the Results section, we provide here the mean and standard deviation of the population in each course and subject used to standardise students' scores: in 2008-09 the mean score in reading (maths in brackets) was 68.14 (48.92) with a standard deviation of 17.21 (12.74); in 2011-12, the mean score in reading was 78.92 (39.75) with a standard deviation of 18.38 (11.50); in 2012-13, the mean score in reading was 70.24 (40.78) with a standard deviation of 18.44 (11.92).

Around 75% of the students attend public schools and 25% semiprivate schools[2]. The socioeconomic level is included, measured in terciles. Despite the short time period, around 34% of students change their socioeconomic level from the 5th grade to the 8th grade. Out of the 70,131 individuals that we follow from the 5th to the 8th grade, the final size of the sample is reduced by around 5,000 students who did not take the reading or maths exam.

4. Methodology

The estimation of the relationship of parental expectations with students' academic achievement can be biased, to the extent that there are unobservable factors which may potentially influence, simultaneously, parental expectations and student educational performance. Our longitudinal dataset provides an advantage in dealing with this issue. We follow two different and alternative identification strategies. The first relies on the use of time fixed-effects in which changes in expectations can explain the evolution of the scores during student transition from primary to secondary education. An alternative solution to this problem is an instrumental variable procedure. This design controls for unobservable factors in the 8th grade academic performance estimation through the inclusion of the residuals from the 5th grade estimation. This approach closely follows Dolton et al. (2003), developed using a different setting. We explore each one of these strategies below. Despite using two identification strategies to get as close as possible to the causal effect of parental expectations on students' academic performance, there are many unobservables which we are not able to control for; hence, we are cautious and interpret our results as conditional associations rather than as causal effects.

The structural form of our model is specified in Eq.s (1) and (2), where y_{i0} and y_{i1} are, respectively, the 5th grade (time period 0) and the 8th grade (time period 1) performance scores in reading or in maths, X_{i0} and X_{i1} are student and family characteristics, such as socioeconomic factors, which may influence scores at the 5th and 8th grade. Using both subjects allows us to test for the robustness of our results. As a measure of previous student performance, grade retention has been considered. In Eq. (1), this enters as whether the student has repeated a school year before the 5th grade. In Eq. (2), if the student has repeated a class year between the 5th and 8th grades. The variable Exp_{it} represents parental expectations, which are the focus of our research, while μ_{i0} and μ_{i1} represent unobservable factors conditioning both parental expectations and performance scores of individual i at time 0 and time period 1, respectively. The error terms in the two equations are u_{i0} and u_{i1}:

$$y_{i0} = \alpha_0 + \beta_0 X_{i0} + \pi_0 Exp_{i0} + \delta_0 \mu_{i0} + u_{i0} \quad (1)$$

$$y_{i1} = \alpha_1 + \beta_1 X_{i1} + \pi_1 Exp_{i1} + \gamma y_{i0} + \delta_1 \mu_{i1} + u_{i1} \quad (2)$$

This structural form suggests taking the 5th grade academic performance scores as an indicator of students' competences, to deal with endogeneity. However, 5th grade scores may also be conditioned by unobservables influencing parental expectations. In order to obtain the influence of expectations on students' achievement using this specification, we may assume that 5th grade performance

[1] Data source: Statistics of Education in Spain. Ministry of Education and Vocational Training (http://www.educacionyfp.gob.es/servicios-al-ciudadano/estadisticas).

[2] We exclude students who attend private schools since they only represent 0.3% of the 8th grade sample; furthermore, the 8th grade DA is the only one which evaluates them.

Table 1
Parental expectations by students' gender.

