

## **“Testing the impact on educational achievement of expectations”**

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### **Abstract**

Parental and students' expectations on the educational achievement of the latter have been highlighted in the literature as proper proxies for students' forthcoming performance and high school track elections. In this research we intend to measure the effect of these expectations on students' performance accounting for the existence of endogeneity, due to the reciprocal relationship between the expectations of parents and students and their correlation with unobservable variables conditioning students' achievement. A rich dataset containing information on Andalusian parental and students' socio-economic characteristics, expectations, parental involvement interactions and academic performance variables is used to conduct the empirical analyses. Our results show that the agreement of parental and students' expectations presents a positive influence on students' achievement and the likelihood of selecting a high school track. In addition, parental expectations have been found to be dependent on family socio-economic background, what supports the argument of the persistence in Andalusia of strong barriers to socioeconomic mobility. In the view of these results, we suggest policy interventions as, e.g., fostering the participation of both parents and students on university and professional orientation in early moments of secondary education, so they could have complete and symmetric information to set their expectations on realistic basis.

**Keywords:** parental expectations, students' expectations; educational performance; high school track; endogeneity.

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## 1. Introduction

Economics of Education research has paid special attention to analyze the influence of family related factors on students' achievement, such as family background –mainly parental education level (Holmlund *et al.*, 2011; Rimkute *et al.*, 2012; Marcenaro and Vignoles, 2015)–, parental involvement (Hanson *et al.*, 1997; Froiland *et al.*, 2012), the level of household's income or family structure (Jacobs and Harvey, 2005). However, expectations of parents and students have only been highlighted in the recent literature as important factors in predicting students' academic achievement and decisions about high school tracks. These expectations are said to maintain a reciprocal relationship between them –generating problems of endogeneity in the estimates– and also to be correlated with unobservables which determine students' academic achievement (Hao and Bonstead-Bruns, 1998; Zhang *et al.*, 2010). Both issues complicate empirical analyses and, consequently, –despite the potential importance of the link between expectations and students outcomes– the literature on this is scarce; this is particularly the case of Spain, due to the difficulty to get access to good observational data on expectations.

In this context, we intend to measure whether the coincidence or discordance of these expectations could condition students' achievement, controlling for a set of more “traditional” factors (gender, family background, study hours, etc.). Furthermore, this agreement (disagreement) in expectations could be affecting the future high school track selected by students (Räty, 2006) and, consequently, the academic career of the students in the medium and long run. The main interest of going in depth into the knowledge of both –expectations and their influence on students' achievement– would be to determine the extent to which they might be conditioned by the socio-economic characteristics of the household. If these characteristics have little impact on the expectations, we could be moving towards a more egalitarian and meritocratic society, which represents an important aim of education policy interventions (Marcenaro *et al.*, 2014). Furthermore, we believe this agreement (disagreement) is caused by the asymmetric information of parents and students with regard to the actual capacity of the latter, what has important implications in terms of educational policies, as the personal and pecuniary cost of those failing to complete the academic track is massive, what is a matter of particular concern in times of budgetary constraints.

Furthermore, families' interest in overcoming academic achievement limitations rooted in their socio-economic background characteristics and accomplishing a high level of expectations could be reflected in many procedures, as parental involvement in students' schoolwork. However, as students reach secondary education, literature has shown that they should have enough autonomy and independence in order to manage their resources and learn in their own, making the necessary effort to accomplish realistic aims. Thus, expectations should be formed underneath solid pillars of information in academic options and their requirements, so students could choose the future academic track which best fits their personal characteristics, and not only based in their socio-economic background. This lack of academic information is an important concern nowadays, what denotes the need to trigger policy interventions in order to sort it out.

In our research we focus on the Spanish autonomous community of Andalusia –the most populated region– due to its poor education performance –as compared to other Spanish regions–. The figures on the educational performance in this autonomous region show that it has obtained lower scores than the average of Spain in the three competencies evaluated by PISA 2012 (reading, mathematics and science), belonging to the group of the three worst performing autonomous regions in Spain in these subjects<sup>1</sup>. Andalusia also shows very high rates of early drop out of compulsory studies (27.7%; 31% and 24.2% for both male and female students, respectively) as compared to a total of 33.1% for Spain) in 2014 (IECA, 2015). Furthermore, following Fundación Foessa (2014), Andalusia is also at the bottom in terms of income equality

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<sup>1</sup> To be precise, 472 points in mathematics, 12 points underneath Spain; 477 in reading, 11 points below Spain; and 486 in sciences, 10 points underneath Spain (MECD, 2013).

(Income Gini Index of 0.344)<sup>2</sup>. This high inequality level has an impact on economic growth and many other social and economic aspects.

The results of our study show that parental and students' expectations have a reciprocal and positive relationship between them, confirming the results reported for other geographic areas in the literature. In addition, it was found that the effect of parental involvement is of opposite sign for each of these expectations: students' expectations are increased by these practices, while their parents' are reduced, what reflects the different perception that both collectives have about parental help with schoolwork. Furthermore, their degree of concordance is important to the extent that, otherwise, students' achievement and the likelihood of attending to more demanding high school studies are reduced. Our results also showed that, conditioned on children expectations, parental expectations are higher for those families with a medium to high income level, which provide evidence of the difficulties faced by socioeconomic disadvantaged groups to move up, i.e. we are far from a socially mobile society.

The rest of the paper is organized as follows: In section 2 we make a brief revision of the literature on parental and students' expectations. In section 3 we describe the characteristics of our data. Section 4 is devoted to the methodology employed in order to obtain the results reported in section 5. In section 6 we present the main conclusions and comment the policy implications derived from our analysis.

## 2. Literature review

The use of expectations as a relevant variable in explaining students' achievement began with the seminal works of Sewell and Vimal (1968) and Sewell *et al.* (1969, 1970), who considered parental and students' expectations in their achievement models –the Wisconsin status attainment model– and obtained that they were proper predictors of students' achievement.

When studying parental expectations –and also students'– it is essential to distinguish them from parental aspirations. Goldenberg *et al.* (2001, p. 548) denoted that parental aspirations reflect “the educational level they hope their child attains”, i.e., what the individual wishes to happen, while parental expectations reflect “the level the child is realistically expected to attain”, i.e., what the individual thinks that will happen (Reynolds and Pemberton, 2001; Gorard *et al.*, 2012). Particularly, Goldenberg *et al.* (2001) found –for the United States– that parental aspirations were stable and high from kindergarten to sixth grade, showing that parents want their children to achieve high attainment, while expectations were lower and less stable, because they are influenced by the way children are actually performing at school. Another relevant result of their study was that students' final achievement was not limited by parental expectations or aspirations. Other authors as Khattab (2015) found that when students' aspirations or expectations are high –being the other one low– they are supposed to provide high achievement to students. They also indicated that a high level in the three variables –students' achievement, expectations and parental expectations– made more likely that the student joined to a university degree and that high parental expectations affected positively students' achievement.

A key issue within the literature on expectations is that socio-economic background has been highlighted as helping to increase students' and parental expectations, and then academic achievement. Hao and Bonstead-Bruns (1998) argued that better socio-economic background provided a more favorable environment for the development of children. Besides, a high income level in the household supposed higher parental expectations, which were translated into the allocation of their income in educational activities and participation in school programs. In addition, they claimed that agreement on parental and students' expectations helped students of eighth grade in United States to obtain better achievement. Likewise, Rimkute *et al.* (2012) found that family background, previous academic achievement and parental level of education predicted parental and students' expectations. In addition, they highlighted that parental expectations were a good predictor of students' expectations and that parental and students' expectations became more similar when students reached ninth grade, so their expectations converge when adolescents

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<sup>2</sup> Surpassed only Canary Islands (0.346) and Castilla-La Mancha (0.363).

approach an education transition, due to the higher discussion about this subject with their parents (Nurmi, 2004), so expectations become more realistic. This adjustment process can be also seen in Hossain and Tsigaris (2015), who found that students' expectations on their achievement in each course are formed from its very beginning.

