Household Social Composition and Academic Performance in Primary School: Univariate and Multivariate Effects of Family Occupation and Education in Europe

Composición social del hogar y rendimiento académico en primaria. Efectos univariados y multivariados del nivel ocupacional y educativo familiar en Europa

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Abstract

Studies linking inequality in educational achievement to social inequality often use parental occupation and educational attainment, but considering only the highest value of one parent for both variables. This approach masks the household joint effect, limiting the range of variability in performance. The aim of this study is to analyse the aggregate effect of household social composition on educational outcomes. We will examine the combined effect of the occupational and educational level of both parents on student performance in Maths and reading and assess the improvement in the explained variance compared to solely considering the highest occupational or educational level of one parent. Data come from TIMSS-2019 (maths) and PIRLS-2021 (reading), with two samples of 57,735 and 69,849 4th grade students from 12 European countries. One- and two-way ANOVA models were estimated to identify the effects of household occupational and educational conditions, and their interaction, on educational performance. The results indicate that the significant variation in performance is higher when both parents are considered, for either education or occupation, as well as when both variables are included in the two-way model. The inclusion of the household aggregate effect reveals greater inequality in student performance between more disadvantaged households, with lower cultural (related

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to education) and material (related to occupation and income) resources, and more socioeconomically advantaged households, with more resources. We argue that the household represents more accurately the effects of inequality of educational opportunity on students with lower socio-economic and cultural resources.

Keywords: inequality of educational opportunity; socioeconomic status; family structure; educational achievement.

Resumen

Los estudios que relacionan la desigualdad de resultados educativos con la desigualdad social recurren habitualmente a la ocupación y los estudios de los progenitores, tomando el valor más alto de cada variable. Este procedimiento invisibiliza el efecto conjunto del hogar, limitando el intervalo de variabilidad del rendimiento. Nuestro objetivo es analizar el efecto agregado de la composición social del hogar en los resultados educativos. Estudiaremos el efecto combinado del nivel ocupacional y educativo de ambos padres en el rendimiento y evaluaremos la mejora en la varianza explicada frente a la sola consideración del nivel ocupacional u educativo más alto de uno de ellos. Utilizamos datos de TIMSS-2019 (matemáticas) y PIRLS-2021 (lengua) de dos muestras de 57.735 y 69.849 estudiantes de 4º de Primaria en 12 países europeos. Estimamos Modelos ANOVA de una y dos vías para identificar los efectos de la condición ocupacional y educativa del hogar y su interacción sobre el rendimiento académico. Los resultados muestran que la variación significativa del rendimiento del alumnado es mayor cuando se considera a ambos progenitores frente a uno, tanto con estudios como con ocupaciones, así como cuando se incluyen ambas variables en el Modelo. El efecto agregado del hogar muestra la mayor desigualdad de rendimiento del alumno/a, entre los hogares más desfavorecidos, con menos recursos culturales (asociados a estudios) y materiales (ocupación y renta), y los más favorecidos. Sostenemos que el hogar representa con mayor precisión los efectos de la desigualdad de oportunidades educativas del alumnado con menores recursos socioeconómicos y culturales.

Palabras clave: desigualdad de oportunidades educativas; estatus socioeconómico; estructura familiar; logro educativo.

Introduction

Inequality of educational opportunity by social origin has attracted great attention for more than half a century of research on factors of educational achievement, and continues to do so today (Andersen, 2019; Bodovski et al., 2020; Cabrera et al., 2020; Erikson, 2020; García-Luque et al., 2023; Scherer et al., 2024Bodovski et al., 2020; Cabrera et al., 2020). For almost six decades, socioeconomic status (SES) has been identified as one of the most important predictors of educational attainment (Coleman et al., 1966; Jencks et al., 1972). This close relationship has been widely documented internationally, and it is well known that students born into lower-income households, with less educated parents or unskilled workers, consistently face greater difficulties in their school performance (Andersen & Hansen, 2012; Barone, 2006; Broer et al., 2019; Cabrera et al., 2015; Choi et al., 2018; Gustafsson et al., 2013; Hanushek et al., 2019; Pérez et al., 2013; Schlicht et al., 2010; Skopek & Passaretta, 2021). In the long run, this implies that the

educational level attained by parents 'conditions' (*i.e.*, is a predictor of) their children's chances of achieving higher educational attainment, leading to an intergenerational transmission of educational disadvantage (Mastekaasa & Birkelund, 2023; Wiborg & Hansen, 2009) and, ultimately, a tendency to the reproduction of social inequality of origin in social inequality of destination.

From the latter half of the 20th century, the universalisation of education within the context of expanding European welfare states became one of the fundamental pillars for the legitimisation of liberal democracies (Cabrera et al., 2011). However, the assumption that universal access to school would translate into equal opportunities to compete for desired social positions was called into question by the realisation that students with lower socioeconomic status systematically performed worse at school (Coleman et al., 1966; Jencks et al., 1972), demanding policies that addressed this structural inequity through compensatory measures targeted at students from socially disadvantaged backgrounds (Borman et al., 2001). Decades later, these gaps persist (Chmielewski, 2019; Hanushek et al., 2019) and raise the concern of international agencies (OECD, 2023a, 2020; World Bank, 2023), all while the reports of international educational assessments continue to account for the existence and persistence of unequal performance by socioeconomic status in the analysed countries (Broer et al., 2019; Herrera Sosa et al., 2018; OECD, 2023b).

