

Cultural Diversity in the Classroom and its Effects on Academic Performance

A Cross-National Perspective

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Abstract. Drawing on data from the Organization for Economic Cooperation and Development's Program for International Student Assessment (OECD/PISA), we examined the relationship between the percentage of immigrant students and the reading and mathematics performances of native and immigrant students across nations. In line with research on cultural diversity, results indicated performance benefits as the percentage of immigrant students increased across nations. Interestingly, these effects remained significant for both native and immigrant students, once several other predictors of test performance at the national, school, and individual levels were controlled for. These findings challenge the assumption that the increasing presence of immigrant students in educational institutions represents a threat to native students' academic performance. Potential mechanisms are proposed and discussed, offering new avenues for research.

Keywords: racial diversity, native and immigrant students, performance benefits

In Europe, the presence of immigrant students in educational institutions generates considerable debate and controversy. For example, in Germany and Switzerland, some politicians emphasize the high proportion of immigrant students in their nation as one reason of the poor results of native students on international comparative standardized tests, such as PISA 2000 (Ammermüller, 2007). Along a similar line, representative surveys indicate that 52% of Europeans believe that the higher the percentage of immigrant students in a school, the lower the quality of education (Thalhammer, Zucha, Enzenhofer, Salfinger, & Orgis, 2001). In sum, at least in Europe, people seem to hold a negative belief about the presence of immigrant students in educational institutions. But is there really a relationship between the relative proportion of immigrant students and the performance of native and immigrant students across nations? The present study sets out to answer this question.

Several studies have attempted to examine the effects of cultural diversity on performance. In their review of the literature, Moreland, Levine, and Wingert (1996) argued that diversity is associated with both positive and negative outcomes. On the one hand, negative impacts of diversity concern group cohesion and conflict (see De Dreu & Weingart, 2003); on the other hand, the positive impact of diversity relates to superior group performance (Sommers, Warp, & Mahoney, 2008). To illustrate, an experiment by

Antonio et al. (2004) indicated that racial diversity has positive effects on "complex thinking." Similarly, McLeod, Lobel, and Cox (1996) found that racially diverse groups performed better on an idea-generation task than did racially homogeneous groups. Recently, Sommers et al. (2008) also found that White students who expected to discuss something with a racially diverse group exhibited better reading comprehension than did Whites assigned to all-White groups.

These effects suggest that cultural diversity has positive effects on performance. The existing evidence, however, is largely restricted to a single cultural context (i.e., the United States). Moreover, very few studies have examined the effects of cultural diversity on performance using standardized tests. Therefore, little is known to date about how the relative proportion of immigrants in a nation relates to the performance of native and immigrant students on standardized tests. For instance, the Organization for Economic Cooperation and Development's Program for International Student Assessment (OECD/PISA, 2006) found a negative correlation between the percentage of immigrant students overall (first-generation and second-generation) within each country and the performance gaps between these students and their native counterparts (correlation rate = $-.56$). That is, performance gaps between immigrant and native students tend to be smaller in countries with a relatively

Table 1. Performance scores as predicted from the percentage of immigrant students in PISA 2000, 2003, and 2006

Performance scores	Correlation with relative proportion of immigrant students in each country		
	2000	2003	2006
Native students in mathematics	.38* (31)	.50** (22)	.33** (57)
Native students in reading	.39* (31)	.30 + (22)	.36** (57)
Native students (combined score of mathematics and reading)	.38* (31)	.45* (22)	.35** (57)
Immigrant students in mathematics	.45* (18)	.68** (22)	.45** (35)
Immigrant students in reading	.34 + (18)	.49* (22)	.37* (35)
Immigrant students (combined score of mathematics and reading)	.39* (18)	.62** (22)	.48** (35)

Note. Entries are Spearman (rho) correlation coefficients. Sample sizes appear in parentheses. Because the sample size of countries was small and the directions of hypothesized effects were specified on the basis of preexisting theory, we used one-tailed tests to assess the significance of correlational results. + $p < .10$. * $p < .05$. ** $p < .01$. Note that the sample size of countries differs between natives and immigrants because data for the latter group are not available for all countries participating in each PISA survey.

