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Schools and Social Origins:
Do Schools Matter More for Disadvantaged Students?

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Abstract

This paper investigates the relationship between students' social origins and students' reading performances on the one hand, and the relationship between these performances and the specific primary schools the students attend on the other hand. Moreover, it examines whether primary schools vary in the degree of influence they exert on the achievement of students from different family background, in terms of parents' education and occupation.

The main findings of the multilevel analyses on PIRLS 2006 data for Sweden, Germany and Italy are that social origins influence students' performances (particularly in Sweden), achievement varies among primary schools (especially in Germany and Italy), and schools attended matter more for students with lower social origins.

Keywords

Social origins, achievement, differences between schools, multilevel, PIRLS

Social origins, schools and students' achievement

The Universal Declaration of Human Rights assesses that "All human beings are born free and equal in dignity and rights […] without distinction of any kind, such as […] national or *social origin*, *property*, *birth* or other status". Therefore, all people should have the same opportunity to obtain educational attainment—and more generally social status and social class—besides their social origins. Compulsory education was promoted in order to replace the intergenerational transmission of social positions from parents to children. Nevertheless, education still remains unequally distributed and social inequalities are transmitted through education: the achievement gained by students is still linked to their parents' social origins (Shavit and Blossfeld 1993; Pfeffer 2008).

The transmission of language, knowledge, habits, aspirations, etc. from parents to children begins in the first years of life. Moreover, learning is highly cumulative: what you learn depends on what you have learned before (Cunha and Heckman 2007; Braga et al. 2011). For instance, educational attainment and performances at the end of educational careers are related to secondary school performances, which are themselves related to primary school performances.

This paper specifically investigates the reading skills of 9 and 10 year old students. Indeed, learning to read well during this period is essential in order to learn new things: when students begin to 'read to learn' (instead of 'learning to read') their reading difficulties become bigger and create problems in many other subjects (Araujo and da Costa 2012). Thus, if students' social origins affect the

acquisition of basic skills, there is an elevate risk of accumulation of educational inequalities from the lowest to the higher levels of the educational system.

This study's *first research question* investigates to what extent students' reading performances and their social origins—parents' educational level and occupational class—are linked.

In addition to parents' background, the specific schools attended by students are relevant to determine their learning process and their resulting performances (Yang-Hansen 2008; Rabash et al 2010). Indeed, students' achievement can vary among schools due to peers, teachers, teaching methods, school characteristics and organization, and other factors.

Differences between schools are well recognized and studied in those educational levels where students are formally divided in different tracks. On the contrary there is lack of research concerning the previous educational levels. Primary schools (in Europe at least 4 years of education with unique curriculum) are formally considered equal. Nevertheless, there are differences between primary schools as well (Entwisle et al. 1997). Thus, this paper's *second research question* investigates differences in students performances between different primary schools.

Moreover, schools may have different degree of influence on students' achievement depending upon students' social origins. Both cultural capital theory (Bourdieu and Passeron 1979; Lareau and Weininger 2003) and rational action theory (Boudon 1974; Breen and Goldthorpe 1997)—the sources of two main theorizations of educational inequalities—recognize that students from higher social background receive more support to education than students from lower ones. Parents with higher social positions have more capacity to help their children to study and to do homework—or to pay someone to help them, they know better the educational system, they tend to visit museums and to do cultural activities, they normally speak in more refined and worldly language, they are used to reading more books and newspapers, and so on. Thus, while students from higher background learn at home a lot of things that are also required at school, the learning process of students from lower background takes place mainly at school.

This study's *third research question* is born of these considerations: do primary schools vary in the degree of influence they exert on the performances of students from different social origins? Based on the previous literature, it has been hypothesized that the specific school attended matters more for less advantaged students.

These three research questions are contextualized in different European countries, since the association between social origins and educational achievement and attainment has different degrees of influence in different countries (Archer 1989; Shavit and Blossfeld 1993). In addition, the role of the school, and the interaction between school and social origins may be different in various institutional contexts (Pfeffer 2008).

