SCHOOL SEGREGATION OF MIGRANTS AND THEIR DESCENDANTS IN A DUAL EDUCATION SYSTEM: THE CASE OF BARCELONA

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Introduction

In the city of Barcelona, the progressive incorporation into schools of descendants of immigrants has, in recent years, notably raised the number of pupils of immigrant origins, thus diversifying and transforming the composition of the student body and changing the distribution of students in schools and their patterns of segregation. In this context, the few studies on school segregation carried out so far have analysed students on the basis of their nationality, distinguishing between Spanish and foreign students. Nationality, however, is conditioned by laws giving access to Spanish citizenship and, accordingly, by nationality-based differences with regard to some nationalities in relation with others. This gives rise to partial perspectives in which some groups are rendered invisible, as is the case of students of Latin American origins, especially those who born in Spain.

In order to overcome such a bias, this study has linked data from administrative series and population registers, a research device that is innovative in the Spanish context. Student microdata ceded by the Department of Education and the Population Register have been brought together, making it possible to reconstruct a typology of students along the lines of work by Rumbaut (2004) by classifying the students according to the year of their arrival in Spain (and entry into the school system), their place of birth, and that of their progenitors. The present study is based on the 2015-2016 school year in the city of Barcelona. It distinguishes between public schools and private/state-subsidised private (henceforth, for our purposes,

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"private") schools since this dual education system explains a good part of the segregation we have observed. Until now, this kind of analysis has not been possible in Spain due to lack of available statistical data on the distribution of students.

Interest in analysing school segregation derives from the fact that it is one of the key mechanisms for understanding reproduction of inequalities and the chances of these students for social mobility (Boterman et al., 2019), while it also allows us to complement the traditional view of segregation which draws on residence-based analysis.

The study is carried out in the city of Barcelona. Since the end of the twentieth century, Barcelona has seen a sharp rise in the growth of its migrant population, to such an extent that 25% of its population is now foreign-born. The study is based on data of 176,000 students who were living and studying in Barcelona in the 2015-2016 school year. Among them, 12.2% is of foreign origins and 10% was born abroad. These figures are multiplied if all students of foreign origin (born abroad or with a parent or parents born abroad) are taken into account. The numbers then rise to 53,612 and 30.4% of the city's students.

Against a background of growing urban segregation in Europe (Tammaru et al. 2016), the levels of immigrant residential segregation in cities in the south of the continent have generally been low for most groups of immigrants, with the paradox that, despite these smaller values, the social distance observed with regard to autochthonous residents has been high (Arbaci, 2019). The school is one of the spheres in which the greatest levels of segregation are observed, revealing differences between autochthonous and immigrant students outside the residential domain. In this context, segregation with regard to students of immigrant origin is analysed, taking into account elements of the migratory process itself, among them year of arrival and place of birth, which appear as basic elements for interpreting their levels of segregation. Before this, however, prior work of identifying and classifying students is carried out with a view to subsequent study of the relationship between school and residential segregation. The study concludes by estimating the effect of the dual education system on the levels of segregation thus calculated.

Methodology

Microdata on non-university students in the city of Barcelona and for the 2015-2016 academic year ceded by the Department of Education of the Generalitat (Government) of Catalonia are cross-matched with data from the Municipal Register of Inhabitants (Padrón Continuo). This operation, carried out by Idescat (Statistical Institute of Catalonia) has made it possible to recover information on the year of arrival of students in Catalonia and the nationality of their parents, thus enabling the construction of a typology by "generations". In Spain, education is

obligatory from six to sixteen years of age, and is divided into two stages, primary (six school years) and secondary (ESO, consisting of four school years). This is preceded by nursery or pre-school education, with a second cycle (3-5 years), which is practically universal. After completing ESO, students can go on to the baccalaureate (the stage preceding university) or vocational training.

The classification used is as follows:

1) First Generation: schoolchildren born abroad and who arrived in Catalonia aged seven and older and who have therefore not been in the educational system from the start of their schooling;

2) Generation 1.75: schoolchildren born abroad but who arrived in Catalonia before the age of seven and who have therefore entered the obligatory educational system at the beginning;

3) Second Generation: schoolchildren born in Spain of two parents (or one, where information about only one parent is available) who were born abroad;

4) Generation 2.5: schoolchildren born in Spain, one of whose parents was born abroad and the other in Spain;

5) Autochthonous: schoolchildren born in Spain of parents also born in Spain. When there is information about only one of the parents and that parent was born in Spain, the student comes under this heading.