Table 2. Native and immigrant students' performance as predicted from the percentage of immigrant students in PISA 2003 after controlling country, school, and individual level variables

Predictors	Native students			Immigrant students		
	B	t	p <	B	t	p <
GDP index	94.84	1.08	.32	570.47	2.63	.06
Education index	838.19	5.43	.01	372.03	.77	.48
School resources index	690.34	13.33	.0001	220.78	7.73	.001
Socioeconomic status index	135.24	6.24	.001	83.05	7.71	.001
Parents' level of education	34.67	17.64	.0001	5.76	2.98	.05
Attitude toward school	34.38	4.94	.01	200.34	9.31	.001
Age at arrival	—	—	—	17.48	5.03	.01
Proportion of immigrant students in each country	3.90	11.86	.001	1.97	2.14	.08

higher proportion of immigrant students. However, this correlation does not tell us much about the relationship between the percentage of immigrant students and the performance of both native and immigrant students, taken independently. In addition, the relationship is reported without attempting to provide any psychological reasons why the performance gaps between immigrant and native students is smaller in countries with a higher percentage of immigrants. Drawing on previous efforts – and using cross-national data from OECD/PISA – we sought to shed more light on this important issue.

There are several theoretical reasons to predict that the relative proportion of immigrant students in a nation would affect the performance of native and immigrant students. In fact, cultural diversity may affect the performance of native and immigrant students through similar or different mechanisms. For instance, experimental studies on minority influence indicate that the presence of a few group members who hold opinions that are different from those of the majority leads to increased reasoning and creativity (e.g., Butera, Mugny, Legrenzi, & Pérez, 1996; De Dreu & De Vries, 2001; Nemeth, 1992, 1995; McLeod et al., 1996; Triandis, Hall, & Ewen, 1965). In this respect, it is generally assumed in the literature that heterogeneity of individuals involves heterogeneity of ideas (Doise & Mugny, 1984; Mannix & Neale, 2005). Thus, cultural diversity

might improve performance of both majority and minority group members through the same mechanism, by promoting divergent thinking in *all* students (see Antonio et al., 2004, for a similar reasoning).

However, cultural diversity might also affect the performance of native and immigrant students through processes that are entirely different. Research suggests, for instance, that immigrant students may suffer less from the negative effects of solo status (Saenz, 1994) and from threatening ingroup stereotypes (Steele & Aronson, 1995) as the relative proportion of immigrant students increases in the classroom (see Sekaquaptewa & Thompson, 2002, 2003). Indeed, minority group members may feel less visible, more competent, and more confident in culturally diverse educational environments than in more homogeneous environments. In the same way, immigrant students may cooperate with other immigrant students on school tasks in culturally diverse environments. Thus, the performance of immigrant students may increase as their relative proportion in the classroom increases.

At the same time, the increase of the percentage of immigrant students may boost the performance of native students by making group-relevant factors salient in the evaluative context (Danso & Esses, 2001; Sommers et al., 2008; Walton & Cohen, 2003). For instance, Sommers et al. (2008) found that race-related thought activation medi-