The research focuses on Sweden, Germany, and Italy[1]. These countries have different educational systems and different levels of overall inequalities. Sweden has a comprehensive and more equal education, while Germany has a selective

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[1] The idea is to extend the analysis to a larger number of countries.

system and Italy has a system with low selection but quite high inequality. Moreover, looking at PISA (2006 and 2009) results, the German and the Swedish performs better in school than the Italians (OECD 2007, 2010). Furthermore, the broader social class inequalities are lower in Sweden, and higher in Germany and Italy. Thus, due to the link between higher and lower level of education, and between the amount of inequality in schools and in the whole society, the hypotheses are that, with respect to Germany and Italy, in Sweden the association between students' achievement and their social origins is lower, students' performances are higher, and the specific school attended matter less. It is also expected that Italian students perform less well then German and Swedish ones, while the level of inequalities and the differences between schools are supposed to be higher in Germany and Italy.

In the following sections, firstly the data and the main variables are explained, secondly analyses and results are described, and finally the results are discussed.

Data and variables

PIRLS survey (Progress in International Reading Study) 2006, promoted by IEA (International Association for the Evaluation of Educational Achievement), have measured levels of reading and reading comprehension of primary school students in 41 countries. Further, PIRLS have collected background information about students, students' parents and schools (Foy, Kennedy, 2008)[2].

The *dependent variable* of this study is composed by the standardized scores of third (for Sweden) and fourth (for Germany and Italy) grade students' in a test that evaluate reading and reading comprehension skills[3]. The scores give a measure of students' reading performances, and are considered indicators of the skills acquired by students.

The main *independent variables* are parents' educational level and occupational class. They are both considered indicators of students' family background or social origins. Indeed, they can be seen as expression of two aspects of social origins: educational level is mainly linked to cultural and educational resources, as parents' capacity to participate in their children's educational careers by helping with school homework and study, providing informed guidance through the educational system, etc.; occupational class is mainly related to economic resources of the family (Bukodi and Goldthorpe

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[2] The sample design is two-stage stratified: schools at the first stage—taking into account their size and geographic location; students at the second stage—all students attending one or two classes per school. Sample design and information about questions in the questionnaires and reading texts are described in detail by Mullis et al. (2007) and Foy and Kennedy (2008).

[3] PIRLS esteems five different scales of achievement (and five plausible values for each scale): four are related to a set of reading questions, and the fifth is the general score of all scales. As exploratory dependent variable, the mean (for each student) of the five plausible values of the fifth general scale has been used. Future analyses will be done with the correct imputation of plausible values.

2012)[4]. The higher position between father and mother has been chosen for both variables[5].

In the choice of *other independent variables* parsimony has been used, by avoiding to put in the models all the variables at disposal[6]. The independent variables are: students' sex; parents' nationality and students' nationality—particularly important due to the attention on reading skills, that are strictly linked to spoken, listened, and read language in everyday life; type of school location (urban, suburban or rural)—that allows taking into account some of the geographic differences inside each country. These variables have been put in all the models as control variables.

In some variables of the PIRLS 2006 dataset there are a lot of missing values. Missing values in the independent variables (the dependent variable has not missing values) have particular extent in Germany, followed by Sweden and then Italy. Missing values have been explored and their distribution is not casual: students that have lower scores and whose parents have lower educational level or occupational class have more missing. Missing values of some variables are also linked with parents' nationality and school location. Although specific profiles have not been found, missing values have been taken in the analyses by building a specific category for each independent variables (instead of eliminating them distorting the perception of results) due to their high numbers and not casualty. Thus, even if missing values have not received comment, they are in all the analyses.

Analyses and results

Multilevel analysis allows for two hierarchical levels to be distinguished: level 1—students— which is nested in level 2—schools[7].

