Centre for Research and Analysis of Migration

CReAM

Discussion Paper Series

CDP No 18/13

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Abstract

According to Robert Putnam (2007) ethnic diversity in cities and neighborhoods does not lead to an increase of trust and social capital as previously predicted by intergroup contact theory (Pettigrew, 1998); instead it triggers a reaction of hunkering down that leads to a decrease in trust and social capital of both in-group and out-groups. But what happens if we focus on youngsters that are growing up in a multi-ethnic metropole, that are considering ethnic diversity as a something "normal", and that are bridging their ethnic differences by sharing a common street culture and language? In this article we use data about 905 pupils, 41 classes and 11 schools in a European metropole to confirm the hypothesis that in this specific context ethnic diversity in classrooms does lead to positive effects on educational performance.

Key words: ethnic diversity; educational performance; classroom effects; multi-ethnic cities

Introduction and research question

The general and scientific debate on the educational performance of migrants' children is helped by clearly distinguishing between the ethnic and socioeconomic *composition* of a school or class on the one hand and the ethnic and socioeconomic *diversity* of that school or class on the other hand. From way back, the socioeconomic origin of the pupil is at the centre point for the educational sociological explanation of educational performance (Karabel & Halsey, 1977). In continuation thereof lies the attention for the socioeconomic composition of a class or school as an explanation for the performance of an individual pupil, but also for the ethnic composition of a class or school (Goldring & Addi, 1989; Dekkers, Bosker & Driessen, 2000; Marks, 2005; Levels, Dronkers & Kraaykamp 2008a). The relation between ethnic diversity of classes and educational results has been on the research agenda for quite some time as well (Terenzini et al., 2001; Gurin et al., 2002). It does not happen often however that both the composition and the diversity of a school or class are included as a combination in an analysis (Driessen, 2002; Van Houtte & Stevens, 2009). However, according to us such research designs are preferred, since the two concepts stated just are not the same with regard to contents, although in practice they can be highly correlated as is the case in a national dataset of Dutch primary and secondary schools (Herweijer, 2011).

The variable "composition" can be described as the level in which a certain pupil characteristic occurs at the level of the school or class. A school populace can for instance consist of 80% migrants or have an average parental level of education of 3.5 (on a scale of 1 through 7). However, nothing has then been said yet about the diversity of a school or class, which is a characteristic that can be defined as a mixture of a diverse range of categories. If for example all migrants on a school are of Turkish origin, or if the vast majority of the parents have an average level of education of 3.5, then a situation of diversity is clearly not the case. That would indeed be the case if the stated group of 80% migrant pupils could be subdivided into four different migrant groups of each 20%, or if the average level of education of a school would be determined by two equally large groups of parents with the lowest level of education of 1 and the highest level of education of 7.

In a recent education survey based on the data collected within the framework of the *Programme International Student Assessment* (PISA) of the OECD, standards for ethnic and social/cultural composition and diversity are used in combination with each other for the explanation of reading performance in 15 industrialized countries in 2006 (Dronkers & Van der Velden, 2011). As a rule, the ethnic diversity at school level, also when the ethnic composition of the school is hold constant, appears to have a negative effect on the reading performance of 15-year old pupils in secondary schools. This empiric finding sharply contrasts with the optimism that is displayed when within the social branches of housing, healthcare, or education a policy chooses for the enhancement of diversity and/or mixing various population groups. Not often a “mantra of the mix” can be heard in the social discussion; mixing population groups with diverse socioeconomic or ethnic backgrounds in neighborhoods, healthcare institutions, schools, or classes is deemed to provide a positive contribution to the improvement of the mutual understanding between natives and migrants, and to structural improvement of the socioeconomic position of migrants in Dutch society. Unfortunately, the mutual contact between natives and migrants is in the scientific literature not always regarded as the best recipe for increasing mutual understanding, trust, and appreciation. It was Robert Putnam (2007) who would demonstrate that the increased ethnic diversity in cities has resulted in the fact that citizens retired into their shells and that both the *in-group* and the *out-group* were no longer trusted. Therewith the classic contact hypothesis of Allport (1954) disappeared from the stage, who still predicted that the understanding between cultures would increase if representatives of that culture would get in contact with each other.

Whether the so-called constrict hypothesis of Putnam also applies for schools that are located in multi-ethnic conglomerates of major cities still remains to be seen. Ethnic diversity at the level of a school class appears to have a positive influence on the appreciation of multiculturalism in educational studies performed in lower vocational education, which still indicates support for the contact hypothesis and the *intergroup contact theory* (Geel & Vedder, 2011). The question we would like to answer in this article is therefore:

> Does ethnic diversity in school classes in the context of major cities, where children from an early age grew up with the phenomenon of ethnic diversity, has a positive effect on the educational performance of migrant pupils, taking the ethnic composition of those classes into account?

This question is in line with the expectation that Putnam expresses in his article. However, he only does so in the final section of that article, which bears the ominous title *Becoming Comfortable with Diversity.* This final section is related to the future. His expectation of a positive correlation between diversity and social capital contradicts his earlier drawn conclusions on the present. He states: "(...) my hunch is that at the end we shall see that the challenge [that immigration and diversity pose to social capital and solidarity] is best met not by making 'them' like 'us', but rather by creating a new, more capacious sense of 'we', a reconstruction of diversity that does not bleach out ethnic specificities, but creates overarching identities that ensure that those specificities do not trigger the allergic, 'hunker down' reaction" (Putnam, 2007: 163-164). Our proposition is that within a context in which ethnic diversity has become an accepted or, phrased differently, a “normal” phenomenon, this optimistic expectation for the future of Putnam could indeed become true.

Educational sociological concepts: from SES to ethnic diversity

How does the attention for ethnic diversity have to be interpreted exactly within the context of educational sociological research? Since the 1960s, two concepts play a central role in the history of educational sociology as scientific discipline: the socioeconomic status of the parents of a pupil, usually abbreviated as SES, and the socioeconomic composition of the school calculated as the average SES per school. Since the meanwhile classic study of James Coleman et al. from the 1960s (Coleman et al., 1966), these variables dominate empiric research in which explanations are sought for the variation in educational performance and school careers of pupils in primary and secondary education (Slik, Driessen & Bot 2006; Luyten, Schildkamp & Folmer 2009). In the international educational research of the OECD by means of the PISA data, these two variables are stated as well as the main factors for the explanation of the performance of 15-year olds in the fields of reading, counting, and scientific knowledge (OECD, 2010). A renewed analysis of the "old" data of Coleman with new *multilevel* research techniques supports this line of explanation: the educational performance of a pupil is mainly determined by his or her home environment, but a substantial part of the differences is also explained by school characteristics including the socioeconomical composition of the school, and that parts is - as we can now establish - more large-scale than the previous estimate from the 1960s (Borman & Dowling, 2010; Konstantopoulos & Borman, 2011).