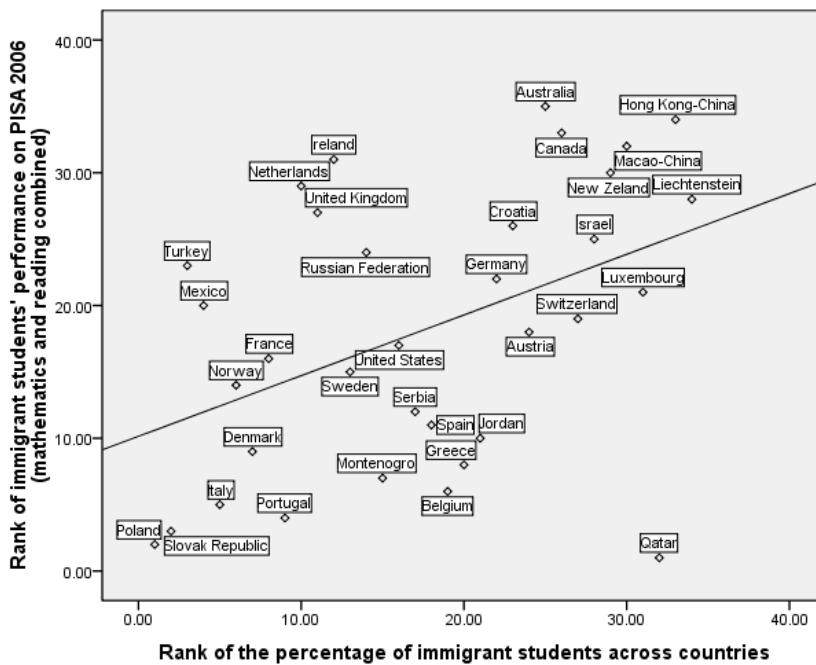


Figure 1. Rank of the performance of immigrant students in PISA 2006, as predicted by the percentage of immigrant students in 35 nations.

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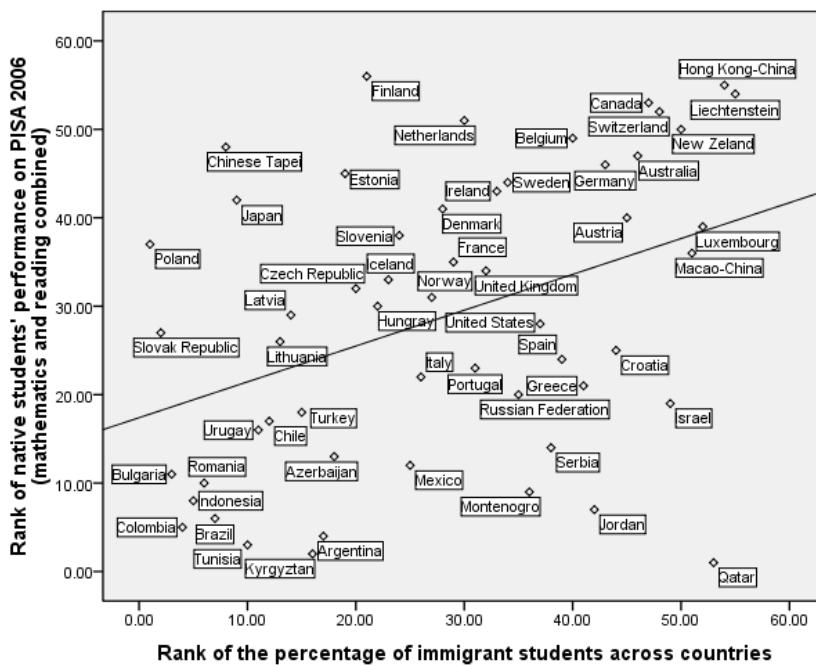


Figure 2. Rank of the performance of native students in PISA 2006, as predicted by the percentage of immigrant students in 55 nations.

ated the positive effect of racial diversity on Whites' performance. Also, native students may perform better in racially diverse environments because such environments foster motivations to maintain the ingroup in a dominant position. Previous research provided support for this interpretation. For instance, Danso and Esses (2001) showed that the desire to maintain hierarchical relations among social groups (i.e., social dominance, Pratto, Sidanius, Stallworth, & Malle, 1994) was positively associated with the

performance of Whites in the presence of a Black – but not in the presence of a White experimenter (see also Chatard, Selimbegović, & Konan, 2008; Chatard, Selimbegović, Konan, & Mugny, 2008).