Bodovski (2014) analyzed a sample of eighth grade students and found that those students with a high socio-economic background had also higher educational achievement and higher levels in three different proxies of *habitus*<sup>3</sup>: expectations, area-specific self-concepts and internal locus of control –the ability to control their lives–. She obtained that high parental expectations and school involvement influenced students' outcomes, but parents' implication in extra-curricular activities did not have a significant effect on them. They indicate that socio-economic background effects on students' achievement influence students previously to school entrance and that parental expectations and activities are a way to transfer them to students' outcomes. Besides, boys showed higher self-concepts in mathematics than girls, but the latter had higher self-concepts, internal locus of control and expectations in reading.

There are many facts which can be reflecting parental expectations, as parental involvement, which has been remarked as helping to increase academic achievement in school by authors as Hanson *et al.* (1997). Froiland *et al.* (2012) studied parental and students' expectations in kindergarten period and claimed that they predict students' achievement in eighth grade. They also measured the influence of parental involvement on students' achievement by activities as helping them with homework and obtained that it was positive for kindergarten students, but when reaching to eighth grade these practices could be counter-productive. Nonetheless, authors as Hao and Bonstead-Bruns (1998) have stated the relevance of parental involvement in school learning to increase eighth grade students' expectations. Froiland and Davidson (2014) analyzed parents-school relationship and parental expectations in the determination of schools' outcomes in the United States' secondary and high schools, finding that these factors were very relevant. They also showed that parental expectations had a positive and higher relation with school outcomes than socio-economic background characteristics of the families, what highlights their relevance.

Nevertheless, the literature has not come to an agreement on the effects of parental expectations by gender of the children. Lundberg (2005) concluded that parental expectations had more effect on boys than girls, while Flouri and Hawkes (2008) stated that the effects of parental expectations are higher in female than in male students. Rätty (2006) found that parental expectations in Finland and their gender differences are gestated in the preschool years of the student, reinforcing themselves when students reach the third school year. They examined the influence of parental expectations in the academic track chosen by the student: vocational education or *gymnasium* (high school). They found that parents with university studies expected boys and girls to enter *gymnasium*, while vocationally educated parents saw vocational education as an adequate option –together with *gymnasium*– when their children were boys.

In the context of USA, Zhang *et al.* (2010) obtained a reciprocal relationship between students' and parental expectations and also between both types of expectations and students' achievement, for students from eighth to twelfth grade. They discriminated in their analysis by gender, reaching to the same conclusion that Lundberg (2005), i.e. parental expectations have a higher emphasis on boys than girls. Kleinjans (2010) goes further by analyzing gender differences in the influence of socio-economic background of parents in students' expectations for Denmark. They claimed that both boys and girls expectations increase with parental education, and that mothers' effects are higher on girls, while fathers' are higher on their sons, i.e. gender roles seem to perpetuate. In addition, parental income also affected boys' expectations, to the extent that it transmitted the importance of a proper level of income and social status, which they argue is not so implemented for the case of girls. Kim *et al.* (2013) denoted that mother's expectations for children in the United States are formed from their early ages and show differences between race

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<sup>3</sup> They proposed these variables based in the definition of Bordieu (1977) of *habitus*: “*habitus* understood as a system of lasting, transposable dispositions which, integrating all past experiences, functions at every moment as a matrix of perceptions, appreciations, and actions”.

and ethnicity. However, the inclusion of economic variables in their analysis made these differences disappear, due to the available household resources being an important element when defining future plans for children.

Expectations have also been analyzed in the Spanish context, although to lesser extent; e.g. Torío *et al.* (2007), who found that students from the region of Asturias had higher expectations in their academic future when their achievement and the level of parental education were high. Portes *et al.* (2010) highlighted that for second generation students in Spain the determinants of their expectations and aspirations were similar to second generation students from the United States –demographic factors, socio-economic background, language skills, etc.–, although the level of expectations and aspirations was far lower.

As could be appreciated from the literature revision, there is a virtual absence –to the best of our knowledge– of previous literature for the Andalusian case on the use of parental and students' expectations coincidences and discrepancies as proxies of ulterior students' achievement and the election of the post-secondary academic track by the student, so this paper will make a notable contribution to the existent literature.

### 3. Data

When performing our analysis we make use of the recent survey ESOC10 (Social Survey 2010: Education and Housing) –constructed with information on a wide set of personal, family and school environment characteristics–, focused on Andalusia and conducted among a total of 5,461 students of 10-11 and 14-15 years old and their families –2,802 from the sample of students born in 1994 and 2,659 from that born in 1998–. This survey was linked to the results from the Andalusian diagnostic assessment tests and to the administrative records (SENECA) of teacher-based scores, provided by the *Consejería de Educación de la Junta de Andalucía*, what reduced the sample to 5,032 individuals, 2,584 born in 1994 and 2,448 born in 1998. This combined database is going to be referred from now on as ESOC10-SEN. Further treatment of the data has been done, in order to avoid the bias of the sample. In particular, we removed from the sample those students who: presented some kind of disability (or we do not have information about this), attended to a private school (or we do not have information about this) or have repeated a course<sup>4</sup>. These filters left us with a total sample of 1,376 observations for students born in 1994 and 2,027 for those born in 1998.

We focus the analysis on the subsample of students aged 14-15 (students born in 1994), because at this age their achievement scores are measured in a 0 to 10 integer scale, while at age 10-11 (students born in 1998) they present a low number of categories<sup>5</sup>, what reduces the discrimination power of the model. Added to this limitation, we do not have information on future high school tracks for eight grade students, which is a major drawback as it is one of the relevant variables in our research.

As we are focusing on parental expectations, we employ those expectations which are reported by fathers and mothers, removing the case of guardians who answered parents' questionnaire, what leave as with a subsample of 1,370 individuals. We have to bear in mind that the parental expectations' variable includes some missing values, what further reduces the sample –to 1,295 students–. In the case of the estimations presented in Table 1, the use of the instrumental variable “the person of reference works more than eight hours every day” –together with household income variables– reduces the subsample to 1,092 observations. The descriptive statistics for the variables employed in our estimations based on this sample are reported in Table A1 (Appendix A). It is important to highlight that the variable which represents the income level of the household had 95 missing observations, so we employed a missing flag procedure in order

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<sup>4</sup> We have not included repeaters in our analysis due to the specific characteristics that these students present –like an high likelihood of grade retention and dropping out, as highlighted by many authors as Carabaña (2013), and thus their lower achievement (Marcenaro, 2013; Cordero *et al.*, 2013)– which could potentially bias the results of our research.

<sup>5</sup> These categories are: fail –2.5–, pass –5–, good –6–, very good –7.5– and excellent –9–.

to control for this issue. Finally, for the estimations reported in Tables 2 and 3, the use of students' scores in reading/mathematics, the variable indicating the high school track chosen by the students in the course 2010/11 and the variable that indicates coincidences/discordances between students and parental expectations contribute to further reduce the sample.

