IS THE PROPORTION OF IMMIGRANT CHILDREN IN ITALIAN SCHOOLS DIRECTLY OR INDIRECTLY ASSOCIATED WITH EDUCATIONAL PERFORMANCES?[1]

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1. Introduction

International migration is generating a deep demographic transformation, giving rise to the children of immigrants as the fastest growing sector of the youth population in Italy (Gabrielli and Impicciatore, 2022).

The topic of the inclusion of immigrants in the Italian educational system is increasingly important. The segregation of children of immigrants across-schools is a demanding issue in terms of students' educational outcomes (Schneeweis, 2013; Cebolla-Boado and Fernández-Reino, 2021).

However, the relationship between immigrants' concentration at school and educational outcomes is not unique. On one hand, multicultural schools can determine positive effects on the school performance of students, including native ones. In fact, teachers can be facilitated in recognizing the needs of immigrant students if they do not represent a small minority, moreover all students can positively benefit from a multicultural climate, which favors the sharing of traditions and cultures (Schneeweis, 2013). On the other hand, immigrants are at greater risk of belonging to disadvantaged backgrounds (European Commission, 2011). In addition, an excessive proportion of immigrants in the same classes or schools could negatively affect the opportunity to learn the language of the country of destination (Cardinali *et al.*, 2015). Therefore, the concentration of immigrants is generally associated with lower performances (Van der Slik *et al.*, 2006; Cebolla-Boado and Fernández-Reino, 2021), higher risk of school dropout and to a higher probability of behavioral problems in school (Traag and Van der Velden, 2011).

Advancing the current literature, we aim to investigate if and how the proportion of immigrants, enrolled in the lower secondary Italian schools (grade 8), is directly or indirectly associated with the student's performances. We use data

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collected by the National Institute for the evaluation of education and training system (INVALSI) during the school years 2018/19 and 2020/21 and perform a multilevel mediation model that includes factors both at individual and school level.

Bearing in mind the theoretical background described below, we formulate the following research questions:

- RQ1: Is the proportion of immigrants at school associated with educational performances?
- RQ2: Has the school-based parents' participation a mediator role between the proportion of immigrants at school and educational performances?
- RQ3: Does the role of schools' socio-economic context prevail on school's ethnic composition in defining education performances?

2. Theoretical background

Ethnic-specific background has a role in determining educational trajectories and outcomes of students. We pointed out the attention on the clustering of students with different migratory backgrounds across schools.

Immigrant students are often overrepresented in socio-economic and cultural disadvantaged contexts, mainly because of their economic constraints. Clapp and Ross (2004) stressed in US the presence of "ghetto schools" concentrated in poor and racially and/or ethnically identified sub-municipal areas and typically attended by socio-economic and cultural disadvantaged students residing nearby because well-educated and affluent families are able to avoid so-called "black schools" by implementing "school flight" strategies (Ichou and Van Zanten, 2019) or by "fleeing" towards private, fee-based schools (Betts and Fairlie, 2003).

At the same time, characteristics of the origin family are also strictly connected to the educational outcomes of descendants, and it is well documented that disadvantaged students have less chance of academic success than more affluent students (Chowdry *et al.*, 2013). This is mainly based on the assumption that investments in education tend to be lower among families with poor socio-economic resources (European Commission, 2011; Blossfeld *et al.*, 2016). The disadvantaged socio-economic background of parents may impede them to support their children in education in terms of school practices, norms, and activities (Pfeffer, 2008) or to provide quality education services for their children (Nesse, 2010). In this perspective, scholars have found that active parents' participation in school-based activities supports the educational success of their children (Castro *et al.*, 2015; Curtis *et al.*, 2021).

In the literature less is known about how the links between school contextual factors and school-based parent participation can jointly shape, directly or indirectly, students' performances (Curtis *et al.*, 2021). In particular, little attention has been paid to the relationship between the compositional features of schools (e.g., concentration of migrants or schoolwide socio-economic disadvantage) and the degrees to which parents participate in school activities or interact with school staff.

For example, Chen and Stevenson (1995) showed that in US the higher performances in mathematics of Asian-American and East Asian students were only indirectly associated to family support and motivation. Greenman (2013) analyzed the direct and indirect effects of peers on educational outcomes in US. Although peers influence immigrant Mexican and Asian-origin students, they may be less susceptible to negative peer influences than native counterpart.