Although the basis of the nomothetic explanatory models in the more quantitative branch of educational sociology has not substantially changed, some modifications were still implemented. Firstly, this concerns the optimization of the socioeconomic home environment of the pupils that brought along the introduction of cultural indicators, in line with the so-called *cultural turn* in social sciences in the 1970s. Among other things, the analysis of the PISA data for instance uses an index that intends to establish the *economic, social and cultural status* of the parents of the pupils (OECD, 2010). After the addition of the concept of cultural capital to the educational sociological lexicon by Pierre Bourdieu, the home environment is no longer (exclusively) conceptualized in terms of economic indicators such as income and prestige of profession (Bourdieu, 1973). The level of education, although empirically correlated with economic background characteristics, was gradually interpreted as a variable with a cultural charge (Graaf de, De Graaf & Kraaykamp, 2000; Houtman 2009).

Secondly, with the influx of migrants on the European labor market in the 1960s, variables were included in the explanatory models which refer to the ethnic origin of pupils and students. The PISA data is an example of this as well, although not during all data collection rounds in every country a question on the country of origin of the pupils was included in the questionnaires. In the Dutch part of the PISA file we have to satisfy ourselves in 2006 with a distinction between natives and migrants, whereby the latter group is subdivided into first and second generation of migrants. The consequence is that effects of growing up in a specific community of migrants can only be established for a limited number of countries. In the PISA file for 2009, the country of origin of the parents is included indeed as a variable.

Thirdly, the input-output models in educational sociology have been expanded with process characteristics with which the *black box of schooling* could gradually be opened (Lacey, 1970; Braster, Grosvenor & Del Pozo, 2011). The cultural educational research from the 1970s according to a qualitative model fits into this tradition (Hargreaves, 1967; Jackson, 1969; Willis, 1977; Ball, 2008), but also the educational sociological research on school effectiveness and school improvement which gained popularity in the 1980s and 1990s (Scheerens & Bosker, 1997), and the educational research on the relationship between differentiation within class context and educational performance from the same decade (Kulik

& Kulik, 1982; Slavin, 1996; Lou et al., 1996). And although, generally speaking, the strength of explanation of the newly included variables in the nomothetic explanatory models is limited - the social origin of the pupil and the social composition of the school remain the dominant factors, and the effects of the *peer group* on the educational performance are minimal (Driessen, 2007) - the general feeling is that the importance of variables that can be manipulated via policy should not be underestimated, whereby the composition of the class is presented not only as an explanatory factor but also as one that can be manipulated (Hoxby, 2002).

Fourthly, the analysis of the expanding nomothetic causal models with social origin as starting point and social success as final point was made easier by the introduction of advanced statistical programs for the analysis of manifest and latent variables (such as Lisrel), and for the simultaneous analysis of several analysis levels (such as MLwiN). In education research, it is possible since the 1980s to include several levels in one single analysis at the same time, whereby errors concerning the estimate of statistic parameters can be prevented.

Fifthly and finally, interest has emerged for the effects of the diversity of the schools and classes on educational performance (Dronkers & Van der Velden 2011). This diversity can be related to both socioeconomic and ethnic aspects. For the measurement thereof we can relate to the work of economists and political scientists who had already developed an index in the 1960s which mapped the mutual competition between companies. This so-called Herfindahl-Hirschman index (HHI) can also be used in order to measure cultural diversity (Fearon, 2003). This is especially useful for the international organizations and collaborations such as UNESCO and the EU, which have included the concept of cultural diversity in their programmes in the 21st century as an objective to be pursued at organizational or branch level (Benhamou & Peltier, 2007).

The mechanisms: ethnic diversity of school classes and educational performance of pupils

With the introduction of the ethnic diversity of schools and classes as possible explanation for the difference in educational performance, the question arises for the causal mechanism that within a certain context is responsible for either a positive or a negative effect. Dronkers & van der Velden (2011) describe several mechanisms which could cause a positive or a negative effect of diversity.

Greater diversity of school populations means that diverse schools have more students whose capabilities and potential differ from one another. The following mechanisms could therefore create a positive effect of diversity on individual educational performances: 1) in more diverse schools, good students may help weaker fellow students, either by giving actual help or by setting an example; 2) in more diverse schools, weaker students have a greater chance of encountering a challenging curriculum, because the teachers teach such subject matter to the better students; 3) more capable students in more diverse schools also learn better themselves, because they explain the subject matter to weaker students. Accordingly, if these mechanisms are powerful enough, promoting ethnic and sociocultural diversity is a policy instrument for increasing the quality of schools.

However, the institutional effects of diversity can also be negative. The mechanisms that are supposed to cause a negative diversity effect include: 1) a more homogeneous student population increases the possibility that teachers specialize in teaching their specific students, thus increasing school effectiveness; 2) In a more homogeneous population, less time needs to be spent on bridging ethnic and sociocultural differences between students, leaving more time for teaching and learning, and hence school effectiveness is higher; 3) in more homogeneous schools, the mutual trust among students, parents, and teachers is assumed to be higher,

resulting in greater involvement of students, parents, and teachers, and hence greater effectiveness of such schools (Westerbeek, 1999; Driessen, 2007).

In the surveys of Maestri (2009) on Dutch primary education, of Janmaat (2012) on secondary education in Germany, England, and Sweden, and of Demanet, Agirdag & Van Houtte (2012) on Flemish secondary education, contrasting hypotheses are formulated as well. So far the battle appears to be between the previously mentioned contact hypothesis of Allport (1954) and the *intergroup contact theory* of Pettigrew (1998), the conflict hypothesis which was elaborated by Blalock (1967) and the recent constrict hypothesis of Putnam (2007). Janmaat (2012) finds indications for the confirmation of the contact hypothesis in Germany and Sweden: in classes that are characterized by ethnic diversity, the tolerance among natives is higher than in homogenous classes. In England, this is relatively negative, but not significantly. In Flanders, natives feel less connected with their friends and with the school itself if a high ethnic concentration and an ethnically heterogeneous school are concerned, but this decrease of social capital is described to the socioeconomic composition of the school and to the lower school type (Demanet, Agirdag & Van Houtte 2012). Finally, Maestri (2009) does not encounter any effects of ethnic diversity on the marks for reading of native pupils in classes, but the effect is indeed positive and significant for pupils from minority groups.