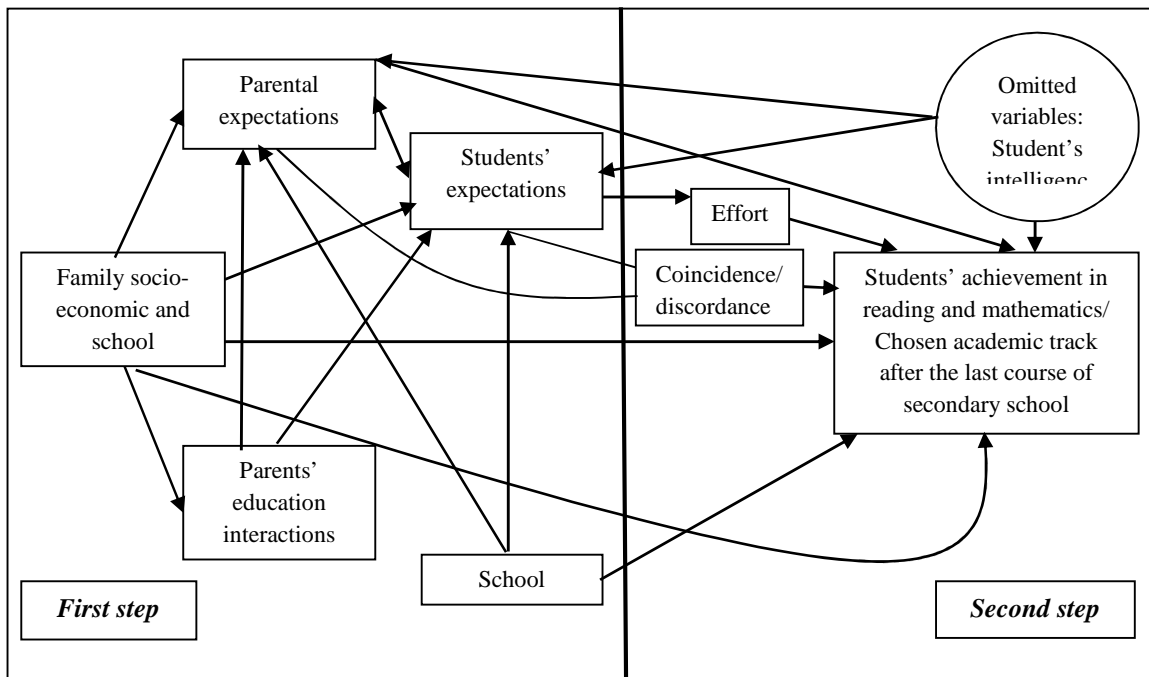
The timing of the observations is also a relevant issue in the kind of study we are performing. In the case of reading and mathematics scores, they are dated on the end of the course, i.e., the last days of June 2010. The rest of variables –among which we find parental and students' expectations– were collected in the ESOC10 survey from April to June 2010.

#### 4. Methodology

The procedure we follow in order to get an accurate vision of the influence of parental and students' expectations on students' achievement and their elected high school track –after finishing the last course of secondary studies– consists of two steps. In the first step, we intend to predict “endogeneity-free” parental and students' expectations –due to their reciprocal relationship–, so they could be employed in the second step to estimate whether their coincidence or discordance affect students' achievement/education elections after the last course of secondary education.

We rely on models from the literature which state that present parental expectations have an influence on students' expectations and vice versa, to build up our theoretical framework. Concretely, the model we are estimating will be represented by Figure 1:

**Figure 1. Relationship of students' performance and future high school track with parental and students' expectations**



Source: Compiled by authors.

The first step of the analysis –left hand side of the diagram– was explained by authors as Bodovski (2014), who departed from previous works on the relationship between socio-economic background of the family, early parental practices and parental expectations in education. They went a step further and related these parental educational expectations and practices to students' general self-concept in many subjects and to their educational expectations. They obtained that students' higher expectations depended positively on family socio-economic background, parental expectations, but parental involvement in extra-curricular education did not showed an effect on students' expectations –although so did other education interactions–. Another interesting relationship is that proposed by Zhang *et al.* (2010), who claimed the existence of a

reciprocal relationship between students' and parental expectations, due to their joint determination, what could be denoting the existence of endogeneity.

Departing from this approach, we intend to move forward and study whether the coincidence or discordance of parental and students' expectations –conditioned on family socio-economic background, student and school variables– could explain students' achievement and their elected high school track after the last course of secondary education. This approach has been employed by some authors as Neuenschwander *et al.* (2007), who found –for primary school students– that parental and students' expectations were widely useful when predicting students' achievement, but they did not analyze the influence of their coincidences on students' achievement nor dealt with students' future educational elections. Froiland *et al.* (2012) also proposed a model with similar characteristics for eighth grade, including the temporal dimension controlling by kindergarten parental expectations and students' achievement, although they did not suppose a reciprocal relationship between parental and students' expectations and, thus, the potential existence of endogeneity.

In addition, we plug in our model an additional relevant variable: students' effort. Once students have formed their expectations, they could vary their effort by devoting more (or less) time to study in order to accomplish their expectations. Because of that, we propose this variable to be a potential medium for the realization of students' expectations on their education achievement and future high school track elections.

Formally, the procedure we follow consists of two clearly differenced steps, which first step models are defined by the estimation of equations (1) and (2) as:

$$\mathbf{SE} = \mathbf{PE}\beta_1 + \mathbf{PC}\beta_2 + \mathbf{PI}\beta_3 + \mathbf{SC}\beta_4 + \mathbf{SCH}\beta_5 + \varepsilon_1 \quad (1)$$

$$\mathbf{PE} = \mathbf{SE}\gamma_1 + \mathbf{PC}\gamma_2 + \mathbf{PI}\gamma_3 + \mathbf{SC}\gamma_4 + \mathbf{SCH}\gamma_5 + \varepsilon_2 \quad (2)$$

where  $\mathbf{PE}$  are parental expectations and  $\mathbf{SE}$  represents students' expectations, being  $\beta_1$  (in equation 1) and  $\gamma_1$  (in equation 2) their respective slopes<sup>6</sup>;  $\mathbf{PC}$  stands for parental and household characteristics and  $\mathbf{PI}$  for parental interaction in education, being  $\beta_2$  ( $\gamma_2$ ) and  $\beta_3$  ( $\gamma_3$ ) the vectors of their slopes in equation 1 (2), respectively;  $\mathbf{SC}$  represents students' characteristics and  $\beta_4$  ( $\gamma_4$ ) their coefficients in equation 1 (2);  $\mathbf{SCH}$  stands for school characteristics, which slopes are  $\beta_5$  ( $\gamma_5$ ) in equation 1 (2). Finally,  $\varepsilon_1$  and  $\varepsilon_2$  are the vectors of error terms which are hypothesized as  $\varepsilon_1 \sim N(0, \sigma_{\varepsilon_1}^2)$  and  $\varepsilon_2 \sim N(0, \sigma_{\varepsilon_2}^2)$ .

The variables  $\mathbf{SE}$  and  $\mathbf{PE}$  are the dependent ones in equations (1) and (2), respectively. Nevertheless, when we include one of them as regressor for the other, an endogeneity problem arises, because they are jointly determined by students and parents, what violates an important assumption of the model: the independence between regressors and the error term. Because of that, we make use of an instrumental variables approach by estimating equation (1) and (2) by Two-Stage Least Squares (2SLS), proposing  $\mathbf{Z}_1$  (for equation 1) and  $\mathbf{Z}_2$  (for equation 2) as instruments. These instrumental variables must fulfill the relevance requirement (they must account for a significant variation in the endogenous variable) and the validity requirement (they must not be correlated with the dependent variable, i.e.,  $E(\varepsilon_1|\mathbf{Z}_1) = 0$  and  $E(\varepsilon_2|\mathbf{Z}_2) = 0$ ).