Multilevel analysis has substantive and technical advantages. The substantive advantage is that the overall not explained variance of students' scores can be split in two components: first, the variance due to the context—in this case schools— and second, the variance due to individuals. The technical advantage is that multilevel analysis helps to avoid the distortion (under esteem) of standard errors that occurs if observations are considered independent, even if they are probably dependent: it is recognized that students attending the same school may have more similar results with respect to students from different schools. Instead to be a problem, this similarity becomes object of analysis.

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[4] Occupational class has been codified following Esec classification.

[5] In the discussion of results, the expressions parents' level of education and parents' occupational class have been used.

[6] This practice would have been made less clear the comprehension of coefficients and would have been inferred on cells with very small or null case numbers.

[7] Two instead of three levels (student, class, school) are considered in the analyses because in the majority of schools only one class has been sampled, and in Germany no schools with more than one class have been sampled.

To answer the *first research question*, a multilevel analysis has been done, even if the focus is not on multilevel coefficients. Table 1 shows that in all three countries the higher the cultural and economic resources of students' families, the higher the students' scores; and viceversa, the lower the parents' educational level and occupational class, the lower the students' reading performances. For example, the students' scores advantage of having university educated parents instead of having lower secondary educated parents is from 33 to 37 additional percentage points.

Tab. 1. *Students' reading scores by parents' educational level and occupational class in Sweden, Germany, and Italy (multilevel model with control variables)*

	Sweden		Germany		Italy	
	β	S.E.	β	S.E.	β	S.E.
Constant	567.9	3.24	576.1	2.70	583.0	3.88
Parents' educational level						
University	-	-	-	-	-	-
Upper secondary	-18.0	2.25	-15.3	1.80	-17.4	3.26
Lower secondary	-37.7	3.85	-36.4	1.93	-33.8	3.76
Missing	-26.3	2.97	-26.5	2.03	-41.4	5.36
Parents' occupational class						
Managers and professionals	-	-	-	-	-	-
Intermediate employees	-7.0	2.52	0.7	2.64	3.5	5.00
Small employers	-15.1	3.17	-11.6	2.33	-5.1	3.80
Lower employees	-14.4	2.71	-10.0	1.92	-3.7	3.35
Blue collar worker	-23.2	3.63	-23.1	2.43	-16.4	3.61
Never worked	-30.4	10.01	-38.7	7.03	-25.1	7.18
Missing	-18.4	3.57	-21.2	2.29	-15.0	4.57
Sex						
Male	-	-	-	-	-	-
Female	15.5	1.57	7.5	1.07	5.1	1.78
Parents' nationality						
Both native	-	-	-	-	-	-
One native	-1.4	2.48	-12.1	2.05	-10.8	3.57
Both foreign	-24.4	2.76	-24.3	2.04	-22.9	4.71
Missing	-21.2	3.65	-23.1	2.34	-31.9	5.42
Students' nationality						
Native	-	-	-	-	-	-
Foreign	-23.5	3.73	-6.4	2.75	-5.3	4.80
Missing	-45.4	6.56	-16.5	2.86	23.2	12.07
School location						
Urban	-	-	-	-	-	-
Suburban	2.0	3.56	14.3	4.31	4.2	7.18
Rural	2.0	4.90	14.1	3.26	-13.1	7.37
Missing	15.1	17.79	0.7	7.48	-	-
Variance						
School level variance	243.0	39.92	737.7	60.29	853.7	114.08
Studentl level variance	2592.9	56.24	2163.6	35.34	2712.3	65.48
-2*Loglikelihood	47176.5		83871.7		38764.6	
N. School	147		405		150	
N. Students	4394		7899		3581	

Moreover, Sweden appears to have higher performance disparities between students from different social origins, followed by Germany, and Italy[8]. In addition, it is worth considering that Italian students have performed on average better than German students, and these ones have achieved higher scores than Swedish students. These results are in contrast to the initial expectations, since from PISA test it was supposed German and Swedish students to be better than Italian's ones. It could be argued that while Italian education is good at primary school, it becomes worse in the subsequent levels. However, it's important remind that Swedish students have done the test after three years of school, instead of four as in the other countries.