Summarizing, the most recent studies in which ethnic diversity and composition were analyzed within their mutual correlation do not provide an explanation of the specific causal mechanisms which constitute the foundation of the relation between diversity and educational performance, despite the fact that a number of these quantitative studies have shifted their focus from the level of the school to the school class. The relationships between ethnic diversity and educational performance can be mediated by the social capital of pupils that in general is positively related with scholastic achievement (Goddard, 2002; Dika & Singh, 2003). It is clear though that the context within which a study was carried out is of decisive meaning. This is the reason why in the next section we will address the specific characteristics of the data that will be analyzed in the remainder of this article.

The context: a multi-ethnic conglomerate in a European metropole

The pupils of whom we have data on their marks and the composition and diversity of the classes within which they attend education all live in an urban conglomeration that counts over 170 nationalities. The heart of this conglomeration is an international harbor city which is managed by a mayor whose parents were born in Morocco. A mayor with a migrant background is in itself unique in the Netherlands, but it fits in well with a population of pupils of whom the majority can also be branded as migrant. Within such a multi-ethnic context, the question arises whether the diversity in neighborhoods and districts - as Putnam (2007) predicts - has a negative effect on mutual trust, solidarity, and the social capital. Indeed there appear to be indications that the constrict hypothesis at least partially applies for the major cities in the Netherlands (Lancee & Dronkers, 2011; Gijsberts, Van der Meer & Dagevos, 2011). In the continuation thereof could apply for school classes what also applies at a higher level of analysis for neighborhoods and districts.

However, the micro level of a school class is accompanied by other dynamics. Janmaat (2012) points out that in a diverse school class, pupils of different ethnic backgrounds are equal to each other, share the same experiences, interact intensively and protractedly with each other, and are under the supervision of one teacher. Therewith a number of important conditions for the acceptance of the contact hypothesis are complied with: equal status between groups, common objectives, collaboration between groups, support by laws and habits, and the opportunities for the emergence of friendship (Pettigrew, 1998). In other words: the constrict hypothesis might apply to the older inhabitants of a

neighborhood or district, but for 13-year olds in ethnic diverse school classes this does not have to be the case. After all, where older generations can still have difficulties with the increased cultural diversity of their living environment, the children of those generations have fewer problems with this: after all they don't know any better. If they can influence their educational performance in a positive sense by making use of their contacts with relevant peers within their class or school, then someone's ethnic background is no important issue.

The cultural globalization did not pass by the younger generation in major city conglomerates unnoticed either. Within the context of the global city, the opportunities for the individualized youths to make contacts are no longer limited by traditional definitions of the concepts of class and ethnicity, which are characterized as "zombie categories" by Beck & Beck-Gernsheim (2002). Youths give their own interpretation to existing categories within their social world. They define what is "cool" and what isn't. In the thinking of youths, the definition thereof does not run parallel to the classic contrast between working class and middle class, or to the policy difference between natives and migrants. The observation that many pupils in a major city context share a common street culture with a corresponding street language, which is spoken by both native and migrant pupils, is important at that (Hadioui, el 2010). Within such a street culture, an ethnically diverse class that consists of pupils with a Turkish, Moroccan or Dutch origin can be classified by the youths themselves as "these people are all natives. (..) You can see how they speak and how they act, can't you?" (Hadioui, el, 2010: 36). The concept of "migrant" refers in the social city environment of youths to deviant behavior and has little to do anymore with the official CBS (Dutch Central Bureau of Statistics) definition. In other words: sharing a common street culture brings youths from various ethnic environments closer to each other. If this assertion is correct, then there are sufficient grounds to exchange the constrict hypothesis for the contact hypothesis in ethnically heterogeneous classes. The acquired social capital can thereby be implemented in order to achieve the educational objectives. If however a certain ethnic group would become dominant in a class, then the street language is no longer the binding element between the ethnic groups, but the native tongue of that dominant ethnic group. If that language is a different one than Dutch, this could indeed influence the educational performance negatively.

Hypotheses

The above reasoning brings us to the formulation of two hypotheses. They are successively:

(1) An increase of the ethnic diversity of a class has a positive effect on the educational performance of migrant pupils, taking the ethnic composition of that class into account.

(2) An increase of the share of a migrant group within a class has a negative effect on the educational performance of migrant pupils, taking the ethnic diversity of that class into account.

Additionally, two hypotheses can be formulated that are related to the socioeconomic composition and the socioeconomic diversity of a class respectively. The first thereof is in line with the classic finding from educational sociological research in which, apart from the socioeconomic position of the individual pupil, the average composition of the class or school in a socioeconomic aspect is also considered to be responsible for the level of the educational performance of a pupil (see among others: Dronkers, 2008). The second is related to the situation in which a pupil must function with a given performance level in a homogeneous or heterogeneous class situation. In accordance with the previously cited educational meta-surveys on the effects of differentiation (see also: Reezigt, 1993; Reezigt, Houtveen & Van de

Grift, 2001), it is then expected that an initially weak-performing pupil will obtain a higher educational performance in a heterogeneously composed class, whereas a strong pupil is served with a homogeneously composed class. The hypotheses are successively:

(3) An increase of the average socioeconomic composition of a class has a positive effect on the educational performance of native and migrant pupils, taking the socioeconomic diversity of that class into account.

(4) An increase of the socioeconomic diversity within a class has a positive effect on the educational performance of native and migrant pupils, taking the socioeconomic composition of that class into account.

Data and variables

By means of a database made available by a school board in the city of Rotterdam, the above expectations can indeed be tested. The data is related to 11 schools for catholic and private-neutral secondary education. This school file contains five schools for four years of lower general secondary education (MAVO), one for five years of general secondary education (HAVO), and one for six years of pre university education (VWO). Apart from that, there are three schools with a HAVO-VWO combination, and one with the combination MAVO-HAVO-VWO. In the latter combination, during the first year three types of classes are available: MAVO, MAVO-HAVO and HAVO-VWO. The total number of classes amounts to 41 and varies per school between one and six. 905 pupils attend these classes.

[Table 1]

Characteristics of individual pupils From each pupil, the average scores for the key topics Dutch, English, and mathematics during the first school year are known. As expected, these scores are mutually related, but the correlation is relatively limited. The highest correlations are between the scores for mathematic and the scores for Dutch and English: +0.39 and +0,32 respectively. The average score for the topic mathematics among migrants and natives is 6.32 and 6.43 respectively, which is around half a point lower than the average scores for the other two topics, Dutch and English. In this paper we will use the individual scores for mathematics as the dependent variable because this variable is - as expected - positively correlated with an entrance test score, and because these scores are relatively less independent of the context of the classroom in which the mathematic tests were performed.

