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Does classroom composition make a difference: effects on developments in motivation, sense of classroom belonging, and achievement in upper primary school

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The present study investigated the effects of socioeconomic and ethnic classroom composition on developments in students' motivation, sense of classroom belonging, and achievement. A sample of 722 primary school students completed questionnaires from 3rd to 6th grade. Latent growth curve analyses revealed that the reading comprehension scores of students with a low socioeconomic status (SES) were lower for each measurement in more socioeconomically disadvantaged classes, whereas these scores were higher in classes with more ethnic minority students. In practice, these effects may often cancel each other out. Furthermore, in classes with a high share of low-SES or ethnic minority students, students of all backgrounds showed more positive developments in motivation. These findings contradict commonly held fears that disadvantaged students "bring down" other students in the classroom. The results furthermore highlight the importance of studying longitudinal developments.

Keywords: classroom composition; school composition; peer effects; motivation; achievement

Introduction

Students' motivation for school and achievement in school is affected by many contextual factors, including instructional, interpersonal, and organisational factors (Roeser, Eccles, & Sameroff, 2000). Moreover, poor integration of students in their school environments decreases their motivation for school and negatively affects their learning outcomes (e.g., Eccles & Roeser, 2011; Roeser et al., 2000). By definition, classrooms are "social environments" as social interactions with teachers and with classmates shape the learning process (Urdan & Schoenfelder, 2006). The composition of the classroom may thus be essential for students' motivational and learning outcomes.

As in many countries, the schools in The Netherlands are very diverse with regard to social and ethnic classroom composition. Socioeconomic and ethnic school segregation is a common phenomenon, particularly in urban areas (Bakker & Denessen, 2011; Centraal Bureau voor de Statistiek [CBS; Statistics Netherlands], 2010; Karsten et al., 2006). Although schools in The Netherlands receive additional funding for students with disadvantaged backgrounds (Organisation for Economic Co-operation and Development [OECD], 2012), there is still fear that students in classrooms with many peers from disadvantaged backgrounds will be negatively affected when compared to similar students in classrooms with a different composition.

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Many studies on classroom composition focused solely or predominantly on achievement outcomes (e.g., Driessen & Sleegers, 2000; P. A. Goldsmith, 2004; Opdenakker & Van Damme, 2007; Peetsma, Van der Veen, Koopman, & Van Schooten, 2006). Yet, as important as achievement levels may be, good grades may not be the only desired outcome of education. The context in which children learn can also affect other school-related outcomes, such as children's desire for learning, their feelings of competence, and their sense of belonging in the classroom (Volet & Järvelä, 2001). These other factors are not only important because they may enhance achievement, they may also be considered desirable in their own right. Therefore, the current study focuses on the influence of socioeconomic and ethnic composition on motivation, sense of classroom belonging, and academic achievement.

Ethnic background and socioeconomic status

There are three main types of immigrant groups in The Netherlands, as follows: (a) guest workers and their families from Mediterranean countries, such as Morocco and Turkey; (b) immigrants from former Dutch colonies, including Suriname and The Netherlands Antilles; and (c) refugees from countries such as Iran, Iraq, former Yugoslavia, and Somalia. Overall, immigrant students with non-Western backgrounds from each of these groups show considerable educational disadvantages when compared to their Dutch peers and to immigrant students with Western backgrounds (CBS, 2010; The Netherlands Institute for Social Research, 2010). Therefore, educational policies in The Netherlands often distinguish between ethnic minority and majority students instead of immigrant and non-immigrant students (The Netherlands Institute for Social Research, 2010). The current paper utilises a similar distinction.

Additionally, low-SES students lag behind in school compared to high-SES students (Roeleveld, Driessen, Ledoux, Cuppen, & Meijer, 2011; The Netherlands Institute for Social Research, 2010). Both in research and policy, the characteristics of ethnic minority and low-SES students are often considered interchangeable. Although ethnic minorities are more likely to have a lower socioeconomic status, ethnic minority students and low-SES students differ from each other in many aspects, such as their historical and cultural backgrounds. Furthermore, ethnic minority students in The Netherlands typically speak Dutch as a second language (The Netherlands Institute for Social Research, 2010). Given these differences, socioeconomic and ethnic classroom composition may have different effects on students; therefore, classroom effects with regard to ethnicity and SES are considered separately in the current study.

Explanations for classroom composition effects

A general belief is that segregation leads to adverse outcomes for students in disadvantaged, segregated classrooms. A common fear is that student groups that are considered disadvantaged due to their average achievement levels, that is, ethnic minority students or students from socioeconomically disadvantaged backgrounds, will "bring down" other students in the classroom and that these disadvantaged students themselves will not benefit from the potential of more privileged classrooms. There are a number of different explanations of the underlying processes through which a disadvantaged classroom composition negatively affects students. This paper will address these explanations before describing the studies that were conducted to examine the effects of classroom composition.