When analysing segregation, an equality indicator is used first, for example the segregation index,[1] which compares the distribution of a group with respect to the population as a whole. This is indicated when the population shows a high degree of diversity of origins.

$$IS = \frac{1}{2} \sum_{i=1}^{n} \left| \frac{x_i}{X} - \frac{t_i - x_i}{T - X} \right|$$

The existence of a dual education system (public and private) requires consideration of a new indicator that allows quantification of the contribution of these sub-systems to total segregation. In an approach similar to that of Jenkins et al. (2008), Vázquez (2012), and Murillo (2016), we calculate the square root index or Hutchens indicator (Hutchens, 2004), which has the property of additive decomposition and allows breakdown into subsystems or, in this case, the influence of public and private schools on segregation. The indicator is defined as

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[1] Where x_i is the population of group X in the spatial unit i; X the population of group X in the municipality; t_i, the total population in spatial unit i; T, the total population of the municipality, where n is the number of spatial units.

$$H = \sum_{i=1}^{k} \left(\left(\frac{x_{1i}}{X_1} \right) - \sqrt{\frac{x_{2i}}{X_2} \frac{x_{1i}}{X_1}} \right)$$

Here, x_{1i} and x_{2i} represent the numbers of students in the minority and majority groups in the school i, and X_1 and X_2 are the totals for these subgroups in the municipality. This is decomposed into:

$$H = H_{within} + H_{between}$$

where

$$H_{within} = \sum_{g=1}^{G} W_g H_g$$

and

$$W_g = \sqrt{\left(\frac{P_g}{P} \right) \left(\frac{R_g}{R} \right)}$$

Here, g refers to the subgroups, W_g to the influence of the subgroup g, P_g and Pr_g to the number of cases (students) in the subgroup g with regard to the majority groups P and R (public schools and private schools respectively). This has the problem of showing generally low values and also of being little known among researchers (Allen and Vignoles, 2007).

These indicators will be calculated, first, according to nationality and place of origin of the students, identified by continent. Later, the typology of immigration status is used. In the segregation index the calculations are carried out for each school year and the Hutchens index will be calculated by educational stages. The results are compared with residential segregation, using in this case students aged from 6 to 15.

The unit of analysis is the primary or secondary school. In the case of primary education there are 333 schools (166 public and 167 private). With secondary education, the presence of private schools is greater since, of the 212 concerned, 65 are public and 147 private. Two scales have been used to analyse residential segregation, namely census section (1,068 sections) and Basic Statistical Areas (AEBs) consisting of 238 areas. In this latter case, the number is closer to that of the schools.

Main Results

In the city of Barcelona and for the 2015-2016 school year, we find 176,160 students, 12.2% of whom have foreign nationality and 10.0% are foreign-born (21,525 and 17,605 respectively). A significant number of foreign students were born in Spain (47%), with percentages exceeding

75% in the early school years. However, the reverse situation is observed with secondary education where more than 90% of immigrant students are foreign-born (Figure 1, left). In this regard, the composition of these students shows that the largest group is of Asian origins (36.5%), followed by 28.5% from the Americas, 25.5% from Europe, and 9.5% from Africa. Among students of immigrant origin, however, access to nationality is important (35.4%) but with minor variations among the school years (from a minimum of 26.8% to a maximum of 43.5%). In this group, 44.8% were born in the Americas, 28.4% in Asia, 20.4% in Europe, and 6.3% in Africa.