For each pupil, the amount of absence hours - permitted and not-permitted - was subsequently registered during the whole year. On average, 59 lessons are missed with permission per year, with a maximum of 359 hours. The non-permitted absence amounts to 7 lessons per year, with a maximum of 99 hours.

Furthermore, of each pupil an entrance test score obtained at the previously attended primary school is known. These tests are made by the national institute of educational measurement (CITO). In the supplied basic file of 12 schools, one school for HAVO of which all this data was missing, is not included in the analysis. The average entrance test score for the remaining 11 schools amounts to 532. The lowest value was 516, and the highest 550.

Finally, we know of each pupil the country of origin of the parents, the religion, and the zip code of the parental home. The pupil populace reflects the multi-ethnic and multi-religious composition of the municipal conglomerate where the schools are located. Based on the country of origin of the parents and the religion, the ethnic-religious origin of the parents was determined. The selected categorization complies with the division that Dronkers has

made at the analysis of the international PISA data (2011). In view of the huge diversity of countries of origin within the surveyed schools, preference was given to this above the usual division in which Dutchmen are divided into Turks, Moroccans, and people from Surinam. The parents of the pupils originate from: the Netherlands (32%), western OECD countries (2%), Eastern Europe (2%), non-Islamic Asian countries (2%), Islamic Asian countries including Turkey (27%), non-Islamic African countries (5%), Islamic African countries including Morocco (19%), and Latin American countries including Surinam (12%). Based on the zip code, the SES of a pupil is known (see below).

Characteristics of classes The ethnic-cultural diversity of a class was determined with the previously mentioned Herfindahl index. This index varies between 0 through 1, whereby a high value stands for a higher degree of diversity. For the calculation the following formula was used:

$1 - [(\%\text{ ethnic group } 1)^2 + (\%\text{ ethnic group } 2)^2 \ldots + (\%\text{ ethnic group } n)^2]$.

The mode of calculation of this index implies that both a completely "white" and a completely "black" class score 0 for their degree of diversity. The index is therefore color-blind (Stolle et al., 2008). This is not an insurmountable problem however, on the condition that this diversity index is analyzed in combination with the ethnic composition of the class, expressed as percentage of pupils in a class of which the parents originate from a certain country of origin. The thus calculated ethnic diversity of a class amounts on average to 0.57, with 0.09 as lowest and 0.84 as highest value. The relation between the ethnic diversity in a class and the percentage of migrant pupils in that class has been included as illustration in Figure 1.

[Figure 1]

Figure 1 show that a higher percentage of migrants in a class coincide with a higher ethnic diversity, but the relation is better explained by a curvilinear than by a linear correlation: the relation between the ethnic diversity and the ethnic composition namely becomes negative if the percentage of migrant pupils in a class is higher than around 60%. A comparable curvilinear relation between ethnic diversity and composition was also found by Maestri (2009).

The socioeconomic diversity of the class was also calculated by means of the Herfindahl index. In that case the formula is:

$1 - [(\%\text{ SES category } 1)^2 + (\%\text{ SES category } 2)^2 \ldots + (\%\text{ SES category } 5)^2]$

Once again, the score on this index varies between 0 through 1, whereby a high score stands for a higher degree of diversity. In order to prevent interpretation problems, the diversity index should in this case be analyzed at the same time as the average score for the SES of a class as well. The socioeconomic diversity of a class amounts on average to 0.61, with 0.42 as lowest and 0.76 as highest value.

A necessary part of the formula for the socioeconomic diversity of the class is the percentage of pupils in that class that falls within a certain SES category. The SES for an individual pupil was established based on the social status score of the postal code area with the pupil lives. These social status scores which are made available by the Social and Cultural Planning Agency (SCP) in The Hague consist of three elements: income, employment, and level of education (SCP, 2012). Based on these three indicators, for all four-digit postal code

areas in the Netherlands a standardized score is calculated by means of a principal components analysis. The score is a measure for the socially underprivileged status of an area. We have re-coded the original factor scores into five SES categories, which contain 10%, 20%, 40%, 20, and 10% of the observations respectively, and whereby the highest percentage represents a socioeconomically advantageous situation.

It should be clear that the obtained scores are an estimate for the factual socioeconomic home environment of the parents of the pupil. With the exception of the ethnic-religious group to which a pupil can be attributed, the database namely does not contain any information on the income, professional, or education level of the parents. The relevance of such data is not estimated highly by the competent authorities of the schools, whereas privacy considerations play a role as well of course. We therefore continue working with a *proxy* for the socioeconomic origin of a pupil, which can also be used as a basis for the socioeconomic composition and diversity of the class. This is in itself not unusual for the analysis of existing data, but we should at the interpretation of the outcome indeed pay attention to that fact that our measurement of SES at pupil level is therefore in essence a measurement of the socially underprivileged situation of the neighborhood in which the pupil lives (Lancee & Dronkers 2011).

The statistic characteristics of all variables, subdivided into native and migrant pupils, are stated in table 2. For the benefit of the multivariate analysis, all variables were centered, with the exception of the dummy variables and the scores for mathematics. Centering means that of each individual score on a variable, the average score was deducted. This approach has the advantage that at the calculation of interaction-effects in a multi-variate analysis the usual problem of multicollinearity is prevented (Aiken & West 1991).

[Table 2]

The analysis

The data of the 905 pupils, the 41 classes, and the 11 schools for secondary education was analyzed by means of a multilevel analysis with three levels: pupils, classes, and schools. After testing a 0-model, we carried out the analysis in four steps. In the first step, the central characteristics at class level are included: the socioeconomic composition, the socioeconomic diversity, the ethnic composition, and the ethnic diversity. In the second step, characteristics of the parents of the pupils are added to this: the socioeconomic status and the country of origin. In the third step, a check was carried out for some individual start characteristics of pupils, namely the gender, the age, and the CITO test score obtained at primary education. In the fourth step, some individual educational characteristics were added to the analysis. The were subsequently the amount of lessons during the school year that permitted and non-permitted absence occurred, and the curriculum level at which the pupil followed secondary education, namely MAVO, MAVO-HAVO, HAVO, HAVO-VWO, and VWO.