Following these requirements, together with the literature support, we have checked which variables inside our dataset could potentially be adequate instrument candidates. However, as it is well known in the Econometric literature, finding a proper instrumental variable is always an arduous task, and its suitability could change from one dataset to another, depending on its nature. In our case –for the best of our knowledge–, the proposed instrumental variables have not ever been employed in the study of expectations, but they have provided good results in this

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<sup>6</sup> Both parental and students' expectations are coded according to the translation of the ISCED level of studies that students or parents expect –for students' highest level of education– to the correspondent number of years of education: Not finishing secondary studies (6 years); secondary studies (10 years); middle-level vocational training or high school (12 years); high-level vocational training (14 years); university studies (16 years).

research, both empirically –as can be seen in Table 2, section 5– and theoretically, as it is discussed in what follows.

The instrumental variable elected for parental expectations ( $Z_1$ ) was “parental opinion on student’s manual skills” –ranging from 0 to 10–, which could be reflecting that parents are usually who realize the potential abilities that their children could have and develop –in addition to teachers– (Winner and Martino, 1993), formulating their expectations based on their perceived skills. The way these skills are noticed and the value assigned to them by parents depend on the society where the family lives (quotation of Pfeiffer included in Delisle and Galbraith, 2002). These “manual skills” –or manual dexterity– are presented by children in a natural way and they could also affect competences in many fields of human activity as art, music, mechanics or sculpture (Howe *et al.*, 1998), due to the wide range of disciplines that this term gathers. This variable could be reflecting parents’ perception of student’s innate talent –students who are very brilliant in many aspects or gifted–, although they do not employ their abilities on the education field, presenting underachievement in some cases, which could be due to many aspects as high and unrealistic parental expectations about their performance (Karen and Parker, 1997; Steven, 2008).

In the case of students’ expectations, the selected instrumental variable ( $Z_2$ ) indicates whether the person of reference –who provides higher income to the household– works more than eight hours every day or not. Vincent and Neis (2011) stated that parental work schedules have changed in the last years, reaching to a configuration where both parents work full-time and even in non-standard working hours. In addition, they established that parental work schedules can influence parents’ emotional state, affecting their relation and involvement with their children, what finally influences students’ achievement. In relation to students’ perception of their parents’ job, Wierda-Boer and Rönkä (2004) obtained that students wished that their parents could have a job which involved less working hours, better paid, with more holidays and less travelling. Thus, students would be seeking more attention from their parents. Furthermore, Kinnunen and Mauno (2001) highlighted that students are more critical with their parents’ job than themselves. It is also interesting to denote that our data is referred to the third year of a crisis period (year 2010), so this situation could have forced parents to spend more hours in their jobs, maybe for the same salary –so they could avoid losing them–, what could have influenced the formulation of students’ expectations during this period.

Returning to our empirical model, we have redefined equation (1) by including  $Z_2$  and equation (2) by adding  $Z_1$ , in order to test whether they will be affecting students’ or parental expectations, respectively. To avoid the confusion of these regressors with the respective instrumental variables, we have renamed them according to the characteristic that they represent respectively –thus,  $Z_2$  is renamed as  $WH$  in equation (3) and  $Z_1$  as  $MS$  in equation (4)–. Then, we obtain the following equations:

$$SE = PE\beta_1 + PC\beta_2 + PI\beta_3 + SC\beta_4 + SCH\beta_5 + WH\beta_6 + \varepsilon_1 \quad (3)$$

$$PE = SE\gamma_1 + PC\gamma_2 + PI\gamma_3 + SC\gamma_4 + SCH\gamma_5 + MS\gamma_6 + \varepsilon_2 \quad (4)$$

The first stage of 2SLS begins with the estimation of an alternative specification for equation (3) and (4): The first one (equation 3.a) includes as regressors the correspondent instrument ( $Z_1$ ) and  $PC$ ,  $PI$ ,  $SC$ ,  $SCH$ ,  $WH$ , while the second one (equation 4.a) includes  $PC$ ,  $PI$ ,  $SC$ ,  $SCH$ ,  $MS$  and the instrument ( $Z_2$ ). The dependent variable in equation (3.a) will be the endogenous one in (3) and the dependent variable of equation (4.a) will be endogenous of (4), respectively, so we obtain the following models to estimate:

$$PE = Z_1\pi_1 + PC\pi_2 + PI\pi_3 + SC\pi_4 + SCH\pi_5 + WH\pi_6 + u_1 \quad (3.a)$$

$$SE = Z_2\theta_1 + PC\theta_2 + PI\theta_3 + SC\theta_4 + SCH\theta_5 + MS\theta_6 + u_2 \quad (4.a)$$

Then, in the second stage of 2SLS we add the fitted values of parental expectations ( $\widehat{PE}$ ) from equation (3.a) and the fitted values of students’ expectations ( $\widehat{SE}$ ) from equation (4.a) as instruments of the real values of the endogenous variables in their respective original regressions ( $\widehat{PE}$  in the case of equation 3 and  $\widehat{SE}$  in equation 4). Due to their properties  $-Cov(\widehat{PE}, \varepsilon_1) = 0$



and  $Cov(\widehat{SE}, \varepsilon_2) = 0$ —endogeneity should not be a problem. Thus, we will estimate the following models in the second stage:

$$SE = \widehat{PE}\beta_1 + PC\beta_2 + PI\beta_3 + SC\beta_4 + SCH\beta_5 + WH\beta_6 + \varepsilon_1 \quad (3.b)$$

$$PE = \widehat{SE}\gamma_1 + PC\gamma_2 + PI\gamma_3 + SC\gamma_4 + SCH\gamma_5 + MS\gamma_6 + \varepsilon_2 \quad (4.b)$$

Once obtained a prediction of students' expectations ( $\widehat{SE}$ ) and parental expectations ( $\widehat{PE}$ ) from equations (3.b) and (4.b) —which are no longer joined to the random error and thus, we do not have the problem of the correlation with the error term—, they will be employed in the second step of our analysis, represented by the estimation of the model:

$$SA = PSE\delta_1 + PC\delta_2 + SC\delta_3 + SCH\delta_4 + SEF\delta_5 + \tau \quad (5)$$

where  $SA$  measures students' achievement in reading or mathematics;  $PSE$  represents whether parental expectations are higher, similar or lower than students' expectations, being its coefficient  $\delta_1$ . This variable is defined by the use of the predicted students' expectations ( $\widehat{SE}$ ) from equation (3.b) and the predicted parental expectations ( $\widehat{PE}$ ) from equation (4.b)<sup>7</sup>;  $SEF$  represents students' effort and  $\delta_5$  is the vector of its slopes;  $\tau$  is the vector of error terms which is hypothesized as  $\tau \sim N(0, \sigma_\tau^2)$ .

As an alternative to this second stage, the dependent variable  $SA$  will be replaced by student's academic track followed after finishing the course in which they are supposed to conclude their secondary studies. This analysis will be approached by the use of a multinomial logit model and the replacement of the dependent variable of (5) by students' elected high school track ( $SAT$ )<sup>8</sup>.

$$SAT = PSE\varphi_1 + PC\varphi_2 + SC\varphi_3 + SCH\varphi_4 + SEF\varphi_5 + \omega \quad (6)$$

where  $\omega$  is the vector of error terms which is hypothesized as  $\omega \sim N(0, \sigma_\omega^2)$ .