The *second research question* investigates whether and to what extent students' scores varies among the primary schools they attend[9]. Differences among schools are intuitively understandable through graphs (Fig. 1, 2, and 3): each line represents a school, it has values on the y axis due to the scores of the students attending that school, and it has a slope due to the association between students' scores and parents' educational level (x axis). The more the lines are closed to each other, the less the differences between schools; the more the lines are distant, the more the differences between schools (in terms of their students' performances). From the graphs it is clear that in Germany and Italy a large part of the variability in students' performances is due to schools attended by students, whereas in Sweden the differences between schools are less[10].

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[8] In order to see whether the strength of the association is significantly different in Sweden, Germany, and Italy, another model has been developed, by collapsing datasets of the three countries and adding interactions between countries and students' social origins.

[9] Firstly, a null multilevel model has been done: students in the same schools have more similar results than students attending different schools. Secondly, indicators of social origins and control variables have been added to the null multilevel models (random intercept models). In this second model (the same presented in table 1) the not explained variance diminished either at the individual and at the school levels, but was still significant in both.

[10] The more accurate way to measure the extent of the differences between students' performances among schools is the variance partitioning coefficient (known as VPC, ICC or ρ). It is obtained by dividing the second level variance with the total variance, and values range from 0—differences only between students—and 1—differences only between schools. The VPC is 0.09 for Sweden (0.14 in the null model), 0.25 for Germany (0.34 in the null model) and 0.24 for Italy (0.26 in the null model).

Fig. 1. *Reading scores variation between schools by parents' educational level in Sweden (random intercept model)*
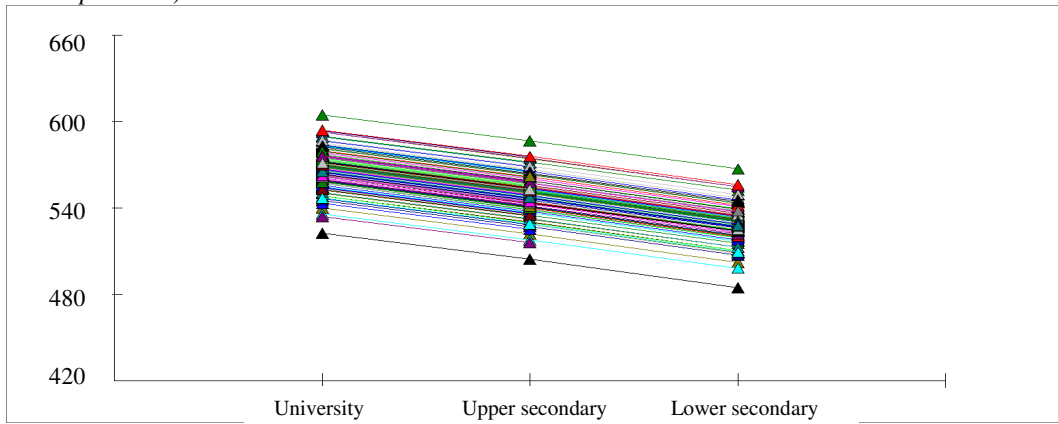