The *instructional quality* explanation states that quality is lower in disadvantaged classrooms because of several reasons. Teachers adapt their general instructional level to

the average level of their students (Beckerman & Good, 1981), and their expectations of students may be lower in disadvantaged classrooms (Jussim, Eccles, & Madon, 1996; Jussim & Harber, 2005; Van den Bergh, Denessen, Hornstra, Voeten, & Holland, 2010), which may result in lower standards. Moreover, disadvantaged schools may have more problems finding qualified motivated staff members (OECD, 2005).

The *language contact* hypothesis proposed by Driessen, Doesborgh, Ledoux, Van der Veen, and Vergeer (2003) states that ethnic minority students in segregated classrooms have fewer opportunities to come into contact with the Dutch language when compared to ethnic minority students in classrooms with a higher proportion of Dutch students. Accordingly, ethnic minority students in integrated classrooms should become more proficient in the Dutch language, which also supports learning other academic subjects (Driessen et al., 2003). Other students in the class may also be deprived of language opportunities due to the lower levels of proficiency in Dutch of their ethnic minority classmates. Although the language contact hypothesis may be particularly relevant for ethnic classroom composition, it may also apply to some extent to socioeconomic classroom composition, considering the distinction in "restricted" and "elaborated" code described by Bernstein (1964).

The *social contagion* explanation states that through social interactions students influence each other's motivation and learning outcomes, leading them to become more alike, either positively or negatively (Erbring & Young, 1979; Kelly, 2009). Similarly, the *normative explanation* states that students become more like their peers due to the norm being set in the classroom (P. R. Goldsmith, 2011). Based on these two explanations, it is often assumed that students in disadvantaged classrooms will "bring each other down" in terms of motivation and achievement. Thus, group dynamics may lead to a culture of amotivation within a class (Paulle, 2002). However, the reverse may also be the case, as students from disadvantaged backgrounds have more to gain from education in terms of upward mobility (Van der Veen, 2003). Previous research (e.g., Hornstra, Van der Veen, Peetsma, & Volman, 2013) has found that ethnic minority students report higher levels of motivation than the majority students, which suggests that, contrary to commonly held beliefs, students in disadvantaged classrooms may set a norm of high motivation and may encourage achievement.

Although most of the aforementioned explanations suggest that being in a classroom with many ethnic minority or low-SES students negatively impacts motivation and achievement, it has also been argued that students in disadvantaged classrooms may benefit from school segregation. The *specialisation* hypothesis suggests that teachers of segregated disadvantaged classrooms are more proficient at tailoring their instruction to the specific needs of their disadvantaged students (Driessen et al., 2003). This tailoring may refer to the content of the instructional practices, such as focusing more on language in classrooms with high numbers of students with language delays, and to the adaptation of instructional styles that cater to students' particular backgrounds. According to the *big-fish-little-pond* (BFLP) effect, students should have more positive self-concepts in classes in which the overall ability levels are lower (Marsh, 1987). Therefore, self-efficacy and learning outcomes of students with disadvantaged backgrounds may develop more positively in disadvantaged classes.

Previous research on classroom composition effects

Most of the aforementioned explanations assume that socioeconomic and ethnic classroom composition effects are due to differences in overall ability levels. Studies

examining the effects of aggregated classroom ability levels on students' achievement outcomes have primarily found that average classroom ability levels are positively related to students' achievement outcomes (see, e.g., Duru-Bellat & Mingat, 1998; Opdenakker & Van Damme, 2001, 2006, 2007).

Another line of research specifically examines the effects of socioeconomic and/or ethnic classroom composition on achievement outcomes. Previous studies examining overall socioeconomic classroom composition have found small to more substantial effects on achievement, indicating that students in more disadvantaged classes (referring to classes with more students from lower socioeconomic status) performed worse or showed lower achievement gains compared to similar students in classes with a more socioeconomically privileged composition (Alexander & Eckland, 1975; Blakey & Heath, 1992; Brookover, Beady, Flood, Schweitzer, & Wisenbaker, 1979; Brookover et al., 1978; Caldas & Bankston, 1997; Dumay & Dupriez, 2008; Henderson, Mieszkowski, & Sauvageau,1978; Lauder & Hughes, 1999; McDill, Rigsby, & Meyers, 1969; Opdenakker, Van Damme, De Fraine, Van Landeghem, & Onghena, 2002; Palardy, 2008; Peetsma et al., 2006; Resh & Dar, 2012; Rumberger & Palardy, 2005; Rutter, Maughan, Mortimore, & Ouston, 1979; Shavit & Williams, 1985; Summers & Wolfe, 1977; Van Landeghem, Van Damme, Opdenakker, De Fraine, & Onghena, 2002; Willms, 1985, 1986). Other studies examining socioeconomic classroom composition have found no effects on achievement outcomes (e.g., Bondi, 1991; Guldemond & Bosker, 2009; Hauser, Sewell, & Alwin, 1976).