Figure 1: Proportion of students according to immigration status in Barcelona, by school year and type of school, 2015-2016

Students of foreign nationality by place of birth

Foreign-born students by nationality
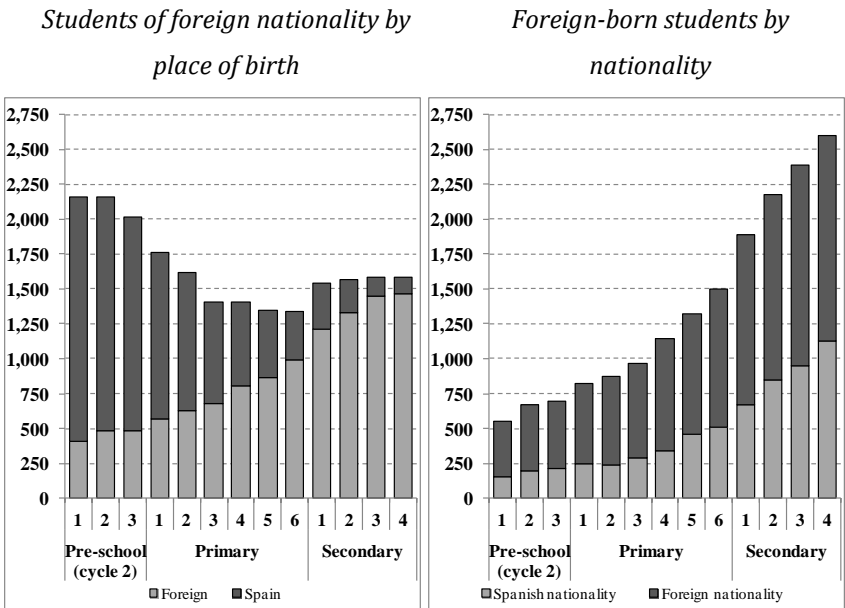
Source: Authors with Department of Education and Idescat microdata

When a distinction is made in accordance with the type of school (public or private), there is a clear overrepresentation of students in public schools (Table 1), and this is particularly the case with foreign students (20.1% of students in public schools and 6.7% of those in private schools). This is the result of the fact that two out of three foreign students attend public schools. The concentration is less depending on the place of birth (14.8% and 6.6%, respectively), except in secondary education where 28.1% of the students in public schools are immigrants by comparison with 10.2% in private schools. The paradox hidden behind these figures can be interpreted through two processes, which will later be observed in more detail: the segregation of some origins, independently of place of birth, in the first case, and the concentration of newly arrived students in just a few secondary schools, in the second.

Table 1: Students according to nationality, country of birth, and immigration status in Barcelona, by educational stage and type of school

	By nationality								
	Public school			*Private school*			*All students*		
	Foreigners	Total	(%)	Foreigners	Total	(%)	Foreigners	Total	(%)
Pre-school (second cycle)	4,314	18,011	24.0	2,032	21,895	9.3	6,346	39,906	15.9
Primary	6,109	34,915	17.5	2,796	46,952	6.0	8,905	81,867	10.9
Secondary	4,142	19,592	21.1	2,132	34,795	6.1	6,274	54,387	11.5
Total	**14,565**	**72,518**	**20.1**	**6,960**	**103,642**	**6.7**	**21,525**	**176,160**	**12.2**
	By country of birth								
	Public school			*Private school*			*All students*		
	Immigrant	Total	(%)	Immigrant	Total	(%)	Immigrant	Total	(%)
Pre-school (second cycle)	1,061	18,011	5.9	861	21,895	3.9	1,922	39,906	4.8
Primary	4,169	34,915	11.9	2,457	46,952	5.2	6,626	81,867	8.1
Secondary	5,508	19,592	28.1	3,549	34,795	10.2	9,057	54,387	16.7
Total	**10,738**	**72,518**	**14.8**	**6,867**	**103,642**	**6.6**	**17,605**	**176,160**	**10.0**
	By migratory status (with relation to migration)								
	Public school			*Private school*			*All students*		
	Non-authoctonous	Total	(%)	Non-authoctonous	Total	(%)	Non-authoctonous	Total	(%)
Pre-school (second cycle)	8,448	18,011	46.9	5,595	21,895	25.6	14,043	39,906	35.2
Primary	14,113	34,915	40.4	9,743	46,952	20.8	23,856	81,867	29.1
Secondary	8,507	19,592	43.4	7,206	34,795	20.7	15,713	54,387	28.9
Total	**31,068**	**72,518**	**42.8**	**22,544**	**103,642**	**21.8**	**53,612**	**176,160**	**30.4**

Source: Authors, with Department of Education and Idescat microdata.