Theoretically it was necessary to analyze ethnic diversity and composition simultaneously.This has the risk of high correlations between independent variables resulting in possible problems with multicollinearity. To avoid this risk we have followed several procedures (Gordon, 1968; Belsley, 1991). Firstly we have checked the correlations between the independent variables at the level of classes and pupils. In Table 3 and Table 4 we present the results. For migrant students the highest correlations at class level are found between the percentage of pupils with parents from Islamic African countries and the mean socioeconomic status of a class (-0,71) and between this percentage and the ethnic diversity of a class (+0,66). For native students the correlations on class level are also relatively high (respectively -0,69 en +0,65), but in none of the cases we have found disturbingly high values of $\pm$0,80 or higher.

Secondly we have checked with ordinary regression analysis if the variance-inflation factor (VIF) and the condition index were unacceptably high (respectively higher than 10 and higher than 30) (Friendly & Kwan 2009). Finally we have analyzed multilevel models without variables that could pose a potential threat with respect to multicollinearity and without cases that could be considered to be outliers. All these steps led to the conclusion that, as expected, there are high correlations between diversity and composition, but it also led to the conclusion that the results of our analyses are not distorted by this correlations.

[Table 3 and table 4]

Results

Table 5 lists the results of the multilevel analysis with the mean score for mathematics as dependent variable. In this Table, the analysis was subdivided into migrant (N=621) and native (N=284) pupils. We herewith summarize the main conclusions:

The outcome of the analysis shows that migrant pupils obtain higher marks for mathematics if the ethnic diversity of the class which they attend increases. For native pupils there is a positive correlation as well, but this is not statistically significant. This conclusion means a confirmation of hypothesis 1. Since the ethnic diversity is strongly related with the ethnic composition we tried out various models in which the variables that are responsible for a possible multicollinearity problem (and therefore incorrect outcome) were removed from the analysis. We have also tried models where the school was removed from the analysis where a high percentage of Islamic Asian pupils coincide with a lack of ethnic diversity (see data points in the lower right corner of Graph 1). In neither case the positive and significant effect of ethnic diversity on mathematics marks was neutralized. As said before, other procedures to check for multicollinearity problems also did not let to other conclusions, meaning that our outcome can hardly be ascribed to the relatively high empirical correlations between ethnic diversity and ethnic composition.

In general, the ethnic composition of a class has little effect on the mathematics performance of a pupil in that class. For the migrant pupils, only one on a total of 14 coefficients in the two models is statistically significant; for the native pupils three out of 14 are. The most striking outcome is the positive effect of a high percentage of pupils from Eastern Europe in a class on the individual mathematics performance of native pupils. However, we can currently not draw any conclusion from that which could be generalized to other locations and situations; perhaps this outcome reflects the current influx of ambitious Eastern European pupils (Poles) in Dutch society. Hypothesis 2 is therewith rejected.

The socioeconomic composition of a class has, as expressed in hypothesis 3, a positive effect on the mathematics performance of native and migrant pupils, but the effects are minimal and not statistically significant in any analysis model. The SES score of an individual pupil also has little to do with the mathematics performance of that pupil. This does not mean that these two classic variables from the sociology of education text books can be skipped as being no longer relevant, but it is clear indeed that they do not play a role of any importance anymore within the specific research design whereby a check was carried out on ethnic diversity and composition. It should also be noted that we had to make the SES variables operational by means of the postal code of the address of the pupil, and such operational use is imperfect and therefore sooner results in insignificant coefficients. Hypothesis 3 is rejected by all means.

If the ethnic diversity of the class increases, the mathematics performance of migrant pupils increases as stated before, but if the socioeconomic diversity of the class increases, their mathematics performance instead decreases. This negative relationship also applies for

the native pupils, which implies that hypothesis 4 also must be rejected. An ethnic heterogeneous class is positively related with higher individual performance in mathematics, but in a socioeconomic heterogeneous class the opposite seems to be true. This empirical finding needs to be explored further.

The mathematics performance of migrant pupils is somewhat lower than that of native pupils. Within the migrant group, no ethnic category can be pointed out which scores significantly higher or lower. It is clear though, that the mathematics scores in the total analysis model are positively and significantly related to the entrance test scores. There is also a significant correlation between the individual mathematics scores and the average entrance test score per class, but the direction of this relation is negative. In the classes with pupils who score high on the entrance test - these are the classes with a higher curriculum level such as pre university secondary education (VWO) - the mathematics performance is lower than in the classes where average low entrance test scores were obtained.

Quite understandably, mathematics scores also end up higher if the amount of absences decreases. An increase of the amount of hours that non-permitted or permitted absence occurs has a significant impact on the level of the mathematics scores. The effect of non-permitted absence is slightly stronger with the native group (b= -0.04) than with the migrant group (b= -0.02).

[Table 5]

Discussion

During the materialization of the national education system in the Netherlands at the beginning of the 19th century, the mixed general school was the standard (Glenn, 1988). It was a school where protestant, catholic, and Jewish children would commonly be given education. Soon the model appeared to conflict with the preferences of many parents. Confessional pressure groups would seek religiously segregated education. In 1848, this resulted in a constitutional modification, after which freedom of education would be a fact. At the beginning of the 21st century and within the legal framework of this freedom, pupils of various ethnic-religious home environments have found their places in schools and class rooms. The diversity with which they are confronted there is not shocking: from an early age they are used to a context within which diverse groups of youths interact with each other, both positively and negatively. Their educational performance is not automatically influenced negatively by this ethnic diversity. On the contrary: the mathematics scores of migrant youths are higher if the ethnic diversity of the class they attend increases. According to our proposition this is not remarkable in a multi-ethnic major city context within which that ethnic diversity is regarded as a “normal” situation. Our findings contrast with the international research which shows a negative effect of ethnically diverse schools on learning performance of pupils in secondary schools (Dronkers & Van der Velden 2011) and with Dutch educational research that generally shows no effects of ethnic diversity in primary schools (Driessen, 2002). But our findings do not conflict with that: diversity is effective in a certain context, depending on the balance of power between the ethnic groups. The data that Dronkers and others have used was related to the national context of OECD countries. Ethnic diversity is not the “normal” situation therein, but moreover a large dominant ethnic group (natives) and a smaller or larger amount of ethnic groups which are each in itself a small minority are concerned. In such a conflict-prone and unequal situation, ethnic diversity has a negative effect on learning performance, firstly on that of the migrant pupil. The classic contact hypothesis of Allport (1954) would in such a conflict-prone and unequal situation not expect greater understanding between unequal ethnics groups either. It is however possible

that in the multi-ethnic major city context, in which no dominant ethnic group exists any longer (also because of the white and highly-educated escape to the countryside), the classic contact hypothesis of Allport (1954) does apply, and the optimism of Putnam (2007) does obtain empiric support after all. Our outcome is therefore not an automatic support for the "mantra of the mix", whereby mixing population groups with diverse socioeconomic or ethnic backgrounds in neighborhoods, healthcare institutions, schools, or classes is deemed to provide a positive contribution to the improvement of the mutual understanding between natives and migrants, and to structural improvement of the socioeconomic position of migrants in Dutch society. It is namely rather questionable whether the strong environmental segregation of native and migrant groups in the urban conglomeration that we have studied is socially and politically wise.