In sum, several lines of work suggest that the performance of both native and immigrant students should increase as the relative proportion of immigrant students increases. Such a finding is of interest, inasmuch as it may extend and generalize to performance on standardized

scores, as assessed in nationally comparative examinations. Therefore, the present study tests whether the percentage of immigrants in a country predicts the performance of both immigrant and native students. Moreover, we also examine whether this relation remains significant once the relative weight of other known determinants of test performance of both immigrant and native students is controlled for. Indeed, previous research showed that the performance of both groups of students is associated to their family and own characteristics on the one hand, and to the characteristics of schools they attend on the other. At the family and individual levels, numerous studies have pointed out that the performance of both immigrant and native students is affected by the socioeconomic and educational backgrounds of their parents (Ammermüller, 2007; Bauer & Riphahn, 2004; Gang & Zimmerman, 2000; Marks, 2005; OECD/PISA, 2006; Schnepp, 2007). A second category of studies emphasizes the role of cultural factors such as students' attitudes toward school and education (Kao & Thompson, 2003; Sullivan, 2001), although results seem to be mixed in this regard (Driessen, 2001). Third, yet another line of research pointed toward the age of arrival of immigrants in the host country as an important determinant of their academic achievement and school performance (Chiswick & DebBurman, 2004; Cortes, 2006; Gonzales, 2003). At the school level, it has been shown that the quality of school infrastructures and educational resources plays an important role in students' performances (OECD-PISA, 2001, 2006, 2007). Finally, it seems that the overall economic and educational levels of countries play a significant role in students' performances on international tests (OECD/PISA, 2001, 2006, 2007).

The present study examines the relationship between the percentage of immigrant students in various countries and the performance of immigrant and native students. In line with our theoretical reasoning, we expected a positive relationship between these two variables, one that would also hold after controlling for the aforementioned factors related to performance.

Method

Sampling Techniques and Measures

For this study, we used 3-wave data (2001, 2006, and 2007) from the OECD/PISA survey. PISA is a well-known internationally representative program that examines the achievement of 15-year-old students in mathematics, reading, and science in various countries.

A total of 32 countries participated in PISA 2000 – 28 OECD countries and 4 partners. PISA 2003 was conducted in 40 countries, which included 29 OECD countries and 11 partners. Finally, 57 countries participated in PISA 2006,

with 29 OECD countries and 25 partners¹. In each country, survey organizers collected a representative sample. In doing so, the PISA countries used a two-stage sampling procedure. First, 150 schools in which 15-year-old students were enrolled were randomly selected in each country. In countries in which there were not so many schools, all schools were selected. Second, 35 of the 15-year-old students were randomly selected in each school. As in the case of school selection, when there were less than 35 15-year-old students in the school, they were all selected. With this sampling procedure, more than a quarter of a million students participated in PISA 2000 and PISA 2003, and some 400,000 took part in PISA 2006.

Participants completed a set of standardized pencil-and-paper tests. The items included open-ended and multiple-choice questions. In each school, the survey organizers summed up the number of points obtained by each participant as the index of his or her performance. In each country, scores of all participants in each key subject were scaled to have a single mean score for immigrant and native students, respectively. For instance, the performance of immigrant students on mathematic literacy in PISA 2006 ranged from 380 (Qatar) to 530 (Australia), whereas native students was ranged from 380 (Qatar) to 554 (Hong Kong-China). After the completion of the main test, participants answered a background questionnaire, which included questions about the socioeconomic and cultural status of their families, their parents' level of education, and their own attitudes toward education and school. In addition, each school's principal answered a wide range of questions about the school and about his or her perception of factors potentially impeding instruction at school.

Percentage of Immigrants

We collected the percentage of first-generation immigrant students within each country included in the PISA database (OECD, 2001, 2006, 2007). First-generation immigrant students were foreign-born as well as both of their parents. Native students had at least one parent born in the country of assessment.