The strength of the relationship between SES and performance depends on several factors. These include some institutional factors of education systems, such as the existence of early tracking, which tends to increase the gaps by social background, or the generalisation of pre-school education, the degree of decentralisation of education systems and the homogeneity between schools in a territory, which favour educational equity (Broer et al., 2019; Contini & Cugnata, 2020; Schütz et al., 2008). There are also methodological issues that affect the estimation of these gaps, such as the way in which achievement is measured, the student's course, grade or educational stage, the year in which the assessment was carried out (White, 1982) and, most relevant for our purposes, the measure chosen to operationalise SES (Sirin, 2005).

The literature on the relationship between socioeconomic status and achievement has used a variety of operationalisations of SES. In the US, eligibility for free-meals has been commonly used as a dichotomous indicator variable of SES, although it has been questioned as an unstable and limited measure of socioeconomic status (Dickinson & Adelson, 2014). There are other more precise and robust measures, such as composite indices based on multiple SES indicators (Van Ewijk & Sleegers, 2011), that result in a metric variable of socioeconomic status in which the student obtains a lower or higher value within a continuum depending on the possession of and access to valuable cultural and material resources. This option is typically used in the international educational assessments PISA (OECD) and TIMSS and PIRLS (IEA). Both the OECD and the IEA operationalise SES as a synthetic index composed of the highest educational level of one parent, the highest occupational level of one parent and various indicators of material wealth in the household (Martin et al., 2020; OCDE, 2023c; Scheiler, 2023), including the number of books at home.

The number of books at home has been demonstrated as a robust indicator of household cultural capital, complementing other SES variables (Marrero et al., 2023).

Other indicators, such as income, have also been used previously as a measure of SES, although they have limitations, including a lower response rate (Dickinson & Adelson, 2014), in addition to the fact that income is already included in occupation (Eurostat, 2019, 2021, 2023).

Concerning family structure, which has been less addressed by previous studies on educational performance factors, an association has been found between 'non-intact' families, *i.e.* other than the two-parent model, and a higher risk of underachievement (Bernardi & Boertien, 2017; Martínez García, 2008). This relationship would be attributable to a lower capacity for study support and lower availability of material resources in single-parent households (Astone & McLanahan, 1991; McLanahan & Percheski, 2008). Other authors have suggested that this effect might be mediated or moderated by social class, as they have found that the effect of non-biparental families on achievement tends to disappear after controlling for socioeconomic status (Björklund et al., 2007; Ginther & Pollak, 2004), or that this effect is not the same across social positions, so that the negative effect of single-parent families on achievement is reduced or disappears among students with lower socioeconomic status (Martín Criado et al., 2000) and immigrant students (Guetto et al., 2022).

However, different theoretical approaches support the need to pay attention to family structure when explaining variation in educational outcomes. Moreover, we add that the household structure depends not only on the presence of one or two parents living with the student, but also on the level of qualifications of both, which will determine the volume of capital in its different forms that can be mobilised in favour of achievement.

According to the thesis developed by Bourdieu and Passeron in *Reproduction* (1977), we would place the causes of the lower educational achievement of working-class students in the distance that separates their *class habitus* from school culture, institutionalisation of the *legitimate culture* and 'reflection' of the cultural practices of middle classes. However, it is from the second development of Bourdieu's work, with the introduction of the concept of *capital* in its different forms (Bourdieu, 1984), that we can interpret the effects of family structure and the joint social position of both parents on educational attainment. For Bourdieu (1986, 1998), the *volume* of capital is the total capital available in its different forms, economic, cultural and social, the first two being determinants of the possibilities of access to coveted social positions in capitalist societies. In turn, three states of cultural capital can be distinguished (Bourdieu, 1979): *embodied* (socially valuable knowledge possessed), *objectified* (material goods containing cultural capital, such as books, paintings or other artistic works at home) and *institutionalised* (academic degrees). The fact that both parents have higher education, and that they also capitalise on these qualifications by gaining access to professional occupations, that is, by transforming this institutionalised cultural capital into economic capital, implies an increase in the volume of capital in the household, therefore, not only more transmittable cultural capital in its embodied state to the student, but also more resources at home to support educational performance.

For Coleman (1987, 1988), social capital is understood as a set of resources and aspects of the social structure that can be mobilised by actors to achieve their goals. In the educational context, it encompasses the social networks, norms and relationships

(e.g. family–school) that constitute additional support for student achievement. In this sense, the existence of a two-parent model, and in particular a higher educational or occupational level of both parents, implies a higher family social capital and, therefore, an added effect on student achievement.

Despite the vast literature, there is still scope for improving the understanding of the variability of student performance by social origin. This paper addresses two relevant questions regarding the effects of household socioeconomic and cultural conditions on student performance. First, the effect of dual occupational and educational condition of the household on achievement. Previous studies, when using composite SES indices, such as the PISA ESCS, have typically done so by considering only the highest occupational or educational level of one parent, which masks the household aggregate effect. For this reason, some authors have drawn attention to the need to consider the family structure in the analysis of academic performance factors (Cabrera & Bianchi, 2023; Cabrera et al., 2015; Pérez et al., 2013, 2014). Second, we consider that insufficient emphasis has been placed on the interaction between the occupational and the educational level of the household. We suspect that the achievement gap might be larger if we consider the added effect of capitalising on tertiary education through access to professional occupations –not always when both parents have university degrees they also have professional occupations, but when this happens, its effect on achievement would be maximised–.

