Investigating school mix effects in french secondary schools

A quantitative and qualitative research

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In France, school has a statistic and significant influence on pupils achievement, at the level of the "collège" (junior secondary schools) (Duru-Bellat & Mingat, 1988), and at the level of the "lycée" (upper secondary schools) (Le Bastard-Landrier, 2002). When investigating this school effect in Anglo-Saxons countries, Thrupp (1999) suggests that « many school processes which have been identified as contributing to student achievement may be less independent of school mix than researcher have typically allowed ». Opdenakker & Van Damme (2001) confirm that there are important relationships between pupils' SES and school process variables in Belgium secondary schools. Until now, no such studies have been carried out in France. To fill this gap, an exploratory research has been undertaken recently in secondary schools.

This communication presents results of the assessment of social mix impact (and not academic mix impact) on pupils achievement in French upper secondary schools. This study develops both a quantitative and qualitative approach around two questions: are there significant school mix effect at the secondary level, and, if any, what are the processes through which social mix might exert its effects.

The quantitative analysis is based on a small sample of schools which more than 2000 pupils in the first year[2] of upper secondary schools. Considering constraints relative to this research (social and politic context in France), it was not possible for us to collect data on pupils achievement on the basis of common tests. So, pupils grade averages (out of report card) in french and mathematics were collected with the aim to control possible grading biais within schools. For this reason, we collected also results of nationals evaluations at year 10 which are perfectly comparable between schools. Because some schools did not answer, we restrict the analysis to 11 schools and 950 pupils.

Moreover, to identify the processes through which social mix might have an influence, a qualitative study has been undertaken. We carried out interviews with headmasters (about

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[2] In France, « classe de seconde », or K10 in the United States, or 5th grade in the UK..

their role, the stability of the teaching staff, pupils' characteristics…). Questionnaires were submitted to pupils (concerning peer's relationships, attitudes with respect to authority in schools…). Last, we made observations within the schools surveyed, about quality of buildings, classrooms, etc...

In a first time, we will present quantitative analysis results by focusing on assessment of the social mix influence on pupils achievement in french and mathematics. In a second time, we will present some results of the qualitative study concerning differences of pupils perception and behaviour within socially contrasted schools.

1) Social mix effect on pupils' performances in french and mathematics

To characterise schools and to assess the impact of the social mix, it was necessary to identify social groups in schools. In our sample, there are around 35% of both « high SES pupils[3] » and « low SES pupils ». Although table 1 shows a large dispersion, [for instance from 9% to 40% of high SES pupils in the sample], the social composition of schools is even more contrasted in the country.

Table 1 : Social composition of the schools of the sample.

Pupils (%)	Minimum	Maximum	Mean	Standard deviation
High SES	09	40	35	06,3
Mean SES	13	41	30	08,9
Low SES	19	54	35	10,3

Then, we built a typology which characterises the secondary schools social composition public. As our sample is small and not particularly contrasted, it was not easy. Observing that schools are distributed according to the « normal curve », we decided to qualify the 25% of secondary schools including the higher number of high SES pupils as « privileged » schools. In the same way, we considered that the 25% of secondary schools including the higher

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[3] High SES pupils : managers, intellectual professions, teachers, doctors… ; Low SES pupils : unemployment, unknown profession, worker… ; Mean SES pupils: employee, shopkeeper, craft.

proportion of pupils of popular families, as socially "disadvantaged" schools. The remaining schools are considered as socially heterogeneous schools. However, this measure of heterogeneity is approximative. For this reason, a dissimilarity index[4] defined previously (Duru-Bellat & Piquée, 2003) has been estimated to provide a continuous measure of social heterogeneity of schools.

By contrast to study conducted in primary schools (Duru-Bellat & Piquée, 2003) this analysis is conducted at the school level and not at the classes level. Indeed, research shows that in France the school effect is more important at the secondary than at the primary level. We can therefore assume that school mix impact is stronger at this level.