Fig. 2. *Reading scores variation between schools by parents' educational level in Germany (random intercept model)*
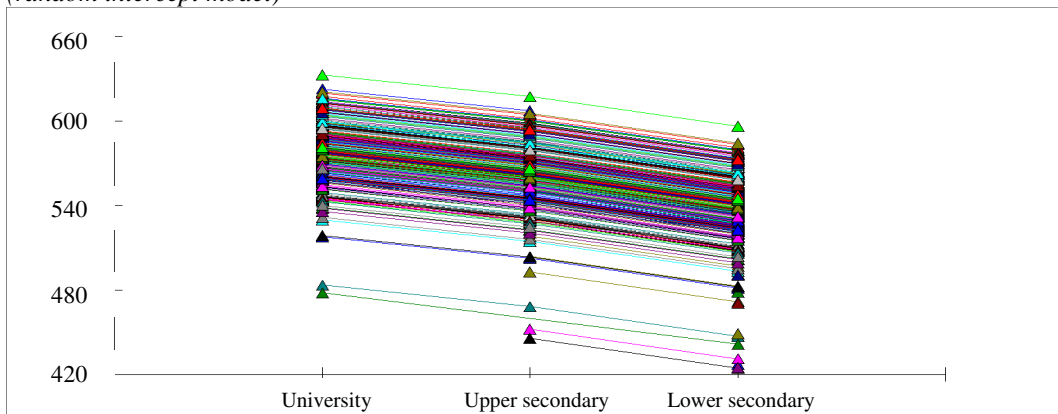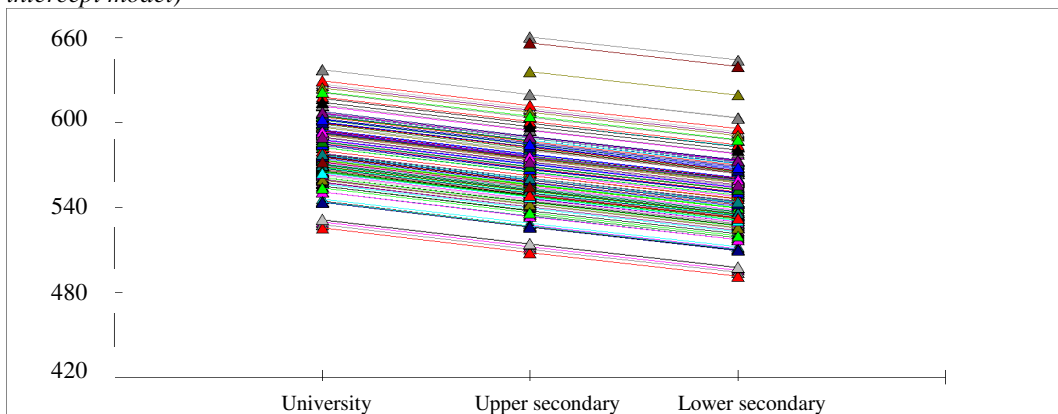

Fig. 3. *Reading scores variation between schools by parents' educational level in Italy (random intercept model)*

To sum up, students' performances are influenced by both their parents' social origins and the school they attend. Does exist a link between these two aspects? To answer the *third research question*, multilevel random slope models have been developed: the lines are been allowed to vary in their slope across the educational level and occupational class of students' parents. Therefore, students' performances among schools are allowed to vary for students from different cultural and economic background (Fig. 4, 5, and 6).

In all three countries the scores of students with higher social origins have smaller variation between schools than the scores of students with medium and lower social origins: the variability of students' performances among schools increases the lowest the students' social origins. This analysis provides support to the hypothesis that schools attended matter more for less advantaged students: while students with higher cultural and economic family resources learn also irrespective of the school they attend, school quality is more important for the reading achievement of students with less family resources. This evidence is particularly clear in Italy and Germany, where the differences between schools are higher.