## 5. Results

In this section we present the main results of the analysis. First of all, we begin with a bivariate analysis performed with the variables employed in this section for students' achievement in reading and mathematics and also parental and students' expectations, which is shown in Table A2 (Appendix A). We can appreciate a clear increasing trend in both competences and expectations for the case of the variables reflecting parental level of studies and household income level. This pattern could be showing the existence of lack of socio-economic mobility in the Andalusian society. Students who live with both parents present the highest academic achievement and their parents have the highest expectations, although students who live only with their mother show the highest expectations. Parental involvement in students' homework is negative for students' achievement—as indicated by the literature for secondary school students—, although its influence in expectations is not so clear.

Female students overcome male in both competences and expectations, as also happens for native students compared to immigrants—with the exception of students' expectations, which are slightly surpassed by those of immigrants—. Students attending semi-private schools show high achievement in both competences and higher expectations than students from public schools, and the time devoted for homework shows an increasing trend in achievement and expectations with the number of hours. Finally, in the case of the instrumental employed variables, achievement and expectations increase with the punctuation assigned by parents to the manual

<sup>7</sup> We have considered that parental expectations are higher or lower than students' when they show a difference of 1 year or more.

<sup>8</sup> We have considered the categories of repeating, high school of science and technology, and high school of social and human sciences. The categories of high school of arts and educational cycles have not been used due to their low number of observations.

skills of their children and those students whose parents work more than eight hours every day present higher values in achievement and expectations.

Then, we performed the estimations for the first step of our analysis, whose results are displayed in Table 1.

**Table 1. Correlation between student, parental household and school variables with parental and students' expectations**

Variables	Students' expectations	Parental expectations
<b>Endogenous variables</b>		
Parental expectations about children's years of study	0.545*** (0.206)	
Students' expectations about children's years of study		0.716* (0.413)
<b>Household variables</b>		
Mother answers the questionnaire	-0.063 (0.076)	-0.026 (0.092)
Father's studies ( <i>Reference group: Lower than primary</i> )		
Primary	-0.132 (0.197)	-0.110 (0.238)
Secondary	-0.095 (0.173)	0.233 (0.166)
High school	-0.019 (0.200)	0.316 (0.198)
University	0.106 (0.193)	0.158 (0.213)
Mother's studies ( <i>Reference group: Lower than primary</i> )		
Primary	0.339 (0.227)	0.109 (0.336)
Secondary	0.438** (0.196)	-0.028 (0.331)
High school	0.485* (0.267)	0.230 (0.448)
University	0.693** (0.295)	0.177 (0.557)
Household structure ( <i>Reference group: Lives with both parents</i> )		
Lives only with mother	0.078 (0.140)	0.010 (0.150)
Lives only with father	0.106 (0.362)	-0.152 (0.368)
Monthly income level of the household ( <i>Reference group: Lower than 1100 euros</i> )		
Between 1101 and 1800 euros.	-0.075 (0.165)	0.415*** (0.159)
Between 1801 and 2700 euros.	-0.081 (0.184)	0.460*** (0.177)
More than 2700 euros.	-0.021 (0.207)	0.457** (0.221)
Income level missing flag	-0.018 (0.219)	0.472** (0.234)
<b>Parent-Children education interaction variables</b>		
Parental implication in homework ( <i>Reference group: Not at all</i> )		
A lot	0.376** (0.187)	-0.394* (0.221)
Some	0.364** (0.180)	-0.432** (0.193)
A little	0.416** (0.173)	-0.268 (0.256)
<b>Students' variables</b>		
Female ( <i>Reference group: Male</i> )	0.249*** (0.092)	0.003 (0.184)
Immigrant ( <i>Reference group: Native</i> )	0.032 (0.215)	0.082 (0.226)
<b>School variables</b>		
Semi-private school ( <i>Reference group: Public school</i> )	-0.225*** (0.075)	0.183 (0.111)
<b>Instrumental variable for the other expectations' specification</b>		
Parental opinion on student's manual skills		0.054** (0.027)
The person of reference works more than eight hours every day ( <i>Reference group: The person of reference works eight hours or less every day</i> )	0.129 (0.091)	

<b>Constant</b>	6.109** (2.838)	3.589 (5.499)
<i>Observations</i>	1,092	1,092
<i>R-squared</i> <sup>1</sup>	0.485	0.504
<i>Wald test</i>	271.69***	340.94***

Source: Authors' own calculations from ESOC10-SEN.

Standard errors in parentheses. \*\*\* denotes variable significant to level 1%; \*\* to 5%; \* to 10%.

Notes:

<sup>1</sup>The R-squared has no statistical meaning in the context of 2SLS.

The results presented in Table 1 show that parental expectations have a positive effect on students' expectations (increasing them in 0.545 years for each additional year of parental expectations), and the same effect can be found for students' expectations on parents' (with a somewhat high coefficient of 0.716), as highlighted in the literature. Another interesting result is that mothers' educational studies help to increase students' expectations. This could be explained by the high influence that mothers might have on their children (Wolfe, 1982) and also their highest capacity for leading their children's academic careers, due to the high quality of the time they devote to them (Murnane *et al.*, 1981; San Román and Goiricelaya, 2012).

As can be seen from the estimations, a medium-high family income is positive for parental expectations, as it was shown by the research of Davis-Kean (2005) or Froiland and Davidson (2014). Furthermore, the missing flag variable approach employed in order to solve the existence of non-observed values for many individuals in this variable shows that students who did not answered the question presented high parental expectations, with an effect on these expectations similar to a high level of income, so theirs could be thought to be high. The variable which reflects parental involvement on students' education –parental help with homework– shows us very remarkable results. In the case of students' expectations, the effect of this variable is positive, what might be reflecting the belief among students that parents' implication would be an important support for their ulterior success and thus, it enhances students' self-concept (Bouchey and Harter, 2005; Bovovski, 2014). However, this variable has a completely inverse effect in the case of parental expectations (e.g., a high frequency on these practices increases students' expectations in 0.376 years, while it decreases parental expectations in 0.394 years). This could be reflecting the perception of parents about the low ability and independence of their children, so they intend to compensate it by providing more help to them (Chan, 2005; Phillipson, 2010).

In the case of female students their expectations are higher than males (in 0.249 years), as it has been highlighted in the literature (Reynolds and Burge, 2008) and we also obtain the interesting result which indicates that expectations are not affected by the immigrant status of students (contrary to that claimed by Hao and Bonstead-Bruns, 1998). Finally, it could be highlighted that students' expectations are lower when attending to semi-private schools<sup>9</sup>.

**Table 2. Instrument analysis tests**

<b>Instrument's tests</b>	<b>Instrumental variable for parental expectations (Parental opinion on student's manual skills)</b>	<b>Instrumental variable for students' expectations (The person of reference works more than eight hours every day)</b>
Correlation with parental expectations	72.306***	1.901
P-value	0.001	0.593
Correlation with students' expectations	27.348	8.851**
P-value	0.936	0.065
Durbin endogeneity test	0.166	0.017
P-value	0.684	0.895
Wu-Hausman endogeneity test	0.162	0.0170
P-value	0.687	0.896

Source: Authors' own calculations from ESOC10-SEN.

Standard errors in parentheses.

<sup>9</sup> The estimations in Table 1 were reproduced with the difference that only the level of studies of fathers and mothers were employed –alternatively– for both types of expectations. In this case, the coefficient of semi-private schools for parental expectations was positive and significant –in addition to its negative and significant effect on students' expectations–. This table is available upon request to the authors.

\*\*\* denotes variable significant to level 1%; \*\* to 5%; \* to 10%.