Figure 2: Proportion of students according to immigration status in Barcelona by school year and type of school, 2015-2016
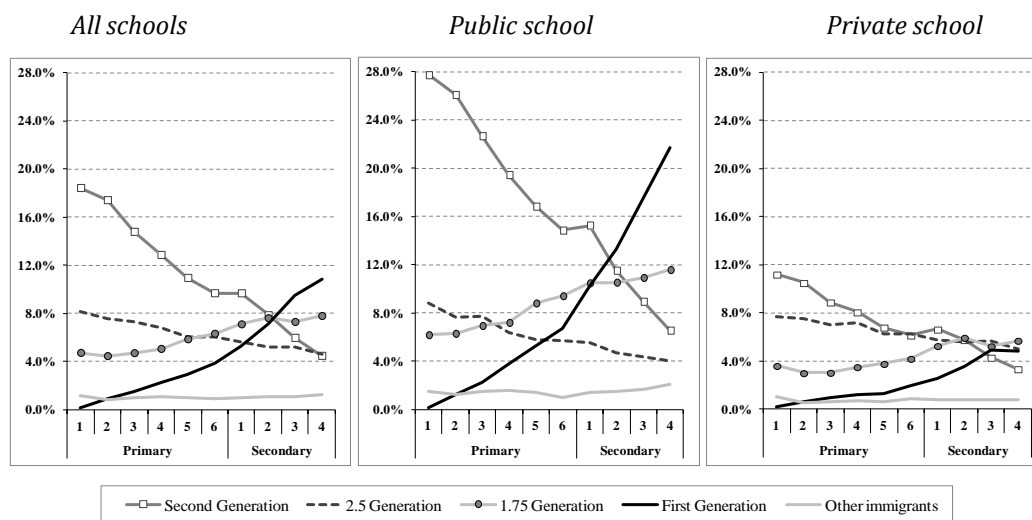
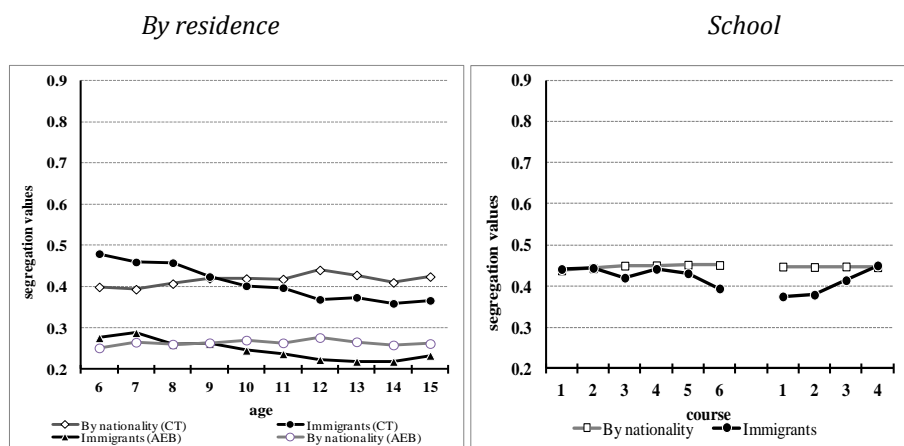Source: Authors, with Department of Education and Idescat microdata.

The number of students related with the migratory process rises to 53,612 or 30.4% of all students when the immigration status typology is used (Table 2). By educational stages, the numbers are 14,043 for pre-school (35.2%), 23,856 for primary (29.1%), and 15,713 (28.9%) for secondary. By type of school, the gap between systems continues to grow, with 42.8% of the students in public schools and 21.7% in private schools. These percentages are the result of a composition where not all the categories have the same weight. With the private school, for example, Generation 2.5 (for which one of the parents is autochthonous) represents one third of

the students of immigrant origin, when in public schools the figure is less than 17%. In this regard, it is notable that 69.3% of the first generations attend public schools by comparison with 33% of autochthonous students.

School and residential segregation in Barcelona

The levels of segregation for both schools and residence at these same ages show medium or even low values. If the values calculated by census section are taken, in terms of nationality, segregation at school (especially in primary school) is always greater while, in terms of origin, it is greater in secondary schools, to the extent of being eight points higher in the final year. This fact coincides with the recent arrival of many of these students. If the AEBs are taken as a reference, with a number of units similar to that for schools and therefore with more comparable values, residential segregation is always higher, which means that it can be stated that the levels of segregation in schools are greater.