The aim of this study is to analyse the aggregate effect of household social composition on educational outcomes. We will examine the combined effect of the occupational and educational level of both parents on student performance in maths and reading. Our secondary objective is to assess the improvement in the explained variance compared to solely considering the highest occupational or educational level of one parent. We hypothesise that there is an added effect of dual occupational and educational condition of the household on educational achievement, which would lead to a larger performance gap by socioeconomic status than when considering the highest occupational or educational level of one parent.

In summary, parents' education and occupation are the two primary indicators of student SES. However, we consider that the type of measure frequently used in international assessments has the limitation of only considering the highest value of one parent or legal guardian. We believe that we could obtain greater precision in explaining the variability of educational outcomes by using composite household SES variables that consider the joint educational and occupational level of both parents.

Data and methods

Data

We use microdata from the latest international educational assessments focusing on the performance of primary school students, both conducted by the International Association for the Evaluation of Educational Achievement (IEA). Specifically, we draw on data from TIMSS-2019, which assesses the mathematics performance of 4th-grade

students, and PIRLS-2021, assessing the reading performance among students of the same grade.

In order to restrict the analysis to a limited geographical context, we selected a sample of 12 Western European countries with a total of 57,735 (TIMSS) and 69,849 (PIRLS) students.

Variables

Both Maths and Reading variables have a mean of 500 and a standard deviation of 100, following the standards of international assessments.

Two variables are defined to characterise the dual occupational and educational status of both parents (or legal guardians):

Home occupational level. It is constructed from the ISCO-08 classification (ILO, 2012) and distinguishes between: 1) those households in which both have a 'high' occupational level ISCO-08 1 or 2 (professionals and managers); 2) when only one of them has a high occupational level; 3) both with 'medium' level, which corresponds to ISCO-08 occupational groups 3 to 8 (skilled workers); 4) only one with medium level, and the other lower or not applicable; 5) both with 'low' level, which we identify with ISCO-08 9 (unskilled workers) and 6) one with a low level and the other unemployed or not applicable.

Home educational level. It is constructed from the ISCED-11 classification (UNESCO, 2012) and distinguishes between: 1) both with tertiary education (ISCED≥5); 2) only one of them with tertiary education; 3) both with post-secondary non-tertiary education (ISCED: 3 or 4); 4) only one with post-secondary non-tertiary education and the other with lower level or not applicable; 5) both with secondary education or lower (ISCED: 1, 2 or never attended school) and 6) one with secondary education or lower and the other not applicable.

Occupation and educational attainment are closely related variables and are, in turn, directly related to income. Eurostat data (2019, 2021, 2023) for the EU-27 clearly show the associations between occupation and educational attainment (Appendix 1- Table 1) and between occupation and income (Appendix 1- Table 2). The data show that people with tertiary education (ISCED≥5) constitute the majority in professional and managerial occupations (85% and 60% respectively) and substantially reduce their presence in the remaining occupational groups: 44% (ISCO-08: 3), 31% (ISCO-08: 4), less than 20% (ISCO-08: 5 and 6), and less than 10% (ISCO-08: 7, 8 and 9). On the other hand, earnings are four, three and two times higher in ISCO-08 1 and 2 occupations than in the rest of ISCO-08 occupations, especially ISCO-08≥4 occupations. This implies that tertiary education increases the likelihood of access to higher-income occupations, multiplying proportionally their material and cultural resources, with a direct impact on the inequality of educational opportunities, as we will see below.

Thus, households are placed on a scale where those with the highest status, such as tertiary education and professional-managerial occupations, are at the upper end, while those with the most disadvantaged conditions, such as single-parent families with only secondary or lower studies and elementary occupations with only one income, are at the lower end. However, we must note that the TIMSS-19 and PIRLS-21 ques-

tionnaires do not inquire about family type. Therefore, single-parent families cannot be specifically identified and can only be inferred based on missing or non-applicable values. Hence, our classification considers whether both parents in each occupational and educational group have the same level of education or whether there is a situation of family hypergamy, where one parent transmits the major effect of cultural and economic capital. Single-parent families are included in the latter group.

Data analysis

For each of the dependent variables, maths performance in TIMSS-19 and reading performance in PIRLS-21, we first estimate a series of three one-way and two-way ANOVA models with highest educational attainment and highest occupational level as factors.

$$Y_{ij} = \mu + Edu_i + e_{ij} \ , \hspace{5cm} \textit{Model 1.0,}$$

$$Y_{ij} = \mu + Occu_i + e_{ij} , \hspace{5cm} \textit{Model 2.0,}$$

$$Y_{ijk} = \mu + Edu_i + Occu_j + (EduOccu)_{ij} + e_{ijk} \hspace{2cm} \textit{Model 3.0,}$$

where Y is the performance in maths or reading, μ is the mean of Y over all individuals, Edu is the factor *Highest Educational Level* of one of the parents, $Occu$ is the factor *Highest Occupational Level* of one of the parents and $EduOccu$ is the interaction between the two factors.

Second, we estimate a new set of three one-way and two-way ANOVA models, but with *Home Educational Level* and *Home Occupational Level* as factors. These ANOVA models are defined as:

$$Y_{ij} = \mu + EduH_i + e_{ij} \ , \hspace{5cm} \textit{Model 1.1,}$$

$$Y_{ij} = \mu + OccuH_i + e_{ij} , \hspace{5cm} \textit{Model 2.1,}$$

$$Y_{ijk} = \mu + EduH_i + OccuH_j + (EduHOccuH)_{ij} + e_{ijk} , \hspace{1.5cm} \textit{Model 3.1,}$$

where H is the identifier that the variable refers to the household joint educational or occupational level.