To assess a possible effect of the social mix, we computed regression linear models[5] explaining pupils' progress during the year, on the basis of their own individual characteristics. Every model presented here uses the same individual control variables, namely, initial grade average, gender, age and social background of pupils.

In a first step, we introduced the school variable in the models. The results show that the secondary school contributes slightly, but significantly, to explain the progress of the pupils (2,26 % in french and 3,97 % in mathematics). This is in agreement with previously published results using the same method in France (Duru-Bellat & Mingat, 1988, Duru-Bellat, Jarousse & Mingat, 1992, Felouzis, 1997).

In a second step, we substituted social mix to schools : as school explains a small part of the variance of achievement, we would expect a very limited contribution of the social mix. Actually, we observed that this contextual characteristic exerts a significant influence and represents 11% of the school effect in french and 29% in mathematics. Thus, social mix explain a sizeable part of the school effect.

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[4] The dissimilarity index assessing the percentage of pupils of one social group which would have to be removed from a school to achieve no social segregation.

[5] Linear regression models have a major disadvantage because they do not distinguish in the progress the school effect and the class effect. Multilevel models should be more adapted but the size of the sample is to small.

Table 2 : Percent of final grade average variance explained by regression linear models

Models	French	Maths.
1) School effect		
Final grade average = f (initial grade average, gender, social background, age)	50,46	57,29
Final grade average = f (initial grade average, gender, social background, age, schools)	52,72	61,26
% of variance of the final grade average explained by the secondary schools	**2,26%**	**3,97%**
2) Social mix effect		
Final grade average = f (initial grade average, gender, social background, age, % high SES pupils)	50,67	57,37
Final grade average = f (initial grade average, gender, social background, age, % low SES pupils)	50,69	57,51
Final grade average = f (initial grade average, gender, social background, age, posh and disadvantage schools)	50,68	58,19
Final grade average = f (initial grade average, gender, social background, age, dissimilarity index)	50,71	58,45
% of the school effect explained by the social mix	**11,1%**	**29,2%**

Analysis of the school mix impact reveals that in french, the share of high SES influences positively pupils final grade average (+0,01 for a percentage point significant at .05). The share of low SES has a reverse effect (-0,01 for a percentage point significant at .05).

Although these coefficients are modest, simulations show that the differences in term of results are perceptible : for example, a pupil who has an initial average grade of 12 out of 20 in french, who has never repeated, attending a secondary school with :

- 20% of high SES pupils will have a final average grade of 11,1/20.
 Or with :
- 70% of high SES pupils will have a final average grade of 11,6/20.

In mathematics, only disadvantaged pupils percentage influences in a significant and negative way the final grade average of pupils (-0,01 significant at .05).

In other models, we introduced, as alternative measure of the social mix, the social typology of schools. We obtained the following results :

Table 3 : effect of the social mix on the individual progress in French and mathematics.

Reference	Active	French		Mathematics	
		Coef.	T	Coef.	T
Boys	Girls	0,30	***	-0,28	*
Initial average		0,68	***	0,76	***
Other	Father from high SES	0,05	Ns	0,45	**
Number of year repeated		-0,63	***	-0,76	***
Disadvantage schools	Privileged schools	**0,30**	**	**0,52**	.01
	Mixed schools	0,05	Ns	**0,90**	.01
R2 (percent of variance explained)		50,68		58,19	
Intercept		3,04	***	1,65	***

In french, " other things being equal ", pupils attending a high SES school realise more progress than those attending a school with a low SES population. In mathematics, pupils attending a high SES school progress significantly more than pupils of the popular schools. Moreover, they progress less than those in the socially mixed schools. Finally, pupils attending a socially mixed school progress also significantly more than pupils of disadvantaged schools.

To investigate more precisely the influence of the social mix, we characterised every school by the dissimilarity index used at the primary level (Duru-Bellat & Piquée, 2003). The variety of the schools in this respect is striking : it varies from 6% to 45%, around an average of 24%. This indicator was introduced into the model explaining the pupils' academic progress in French and in mathematics. One notices a negative effect of this index : the higher the number of pupils to be moved, the less important is the progress. This result demonstrates a positive effect of the heterogeneity of the social mix on pupils' progress. It should be noted however that the percent of explained variance is very low [0,25% in french and 1,16% in mathematics].