	Boys	Girls
Parental expectations in 5th grade		
Secondary education	5.15 %	4.22 %
Medium grade vocational education	6.51 %	4.40 %
High school	5.48 %	4.45 %
High grade vocational education	9.15 %	7.34 %
University	73.71 %	79.59 %
Parental expectations in 8th grade		
Secondary education	5.56 %	3.75 %
Medium grade vocational education	8.83 %	5.91 %
High school	6.38 %	4.91 %
High grade vocational education	10.67 %	7.84 %
University	68.56 %	77.59 %

Source: Authors' own calculations.

plays no role in 8th grade performance and that unobservables either do not matter or cannot be measured. We also need to assume that both X_{i1} and Exp_{i1} are exogenous:

$$E(u_{i1} / X_{i1}) = 0$$

$$E(u_{i1} / Exp_{i1}) = 0$$

$$\delta_0 \mu_{i0} = \delta_1 \mu_{i1} = 0$$

$$\gamma = 0$$

All these assumptions are difficult to be satisfied. Departing from the structural form described in (1) and (2), in the following, we describe the two proposed identification strategies.

4.1. Time fixed-effects

The first identification strategy is the use of time fixed-effects as it allows to rule out every characteristic which is the same within students and parents between years, such as school characteristics, student ability, etc. – allowing us to obtain the influence of parental expectations on students' progression between 5th and 8th grades. When estimating the education production function (3) using time fixed-effects, we obtain our base model (4), where t_0 corresponds to the 5th grade data and t_1 the 8th grade data, and applying differences between years:

$$y_{it} = \alpha + \beta X_{it} + \pi Exp_{it} + \delta \mu_{it} + u_{it} \tag{3}$$

$$(y_{i1} - y_{i0}) = \Delta y = \Delta\alpha + \beta\Delta X + \pi\Delta Exp + \delta\Delta\mu + \varepsilon_i \tag{4}$$

where $\varepsilon_i = (u_{i1} - u_{i0})$

As unobservable factors (μ) are the same between years, their differences are zero, thus allowing us to obtain the influence of parental expectations (π). As we are focusing on the variation of parental expectations, the potential endogeneity problems of this variable when explaining academic achievement could be attenuated. Formally, the assumptions of the model are:

$$E(u_{i1} / X_{i1}) = 0$$

$$E(u_{i1} / Exp_{i1}) = 0$$

$$\delta_0 \mu_{i0} = \delta_1 \mu_{i1}$$

Furthermore, school dummies have been included in Eq. (4), so that they account for the variation in students' achievement due to school change – for students who changed school between primary and secondary education. We also include a year dummy in Eq. (4), which gathers the variation between years in students' academic achievement that is not due to variation in parental expectations or school change. For instance, this variable could pick up the increase in the difficulty of the subject between primary and secondary education. The base model in (4) has been alternatively estimated for the whole sample and for the subsamples of male and female students.

For this identification strategy to work, we need enough variation in parental expectations variables. The period we employ, i.e. the transition between primary and secondary education, supposes a key milestone in which students have to face new challenges, meaning that parental expectations are very likely to change more than in other periods of compulsory education. As indicated in the Data section, our data accomplishes this requirement. Another requirement is that parental expectations have to be measured before they can influence the scores obtained by students (temporal asymmetry between the dependent and independent variables, as

described by Trusty et al., 2003). In the case of our data, these expectations are measured before parents can see their children's academic performance in the current term, so our data fulfils this condition. Particularly, due to these features of the data and its longitudinal design, our work aligns with the "expectations-driven model" (Goldenberg et al., 2001), a model based on analysing the influence of parental expectations on students' achievement to get as close as possible to causal effects, getting rid of potential endogeneity problems.

4.2. Unobserved ability model

The fixed-effects estimator, which Todd and Wolpin (2003) called the "gains estimator", is not always a solution to the problem of unobservables, since it rests on the often unjustifiable assumption that the unobservable association is fixed across time periods; however, factors typically conditioning expectations about the student may develop as the student progresses. Thus, we move into an alternative solution, i.e. using residuals from Eq. (1) as a proxy for "ability".