Figure 3: School segregation by nationality and origin, Barcelona, 2015-2016
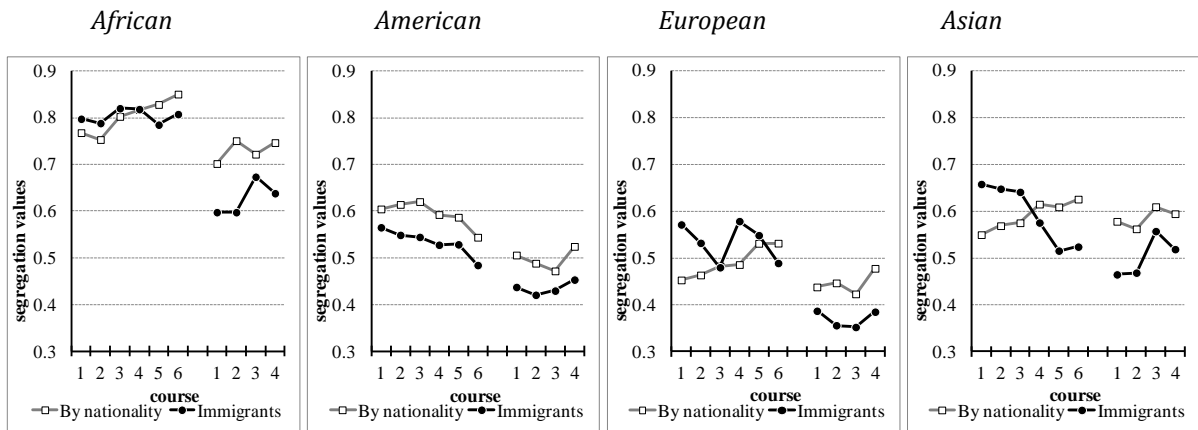

Source: Authors, with Department of Education and Idescat microdata.

If students are grouped by continent of nationality or origin, and segregation is compared between school and residence (by BSA or census tract), some of the results are interesting. First, and comparing the shape of the graphs, it can be stated that there is a clear correlation between school and residential segregation since the dynamics between years or courses are similar for all the cases. In general, the figures are always higher for residence if the census section is used, owing to the fact that groups with few members and a high number of territorial units are being analysed. In this case, the comparison is more pertinent if AEBs are used. Here, segregation is always greater in schools. Beyond the classical problem of number of units, it can be observed how higher values for Africans or segregation of descendants of immigrants from the Americas are similar for residence and school. School segregation is therefore partly explained by residential segregation. However, some phenomena diverge, for example increased school
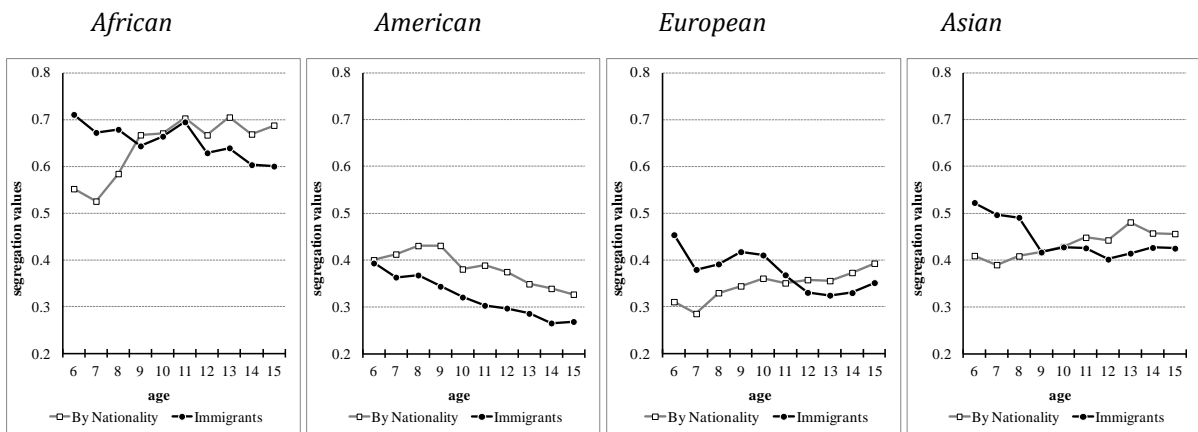
segregation in the last year of secondary school, which is observed in the cases of some schools but without being reflected in the territory.