Fig. 4. *Reading scores variation between schools by parents' educational level and occupational class in Sweden (random slope model)*
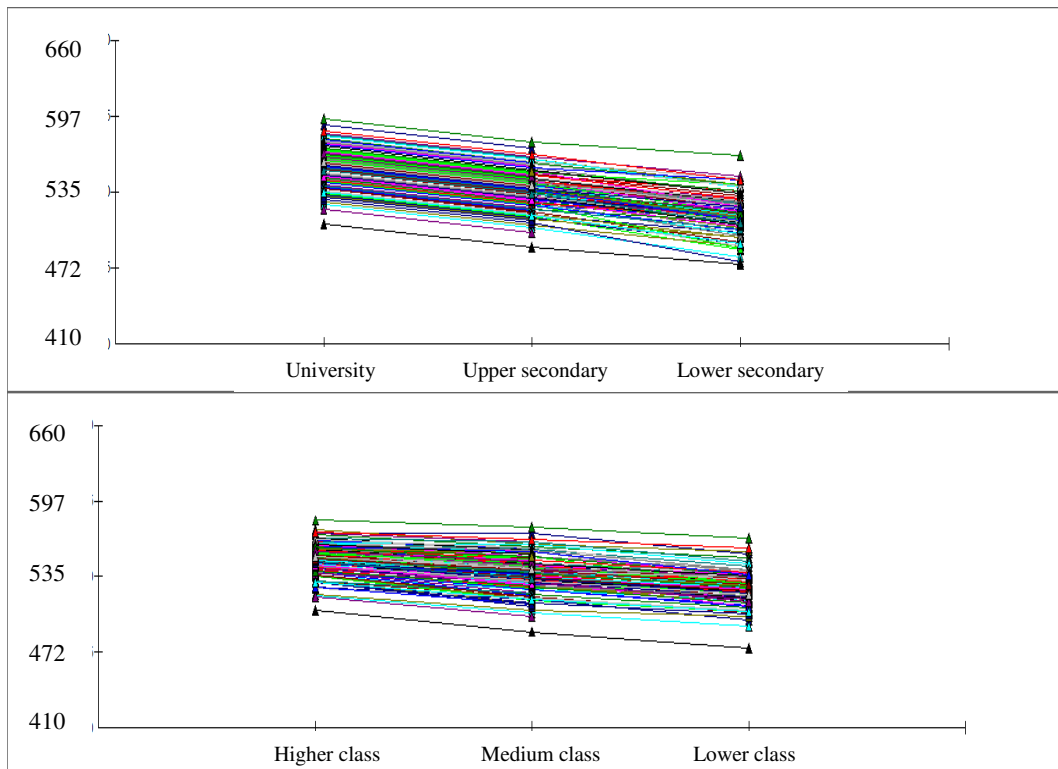