If we assume that a major component of the residuals on the y_{i0} equation consists of the omitted variable associated with unmeasured ability then we can, at least partially, control for this in the y_{i1} equation by using the residuals as an extra regressor. Setting out this model more formally, we depart from the definition of the assumptions:

$$E(u_{i1} / X_{i1}) = 0$$

$$E(u_{i1} / Exp_{i1}) = 0$$

$$\mu_{i0} = \mu_{i1}$$

Estimating the residuals from Eq. (1), we suppose that the residual term is composed by the random component (u) and students' ability (μ) as major component:

$$\widehat{r}_{i0} = (\delta_0 \mu_{i0} + u_{i0}) = y_{i0} - (\widehat{\alpha}_0 + \widehat{\beta}_0 X_{i0} + \widehat{\pi}_0 Exp_{i0}) \tag{5}$$

Substituting $\widehat{r}_{i0}$ into (2) as a proxy for y_{i0} and decomposing the error term:

$$y_{i1} = \alpha_1 + \beta_1 X_{i1} + \pi_1 Exp_{i1} + \gamma \widehat{r}_{i0} + \delta_1 \mu_{i1} + u_{i1} \tag{6}$$

$$y_{i1} = \alpha_1 + \beta_1 X_{i1} + \pi_1 Exp_{i1} + \gamma \delta_0 \mu_{i0} + \gamma u_{i0} + \delta_1 \mu_{i1} + u_{i1} \tag{7}$$

Rearranging the above equation, we can see that the coefficient on the residuals term can be interpreted as an estimate of the importance of unobserved ability:

$$y_{i1} = \alpha_1 + \beta_1 X_{i1} + \pi_1 Exp_{i1} + (\gamma \delta_0 + \delta_1)\mu_i + \varepsilon_i \tag{8}$$

where $\varepsilon_i = (\gamma u_{i0} + u_{i1})$

$$\mu_{i0} = \mu_{i1} = \mu_i$$

5. Results

This section presents main results of the base model, aimed at analysing the influence of parental expectations on students' academic achievement during their transition from primary to secondary education. Parental expectations variables have been included in their original categorical form. We also translated parental expectations into a quasi-continuous variable using their equivalence in years of education, and the results do not change[3].

5.1. Time fixed-effects

The results in Table 2 show that parental expectations explain students' academic achievement: the higher the level of parental educational expectations, the more positive association with students' scores. Specifically, focusing on the time fixed-effects (FE) results, the influence of expectations on maths' performance is slightly lower than in reading, especially in high levels of education. Particularly, a University level of education (16 years) would suppose a sizeable positive association with academic achievement of 0.152 SDs in reading and 0.109 SDs in maths.[4] Therefore, parental expectations are a more important predictor of scores in reading than in maths.

Estimations have been replicated by the use of Ordinary Least Squares (OLS) to check for the influence of omitted variables when not using time fixed-effects. The former estimations show a much higher relationship of expectations with students' academic

[3] These results are available on request.

[4] It is important to highlight that these estimations have been performed using the DA data of 2011-12 for students who were in the 8th grade in 2011-12 but did not pass that course, so they repeated the 8th grade in 2012-13. As a robustness check, these estimations have been replicated using the information of 2012-13 for this group of students and the results hold. These results are available upon request to the authors.

Table 2
The influence of parental expectations on students' academic achievement.

	Reading		Maths	
Variables	OLS	FE	OLS	FE
Parental expectations (Ref: secondary education)				
Medium grade vocational education	0.037**	0.028*	0.036**	0.020
	(0.016)	(0.017)	(0.015)	(0.017)
High school	0.280***	0.084***	0.242***	0.066***
	(0.016)	(0.018)	(0.016)	(0.017)
High grade vocational education	0.317***	0.100***	0.266***	0.044***
	(0.015)	(0.017)	(0.014)	(0.016)
University	0.670***	0.152***	0.595***	0.109***
	(0.013)	(0.015)	(0.013)	(0.014)
Missing flag of parental expectations	0.375***	0.017	0.361***	0.009
	(0.017)	(0.018)	(0.016)	(0.017)
Socioeconomic level (Ref: Low tercile)				
Medium tercile	0.180***	0.016**	0.188***	0.026***
	(0.006)	(0.008)	(0.006)	(0.007)
High tercile	0.355***	0.027***	0.405***	0.041***
	(0.007)	(0.010)	(0.007)	(0.010)
Missing flag of socioeconomic level	-0.018	-0.007	0.004	0.018
	(0.015)	(0.015)	(0.014)	(0.014)
Semiprivate school (Ref.: Public school)	1.707***	1.238**	-0.668***	1.062*
	(0.123)	(0.619)	(0.132)	(0.550)
School change between 5th and 8th grade: Yes (Ref.: No)	-0.155***	-0.105***	-0.224***	-0.104***
	(0.017)	(0.031)	(0.018)	(0.031)
Repeater: Yes (Ref.: No)	-0.652***	-0.108***	-0.649***	-0.131***
	(0.007)	(0.008)	(0.007)	(0.008)
Eighth grade (Ref.: Fifth grade)	0.126***	0.176***	0.180***	0.230***
	(0.008)	(0.007)	(0.009)	(0.007)
School dummies	✓	✓	✓	✓
Constant	-0.700***	-1.016***	-0.946***	-0.645
	(0.124)	(0.358)	(0.133)	(0.484)
Observations	129,254	129,254	130,078	130,078
R-squared	0.349	0.246	0.344	0.251