Dependent Variables

Two educational outcomes were examined in this study: reading and mathematics performance. To do this, we collected the mathematics and reading performance of the native and first-generation immigrant students in each country (OECD, 2001, 2006, 2007).

¹ The detailed lists of countries for each PISA survey are available from the first author.

Controlled Variables

Country Level Predictors

At the country level, we controlled for the *gross domestic product (GDP) index* and the *educational index*. GDP is an indicator of a country's wealth. It is calculated using adjusted GDP *per capita* (PPP US\$). The educational index measures a country's relative achievement in adult literacy and combined gross enrolment in primary, secondary, and tertiary schools. We collected both measures from the Human Development Report (United Nations Development Program, 2000, 2003, 2006).

School Level Predictors

At the school level, we controlled for the *school resources index*, based on school principals' perceptions of factors potentially impeding instruction at school. School resources were measured by seven items (instructional material, computer for instructions, computer software for instruction, calculators for instructions, library material, audiovisual resources, and science laboratory equipment and materials). School principals indicated their responses using a 4-point scale with the categories *not at all, very little, to some extent and a lot*.

Individual Level Predictors

We controlled for predictors of performance at the individual level, described below. All individual predictors are based on students' self-reports. The *index of socioeconomic and cultural background (SES index)* was created to capture relatively wide aspects of students' family and home background, in addition to their parental occupation. Students were asked to report the occupations of their fathers and mothers as well as the educational level attained by each of them. They were also asked to indicate whether they had a desk at home to study, a room of their own, a computer, an Internet connection, their own calculator, books to help with their homework, and a dictionary. *Parents' level of education* is indicated by the number of years of schooling. The level of education of the most educated parent is taken as an index of students' parental educational level in PISA surveys. The *attitudes toward school index* is derived from students' self-reported agreement with four statements ("School has done little to prepare me for adult life when I leave school," "School has been a waste of time," "School gave me confidence to take decisions," and "School has taught me things which could be useful in a job.") Participants answered on a 4-point Likert-type scale, where 1 = *strongly agree* and 4 = *strongly disagree*. Accordingly, positive values on this index indicate a positive attitude toward school. The *age of arrival* was taken in consideration only for immigrants' performance because it has

been found to predict first-generation immigrants' academic achievement.

Results

Correlation Analyses

There was considerable variation in the relative proportion of immigrant students across countries. Because this variable was positively skewed, we report Spearman's rank correlation coefficients (ρ), summarized in Table 1.

All correlations between performance and the relative proportion of immigrant students are positive, even if some are marginal. The two marginal correlations concern students' reading performance. Their marginal size probably results from the fact that students reported being less involved in reading than in mathematics (OECD/PISA, 2006). The association between the relative proportion of immigrant students and the performance (combined mathematics and reading scores) of immigrant and native students in PISA 2003 are depicted in Figure 1 and Figure 2, which show that the proportion of immigrant students in a country is positively related to the performance of both immigrant and native students.

However, these positive relationships do not exclude the relative contribution of other variables known to be related to performance. To verify whether the observed relationship holds when the effects of the impact of other variables are controlled for, we ran regression analyses to predict native and immigrant students' performance from country, school, and individual level variables as well as the relative proportion of immigrant students in each country.

Regression Analyses

The aforementioned predictors (except for the proportion of immigrant students) are available only for PISA 2003. For this reason, the following analyses are limited to the 2003 data. There were several outliers on the percentage of immigrant students (based on Cook's distance). To minimize the potential influence of such outlying observations, and given that sample sizes were too small, we ran robust regression analyses using S-PLUS 8.0 for Windows. Robust regression techniques are a category of statistical tools designed to provide reliable results in the presence of extreme observations or for nonnormal distributions, particularly when sample sizes are too small to recode such outliers as missing variables (Hubert, 2001; Hubert & Vanden Branden, 2003). The results are shown in Table 2.