Table 4 : effect of the dissimilarity index on the individual progress in french and mathematics.

	French		Mathematics	
	Model 1			
R2 (percent of variance explained with control variables)	50,46		57,29	
	Model 2			
Dissimilarity index	**-0,01**	******	**-0,05**	*******
R2 (percent of variance explained in introducing the index)	50,71		58,45	

Despite, the limits inherent in the data (small sample, progress assessment by grade), it remains interesting to search processes through which this school mix effect is generated.

2) A qualitative approach to explain the social mix impact

The qualitative part of this research focuses on relations between the social mix impact and pupils attitudes. As at the primary level, we did not find major differences on pupils attitudes according to schools social mix. But, some differences can be underlined :

First of all, pupils ambition level varies significantly according to their social background and the school social composition : privileged schools pupils consider following higher studies longer than disadvantaged schools pupils (significant at .01). In the same way, high SES pupils expect to follow studies longer than low SES pupils (significant at 01). We can also underline a combination of these effects : low SES pupils of disadvantaged schools have the lowest level of aspiration [3,6 years] and high SES pupils of privileged schools have the highest level of aspiration [4,6 years].

Pupils have also more or less self-confidence according to their social background and the social mix in the school they attend : the highest SES origin of pupils, and the more privileged the school population, the more they think be able to pass the « baccalauréat » (the exam of the end of upper secondary schools in France) at their first attempt. Low SES pupils seem most sensitive to the school mix : they are 65% to think pass their exam at their first attempt when they attend a popular school, against 81% in privileged schools.

Table 5 : pupils % who think they will pass the « baccalauréat » at their first attempt.

	Privileged schools	Mixed schools	Disadvantage schools	% average
High SES pupils	83,4	78,3	77,2	**80,5**
Average SES pupils	73,0	75,5	67,3	**72,4**
Low SES pupils	81,0	70,3	65,2	**71,8**
% average	**80,4**	**74,2**	**68,4**	**75,0**

Pupils pass a positive judgement on their schooling in their school, all the more when social mix is high (significant at 01). Results similar was observed in the primary education (Duru-Bellat & Piquée, 2003). Moreover, privileged schools pupils think more than others that their results would be better if they were in another class in the same school : it can be explained by the fact that streaming would be more frequent in this type of school.

Table 6 : % of pupils who think that their results would be better in an other class.

	Privileged schools	Mixed schools	Disadvantaged schools
%	**31,6**	19,9	23,9
Number	183	143	66

However, disadvantaged schools pupils think clearly that their results would be better if they were attending an other school.

Table 7 : % of pupils who think that their results would be better in another school.

	Privileged schools	Mixed schools	Disadvantaged schools
%	**16,1**	26,3	**35,8**
Number	93	188	97

A further result illustrates the operation of a social comparison mechanism : low SES and privileged schools pupils tend more often to consider that their peers have a social and school experience better than theirs. These two tendencies combine: low SES pupils of privileged schools are more sensitive to this social comparison and high SES pupils of disadvantaged schools are the least sensitive.

Table 8 : Peers comparison score (sum of 6 items).

	Privileged schools	Mixed schools	Disadvantaged schools	Average
High SES pupils	1,8	1,5	1,2	**1,63**
Average SES pupils	1,9	2,0	1,8	**1,94**
Low SES pupils	2,2	2,1	1,9	**2,10**
Average	**1,95**	**1,91**	**1,70**	**1,90**

At last, no difference is observed between pupils of contrasted schools concerning « the exercise of the pupils' profession » the rules of which seem to be assimilated by all (they declare to do one's homework, to follow the rules of conduct, to know teachers expectations…).

To conclude, we can say that social mix does influence academic self concept of students. It may be one among other explanation of the school mix effect observed at that level of schooling.