Notes: Robust standard errors in parentheses.
Estimation method: Ordinary Least Squares (OLS) and Time Fixed-Effects (FE).
Dependent variable: Variation of standardised scores between 5th grade and 8th grade using the mean and standard deviations of the total population for that particular DA cycle.
Coefficient: ***Significant at 1%, ** significant at 5%, * significant at 10%.
Source: Authors' own calculations.

achievement (up to six times higher); this bias can be the result of the omission of relevant variables which are controlled for when employing time fixed-effects. Regardless of the significant influence of the socioeconomic level to explain the evolution of the scores stressed in the literature (Sirin, 2005), the association of this variable with scores is lower than that of parental educational expectations. Regarding school variables, we found that students who attend semiprivate schools have higher scores in reading, while those who changed their school from primary to secondary education reduce their scores compared to students who complete compulsory education at the same school.[5]

Table 3 shows the relationship of expectations about students' performance when dividing the sample by gender (focusing on time fixed-effects). The association of parental expectations is similar for boys and girls, with a growing positive influence of parental expectations while we increase the level of studies, keeping the previously found higher association of expectations in reading. Additionally, parental expectations seem to have a greater influence on boys' performance. For example, a level of University expectations positively associates with maths scores in 0.130 SDs for boys and 0.080 SDs in the case of girls. To the extent that our estimations are not severely influenced by endogeneity, as previously argued, this may be showing a gender difference in the influence of expectations, rooted in societal gender-typed beliefs. Concretely, boys' higher dropout rates (IECA, 2018) may be a plausible explanation, as boys are more likely to drop out before finishing their compulsory studies, so higher expectations than secondary education may help them to perform higher and, thus, prevent them from dropping out of their studies. Regarding the association of University expectations for girls (which are not found consistently in the rest of education level expectations), it may show a higher exigency, in terms of education level, by parents to them, as girls are supposed to be more likely to finish their studies and get higher level of studies. In this sense, Spinath et al. (2014) indicated that girls' attitudes make them better adapted to today's school environment due to their verbal intelligence, higher agreeableness, stronger self-discipline and motivation, so that they usually obtain

[5] As a robustness check, estimations have been replicated including as a control the person who answers the questionnaire (the father or the mother) and results remain stable. These tables are available on request.

Table 3
The influence of parental expectations on students' academic achievement. Subsamples of boys and girls.