Finally, we compare each pair of models using only the highest educational or occupational level of one parent with their alternatives using the household joint effect to assess the improvement in the explained variance.

Results

Results show, firstly, a large variability in the performance of primary school students depending on the educational and occupational level of their parents. The picture is similar for both mathematics and reading (Figure 1). For the sake of clarity, throughout the presentation of the results, we will refer to mathematics when we talk about performance, expressly indicating, if necessary, that we are referring to reading

performance if there were notable differences in the averages of mathematics and reading by educational and occupational level.

Moreover, this effect is present in each of the countries considered (Figure 2), as can be seen from the lack of overlap of the 95% confidence intervals between the two error bars of the joint household measure, indicating that there are significant differences between households with tertiary education and professional or managerial occupations, depending on whether both parents have this level of education or only one of them does so. The aggregate household effect follows a similar pattern across countries.

When considering the highest educational level of one of the parents (Model 1.0), students from households with secondary education or lower (ISCED 1-2) score on average 40 points less than students with at least one parent with post-secondary education (ISCED 3-4) as the highest educational level, and 94 points lower than students with at least one parent with tertiary education (ISCED≥5). The picture is similar for the highest occupational level of one of the parents (Model 2.0). Students with parents in elementary occupations (ISCO-08 9) score 47 points lower than students with skilled-worker parents (ISCO-08 3-8) and 90 points lower than students with professional and managerial parents (ISCO-08 1-2)[2]
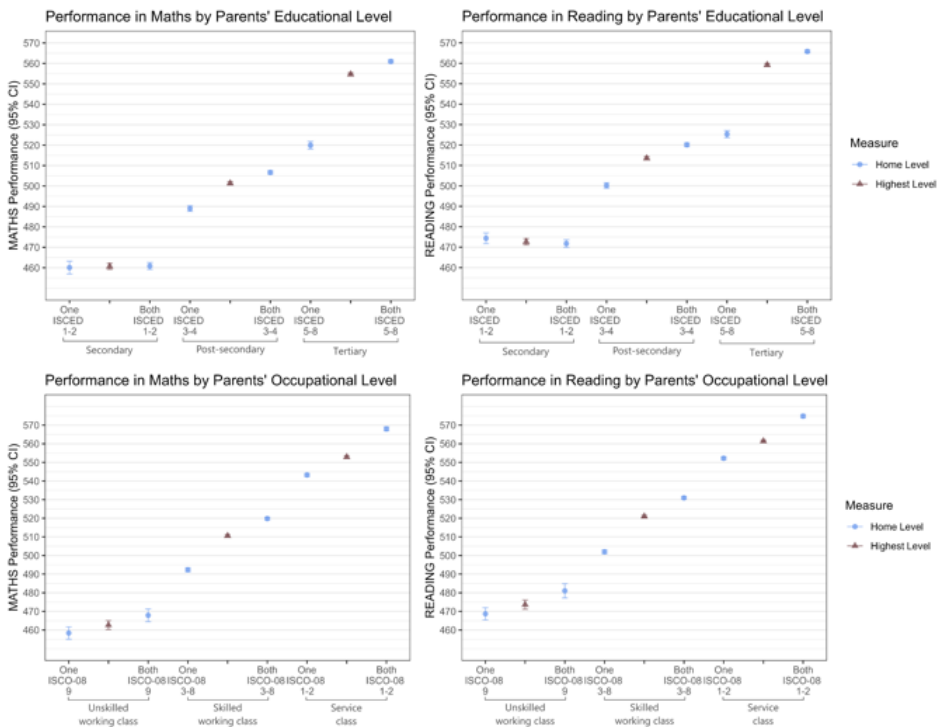

Figure 1. *Error bars of Maths and Reading Performance by Parents' Educational and Occupational Level.* Source: Own elaboration from TIMSS 2019 and PIRLS 2021 (IEA, 2020, 2023)

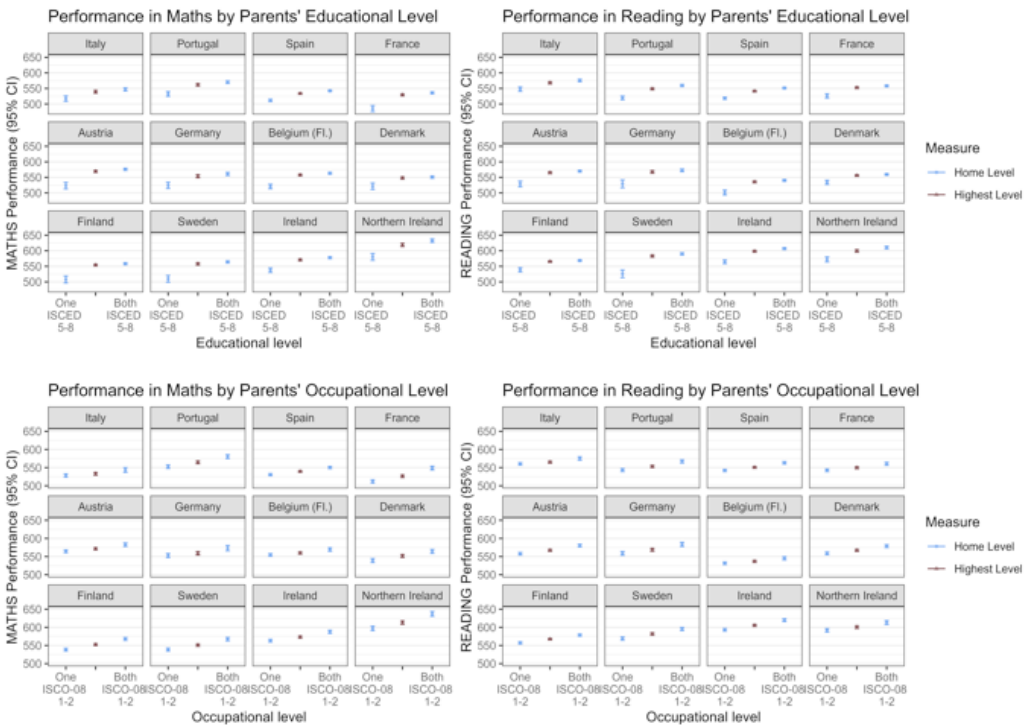2   Pairwise mean comparisons are available upon request from the authors.