Further research should therefore be focused on testing the hypotheses formulated in this article in comparable major city contexts, such as Antwerp, London, or New York. The comparison of educational performance in a multi-ethnic city context with educational performance in industrialized countries is clearly not enough for stating that ethnic diversity in big city classrooms has a positive effect on individual learning outcomes. The comparison needs a database with more urban contexts. A further survey on the mutual relations in a class between pupils with diverse backgrounds, ethnically-culturally or socioeconomically, can be recommended as well. The search for causal mechanism has not been completed with this paper. On the contrary: we are only at the beginning of our journey. The common street language that is developed among youths within a major city context is thereby just one of the possible markers.

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Graph 1. Scatterplot of ethnic diversity in class (centered) and % migrants in class (N=41).

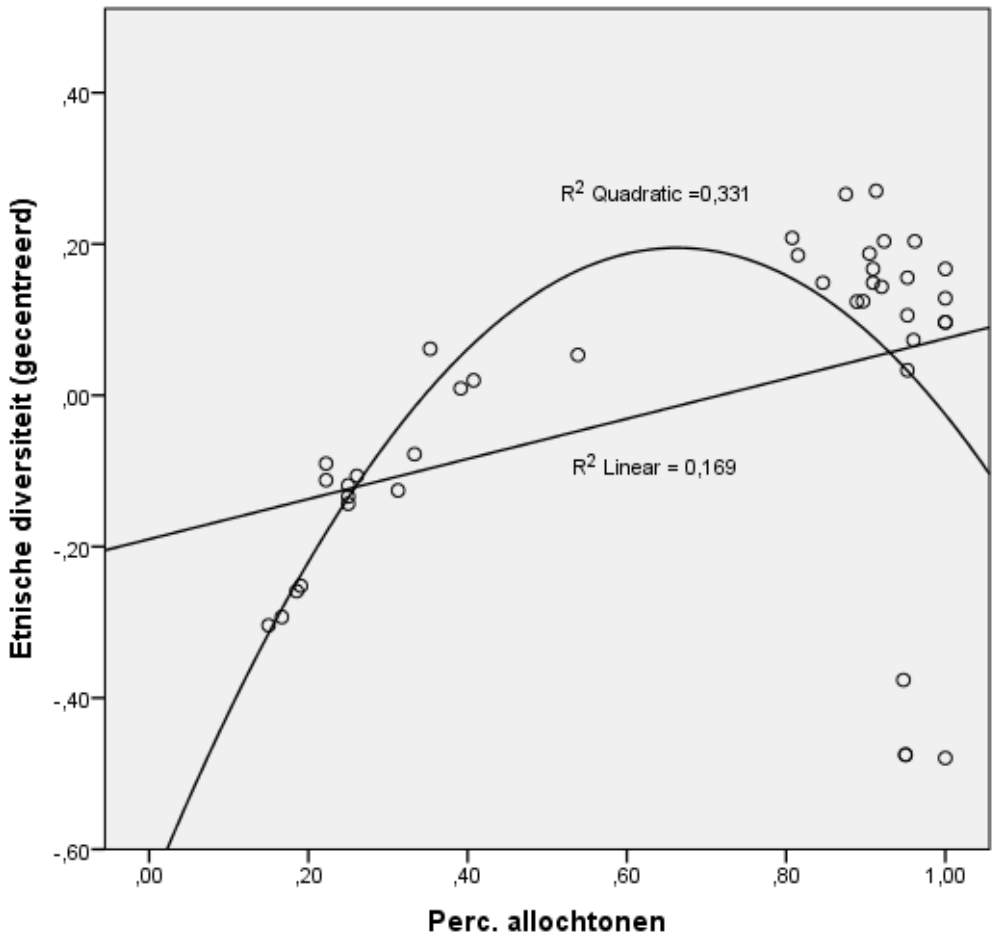

Table 1. Schools, classes and pupils.

Type of School (N=11)	Number of Classes (N=41)	Number of Pupils (N=905)
Mavo	2	48
Mavo	3	51
Mavo	4	80
Mavo	5	110
Mavo	8	185
Havo	2	27
Havo-VWO	1	24
Havo-VWO	4	78
Havo-VWO	5	136
Mavo-Havo-VWO	6	150
VWO	1	16

Table 2. Means, standard deviations, minima and maxima, separated for both students with a migrant background (N=621) and native students (N=284).