Figure 4: School and residential segregation by continental origin and nationality: school year 2015-2016
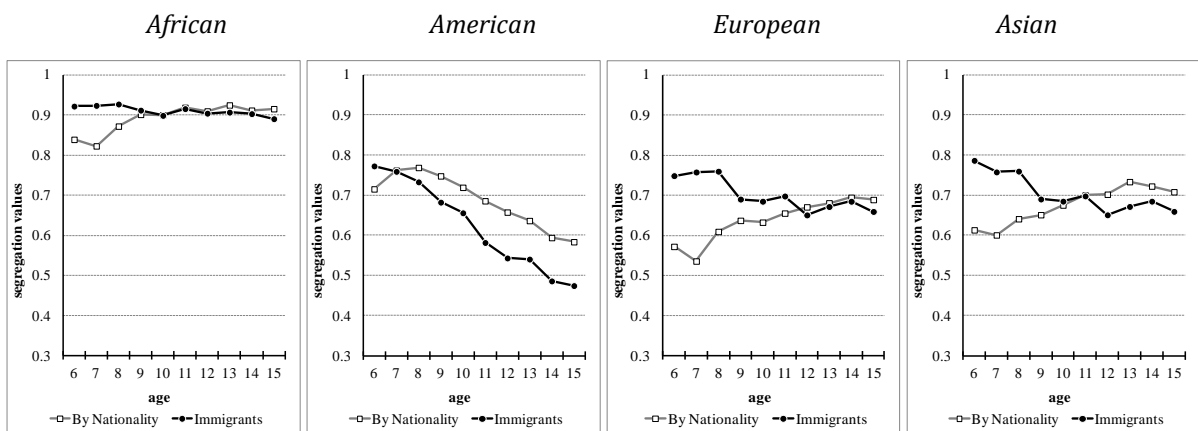
School Segregation

Residential Segregation (Basic Statistical Area - BSA)


Residential Segregation (census tract)

Source: Authors, with Department of Education and Idescat microdata.

Segregation according to immigration status

Using immigration status offers a new reading of segregation that complements the partial views provided by data by origin and nationality. Hence, segregation shows very different intensities according to typology. For first-generation students, segregation reaches its highest levels, even as much as twice those observed for the 2.5 Generation. These values are situated at around 0.5 (in the first school years there are few students) and they rise significantly in the last school year. There is a considerable distance from Generation 1.75, indicating both greater territorial concentration of students arriving in Barcelona and also bad management of year-round enrolment, which is to say allocation to schools of students who frequently arrive when the school year has already started. It is important to note, too, how the second generation experiences levels of segregation that are even higher than those for students of Generation 1.75. This is a matter of concern when 60% of these students have Spanish nationality and when socioeconomic differences as well as statistical invisibility can partly explain these values.

Figure 4. School segregation according to immigration status, school year 2015-2016
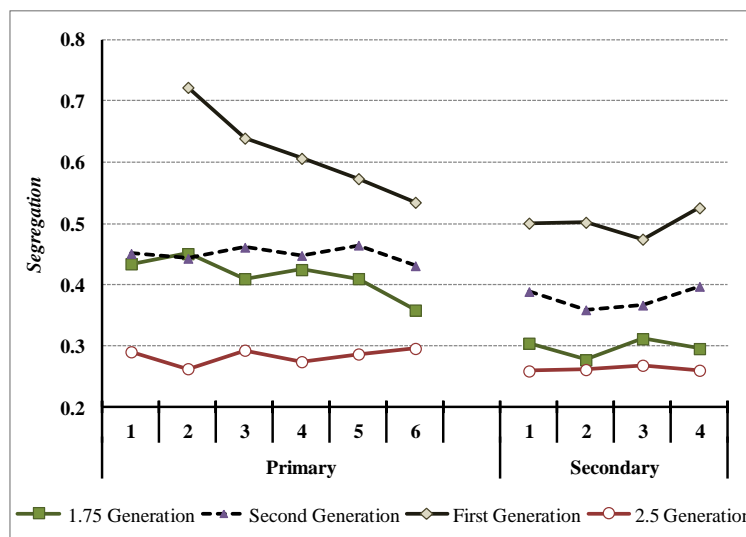
Source: Authors, with Education Department and Idescat microdata.