Figure 2. *Error bars of Maths and Reading Performance by Home Educational and Occupational Level or Highest Level of One Parent (Upper Levels), by country.* Source: Own elaboration from TIMSS 2019 and PIRLS 2021 (IEA, 2020, 2023)

When we look at the performance depending on the joint home educational and occupational level, this variability increases, with significant differences appearing for both mathematics and reading by family structure within educational and occupational groups. We compare the means between households where both parents have the same occupational level and households where one has a certain occupational level and the other has a lower occupational level (or is unemployed, or is a single-parent family), as well as between households where both have the same educational level and households where only one has a certain educational level and the other has a lower educational level (or is a single-parent family).

By educational level (Model 1.1), these internal differences exist in the groups with post-secondary (ISCED 3-4) and tertiary education (ISCED≥5), but not in the groups with secondary or lower education (ISCED 1-2). In the latter group, which compares two-parent households where both parents have secondary education or less with single-parent households with secondary education or less, there are no significant differences in the means for mathematics and reading. For the post-secondary education groups, on the other hand, there is a 17-point difference when both parents have post-secondary education compared to when only one parent has post-secondary education

–and the other has a lower level–. The largest difference, 41 points, occurs when both parents have tertiary education versus when only one of them has tertiary education.

By occupational level (Model 2.1), these differences exist in all three occupational groups, but their magnitude differs between unskilled workers and the rest. In the group of unskilled workers (ISCO-08 9), there is a significant difference of about 10 points when both are employed in elementary occupations, as opposed to when only one of them is employed (and the other does not work for pay, or is a single parent family). Among skilled workers (ISCO-08 3-8), the difference between households where both have this occupational level and households where only one of them has this occupational level is 27 points. This difference is 24 points for households where both parents are professionals or managers (ISCO-08 1-2) compared to households where only one parent has this occupational status.

The interaction between joint educational level and occupational level of both parents is also significant (Model 3.1). This model, which includes joint educational level and joint occupational level of the household as factors, as well as the interaction between the two, explains the largest variance in performance of all the models estimated: 20.8% of mathematics performance and 18.7% of reading performance (Tables 1A and 1B).

The three models that include the educational or occupational level of both parents improve the explained variance in performance compared to the models that only take the highest level of one of them: 1.8 to 2.1% improvement in the explained variance in performance (in mathematics and reading, respectively) by the educational level of the household, 2.7 to 2.8% improvement by the occupational level of the household, and 2.2 to 2.5% improvement in the model that includes the joint educational and occupational levels of both parents and their interaction (Tables 1A and 1B). The comparison between each pair of models (1.0-1.1, 2.0-2.1, 3.0-3.1), both in mathematics and reading, shows a significant improvement (p<0.001) in the goodness of fit of all models that include the joint educational and occupational levels of the household versus those that only consider the highest level of one of the parents.

When we include both educational and occupational level in the two-way ANOVA 3.0 model, we find a significant interaction, indicating that the effect of one of the factors on the outcome variable varies according to the level of the other factor. In line with our hypothesis, this interaction means that occupational level moderates the effect of educational level on performance. As we can see in Figure 3, there is a slight but noticeable maximisation of the distances between the group means when families with higher education also gain access to higher income and prestige occupations.

However, this model, which only considers the highest educational and occupational level of one of the parents, hides a non-negligible part of the household joint effect on performance. This can be seen when we disaggregate the occupational level of the household according to whether it is held by both or only one of the parents (Figure 4). We can see that in households with at least one parent with tertiary education, the differences within each occupational group are amplified, so that in these households, if only one parent has a professional or managerial job (and the other one has a lower level job, or is a lone parent), the average performance is closer to those with parents with tertiary education and both skilled workers than to those with parents with tertiary

education and both professionals or managers. On the other hand, in households with lower educational attainment, these differences tend to narrow.

Finally, Figure 5 shows the mean differences by household joint educational and occupational level. Again, there is a tendency for the differences between the highest educational and occupational levels to widen when both parents are taken into account.

We observe that the household joint educational attainment also generates significant effects after considering the joint occupational status (Figure 5). These effects occur to a greater or lesser extent at all occupational levels.

Table 1A

ANOVA Model Comparison: MATHS performance by highest educational/occupational level or home joint educational/occupational level.