	Boys		Girls	
Variables	Reading	Maths	Reading	Maths
Parental expectations (Ref: secondary education)				
Medium grade vocational education	0.041*	0.026	0.024	0.016
	(0.023)	(0.023)	(0.026)	(0.025)
High school	0.114***	0.080***	0.050*	0.045*
	(0.025)	(0.024)	(0.027)	(0.026)
High grade vocational education	0.126***	0.053**	0.066***	0.034
	(0.023)	(0.022)	(0.025)	(0.024)
University	0.173***	0.130***	0.123***	0.080***
	(0.020)	(0.020)	(0.022)	(0.021)
Missing flag of parental expectations	0.040*	0.023	0.001	0.000
	(0.024)	(0.024)	(0.027)	(0.029)
Socioeconomic level (Ref: Low tercile)				
Medium tercile	0.011	0.033***	0.015	0.014
	(0.011)	(0.011)	(0.011)	(0.011)
High tercile	0.013	0.046***	0.034**	0.035**
	(0.014)	(0.014)	(0.014)	(0.014)
Missing flag of socioeconomic level	-0.021	0.015	0.001	0.015
	(0.021)	(0.020)	(0.022)	(0.020)
Semiprivate school (Ref.: Public school)	0.876	2.010***	1.732***	-0.040
	(0.626)	(0.570)	(0.556)	(1.022)
School change between 5th and 8th grade: Yes (Ref.: No)	-0.105**	-0.079	-0.061	-0.116*
	(0.048)	(0.049)	(0.048)	(0.052)
Repeater: Yes (Ref.: No)	-0.089***	-0.132***	-0.142***	-0.136***
	(0.011)	(0.010)	(0.012)	(0.011)
Eighth grade (Ref.: Fifth grade)	0.141***	0.206***	0.212***	0.256***
	(0.010)	(0.010)	(0.009)	(0.009)
School dummies	✓	✓	✓	✓
Constant	-1.926***	-1.413***	-0.573**	0.543**
	(0.391)	(0.847)	(0.263)	(0.263)
Observations	65,224	65,720	64,030	64,358
R-squared	0.283	0.280	0.288	0.296

Notes: Robust standard errors in parentheses.
Estimation method: Time Fixed-Effects.
Dependent variable: Variation of standardised scores between 5th grade and 8th grade using the mean and standard deviations of the total population for that particular DA cycle.
Coefficient: ***Significant at 1%, ** significant at 5%, * significant at 10%.
Source: Authors' own calculations.

better academic results than boys.

5.2. *Unobserved ability model*

The results of estimating the unobserved ability model are reported in Tables 3 and 4. The output suggests that expectations remain important when the proxy for ability is included[6]. Furthermore, residuals of the estimation of the 5th grade scores are a significant variable, which shows the importance of the unobserved ability. Table 4 displays different models which explain academic achievement in the 8th grade. Comparing the regressions which do not include the instrument of the ability (column 1) and those which add this variable (column 2), we observe a greater size of the coefficients of the expectations' variables in the first specification. An alternative model includes the 5th and 8th grade parental expectations to explain 8th grade performance (column 3) and we underline the low multicollinearity between both variables. These results add further support to the finding that the influence of expectations on students' academic performance is not driven by endogeneity problems.

When comparing the coefficient of unobserved ability in reading and maths, it seems that students' ability is a more important predictor of students' score in maths than in reading. As previously outlined, parental expectations seem to have a greater influence on reading, hence, innate student ability may justify scores in maths to a larger extent than in reading. We have not observed differences between the associations of student unobserved ability on boys' and girls' scores (Table 5). The influence of parental expectations is again slightly greater for boys than for girls.

[6] The 5th grade estimation from which the residual variable was estimated is available upon request to the authors.

Table 4
The influence of parental expectations on students' academic achievement.