According to the cultural fit hypothesis (Calzada *et al.*, 2015), a higher concentration of co-ethnic students and lower study body diversity may promote school-based parent participation, because it promotes interactions among "similar" parents and boosts positive perceptions of the school environment. However, there are barriers that may inhibit parents' participation in school-based activities: parents' low level of education and of language proficiency, low socio-economic status, working time constraints and poor knowledge of the education system (Mantovani and Gasperoni, 2018). Thus, school concentration of immigrant students may be associated to poor parents' participation because immigrant families are often concentrated at the bottom of the academic achievement distribution and of the socio-economic status (Brunello and Rocco, 2013). In this perspective, it can be hypothesized that the schools' average socio-economic context plays a decisive role in parents' participation but at the same time also in the concentration of students with a migrant background who tend to attend disadvantaged schools (Brandén *et al.*, 2019).

3. Data and methods

INVALSI evaluates each year all Italian students at different school levels (primary and secondary education) through standardised tests related to students' achievement in Reading, Mathematics and English. At the same time, INVALSI administers specific questionnaires to the principals and teachers, included in a representative sample of schools and classes, to collect important information related to various aspects of school life, such as management and teaching practices, availability of infrastructure and resources and school climate.

Our analysis draws on the INVALSI data related to the students and principals of the lower secondary school classes (grade 8) in the school years 2018/19 and

2020/21[2]. Our dataset is the result of a merging that involves i) data from the INVALSI school questionnaire filled by school principals, ii) the results from the INVALSI tests assessing mathematical and reading skills, and iii) data related to socio-economic variables collected by the INVALSI student questionnaire. In detail, the analysis was conducted considering the data related to a nationally representative sample of 766 lower secondary school classes (grade 8) with 29.184 students for which the variables obtained from the school principals' questionnaire are available.

Due to the hierarchical data structure, with students (Level-1 units) nested in schools (Level-2 units), we chose a general Multilevel Structural Equation Model (MSEM), that is able to account for both sources of variability (within-school and between-school in our case) and separate between-school and within-school effects, without introducing bias (Asparouhov and Muthén, 2008). The general MSEM model partitions each observed Level-1 variable into two latent (within and between) components (Preacher *et al.*, 2010). In our case, every student-level variable is treated as jointly caused by within- and between-school variation: this means that the observations referring to different students in the same school have to be considered as multiple indicators of the latent school-level construct. In addition, at every level, multiple indicators can be used to reflect an underlying unobserved construct as in the measurement model of a common SEM approach. In these terms, the general MSEM framework appears as a doubly latent model (Marsch *et al.*, 2012).

Consistent with the literature and based on the availability of variables collected by the INVALSI school questionnaire[3], the school-based parent's participation (PP) dimension is measured by the school principal's answers to 13 items (Table 1).

The first four items refer to the interaction between parents and teachers, while the other nine items allow investigating the participation of parents in the activities and organization of the school. These 13 questions were answered on a 4-point Likert-type response option scale (1 = not at all; 2 = little; 3 = to some extent; 4 = a lot). Higher values suggest an higher participation of parents in the various aspects of their children's school life. For the validation of the measurement model, the values of Cronbach's alpha as a reliability index of the latent construct is estimated. A good level of internal consistency of the construct was found since the alpha coefficients is equal to 0.79 and exceeded the recommended 0.70 cut-off.

[2] INVALSI survey was not carried out during school year 2019/2020 because of Covid-19 pandemic.

[3] It is necessary to bear in mind that the parents participation is a multifaceted concept and there is a lot of debate in the literature on how to measure this construct and which aspects to include or exclude. In this perspective, although the INVALSI survey collects several variables relating to specific aspects of parents' participation, the data available does not allow an exhaustive investigation of this concept (ad hoc investigations would be necessary). For example, we have no information on the extent of parental support at home (home-based involvement) but, at the same time, we are not able to measure and analyse the quality of parental involvement which certainly assumes greater importance than the simple quantity.