At the country level, the results are mixed: The performance of native students is not related to GDP, but it is positively related to the country's educational index. In contrast, the performance of immigrant students is positively, albeit weakly, related to GDP, but it is unrelated to

the educational index. At the school level, consistent with previous research (OECD-PISA, 2006), we found a positive relationship between material input and the academic performance of both native and immigrant students. At the individual level, our results confirm previous evidence that socioeconomic status, parents' level of education, attitudes toward school, and age at arrival (for immigrant students only) predict the performance of immigrant and native students. Most importantly for our purpose, the relationship between the percentage of first-generation immigrant students and the performance of native students remains positive and significant even when other predictors are controlled for. The fact that this relationship remains significant after the controlling the key variables suggests that it is robust. Regarding immigrant students, analyses reveal that after controlling all other variables considered in the present study, the relationship between the percentage of immigrant students in each country and their academic performance is positive and marginal.

In sum, the positive effect of cultural diversity on performance in PISA tests is quite consistent for both groups of students and across the two academic domains taken in consideration in the present study (mathematics and reading).

Discussion

The current study is an attempt to extend previous research on the effects of cultural diversity on performances. While early work has examined such effects at the individual and group levels, we looked at the national level. Furthermore, this research provides significant insights into the effects of cultural diversity on the performance of native and immigrant students on standardized tests. At variance with the common view, whereby immigration represents a threat to education (Thalhammer et al., 2001), our results indicate that the performance of both native and immigrant students benefits from the presence of immigrant students in educational institutions. These state-level findings are consistent with previous individual- and group-level research on cultural diversity (e.g., Antonio et al., 2004; Sommers et al., 2008). They also extend it from the North American context to the rest of the world, and from the specific tasks administered in previous studies to nationally standardized tests. It is worth mentioning that such tests are highly predictable of students' academic performances and trajectories (OECD, 2006). Of particular interest, the relationship between the percentage of immigrant students and the performance of immigrant and native students remains significant even when other predictive variables are controlled for. This suggests that the presence of immigrant students in academic settings is not a threat, but rather an advantage for natives' performance, over and above a number of other predictors of performance.

However, an important question remains: Why do peo-

ple, at least in Europe, hold such a (false) negative belief about the presence of immigrant students in educational institutions? We believe this is the case in part because of the negative reputation that immigrant students endure about their academic achievement. Indeed, immigrant students perform at levels significantly lower than their native peers, even after control for demographic variables (e.g., OECD, 2006). This achievement gap may lead lay persons to believe that the presence of many immigrant students impairs the global level of student achievement. Furthermore, people may not be aware that some compensatory processes may lead both native and immigrant students to perform better in culturally diverse environments.

With the data at hand, we were not able to provide any evidence about the causal mechanisms that lead to performance benefits of cultural diversity. As often happens in this kind of research (see van Knippenberg & Schippers, 2007), we have merely assumed potential mechanisms. We suggested that several processes may be at work, some of them being common to both native and immigrant students, and others more specific to each group. These mechanisms have received support in previous research. However, the precise nature of the performance benefits documented here needs further empirical examination.

With regard to the performance of native students, one plausible explanation that merits consideration is the role of the perception of symbolic ingroup threat (Esses, Dovidio, Jackson, & Armstrong, 2001; Falomir, Muñoz-Rojas, Invernizzi, & Mugny, 2004) and the desire for native students to maintain their relative advantage in educational settings (Danso & Esses, 2001). As suggested by Danso and Esses,

when members of a particular social group feel entitled to a position, and they perceive that their position is threatened, they are likely to attempt to assert their dominance in the relevant domain by working to demonstrate superior performance (2001, p. 163).

Such mechanisms may come into play, particularly in countries in which immigrants are assumed to represent a threat to natives' resources.

At a time where cultural diversity is continuously growing (OECD, 2006), an examination of the impact of immigrant students' presence on the performance is an important scientific quest. In conclusion, the present study represents a nice complement to previous reports suggesting that "high levels of immigration do not necessary impair integration" (OECD, 2006, p. 7).

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