In the results of Table 2 it can be observed that parental expectations' instrumental variable was found to present a significant high correlation with it, but none of it in the case of students' expectations. The opposite situation can be found for students' expectations instrumental variable, what accomplish one of the requirements to be suitable instrumental variables. In order to further check for the suitability of our instruments, we have performed Durbin and Wu-Hausman tests, which null hypothesis is accepted for both instrumental variables, i.e., there is not a problem of endogeneity. Besides, first stage F statistic is significant in both cases, so the selected instrument has explanatory power on the endogenous variable after controlling by the other exogenous variables. In addition, Cragg and Donald (1993) minimum eigenvalue statistics for both instrumental variables coincide with F statistic, what will not happen –as highlighted by Stock and Yogo (2005)– with a weak instrument, as it would have made the hypothesis test of parameters estimated by this instrumental variable to abruptly change in their amounts. In our case the models are not overidentified –the number of instruments does not exceed that of endogenous variables– so it is not necessary to check for overidentification. These results show that our instrumental variables will be appropriate to solve the endogeneity problem that the use of parental and students' expectations could present.

Once finished the first step of our analysis and predicted parental and students' expectations, in the second step we obtained the results presented in Table 3.

**Table 3. Correlation between students' achievement in reading and mathematics and parental and students' expectations' coincidences/discordances**

Variables	Reading	Maths
<b>Endogenous variables</b>		
Parental and students' expectations' coincidences/discordances ( <i>Reference group: Parental expectations are similar to students'</i> )		
Parental expectations are higher than students'	-0.785*** (0.268)	-0.693*** (0.268)
Parental expectations are lower than students'	-1.033*** (0.212)	-1.029*** (0.215)
<b>Household variables</b>		
Mother answers the questionnaire	-0.229* (0.132)	-0.174 (0.133)
Father's studies ( <i>Reference group: Lower than primary</i> )		
Primary	-0.300 (0.335)	-0.165 (0.340)
Secondary	0.090 (0.291)	-0.097 (0.296)
High school	0.261 (0.306)	0.124 (0.311)
University	0.157 (0.310)	0.020 (0.316)
Mother's studies ( <i>Reference group: Lower than primary</i> )		
Primary	-0.021 (0.350)	-0.135 (0.352)
Secondary	0.166 (0.307)	0.039 (0.308)
High school	0.332 (0.317)	0.235 (0.319)
University	0.664** (0.327)	0.487 (0.328)
Household structure ( <i>Reference group: Lives with both parents</i> )		
Lives only with mother	0.141 (0.248)	-0.052 (0.249)
Lives only with father	-0.373 (0.678)	-1.076 (0.673)
Monthly income level of the household ( <i>Reference group: Lower than 1100 euros</i> )		
Between 1101 and 1800 euros.	0.243 (0.207)	0.006 (0.209)
Between 1801 and 2700 euros.	0.193 (0.229)	0.075 (0.232)
More than 2700 euros.	0.393 (0.270)	0.474* (0.272)
Income level missing flag	0.569** (0.273)	0.684** (0.278)

<b>Students' variables</b>		
Female ( <i>Reference group: Male</i> )	0.517*** (0.122)	0.240* (0.123)
Immigrant ( <i>Reference group: Native</i> )	-0.991** (0.385)	-0.839** (0.390)
Time devoted to do the homework by the student ( <i>Reference group: Less than 30 minutes</i> )		
Between 30 minutes and less than 1 hour	0.625** (0.310)	0.153 (0.323)
Between 1 hour and less than 2 hours	0.665** (0.295)	0.111 (0.308)
Between 2 hours and less than 3 hours	1.047*** (0.307)	0.525* (0.319)
More than 3 hours	1.595*** (0.328)	1.094*** (0.340)
<b>School variables</b>		
Semi-private school ( <i>Reference group: Public school</i> )	-0.020 (0.139)	-0.178 (0.142)
<b>Constant</b>	4.865*** (0.496)	5.662*** (0.506)
<i>Observations</i>	1,043	1,008
<i>R-Squared</i>	0.148	0.126
<i>Wald test</i>	7.35***	5.92***

Source: Authors' own calculations from ESOC10-SEN.

Standard errors in parentheses.

\*\*\* denotes variable significant to level 1%; \*\* to 5%; \* to 10%.

From the view of these results, it can be established that the coincidence between parental and students' expectations is positive for students' achievement, whereas a discordance between both of them would mean a reduction in students' achievement, which is higher for both competences when parental expectations are lower than students'. Mother highest education level has a positive effect on students' achievement in reading (increasing achievement in 0.664 points) and high family income level positively influences achievement in mathematics (supposing a score of 0.474 points higher when students come from very wealthy families).

Female students show high achievement in both reading and mathematics –the literature usually highlights the higher scores of female students in reading (OCDE, 2010; OECD, 2014), while immigrant students obtain lower results –as indicated by authors as Ammermüller (2007), Marcenaro (2013) or Calero *et al.* (2010)–. Finally, the variable of effort shows that, as it increases, students' achievement also does. This is a relevant result which can indicate that, to the extent that those students with a low socio-economic background can compensate this situation by devoting more time to study, the mobility of the society will be improved, what converts it in a variable of high relevance.

**Table 4. Relationship between the odds of selecting a determined high school track and parental and students' expectations' coincidences/discordances**

Variables	High school of Sciences and Technology	High school of Social and Human Sciences
<b>Endogenous variables</b>		
Parental and students' expectations' coincidences/discordances ( <i>Reference group: Parental expectations are similar to students'</i> )		
Parental expectations are higher than students'	-1.087** (0.505)	-0.527 (0.462)
Parental expectations are lower than students'	-1.780*** (0.408)	-0.690** (0.341)
<b>Household variables</b>		
Mother answers the questionnaire	-0.359 (0.291)	-0.404 (0.284)
Father's studies ( <i>Reference group: Lower than primary</i> )		
Primary	-0.637 (0.737)	-0.585 (0.718)
Secondary	-0.219 (0.692)	-0.085 (0.675)
High school	0.471 (0.733)	0.305 (0.719)
University	-0.174 (0.730)	-0.212 (0.716)
Mother's studies ( <i>Reference group: Lower than primary</i> )		

Primary	0.398 (0.687)	0.290 (0.656)
Secondary	0.337 (0.612)	0.427 (0.581)
High school	0.248 (0.630)	0.259 (0.602)
University	1.077 (0.682)	0.775 (0.659)
Household structure ( <i>Reference group: Lives with both parents</i> )		
Lives only with mother	1.650** (0.734)	1.247* (0.726)
Lives only with father	-0.307 (1.177)	-0.987 (1.292)
Monthly income level of the household ( <i>Reference group: Lower than 1100 euros</i> )		
Between 1101 and 1800 euros.	0.270 (0.429)	0.020 (0.405)
Between 1801 and 2700 euros.	0.514 (0.479)	0.196 (0.455)
More than 2700 euros.	1.000 (0.634)	0.610 (0.617)
Income level missing flag	0.904 (0.586)	0.369 (0.567)
<b>Students' variables</b>		
Female ( <i>Reference group: Male</i> )	0.129 (0.263)	0.560** (0.255)
Immigrant ( <i>Reference group: Native</i> )	-2.294*** (0.607)	-1.854*** (0.527)
Time devoted to do the homework by the student ( <i>Reference group: Less than 30 minutes</i> )		
Between 30 minutes and less than 1 hour	0.904* (0.504)	1.003** (0.497)
Between 1 hour and less than 2 hours	0.827* (0.477)	1.282*** (0.468)
Between 2 hours and less than 3 hours	1.565*** (0.532)	1.465*** (0.526)
More than 3 hours	2.491*** (0.693)	2.141*** (0.687)
<b>School variables</b>		
Semi-private school ( <i>Reference group: Public school</i> )	-0.489* (0.291)	-0.314 (0.283)
<b>Constant</b>	0.207 (0.994)	0.248 (0.959)
<b>Observations</b>	1,011	1,011
<b>Pseudo R-Squared</b>	0.074	0.074
<b>LR chi2</b>	138.68***	138.68***

Source: Authors' own calculations from ESOC10-SEN.