	Migrant students				Native students			
	Min.	Max.	Mean	S.d.	Min.	Max.	Mean	S.d.
Mark Mathematics (1-10)	1,0	9,2	6,320	1,136	1,0	9,6	6,425	1,452
Socioeconomic diversity of a class (0-1), centered	-0,19	0,14	0,0064	0,0713	-0,19	0,08	-0,0138	0,0791
Socioeconomic composition of a class (1-5), gecentreerd	-0,85	1,31	-0,2951	0,5399	-0,85	1,31	0,6616	0,5474
Ethnic diversity of a class (0-1), centered	-0,48	0,27	0,0438	0,2127	-0,48	0,27	-0,0955	0,1507
% students with parents from the Netherlands in a class, centered	-0,31	0,54	-0,1469	0,2267	-0,28	0,54	0,3213	0,2305
% students with parents from Western OECD countries in a class, centered	-0,02	0,12	-0,0036	0,0311	-0,02	0,12	0,0078	0,0396
% students with parents from Eastern Europe in a class, centered	-0,02	0,12	0,0001	0,0354	-0,02	0,12	-0,0001	0,0350
% students with parents from non-Islamic Asian countries in a class, centered	-0,02	0,11	0,0017	0,03627	-0,02	0,11	-0,0038	0,0256
% students with parents from Islamic Asian countries in a class, centered	-0,27	0,69	0,0716	0,2452	-0,27	0,68	-0,1565	0,1309
% students with parents from non-Islamic African countries in a class, centered	-0,05	0,14	0,0086	0,0622	-0,05	0,14	-0,0187	0,0426
% students with parents from Islamic African countries in a class, centered	-0,19	0,38	0,0638	0,1833	-0,19	0,38	-0,1395	0,1095
% students with parents from Latin American countries, centered	-0,12	0,19	0,0048	0,0856	-0,12	0,19	-0,0104	0,0691
Socioeconomic status parents (1-5), centered	-1,73	2,27	-0,3666	0,9213	-1,73	2,27	0,8015	0,9411
Parent(s) from Western OECD country	0	1	0,0274	0,1633				
Parent(s) from Eastern European country	0	1	0,0322	0,1767				
Parent(s) from non-Islamic Asian country	0	1	0,0258	0,1586				
Parent(s) from Islamic Asian country	0	1	0,3881	0,4877				
Parent(s) from non-Islamic African country	0	1	0,0660	0,2485				
Parent(s) from Islamic African country	0	1	0,2818	0,4502				
Parent(s) from Latin American country	0	1	0,1787	0,3835				
Gender (=girl)	0	1	0,5266	0,4997	0	1	0,5141	0,5007
Age, centered	-0,95	2,05	0,0271	0,6193	-0,95	2,05	-0,0592	0,6144
Entrance test score, centered	-15,69	17,31	0,3860	6,2745	-16,69	17,31	-0,8046	6,7309
Number of hours of permitted absence, centered	-58,58	299,42	-1,3336	46,2951	-59,58	670,42	2,9059	59,0958
Number of hours of non-permitted absence, centered	-7,31	91,69	1,4324	12,1556	-7,31	51,69	-3,1445	6,9112
Curriculum level 1 (MAVO)	0	1	0,4525	0,4981	0	1	0,7535	0,4317
Curriculum level 2 (MAVO-HAVO)	0	1	0,1127	0,3165	0	1	0,0246	0,1553
Curriculum level 3 (HAVO)	0	1	0,0097	0,0979	0	1	0,0739	0,2621
Curriculum level 4 (HAVO-VWO)	0	1	0,4026	0,4908	0	1	0,1408	0,3485
Curriculum level 5 (VWO)	0	1	0,0225	0,1486	0	1	0,0070	0,0838

Table 3. Correlations between class level variables: classes with native students above the diagonal (N=36), classes with students with migrant parents below the diagonal (N=41).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Socioeconomic diversity (1)	1	-0,342	0,225	-0,219	-0,009	0,116	0,091	0,076	0,152	0,210
Socioeconomic composition (2)	-0,272	1	0,521	0,364	0,050	-0,198	-0,566	-0,324	-0,690	-0,243
Ethnic diversity (3)	0,068	-0,511	1	-0,012	0,281	0,361	-0,259	0,499	0,649	0,352
% Western OECD (4)	-0,261	0,348	0,021	1	0,284	-0,022	-0,390	-0,017	-0,068	-0,280
% Eastern Europe (5)	-0,005	0,072	0,265	0,270	1	0,273	-0,246	0,040	0,082	-0,130
% non-Islamic Asian (6)	0,002	0,162	0,336	0,017	0,264	1	-0,081	0,169	0,027	0,145
% Islamic Asian (7)	0,195	-0,496	-0,354	-0,395	-0,273	-0,112	1	-0,162	0,074	-0,135
% non-Islamic African (8)	0,119	-0,361	0,505	-0,048	-0,004	0,064	-0,142	1	0,315	0,049
% Islamic African (9)	0,022	-0,711	0,662	-0,060	0,046	0,023	0,016	0,404	1	0,080
% Latin America (10)	0,102	-0,252	0,577	-0,230	-0,086	0,156	-0,223	0,056	0,131	1

Tabel 4. Correlations between student level variables: native students above the diagonal (N=284), students with migrant parents below the diagonal (N=621).

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Mark mathematics (1)	1	0,045	-	-	-	-	-	-	0,005	-0,020	0,182	-0,047	-0,139	-0,047	0,295	-0,029	-0,080
SES (2)	0,001	1	-	-	-	-	-	-	0,074	-0,036	-0,146	0,039	-0,243	-0,115	0,125	-0,252	-0,093
Eastern Europe (3)	0,080	0,106	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Non-Islamic Asian (4)	0,074	0,001	-0,030	1	-	-	-	-	-	-	-	-	-	-	-	-	-
Islamic Asian (5)	-0,038	0,002	-0,145	-0,130	1	-	-	-	-	-	-	-	-	-	-	-	-
Non-Islamic african (6)	-0,066	-0,007	-0,049	-0,043	-0,212	1	-	-	-	-	-	-	-	-	-	-	-
Islamic African (7)	0,042	-0,164	-0,114	-0,102	-0,499	-0,167	1	-	-	-	-	-	-	-	-	-	-
Latin American (8)	-0,023	0,097	-0,085	-0,076	-0,372	-0,124	-0,292	1	-	-	-	-	-	-	-	-	-
Gender (= girl) (9)	0,042	0,017	-0,010	0,012	-0,112	0,018	0,042	0,064	1	-0,030	-0,133	-0,048	-0,185	0,064	0,113	-0,052	-0,002
Age (10)	-0,004	-0,013	0,020	-0,110	-0,039	0,019	0,048	0,021	-0,019	1	-0,045	0,083	0,040	-0,047	-0,017	0,037	-0,054
Entrance test score (11)	0,045	-0,052	-0,035	0,093	0,095	0,001	-0,034	-0,067	-0,072	-0,054	1	0,141	0,030	0,043	0,329	0,500	0,127
Permitted absence (12)	-0,195	-0,002	-0,026	-0,105	0,154	-0,092	-0,056	-0,020	0,006	0,054	-0,009	1	0,144	0,004	-0,020	0,176	-0,029
Non-permitted ab. (13)	-0,199	-0,009	-0,079	-0,072	-0,033	0,034	0,064	0,039	-0,022	0,114	-0,107	0,289	1	0,296	0,042	-0,011	-0,045
Curriculum level 2 (14)	0,061	-0,037	-0,036	0,038	-0,023	-0,074	0,048	0,046	-0,039	0,011	-0,007	0,012	0,194	1	-0,045	-0,064	-0,013
Curriculum level 3 (15)	0,049	0,139	0,262	-0,016	-0,079	-0,026	-0,062	0,040	0,028	0,030	-0,001	0,014	-0,030	-0,035	1	-0,114	-0,024
Curriculum level 4 (16)	-0,073	-0,121	-0,113	0,012	0,195	-0,020	-0,047	-0,117	-0,057	-0,107	0,640	0,001	-0,163	-0,293	-0,081	1	-0.034
Curriculum level 5 (17)	-0,054	0,022	0,095	0,112	-0,076	0,091	0,001	-0,043	0,057	-0,013	0,253	0,010	-0,056	-0,054	-0,015	-0,125	1