	Reading			Maths		
Variables	(1)	(2)	(3)	(1)	(2)	(3)
Female	0.219***	0.235***	0.230***	-0.127***	-0.107***	-0.113***
	(0.006)	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)
Parental expectations in 8th grade (Ref: secondary education)						
Medium grade vocational education	0.070***	0.087***	0.080***	0.027	0.037*	0.034*
	(0.022)	(0.021)	(0.021)	(0.020)	(0.020)	(0.019)
High school	0.209***	0.219***	0.180***	0.105***	0.107***	0.073***
	(0.023)	(0.022)	(0.022)	(0.021)	(0.021)	(0.021)
High grade vocational education	0.240***	0.247***	0.201***	0.125***	0.116***	0.071***
	(0.021)	(0.020)	(0.020)	(0.019)	(0.019)	(0.019)
University	0.564***	0.507***	0.414***	0.463***	0.383***	0.284***
	(0.019)	(0.018)	(0.018)	(0.017)	(0.017)	(0.017)
Missing flag of parental expectations	0.281***	0.246***	0.171***	0.199***	0.147***	0.070***
	(0.021)	(0.021)	(0.021)	(0.020)	(0.019)	(0.019)
Socioeconomic level in 8th grade (Ref: Low)						
Medium tercile	0.197***	0.182***	0.162***	0.180***	0.162***	0.141***
	(0.009)	(0.008)	(0.008)	(0.009)	(0.008)	(0.008)
High tercile	0.376***	0.353***	0.320***	0.406***	0.381***	0.344***
	(0.009)	(0.008)	(0.008)	(0.010)	(0.009)	(0.009)
Missing flag of socioeconomic level	0.028	0.007	0.003	0.063***	0.036**	0.032*
	(0.018)	(0.018)	(0.018)	(0.018)	(0.017)	(0.017)
Semiprivate school in 8th grade (Ref.: Public school)	0.198***	0.224***	0.220***	0.244***	0.278***	0.274***
	(0.007)	(0.007)	(0.007)	(0.008)	(0.008)	(0.007)
Repeater from 5th grade to 8th grade: Yes (Ref.: No)	-0.670***	-0.521***	-0.495***	-0.683***	-0.479***	-0.449***
	(0.009)	(0.009)	(0.009)	(0.009)	(0.009)	(0.008)
Residual of the 5th grade estimation		0.319***	0.331***		0.410***	0.424***
		(0.004)	(0.004)		(0.004)	(0.004)
Parental expectations in 5th grade (Ref: secondary education)						
Medium grade vocational education			0.056**			0.038*
			(0.022)			(0.021)
High school			0.164***			0.108***
			(0.023)			(0.022)
High grade vocational education			0.200***			0.174***
			(0.020)			(0.020)
University			0.361***			0.367***
			(0.018)			(0.017)
Missing flag of parental expectations			0.276***			0.235***
			(0.019)			(0.018)
Constant	-0.513***	-0.507***	-0.717***	-0.292***	-0.281***	-0.479***
	(0.019)	(0.018)	(0.023)	(0.017)	(0.017)	(0.022)
Observations	66,119	64,627	64,627	66,547	65,039	65,039
R-squared	0.301	0.380	0.389	0.260	0.378	0.389

Notes: Robust standard errors in parentheses.
Estimation method: Ordinary Least Squares (OLS).
Dependent variable: Standardised scores in 8th grade using the mean and standard deviations of the total population for that particular DA cycle.
Coefficient: ***Significant at 1%, ** significant at 5%, * significant at 10%.
Source: Authors' own calculations.

6. Conclusions

Our main results have shown that parental expectations explain students' academic progression from primary to secondary education: the higher the level of parental educational expectations, the better students' performance in reading and maths. Particularly, the association of expectations seems to be higher in reading than in maths. This differential effect of parental expectations between reading and maths could be grounded in the social belief that maths skills involve more innate ability while reading skills can be nurtured and learned through training (Gunderson et al., 2017). Based on this, parental expectations may be more conducive to supporting reading than maths in the home learning environment. In addition to this, the population level of skills tends to be relatively higher in literacy than in numeracy (OECD, 2024), hence parents may have less effective tools to support their children in maths compared to reading.

The results also show differences of the effect of parental expectations on academic achievement by students' gender. Boys' academic performance is more sensitive to parental expectations given the greater coefficient size of parental expectations in the subsamples of boys compared to girls. This result suggests that the role played by parental expectations in contributing to their children academic performance is more relevant for boys than girls. Our results also reveal parents hold higher educational expectations for their daughters in primary and secondary education (5th and 8th grade). Besides that, the results show that girls' academic achievement is only benefited by University expectations, while boys are benefited from high school or higher parental expectations. This higher

Table 5
The influence of parental expectations on students' academic achievement. Subsamples of boys and girls.