	Model 1.0	Model 1.1	Model 2.0	Model 2.1	Model 3.0	Model 3.1
Educ	***				***	
EducH		***				***
Occu			***		***	
OccuH				***		***
Educ × Occu					***	
EducH × OccuH						***
Model Fit						
Sig. Change in Model Fit	***		***		***	
R2	0.167	0.185	0.131	0.158	0.186	0.208
AIC	843982.2	842366.5	847113.8	844738.1	842214.1	840225.8
BIC	844019.1	842431.0	847150.7	844802.6	842306.3	840566.8
Log.Lik.	-421987.1	-421176.2	-423552.9	-422362.1	-421097.1	-420075.9
F	7449.5	3373.1	5609.5	2800.6	2132.4	559.9
RMSE	69.79	69.03	71.27	70.14	68.96	68.02

Note: N = 57,735 students; * $p < 0.05$, **$p < 0.01$, *** $p < 0.001$

Table 1B

ANOVA Model Comparison: READING performance by highest educational/occupational level or home joint educational/occupational level.

	Model 1.0	Model 1.1	Model 2.0	Model 2.1	Model 3.0	Model 3.1
Educ	***				***	
EducH		***				***
Occu			***		***	
OccuH				***		***
Educ × Occu					***	
EducH × OccuH						***
Model Fit						
Sig. Change in Model Fit	***		***		***	
R2	0.138	0.159	0.121	0.149	0.162	0.187
AIC	936699.1	934625.9	938285.3	935628.3	934332.5	931936.4
BIC	936736.4	934691.1	938322.6	935693.6	934425.7	932281.4
Log.Lik.	-468345.6	-467305.9	-469138.6	-467807.2	-467156.2	-465931.2
F	6604.3	3130.0	5693.3	2893.0	2000.8	542.0
RMSE	70.02	69.15	70.7	69.57	69.02	68.01

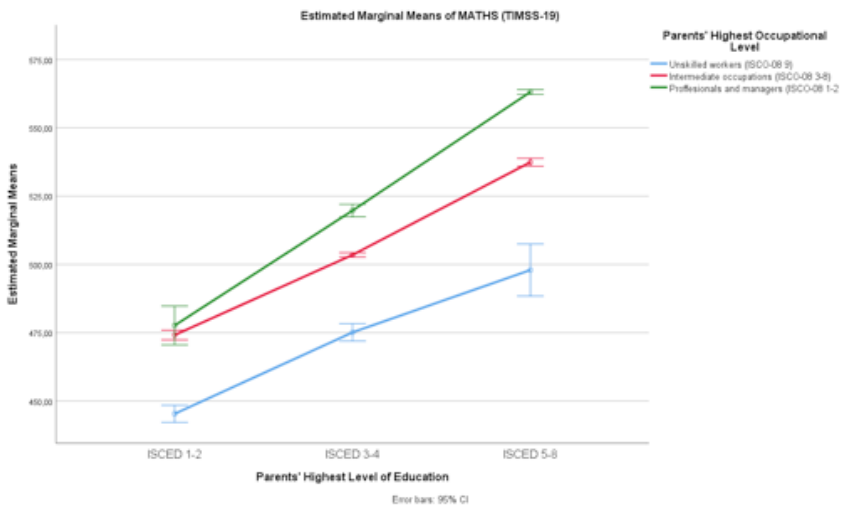*Note:* N = 63,849 students; * $p < 0.05$, **$p < 0.01$, *** $p < 0.001$