Table 2 includes the descriptive statistics of the target variables (test scores in reading and mathematics), the proportion of immigrant in the school and a set of exogenous covariates that typically enter Education Production Function (EPF) models (Buchmann and Parrado, 2006), namely: gender, student socio-economic status (ESCS[4]), immigrant status, and four dummies to account for the territorial literacy divide (Quintano *et al.*, 2012) among the Italian geographical areas[5].

Table 1 - *Latent construct of school-based parents' participation.*

Latent construct	Item	Mean	Std. dev.	Cronbach α
Parents' participation *The school principal declares to what extent parents participate in the school life of their children:* *1="Not at all"* *2="Little"* *3="To some extent"* *4="A lot"*	Participate in parent meetings	2.86	0.64	0.79
	Vote for the election of school council	2.58	0.66	
	Participate in parent-teacher conferences	3.18	0.60	
	Meet the teachers to know progress and behaviours of their children	3.35	0.55	
	Volunteer in building maintenance activities or other outdoor spaces activities	1.85	0.82	
	Discuss the academic achiev. of all the stud.	2.09	0.75	
	Discuss on how to spend the school funds	2.01	0.75	
	Discuss the conditions of school structures and buildings	2.52	0.84	
	Contribute money to the good school perform.	2.03	0.86	
	Volunteer for the good school performance	2.23	0.82	
	Contribute to the definition of school programs	1.44	0.58	
	Participate actively in educational activities	1.98	0.76	
	Discuss the results of the INVALSI asses. tests	1.67	0.69	

Source: our elaborations on INVALSI data, s.y.2018/19 and s.y. 2020/21.

Gender plays a very important role. Generally speaking, girls perform better than boys in reading but worse in mathematics (Croll, 2009). Ethnic-specific cultural traits play another central role in determining educational trajectories and outcomes of students. Children of immigrants underperform at school respect to native counterpart (Freeney and O' Connel, 2012). Characteristics of origin family and of parents are strictly connected to educational outcomes of descendants. Students have low educational performances because of (on average)

[4] The index of Economic and Social and Cultural Status (ESCS), provided by INVALSI, is used. This index takes into account parents' occupations and education, along with variables that measure home possession goods (see Campodifiori *et al.*, 2010 for details).

[5] The geographical areas are defined as follows: North-West (including Liguria, Lombardia, Piemonte and Valle d'Aosta), North-East (including Emilia Romagna, Friuli-Venezia Giulia, Trentino-Alto Adige and Veneto), Center (including Lazio, Marche, Toscana, and Umbria), South (including Abruzzo, Campania, Molise, Puglia, Basilicata, Calabria, Sardegna and Sicilia).

disadvantaged family background factors (low parents' social class and education, occupational, and income levels – Gabrielli and Impicciatore, 2022). A North-South socio-economic gradient is observed in Italy with more economically developed Northern regions than Southern ones.

The INVALSI metric for the overall reading and mathematics score is based on a mean set at 200 while the scale of ESCS index is standardized to have a mean of 0 and a standard deviation of 1.

The high difference in the sample sizes between the two editions are attributable to the Covid pandemic which resulted in a reduction in the sample of students and schools investigated in the 2020/21 edition.

Table 2 – *Descriptive statistics. Mean values (or alternatively relative values) and standard deviation.*

	Variable	Description	Mean	Std.dev
Student level (n=29.184)	Math	INVALSI score in mathematics (outcome variable)	200.00	39.01
	Read	INVALSI score in reading (outcome variable)	200.00	36.40
	ESCS	Index of economic, social and cultural status	0.00	1.00
	Gender	Female	(0.49)	-
		Male (reference category)	(0.51)	-
	Immigrant status	Immigrant	(0.11)	-
		Native (reference category)	(0.89)	-
School level (n=766)	% Immigrant	Avg. proportion of immigrant students at school	(0.11)	-
	School ESCS	Schools' average socio-economic context (ESCS)	0.00	1.00
	Survey edition	2020/21	(0.28)	-
		2018/19 (reference category)	(0.72)	-
	Geographical area	North-west area	(0.21)	-
		North-east area	(0.24)	-
		Central area	(0.19)	-
		South area (reference category)	(0.36)	-

Source: our elaborations on INVALSI data, s.y.2018/19 and s.y. 2020/21.