Reference category of dependent variable: Repeat the course. Coefficients represent the marginal effects of the variables.

Standard errors in parentheses.

\*\*\* denotes variable significant to level 1%; \*\* to 5%; \* to 10%.

The results obtained for the alternative specification modeling students' choices after finishing secondary education are shown in Table 4, being them very similar to that of students' achievement. As it can be seen, the discordance between parental and students' expectations also reduces the probability of students to attend a high school of sciences and technology or social and human sciences. The effect of female students and immigrant status is similar to that obtained for students' achievement, increasing and reducing the likelihood, respectively. In addition, a high amount of study hours also increase the likelihood of electing a high school track. However, there is the interesting result of students who live only with their mother, what increases their probability to attend to both high schools, reflecting the previously stated result that mothers are more able to lead the academic life of their children.

Also interesting is the reduction in the likelihood of attending to high school of sciences and technology when students are enrolled in a semi-private school. This might be showing that, in the case of Spain and, concretely, Andalusia, where non-compulsory education is not publicly funded in semi-private schools, students whose families pay the price of attending to these high schools are not often the ones with the skills which are required in this high school track.

## 6. Conclusions

We have analyzed the effect of parental and students' expectations agreement –or disagreement– on students' achievement and their elections of high school track in the context of the Spanish autonomous community of Andalusia, what supposes a novelty –to the best of our knowledge– to the extent that this relationship has not been analyzed in this geographical area before.

A noteworthy result, which has also been highlighted in the literature for other regions, is the reciprocal relationship that exists between parental and students' expectations, due to them being simultaneously determined. Thus, once managed this issue, the coincidence between parental and students' expectations has been found to be a relevant aim to the extent that it could foster students' achievement and the likelihood of electing a high school track. Because of that, to achieve this aim schools should provide an adequate environment of communication and feedback for parents in order to keep them informed about the performance and the problems that their children could be facing, and also encouraging parents to have deep conversations with them in this subject. In addition, investment on university degree and professional tracks information ought to be done, which should be supplied to both students and parents before the election of high school specialization –e.g., by university and professional orientation visits or conferences– and not in the last course of high school –as usually happens–. This may also have a positive economic repercussion, as far as the costs of wrong degree choices could be attenuated. Then, students and parents would have more information on academic possibilities, so we could be moving towards an agreement between expectations and, thus, a higher education achievement.

Another relevant result is that the effect of parental involvement on expectations has appeared to be of opposite sign for parents and students, what denotes the existence of a trade-off between them. It is important to have in mind that these results of parental involvement are shown by students aged 14-15, as the literature has stated that parental involvement in early ages is positive (Froiland *et al.*, 2012). Because of that, it is essential that both schools and parents had provided to children a proper education on their autonomy and problems' resolution before adolescence, so they would not need the help of their parents with schoolwork at this age. In the case that this autonomy has not been reached by the student for this time, teachers' curriculum should have prepared them to supply their students with study, comprehensive reading, scheduling and synthesizing techniques in order to provide them with learning autonomy –practices which frequently receive less attention when conducting lessons, limiting them only to teach the contents of the subject–. In addition, these procedures should not only be known by students, but also by their parents, in order to avoid their excessive involvement and, thus, the obstruction of students' development.

The conclusions of our research have an extension in terms of resilience in the society. We have not found a meritocracy pattern in the analysis of expectations, due to parental expectations being widely affected by the level of income of the household. This is a problem which should be solved to reach a more egalitarian society. Effort –measured by the number of study hours– has been found to play a relevant role in students' achievement, so encouraging it among students could compensate the effect of the disagreement in expectations on students' achievement. This effort could also be fostered and rewarded by grants and monetary help for students with high achievement and low socio-economic background. Again, the delivery of proper information to students and parents in order to make them more aware of their options and the importance of a proper level of education would improve their future elections –or, at least, make them more realistic–, so that expectations' accomplishment could also increase society happiness.

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## Appendix A

**Table A1. Descriptive Statistics**

		Observations	Mean	Standard Deviation
Who answers the questionnaire	Father	1092	0.34	0.47
	Mother	1092	0.66	0.47
Father's studies	Lower than primary	1092	0.03	0.16
	Primary	1092	0.12	0.30
	Secondary	1092	0.35	0.47
	High school	1092	0.21	0.41
	Universitary	1092	0.29	0.45
Mother's studies	Lower than primary	1092	0.04	0.19
	Primary	1092	0.09	0.29
	Secondary	1092	0.35	0.48
	High school	1092	0.24	0.43
	Universitary	1092	0.28	0.45
Household structure	Lives only with mother	1092	0.08	0.27
	Lives only with father	1092	0.01	0.09
	Does not live with parents	1092	0.00	0.00
	Lives with both parents	1092	0.91	0.28
Monthly income level of the household	Lower than 1100 euros	1092	0.10	0.30
	Between 1101 and 1800 euros	1092	0.38	0.49
	Between 1801 and 2700 euros	1092	0.25	0.43
	More than 2700 euros	1092	0.18	0.39
	Income level missing flag	1092	0.09	0.28
Parental implication in homework	A lot	1092	0.16	0.37
	Some	1092	0.50	0.50
	A little	1092	0.30	0.46
	Not at all	1092	0.04	0.19
Sex	Male	1092	0.48	0.50
	Female	1092	0.52	0.50
Immigrant status	Native	1092	0.98	0.15
	Immigrant	1092	0.02	0.15
Ownership of the school	Public school	1092	0.71	0.45
	Semi-private school	1092	0.29	0.45
Time devoted to do the homework by the student	No tasks	1092	0.00	0.05
	Less than 30 minutes	1092	0.04	0.19
	Between 30 minutes and less than 1 hour	1092	0.19	0.39
	Between 1 and less than 2 hours	1092	0.41	0.49
	Between 2 and less than 3 hours	1092	0.23	0.42
	More than 3 hours	1092	0.13	0.34
Parental expectations' instrumental variable	Parental opinion on student's manual skills	1092	7.28	1.78
Students' expectations instrumental variable	The person of reference works more than eight hours every day	1092	0.18	0.38
	The person of reference works eight hours or less every day	1092	0.82	0.38
Dependent variables	SENECA 2009 reading	1043	6.35	2.00
	SENECA 2009 mathematics	1008	6.14	1.96
	Parental expectations	1092	15.29	1.53
	Students' expectations	1092	15.29	1.47
	Academic track: Repeat a course	1011	0.09	0.28
	Academic track: High school of Sciences and Technology	1011	0.43	0.50
	Academic track: High school of Social and Human Sciences	1011	0.48	0.50

Source: Authors' own calculations from ESOC10-SEN.