Figure 3. *Estimated Marginal Means of MATHS, by Highest Educational Level and Highest Occupational Level.* Source: Own elaboration from TIMSS 2019 (IEA, 2020).
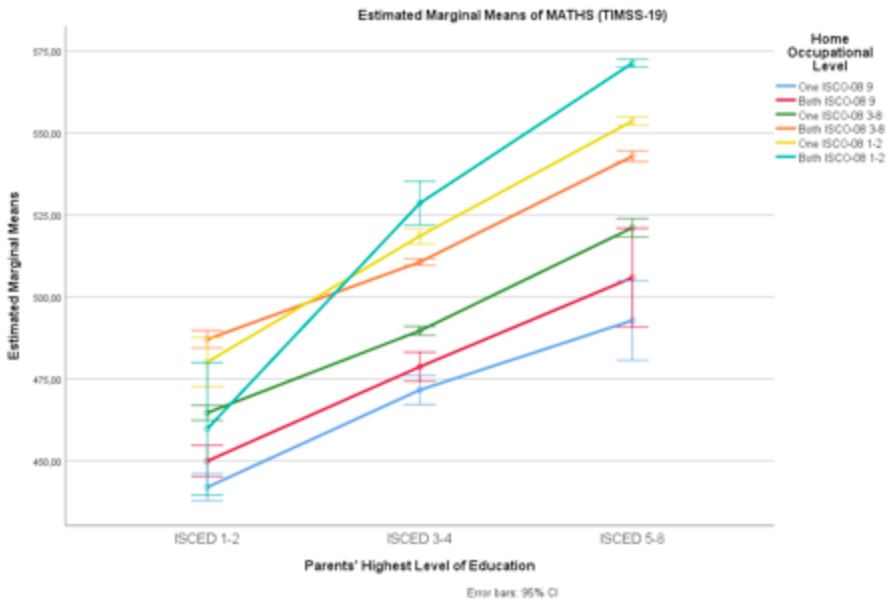
Figure 4. *Estimated Marginal Means of MATHS, by Highest Educational Level and Home Occupational Level.* Source: Own elaboration from TIMSS 2019 (IEA, 2020).
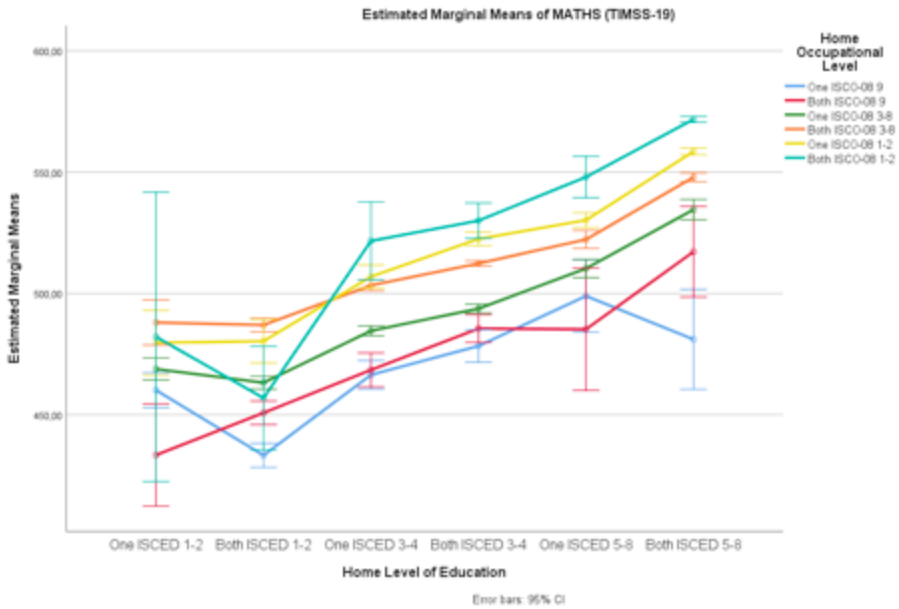

Figure 5. *Estimated Marginal Means of MATHS, by Home Educational Level and Home Occupational Level.* Source: Own elaboration from TIMSS 2019 (IEA, 2020).

Among households with unskilled workers (both or one ISCO-08 9), there is a significant jump from both having secondary education to at least one having post-secondary education, much more pronounced in households with only one income (One ISCO-08 9). Among households with skilled workers (both or one ISCO-08 3-8), there is an increase in performance from having one parent with post-secondary education to having both parents with post-secondary education, and a much larger jump from having one parent with tertiary education to having both parents with tertiary education. But the biggest 'jump' in performance within the same occupational level occurs among households with only one professional or managerial parent (One ISCO-08 1-2), when it goes from only one having a higher level of education (ISCED 5-8) to both reaching this level. We thus see that this gap is even larger between households with only one professional or managerial parent with higher education (One ISCED 5-8, One ISCO-08 1-2) and households where both parents have tertiary education and are professionals or managers (Both ISCED 5-8, Both ISCO-08 1-2).

Discussion

It is well known that there is a difference in educational attainment by social class, which can be seen in the differences in average performance in mathematics and reading according to the educational and occupational level of parents. Children of unskilled workers consistently achieve lower outcomes than children of skilled workers, who in turn achieve lower outcomes than those of professionals and managers. The same is true for secondary or lower secondary, post-secondary and tertiary levels of parents' educational attainment. This is a commonplace in previous literature (Andersen & Hansen, 2012; Barone, 2006; Broer et al., 2019; Cabrera et al., 2015; Choi et al., 2018; Gustafsson et al., 2013; Hanushek et al., 2019; Mastekaasa & Birkelund, 2023; Pérez et al., 2013; Schlicht et al., 2010; Skopek & Passaretta, 2021; Wiborg & Hansen, 2009). The contribution we make here is to show that, within these educational and occupational groups, there are also differences by family structure that need to be taken into account in order to gain a better understanding of the social factors of academic performance.

The effect of having both parents working for a salary at the same occupational level, as opposed to situations of hypergamy or single parenthood, is perceptible from households with post-secondary education onwards and grows in households with higher education. The strongest effect of family structure occurs in those households where both parents have higher education and are employed as professionals or managers, obtaining a much higher achievement than households where both or one has higher education but only one is a professional or manager. We interpret this effect as originating from the capitalisation of the family's cultural capital through the attainment of a more prestigious occupation that also grants access to higher levels of job security and economic resources. Therefore, we can speak of an *added effect* of the household's dual educational and occupational status.

This effect, however, is hidden when only the highest educational and occupational levels of one parent are considered. The choice of the highest educational or occupational level of one parent entails, first, a significant loss in the explanation of variance in performance. Second, and perhaps more importantly, a concealment of additional

factors of unequal achievement attributable to the household structure. This is particularly serious in view of the already identified influence of the effects on achievement of two-parent families where both parents work, as opposed to single-parent families where only the mother is employed (Pérez et al., 2014), as well as the effects of single-parent families on achievement (Bernardi & Boertien, 2017; Martínez García, 2008) and on the risk of early school leaving (Pérez et al., 2013), attributable to the lower capability for study support at home and the lower availability of economic resources in single-parent households (Astone & McLanahan, 1991; McLanahan & Percheski, 2008).