Tabel 5. Effects of diversity and composition of a class on the mean score for mathematics van students with migrant parents (N=621) and native students (N=284) in the first grade of secondary education, parameters MLwin

	Migrants				Natives			
Dependent variable = mean score mathematics	Model 1	Model 2	Model 3	Model 4	Model 1	Model 2	Model 3	Model 4
Intercept	**+6,263 (0,096)**	**+6,267 (0,278)**	**+6,289 (0,286)**	**+6,591 (0,302)**	**+6,419 (0,198)**	**+6,419 (0,198)**	**+6,243 (0,210)**	**+6,474 (0,294)**
Socioeconomic diversity and composition, class level								
Socioeconomic diversity of a class	**- 2,526 (0,937)**	**- 2,522 (0,977)**	**- 2,869 (1,165)**	**- 2,034 (1,052)**	**-3,163 (1,109)**	**- 3,168 (1,112)**	**- 2,424 (1,111)**	*- 1,868 (1,150)*
Mean socioeconomic status of a class	- 0,013 (0,255)	- 0,054 (0,271)	- 0,035 (0,327)	+0,127 (0,282)	+0,520 (0,402)	+0,514 (0,413)	+0,560 (0,406)	+0,605 (0,423)
Ethnic diversity and composition, class level								
Ethnic diversity of a class	**+1,909 (0,842)**	**+2,099 (0,881)**	**+2,522 (1,059)**	**+2,210 (0,919)**	+1,413 (1,420)	+1,406 (1,428)	+1,152 (1,400)	+0,792 (1,372)
% students with native parents (=reference)								
% students with parents from Western OECD countries in a class	+1,234 (2,255)	+0,828 (2,400)	+0,271 (2,886)	- 0,210 (2,888)	-1,612 (3,605)	- 1,587 (3,623)	- 3,231 (3,588)	- 4,889 (4,143)
% students with parents from Eastern European countries in a class	+3,737 (2,110)	+3,442 (2,252)	+3,004 (2,741)	+3,378 (2,565)	**+10,776 (4,185)**	**+10,771 (4,184)**	**+13,215 (4,148)**	**+19,694 (4,777)**
% students with parents from non-Islamic Asian countries in a class	- 3,454 (2,130)	**- 4,587 (2,270)**	**- 6,569 (2,772)**	- 4,165 (2,720)	- 6,337 (3,448)	- 6,330 (3,451)	**- 8,029 (3,427)**	- 4,329 (3,955)
%students with parents from Islamic Asian countries in a class	+0,714 (0,601)	+0,864 (0,630)	+0,684 (0,749)	+1,163 (0,673)	+1,272 (1,128)	+1,273 (1,128)	+1,084 (1,109)	+1,355 (1,098)
% students with parents from non-Islamic African countries in a class	**- 2,712 (1,271)**	- 2,562 (1,359)	**- 4,242 (1,729)**	- 3,050 (1,538)	+2,109 (2,878)	+2,109 (2,878)	+0,758 (2,844)	+3,637 (3,212)
% students with parents from Islamic African countries in a class	- 0,480 (0,719)	- 0,517 (0,762)	- 0,321 (0,937)	+0,220 (0,800)	+1,100 (1,668)	- 1,098 (1,668)	- 0,730 (1,636)	- 0,184 (1,580)
% students with parents from Latin American countries in a class	- 1,281 (1,305)	- 1,397 (1,386)	- 1,059 (1,722)	- 0,345 (1,421)	+0,701 (2,719)	+0,713 (2,729)	+1,561 (2,684)	+1,961 (2,669)
Parent characteristics, pupil level								
Socioeconomic status of the parents		+0,064 (0,053)	+0,061 (0,052)	+0,063 (0,050)		+0,005 (0,095)	+0,011 (0,093)	- 0,037 (0,091)
Parent(s) from Western OECD-country (=reference)								
Parent(s) from Eastern European country		+0,245 (0,361)	+0,145 (0,353)	+0,077 (0,341)		-	-	-
Parent(s) from non-Islamic Asian country		+0,651 (0,383)	+0,506 (0,374)	+0,395 (0,361)		-	-	-
Parent(s) from Islamic Asian country		- 0,067 (0,284)	- 0,124 (0,278)	- 0,051 (0,267)		-	-	-
Parent(s) from non-Islamic African country		- 0,170 (0,318)	- 0,230 (0,310)	- 0,179 (0,300)		-	-	-
Parent(s) from Islamic African country		- 0,010 (0,284)	- 0,109 (0,278)	- 0,078 (0,268)		-	-	-
Parent(s) from Latin American country		- 0,021 (0,289)	- 0,091 (0,283)	- 0,056 (0,272)		-	-	-
Student characteristics, pupil level								
Gender (=girl)			+0,146 (0,085)	+0,144 (0,081)			+0,200 (0,156)	+0,133 (0,155)
Age			- 0,039 (0,068)	- 0,003 (0,066)			+0,013 (0,124)	- 0,024 (0,120)
Entrance test score			**+0,046 (0,011)**	**+0,055 (0,011)**			**+0,052 (0,015)**	**+0,059 (0,016)**
Educational characteristics, pupil level								
Number of hours permitted absence				**- 0,003 (0,001)**				- 0,001 (0,001)
Number of hours non-permitted absence				**- 0,019 (0,004)**				**- 0,040 (0,012)**

Curriculum level 1 (MAVO =reference)										
Curriculum level 2 (MAVO-HAVO)						- 0,467 (0,300)				- 0,028 (0,689)
Curriculum level 3 (HAVO)						- 0,171 (0,679)				- 0,298 (0,705)
Curriculum level 4 (HAVO-VWO)						**- 0,673 (0,284)**				- 0,105 (0,474)
Curriculum level 5 (VWO)						- 1,238 (0,682)				- 4,136 (1,304)
Variance	migrants 0-model	natives 0-model								
Student level	1,127	1,582	1,138	1,114	1,051	0,971	1,595	1,595	1,526	1,411
Class level	0,139	0,280	0,038	0,051	0,114	0,056	0,000	0,000	0,000	0,000
School level	0,093	0,190	0,046	0,046	0,072	0,086	0,153	0,152	0,144	0,116
-2 Log likelihood	1886	970	1867	1857	1839	1781	949	949	937	913

Bold printed parameters are significant: $p < 0,05$; *italic* printed parameters are significant: $p < 0,10$