	Boys		Girls	
Variables	Reading	Maths	Reading	Maths
Parental expectations in 8th grade (Ref: secondary education)				
Medium grade vocational education	0.066**	0.029	0.111***	0.048
	(0.027)	(0.026)	(0.033)	(0.030)
High school	0.222***	0.123***	0.212***	0.083***
	(0.029)	(0.028)	(0.034)	(0.030)
High grade vocational education	0.247***	0.116***	0.243***	0.114***
	(0.027)	(0.026)	(0.032)	(0.029)
University	0.510***	0.395***	0.503***	0.369***
	(0.024)	(0.023)	(0.028)	(0.025)
Missing flag of parental expectations	0.227***	0.136***	0.264***	0.156***
	(0.027)	(0.026)	(0.032)	(0.029)
Socioeconomic level in 8th grade (Ref: Low tercile)				
Medium tercile	0.163***	0.148***	0.201***	0.176***
	(0.012)	(0.012)	(0.011)	(0.011)
High tercile	0.319***	0.369***	0.387***	0.392***
	(0.012)	(0.013)	(0.011)	(0.012)
Missing flag of socioeconomic level	-0.020	0.015	0.039	0.059**
	(0.024)	(0.024)	(0.026)	(0.024)
Semiprivate school in 8th grade (Ref.: Public school)	0.247***	0.280***	0.201***	0.276***
	(0.010)	(0.011)	(0.009)	(0.011)
Repeater from 5th grade to 8th grade: Yes (Ref.: No)	-0.565***	-0.503***	-0.464***	-0.445***
	(0.012)	(0.012)	(0.013)	(0.012)
Residual of the 5th grade estimation	0.320***	0.416***	0.318***	0.404***
	(0.005)	(0.005)	(0.005)	(0.005)
Constant	-0.480***	-0.271***	-0.296***	-0.394***
	(0.024)	(0.023)	(0.028)	(0.025)
Observations	32,612	32,860	32,015	32,179
R-squared	0.378	0.390	0.347	0.364

Notes: Robust standard errors in parentheses.
Estimation method: Ordinary Least Squares (OLS).
Dependent variable: Standardised scores in reading and maths in 8th grade using the mean and standard deviations of the total population for that particular DA cycle.
Coefficient: ***Significant at 1%, ** significant at 5%, * significant at 10%.
Source: Authors' own calculations.

parental exigency for girls in comparison to boys may be a sign of the permanence of gender roles in society, as boys are supposed to have worse behaviour than girls at school, while girls are supposed to have a better attitude for school life (Spinath et al., 2014). This means that there is still a lot of work to do in order to overcome boys and girls gender stereotyping in school, an issue which should be included in teachers' curricula so they are able to address it when and if it arises.

Besides analysing the influence of parental expectations, other variables have been used to model students' academic performance. It is worth highlighting the negative influence of changing school when transferring from primary to secondary education. Until now, Spanish high schools adapted to facilitate this change by associating schools and high schools so that students from a particular school will attend the same high school. An additional policy which could help student transition from school to high school is specialised training for teachers delivering the first course of high school, so that they could adapt their methodology to help with school transition.

From a methodological standpoint, potential endogeneity problems of expectations have been dealt with thanks to the availability of a longitudinal dataset. We have proposed alternatively, the use of time fixed-effects and instrumenting student ability. The latter variable has a higher association with 8th grade performance in maths than in reading; thus, parents seem to play a more relevant role in reading performance whereas innate student ability may have a higher influence on maths.

The main limitation of our research lies in a possible selection bias, resulting from any significant influence of missing values; this issue has been partially controlled by the use of missing flag variables. Although we employ two identification strategies to get as close as possible to the causal effect of parental expectations on student academic performance, there are many unobservables which we are not able to control, so we have been cautious and have interpreted our results as conditional associations rather than as causal effects.

To conclude, this research emphasises the importance that expectations have in the determination of students' performance, this meaning that parental beliefs are a good predictor of academic progression. In this context, schools play a relevant role when helping parents define their expectations, as these institutions are the main source of information that parents have about their children's progress.

CRediT authorship contribution statement

Oscar David Marcenaro-Gutierrez: Writing – review & editing, Supervision, Funding acquisition, Conceptualization. **Claudia**

Prieto-Latorre: Writing – original draft, Software, Formal analysis, Data curation. **Luis Alejandro Lopez-Agudo:** Writing – original draft, Validation, Methodology, Data curation.