**Table A2. Bivariate analysis**

		Reading					Mathematics					Parental expectations					Students' expectations				
		Obs.	Mean	S. d.	Min. val.	Max. val.	Obs.	Mean	S. d.	Min. val.	Max. val.	Obs.	Mean	S. d.	Min. val.	Max. val.	Obs.	Mean	S. d.	Min. val.	Max. val.
Who answers the questionnaire	Father	351	6.56	1.97	1	10	345	6.31	1.91	1	10	368	15.44	1.35	10	16	368	15.42	1.34	10	16
	Mother	692	6.24	2.01	1	10	663	6.06	1.98	1	10	724	15.21	1.61	10	16	724	15.22	1.53	10	16
Father's studies	Lower than primary	29	5.83	2.28	1	10	27	5.70	2.15	1	10	29	14.28	1.98	10	16	29	14.69	1.87	10	16
	Primary	106	5.71	2.27	1	10	101	5.79	1.88	1	10	110	14.49	1.99	10	16	110	14.69	1.76	10	16
	Secondary	367	6.17	2.04	1	10	356	5.89	2.03	1	10	374	15.11	1.66	10	16	374	15.09	1.65	10	16
	High school	212	6.53	1.79	1	10	204	6.29	1.82	1	10	227	15.54	1.29	10	16	227	15.42	1.35	10	16
	Universitary	298	6.73	1.91	1	10	289	6.54	1.90	1	10	319	15.69	1.04	10	16	319	15.68	0.98	10	16
Mother's studies	Lower than primary	38	5.71	2.32	1	10	37	5.70	2.17	1	10	39	14.15	2.17	10	16	39	14.21	2.09	10	16
	Primary	99	5.80	2.14	1	10	96	5.67	1.99	1	10	102	14.75	1.99	10	16	102	14.82	1.79	10	16
	Secondary	375	6.07	1.86	1	10	362	5.83	1.87	1	10	381	14.94	1.76	10	16	381	15.02	1.65	10	16
	High school	243	6.46	2.06	1	10	232	6.28	2.01	1	10	259	15.56	1.21	10	16	259	15.44	1.27	10	16
Household structure	Universitary	282	6.88	1.92	1	10	275	6.66	1.89	1	10	304	15.81	0.81	10	16	304	15.79	0.85	10	16
	Lives only with mother	82	6.32	1.43	2	10	81	5.95	1.97	1	10	85	15.25	1.60	10	16	85	15.39	1.42	10	16
	Lives only with father	8	5.88	2.03	2	9	8	5.13	2.42	2	9	9	15.11	2.03	10	16	9	15.11	2.03	10	16
	Does not live with parents <sup>1</sup>	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monthly income level of the household	Lives with both parents	953	6.35	2.04	1	10	919	6.17	1.95	1	10	998	15.29	1.52	10	16	998	15.28	1.47	10	16
	Lower than 1100 euros	110	5.85	2.02	1	10	106	5.78	2.18	1	10	113	14.50	2.08	10	16	113	14.85	1.75	10	16
	Between 1101 and 1800 euros	403	6.18	2.03	1	10	390	5.87	1.96	1	10	415	15.12	1.66	10	16	415	15.11	1.60	10	16
	Between 1801 and 2700 euros	258	6.35	1.86	1	10	250	6.12	1.78	1	10	270	15.45	1.33	10	16	270	15.37	1.41	10	16
	More than 2700 euros	179	6.89	1.99	1	10	174	6.78	1.80	2	10	199	15.80	0.88	10	16	199	15.76	0.91	10	16
Parental implication in homework	Income level missing flag	93	6.57	2.03	1	10	88	6.61	2.09	1	10	95	15.39	1.31	12	16	95	15.33	1.39	12	16
	A lot	166	6.37	1.92	1	10	160	5.91	1.85	1	10	176	15.28	1.52	10	16	176	15.27	1.47	10	16
	Some	524	6.15	2.00	1	10	504	6.03	1.94	1	10	545	15.13	1.68	10	16	545	15.18	1.56	10	16
	A little	311	6.64	2.05	1	10	302	6.47	2.01	1	10	328	15.52	1.28	10	16	328	15.49	1.28	10	16
Sex	Not at all	42	6.50	1.70	2	10	42	6.12	2.03	2	10	43	15.53	1.22	12	16	43	15.12	1.59	12	16
	Male	497	6.01	2.04	1	10	479	5.96	1.98	1	10	519	15.16	1.60	10	16	519	15.10	1.59	10	16
Immigrant status	Female	546	6.65	1.91	1	10	529	6.31	1.93	1	10	573	15.40	1.46	10	16	573	15.46	1.33	10	16
	Native	1018	6.37	1.98	1	10	984	6.17	1.94	1	10	<sup>106</sup> / <sub>6</sub>	15.29	1.53	10	16	1066	15.29	1.47	10	16

	<b>Immigrant</b>	25	5.28	2.54	1	10	24	5.25	2.47	1	9	26	15.23	1.70	10	16	26	15.31	1.59	10	16
<b>Ownership of the school</b>	<b>Public school</b>	774	6.27	2.03	1	10	758	6.12	1.95	1	10	780	15.20	1.62	10	16	780	15.26	1.48	10	16
	<b>Semi-private school</b>	269	6.55	1.92	1	10	250	6.22	1.99	1	10	312	15.51	1.27	10	16	312	15.34	1.45	10	16
<b>Time devoted to do the homework by the student</b>	<b>No tasks<sup>2</sup></b>	3	7.33	2.52	5	10	3	6.00	4.00	2	10	3	16.00	0.00	16	16	3	16.00	0.00	16	16
	<b>Less than 30 minutes</b>	39	5.56	2.52	1	9	36	5.92	2.22	1	9	40	14.80	1.96	10	16	40	14.70	2.00	10	16
	<b>Between 30 minutes and less than 1 hour</b>	189	5.97	2.08	1	10	181	5.84	1.76	1	10	199	15.07	1.75	10	16	199	15.10	1.64	10	16
	<b>Between 1 and less than 2 hours</b>	431	6.16	1.92	1	10	416	5.91	1.99	1	10	450	15.19	1.60	10	16	450	15.18	1.54	10	16
	<b>Between 2 and less than 3 hours</b>	242	6.65	1.82	1	10	242	6.38	1.92	1	10	254	15.47	1.29	10	16	254	15.53	1.18	10	16
	<b>More than 3 hours</b>	135	7.27	1.74	1	10	128	7.00	1.73	2	10	141	15.76	0.94	12	16	141	15.70	0.92	12	16
<b>Parental expectations' instrumental variable: Parental opinion on student's manual skills</b>	<b>6 or less</b>	314	6.10	1.89	1	10	303	5.97	1.75	1	10	333	15.15	1.68	10	16	333	15.17	1.59	10	16
	<b>More than 6 and 8 or less</b>	476	6.44	1.96	1	10	462	6.16	1.93	1	10	493	15.29	1.51	10	16	493	15.28	1.47	10	16
	<b>More than 8</b>	253	6.49	2.18	1	10	243	6.33	2.22	1	10	266	15.45	1.35	10	16	266	15.44	1.30	10	16
<b>Students' expectations instrumental variable: The person of reference:</b>	<b>Works more than eight hours every day</b>	181	6.58	2.03	1	10	172	6.30	1.84	1	10	193	15.39	1.46	10	16	193	15.41	1.36	10	16
	<b>Works eight hours or less every day</b>	862	6.30	1.99	1	10	836	6.11	1.98	1	10	899	15.26	1.55	10	16	899	15.26	1.49	10	16

Source: Authors' own calculations from ESOC10-SEN.

Notes:

<sup>1</sup> Due to the zero observations presented the reference category in estimations is "Lives with both parents".

<sup>2</sup> Due to the reduced number of observations the reference category in estimations is "Less than 30 minutes".