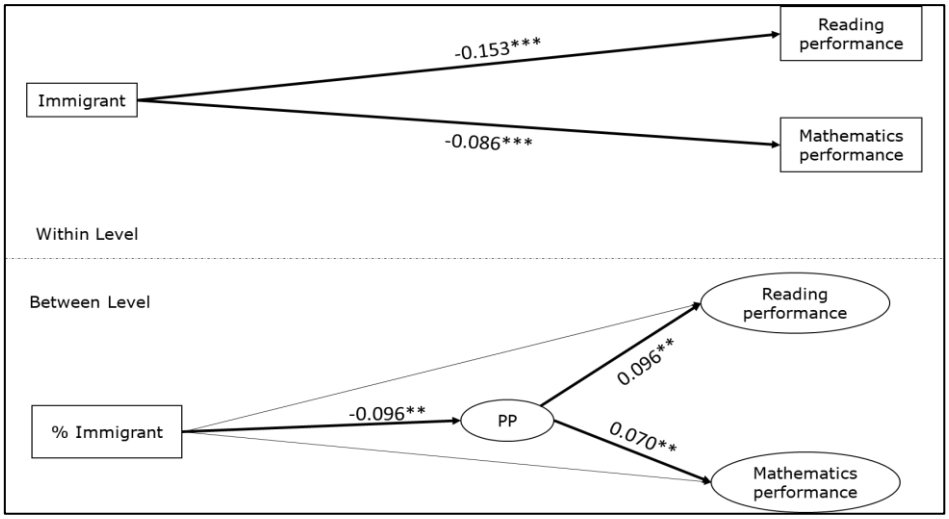
4. Results

The results of multilevel SEM with a random intercept are illustrated in Figure 1, where the standardized coefficients are reported and the straight lines reflect significant paths. At the student level, as expected, the paths from immigrant status to achievements are significantly negative. The standardized coefficients of immigrant status, controlling for gender and socio-economic background, are respectively -0.153 for reading and -0.086 for mathematics.

At the school level, the model accounts for 46% and 53% of the variance of the achievements, respectively for reading and mathematics. We found that the proportion of migrants at school is not directly related to students' performances

(neither for reading nor for mathematics). Conversely, there is an indirect negative association of the proportion of immigrants through PP. In detail, the path from the proportion of immigrants to PP is significantly negative (the standardized coefficient is equal to -0.096), while the paths from PP to reading and math performances are significantly positive (the standardized coefficients are respectively 0.096 for reading and 0.070 for mathematics). Higher proportion of immigrant students is significantly associated with lower parents' participation, while higher parents' participation is significantly associated with higher students' performances.

Figure 1 – *Multilevel standardized mediation model (MSEM). Coefficients and p-values.*



Note: PP denotes the Parents' Participation in school activities and organization. The within-level model includes controls for students' gender and the family socio-economic status (ESCS); the between-level model includes controls for the schools' average socio-economic context, geographical area and the survey edition.
Source: our elaborations on INVALSI data, s.y.2018/19 and s.y. 2020/21.

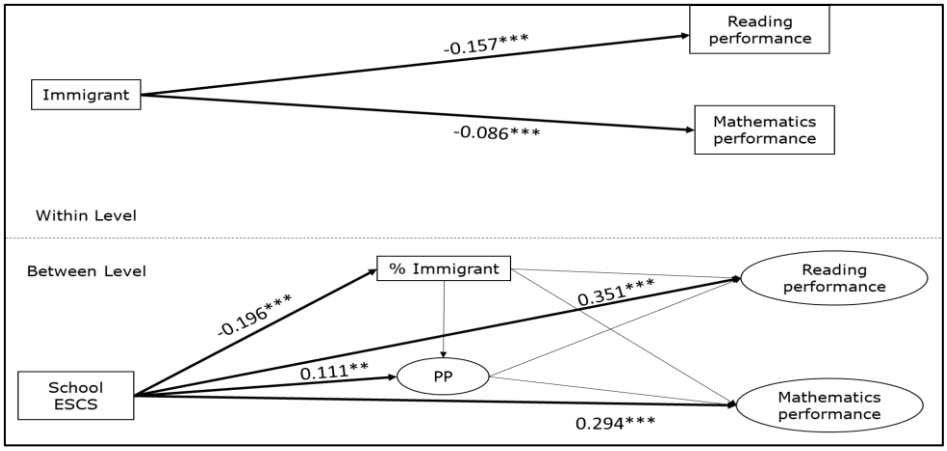
However, the lower parents' participation can be linked not only to the higher proportion of immigrants but also to the lower socio-economic and cultural traits of school, since immigrants are at greater risk of belonging to disadvantaged backgrounds (Brandén *et al.*, 2019). In this perspective, a further MSEM model has been estimated: it emphasizes the role of schools' average socio-economic context (School ESCS) not as a "simple" control variable but as a factor directly associated to educational performances and, at the same time, to the proportion of immigrants and to parents' participation. The model shows (Figure 2) the positive direct association between school ESCS and educational performances (standardized coefficients equal to 0.351 and 0.294 respectively for reading and mathematics). Moreover, there is a significantly negative association (-0.196) between school