We have already noted that the differences by household structure widen in families with higher occupational and educational level. However, among households where parents are unskilled workers and those with lower levels of education, these gaps by family structure are smaller. Martín Criado et al. (2000) had already pointed out that the negative effect of single-parent households on performance tended to dissipate among working-class families. Other studies have pointed in the same direction in the case of immigrant pupils (Guetto et al., 2022). In any case, it seems clear that in situations of greater educational disadvantage due to the lower availability of resources at home, the weight of family structure on achievement is reduced compared to the effect of parental education and occupation. This, however, does not imply determinism: intra-group variability is considerable and hints at the possibilities for improvement and resilience of students even in the most disadvantaged situations.

In this sense, previous research has shown that educational policies that encourage reading habits and those focused on the youngest students at the start of primary school –*i.e.*, those born in the last months of the year– have positive effects on preventing school disengagement (Cabrera et al., 2019), reducing grade retention and improving overall educational outcomes, especially those of the most disadvantaged students (Cabrera, 2019). Furthermore, we believe that some degree of cultural relativism at the school level is necessary to overcome educational inequality, in the sense of the opposition between legitimate and relativistic educational practices (Grignon, 1991). We must consider that, because their cultural patterns are perceived as more distant from the 'school norm', working-class families sometimes find it difficult to engage in productive communication with school actors, and may feel judged or blamed when their children's performance at school drops, which can lead to a rift with teachers (Martín Criado et al., 2014; Reay, 1996). Therefore, schools should recognise the concerns and viewpoints of families as legitimate and worthy of being heard, regardless of their cultural background. From this perspective, there are school practices that have been shown to be effective in reducing educational inequalities. Previous evidence on these effective practices suggests that including families in the daily activity of schools, and their acknowledgement as active interlocutors in the educational process, has a positive impact on reducing educational inequalities (Compte et al., 2012; Flecha, 2012; Lubián & Langa, 2022; Merchán-Ríos et al., 2023).

Conclusion

We have analysed the achievement gaps between students according to the educational and occupational level of their parents. Comparing the differences found when

using only the highest level of one of them and the joint household level, we found that considering the household as a whole significantly improves the variance explained by differences between occupational and educational groups in both mathematics and reading achievement.

Likewise, results show that there is a high and significant variability of performance in mathematics and reading of 4th grade primary school students by parents' educational and occupational level, and that these differences widen when the joint level of the household is taken into account. Differences between family types widen notably in those groups with the highest educational and occupational levels. There is a substantial upturn in performance among families with at least one of the parents with higher education when both are professionals and managers, which points in favour of the hypothesis of the capitalisation of cultural capital when it translates into access to more prestigious and higher income occupations.

Using only the highest educational or occupational level of one parent entails the loss of a source of explanation of the variance in performance, but also a masking of the effects of household structure, particularly those affecting single-parent families, and the risk of underestimating performance gaps by social origin.

Our results support the need for education policy to act in favour of reducing inequality of educational opportunities since primary education, where there are already notable differences in student performance that, if not reversed, will later translate into social inequalities (Betancort et al., 2019; Cabrera et al., 2021; Erikson, 2020).

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Appendix 1. Education attainment and income by occupation in Europe

Table 1

ISCO-08 (Occupation)	ISCED-11 (Educational attainment)		
	ISCED ≤ 2	ISCED 3-4	ISCED≥5
1 Managers	7.9%	31.9%	60.2%
2 Professionals	1.5%	13.2%	85.3%
3 Technicians and associate professionals	7.2%	48.8%	44.1%
4 Clerical support workers	10.1%	58.4%	31.5%
5 Service and sales workers	21.9%	62.3%	15.8%
6 Skilled agricultural, forestry and fishery workers	31.3%	56.1%	12.6%
7 Craft and related trades workers	25.9%	64.7%	9.4%
8 Plant and machine operators and assemblers	29.1%	63.8%	7.0%
9 Elementary occupations	47.5%	45.8%	6.7%
Unclassified			
10 Armed forces occupations	8.8%	57.2%	34.0%
No response	13.2%	46.0%	40.8%
Class Classification - Occupational level	ISCED ≤ 2	ISCED 3-4	ISCED≥5
Service class (ISCO-08: 1-2)	2.7%	16.8%	80.5%
Skilled workers (ISCO-08: 3-8)	14.1%	47.1%	38.8%
Unskilled workers (ISCO-08: 9)	47.5%	45.8%	6.7%
Total	**16.6%**	**46.3%**	**37.1%**

Educational attainment (ISCED-11) by occupation (ISCO-08) and by social class - occupational level in the EU-27 (2022), in percentages of rows

Source: Own elaboration from Eurostat (2023). *Labour Force Survey 2022.*

Table 2

ISCO-08	Annual Earnings (euros)	
	European Union - 27 countries (from 2020)	Euro area - 19 countries (2015-2022)
1 Managers	68,346	81,537
2 Professionals	45,895	51,995
3 Technicians and associate professionals	40,032	43,309
4 Clerical support workers	32,082	34,368
5 Service and sales workers	25,321	27,134
6 Skilled agricultural, forestry and fishery workers	27,713	28,975
7 Craft and related trades workers	28,660	33,176
8 Plant and machine operators and assemblers	26,050	31,078
9 Elementary occupations	21,040	23,078
Total	34,754	38,559

Average annual income per occupation (ISCO-08) in the EU-27 and in the Euro area-19

Source: Own elaboration from Eurostat (2019), *Structure of Earnings Survey 2018.*