Acknowledgements

This work has been partly supported by *Fundación Bancaria BBVA* - Programa Prismas y Problemas 2023 - ("*La inequidad socio-económica derivada de la ineficiencia de los sistemas educativos (INESOCEF)*"), by the *Fundación Ramón Areces* and by the Andalusian Regional Government (SEJ-645-FEDER). Funding for open access charge: Universidad de Málaga/CBUA.

Data availability statement

The data that support the findings of this study are available from Agencia Andaluza de Evaluación Educativa (AGAEVE) but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available. Data are however available from the authors upon reasonable request and with permission of Agencia Andaluza de Evaluación Educativa (AGAEVE).

Appendix

Table A1
Descriptive statistics in 5th grade and 8th grade.

		Sample of reading estimation		Sample of maths estimation	
Variables		Mean	Std. Dev	Mean	Std. Dev
Student's gender	**Male**	0.504	0.500	0.505	0.500
	Female	0.495	0.500	0.495	0.500
Scores	**5th grade**	70.085	16.373	50.351	12.020
	8th grade	80.074	18.634	41.021	11.270
Standardised scores	**5th grade**	0.113	0.951	0.112	0.944
	8th grade	0.128	0.943	0.101	0.984
Parents' expected level of education for the student in 5th grade	**Secondary education**	0.036	0.187	0.036	0.187
	Medium grade vocational education	0.044	0.204	0.044	0.206
	High school	0.040	0.197	0.041	0.197
	High grade vocational education	0.068	0.252	0.068	0.252
	University	0.646	0.478	0.644	0.479
	Missing flag	0.166	0.372	0.167	0.373
Parents' expected level of education for the student in 8th grade	**Secondary education**	0.036	0.187	0.037	0.188
	Medium grade vocational education	0.060	0.238	0.061	0.239
	High school	0.047	0.213	0.047	0.212
	High grade vocational education	0.078	0.269	0.078	0.269
	University	0.629	0.483	0.627	0.483
	Missing flag	0.149	0.356	0.150	0.357
Parental expectations in a quasi-continuous form	**5th grade**	15.171	1.681	15.168	1.683
	8th grade	15.053	1.743	15.049	1.746
School funding in 5th grade	**Public**	0.757	0.429	0.757	0.429
	Semiprivate	0.243	0.429	0.243	0.429
School funding in 8th grade	**Public**	0.745	0.436	0.744	0.437
	Semiprivate	0.255	0.436	0.256	0.437
Change of school from 5th grade to 8th grade	**Yes**	0.743	0.437	0.742	0.437
	No	0.257	0.437	0.258	0.437
Socioeconomic level in 5th grade	**Low tercile**	0.248	0.432	0.248	0.432
	Medium tercile	0.281	0.450	0.280	0.449
	High tercile	0.292	0.455	0.292	0.455
	Missing flag	0.179	0.383	0.180	0.384
Socioeconomic level in 8th grade	**Low tercile**	0.271	0.445	0.271	0.445
	Medium tercile	0.318	0.466	0.318	0.466
	High tercile	0.339	0.473	0.339	0.473
	Missing flag	0.072	0.258	0.072	0.259
Repeater students before 5th grade	**Yes**	0.072	0.258	0.072	0.258
	No	0.928	0.258	0.928	0.258
Repeater students from 5th grade to 7th grade	**Yes**	0.137	0.344	0.139	0.346
	No	0.863	0.344	0.861	0.346
Repeater students in 8th grade	**Yes**	0.075	0.263	0.074	0.262
	No	0.925	0.263	0.926	0.262

(*continued on next page*)

Table A1 (*continued*)

		Sample of reading estimation		Sample of maths estimation	
Variables		Mean	Std. Dev	Mean	Std. Dev
Repeater students from 5th grade to 8th grade	**Yes**	0.212	0.409	0.213	0.410
	No	0.788	0.409	0.787	0.410
Number of observations	64,627	65,039			

Notes: "Std. Dev" stands for "standard deviation". Scores are referred to the estimation of subject (reading or maths) specified in the first row of the table.
Source: Authors' own calculations.

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