ESCS and the proportion of immigrants.

This path highlights a selection process making immigrant students more segregated in socio-economic and cultural disadvantaged schools. At the same time, school ESCS is positively associated with PP (0.111): schools with higher socio-economic and cultural traits are characterized by a higher parents' participation.

Interestingly, the indirect association of proportion of immigrants on educational performances, through school-based parents' participation, becomes no longer statistically significant.

Figure 2 – *Multilevel standardized mediation model (MSEM) focused on the direct and indirect effect of school socio-economic context. Coefficients and p-values.*



Note PP denotes the Parents' Participation in school activities and organization. The within-level model includes controls for students' gender and the family socio-economic status (ESCS); the between-level model includes controls for the geographical area and the survey edition.
Source: our elaborations on INVALSI data, s.y.2018/19 and s.y. 2020/21.

5. Discussion

Our analyses focused on the direct and indirect links among schools' socio-economic context, school's ethnic composition, school-based parents' participation, and students' performances.

Results don't seem to support the general scientific debate regarding the direct negative effects of migrants' concentration at school on overall students' educational outcomes (RQ1).

However, multivariate results seem to point out, on the one hand, the importance of parents' participation in determining children's educational pathways and, on the other, the lower participation of immigrant parents in their children's

school life. Thus, the proportion of immigrants at school has a significant and negative association with educational performances when mediated through parents' participation in the school life of their children (RQ2).

On the other hand, schools with higher socio-economic and cultural traits are characterized by a lower presence of migrant students and higher parents' participation (conversely, a lower socio-economic school context corresponds to a higher proportion of immigrants and a lower parents' participation).

Consequently, the indirect association of the proportion of immigrants on educational performances, through school-based parents' participation, becomes no longer statistically significant once the role of schools' average socio-economic context is emphasized in the analysis. This result leads us to argue that the role of schools' socio-economic context prevails over the school's ethnic composition in defining the educational performances of students (RQ3).

Our final remarks concern the limitations of our analyses. First, our contribution remains descriptive by considering the association between covariates (or factors) included in the multivariate analysis and the dependent variable. Second, the survey does not collect exhaustive information about origin families and their migratory-related characteristics because the survey design is not focused on migrants and their descendants. This limit prevented us from further stratifying immigrant students. Lastly, the covid pandemic has led to a remodelling of the INVALSI survey, which has been focused on the response of the schools and the teachers to the challenges posed by the pandemic but, at the same time, has left out many aspects of the school life that had previously been investigated. In this light, it will be interesting to include in future analyses other constructs, other than school-based parents' participation, to in-depth the analysis of the indirect role of immigrants' concentration at school on educational performances.

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SUMMARY

Advancing the current literature, we aim to investigate if the proportion of immigrants, enrolled in the lower secondary Italian schools (grade 8), is, directly or indirectly, associated to mathematical and reading skills of students. Due to the hierarchical structure of INVALSI data, collected during school years 2018/19 and 2020/21, we perform a multilevel standardized mediation analysis. This approach includes a measurement and structural model at both individual and school level, with random slopes and intercepts. Our results don't seem to support the general scientific debate regarding the direct negative effects of migrants' concentration at school on students' educational performances. Conversely, an indirect effect, mediated by school-based parents' participation, is observed. However, this effect becomes no more statistically significant once the role of schools' average socio-economic context is emphasized in the analysis. This result leads us to argue that the role of schools' socio-economic context prevails on school's ethnic composition in defining education performances of students.

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