Segregation and public and private schools

The existence of a dual education system makes it necessary to evaluate segregation bearing this fact in mind. The Hutchens index makes this possible. The figures provided are significantly lower than those calculated with segregation indicators but, in this case, their reading is of interest when focusing on what happens between the education systems. Calculations have been made in keeping with a distinction between the primary and secondary educational stages (Table 2) and also adding calculations according to nationality and country of birth, and by the four categories related with immigration.

The first results indicate that:

- In primary education there is greater segregation by nationality than by place of birth. In public schools, both categories show similar segregation but segregation by nationality is more pronounced in private schools.

- Unlike the segregation index, segregation increases in secondary schools.

- In private schools, segregation is greater, except for Generation 2.5.

- There are considerable differences in segregation between the first generation and Generation 1.75, but also between the second generation and Generation 2.5.

- A third of the segregation occurs between the school systems while, within the systems, it is more intense in private schools.

Table 2. School segregation (Hutchens index) by students according to educational stage, Barcelona

Primary school

		H intra-subsystems						H inter-systems
		Public			Private			
	H total	*H gross*	*Weight*	*Contribution*	*H gross*	*Weight*	*Contribution*	
Nationality	0.1576	0.0891	0.5204	0.0464	0.1550	0.4359	0.0676	0.0437
Country of birth	0.0985	0.0700	0.5071	0.0355	0.0819	0.4682	0.0384	0.0246
First Generation	0.1866	0.1103	0.5423	0.0598	0.2080	0.4179	0.0869	0.0398
Generation 1.75	0.0796	0.0654	0.5044	0.0330	0.0577	0.4765	0.0275	0.0191
Second Generation	0.1337	0.0745	0.5036	0.0375	0.1333	0.4618	0.0616	0.0346
Generation 2.5	0.0393	0.0654	0.4338	0.0284	0.0369	0.5661	0.0209	-0.0099

Secondary school

		H intra-subsystems						H inter-systems
		Public			Private			
	H total	*H gross*	*Weight*	*Contribution*	*H gross*	*Weight*	*Contribution*	
Nationality	0.1714	0.0884	0.4604	0.0407	0.1487	0.4803	0.0714	0.0593
Country of birth	0.1165	0.0789	0.4348	0.0343	0.0704	0.5197	0.0366	0.0456
First Generation	0.1819	0.1016	0.4783	0.0486	0.1451	0.4544	0.0659	0.0673
Generation 1.75	0.0482	0.0233	0.4270	0.0100	0.0393	0.5567	0.0219	0.0164
Second Generation	0.0957	0.0297	0.4339	0.0129	0.1150	0.5462	0.0628	0.0199
Generation 2.5	0.0413	0.0465	0.3424	0.0159	0.0372	0.6567	0.0244	0.0009

Source: Authors, with Department of Education and Idescat microdata.

First Conclusions

- School segregation and residential segregation are related, with similar patterns in the evolution of school years and ages. Nevertheless, increased segregation occurring in some cases in the final year of school is only reflected in the school but not in the territory.

- The results support the idea that analysis according to immigration status offers an important element of interpretation when trying to ascertain the real scope of the dynamics of segregation. Observing the student body from the standpoint of nationality selects students, and the most represented are those who have just arrived as well as descendants of some immigrants of specific origins, especially Asian and African. The typology used allows accurate analysis of students defined by the migratory process and makes it possible to visualise its effects on segregation.

- There is a high degree of segregation among first-generation students, which is explained by their concentration in public schools and, among them, in certain secondary schools. The management of students who enter the secondary school system is deficient and is the cause of high degrees of segregation.

- The higher degree of segregation of the second generations testifies to transmission of poverty from progenitors to their descendants.

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