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Fig. 5. *Reading scores variation between schools by parents' educational level and occupational class in Germany (random slope model)*
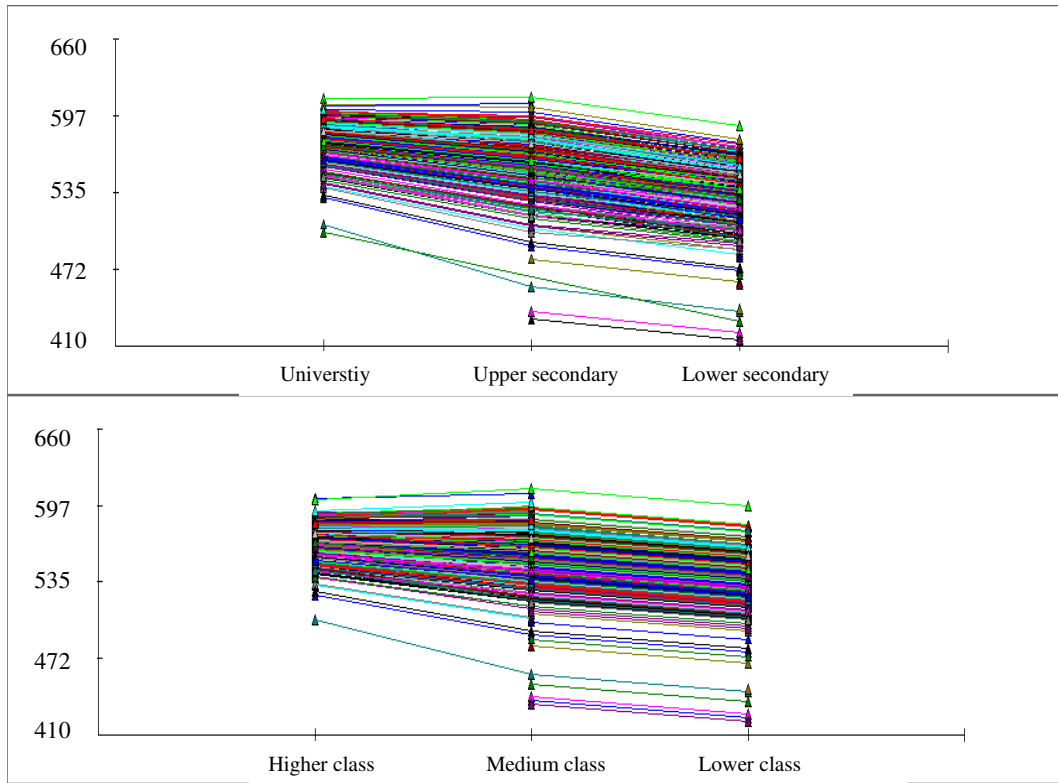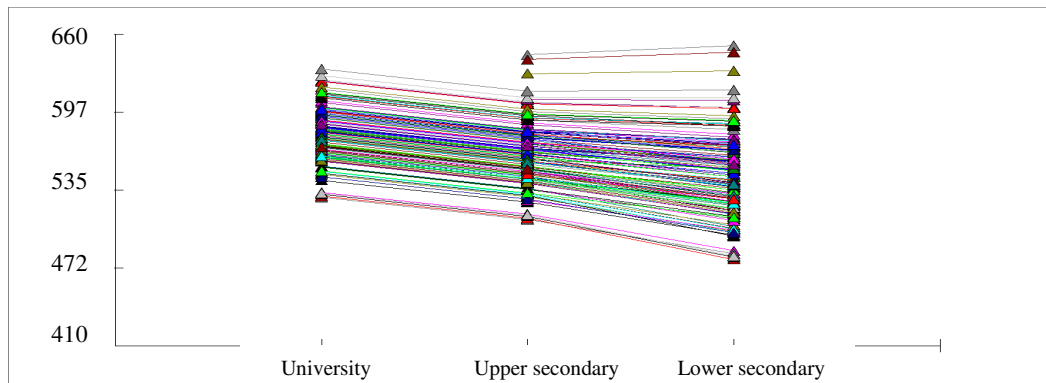

Fig. 6. *Reading scores variation between schools by parents' educational level in Italy[11] (random slope model)*

[11] Due to the scarce association between students' performances and parents' occupational class in Italy (Table 2), only the random slope model for parents' educational level has been shown.

Conclusions

The analyses have shown that students' reading performances are linked to students' social origins in all three countries. According to the literature, the existence of this association even for students at primary school suggests that the intergenerational transmission of social inequalities starts at the beginning of individuals' educational careers.

Nevertheless, some differences between countries have been found: in Sweden the association between students' social origins and their performances is higher than in Germany and Italy, and students have performed less well. However, this could be due to the fact that Swedish students have done the PIRLS test after three years of schools instead of four years (as in the other countries).

On the other side, the analyses have shown that students' performances are more differentiated between schools in Germany and Italy than in Sweden. In this regard, the specific school attended seems to be more important in the first two countries than in the last one; it could be possible that in Sweden the schools give a more equal preparation.

Moreover, differences in students' skills among schools are not equal with respect to their social origins: according to the initial hypothesis, reading performances of students with disadvantaged family background depend more on the school they attend than the performances of students with higher economic and cultural family resources—that receive more direct or indirect support in learning outside schools as well. This phenomenon may be negative because a student from lower social origins who goes at a low quality school is even more disadvantaged. However, it could be positive if schools exploit their higher influence on students from families with lower social origins to compensate their background disadvantages.

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