Studies examining the effects of ethnic classroom composition on achievement outcomes often show small but negative effects of having high numbers of ethnic or racial minority students in a classroom (Caldas & Bankston, 1998; P. R. Goldsmith, 2011; Hanushek & Rivkin, 2009; Peetsma et al., 2006; Resh & Dar, 2012; Van der Slik, Driessen, & De Bot, 2006) or no effects (e.g., Guldemond & Bosker, 2009). However, as socioeconomic status and ethnicity are often confounded, the outcomes attributed to ethnic classroom composition could in fact be due to socioeconomic classroom composition. Indeed, one study by Van der Slik et al. (2006) found a negative effect of the number of ethnic minority students in a classroom on students' achievement, yet this effect disappeared after controlling for socioeconomic classroom composition. In contrast, Caldas and Bankston (1998) found a negative effect of ethnic classroom composition even after controlling for socioeconomic classroom composition. Several studies by Driessen and colleagues (e.g., Driessen, 2002; Driessen et al., 2003) have used a measure for classroom composition that includes both ethnicity and socioeconomic status. Consistent with studies examining both socioeconomic and ethnic classroom composition, these studies have found that students in classes with more disadvantaged populations showed lower performance outcomes.

Overall, studies investigating classroom composition effects have shown that the presence of more disadvantaged peers seems to negatively affect achievement outcomes. However, there is a lack of research examining whether these effects hold equally for different groups of students. Consistent with the *specialisation* hypothesis, Peetsma et al. (2006) found that disadvantaged students benefited from being taught with other disadvantaged peers. When different groups of students are not distinguished, composition effects may be underestimated as negative effects for higher SES or majority students may be cancelled out by positive effects for students from more disadvantaged backgrounds. Moreover, most of the aforementioned studies only included cross-sectional data, and even the aforementioned theoretical explanations for classroom composition effects do not explicitly refer to developments over time. It seems likely that the processes described in

these explanations will increasingly affect students over time. For example, lower instructional quality may not directly lead to lower achievement outcomes in disadvantaged schools, yet students may show lower levels of progress over time in comparison to students in schools that have better instructional quality. This increasing effect of classroom composition over time may also be evident with regard to the explanations stating that students will be negatively affected by their peers in disadvantaged schools, either through social contagion, the norm that is being set, or the language levels of peers. These peer effects may accumulate over time, and these explanations suggest that students in disadvantaged classrooms should show lower levels of progress. Similarly, in line with the *specialisation* hypothesis, students should show higher levels of progress over time when they are taught with similar students. Although longitudinal studies can provide valuable insights in addition to cross-sectional studies, only a few studies have examined composition effects longitudinally (e.g., P. R. Goldsmith, 2011; Palardy, 2008; Peetsma et al., 2006). With longitudinal research, progress can be taken into consideration. Longitudinal studies examining whether classroom composition characteristics can thus help explain why students in some classes show higher levels of progress than in other classes.

Most research examining classroom composition has focused exclusively or primarily on achievement outcomes. With the exception of the literature regarding the BFLP effect, research on non-cognitive outcomes is rather scarce. The BFLP literature primarily includes studies focusing on classroom ability levels with students' self-concepts as an outcome variable (see, e.g., Marsh & Hau, 2003; Nagengast & Marsh, 2012; Thijs, Verkuyten, & Helmond, 2010). These studies support the assumption that students have higher self-concepts in classes that have lower achievement or ability levels. Only a few studies have examined socioeconomic or ethnic classroom composition effects on affective or social outcomes such as motivation and sense of classroom belonging (e.g., Driessen et al., 2003; Peetsma et al., 2006; Van Landeghem et al., 2002). The results of these studies have been inconclusive, but seem to suggest that composition effects on achievement are stronger than composition effects on motivation or social outcomes. This may not be surprising as research has consistently shown that affective and social outcomes vary considerably less at the school or classroom level than achievement outcomes (see, e.g., Konu, Lintonen, & Autio, 2002; Opdenakker & Vandamme, 2000, 2001; Peetsma et al., 2006). However, for achievement as well as motivation and sense of classroom belonging, students' growth curves may show relatively more variance situated at the group level compared to their scores at one specific point in time. This suggests that classroom composition may be underestimated when only cross-sectional measurements are considered. Thus, longitudinal research is needed to gain a better understanding of composition effects on achievement and other school-related outcomes.

In addition to achievement, the present study therefore examines developments in students' self-reported sense of classroom belonging and their motivational outcomes. These motivational outcomes include task orientation, which refers to the extent to which students are oriented towards mastering and understanding school-related tasks (Pintrich, 2000), self-efficacy, which refers to judgments regarding one's capabilities to implement actions that are necessary for successfully completing academic tasks (Bandura, 1977), and school investment, which refers to motivated behaviours. These motivated behaviours can vary with regard to intensity, persistence, and direction. Previous research (Hornstra et al., 2013) has shown that developments in students' task orientation, self-efficacy, and school investment differ for students with diverse ethnic and socioeconomic backgrounds. No differences were evident in lower grades; however, toward the end of primary school, ethnic minority students reported higher levels of task orientation and self-efficacy compared to

majority students, yet they were rated lower on school investment by their teachers. Low-SES students did not differ from other students in task orientation, but they reported lower levels of self-efficacy at the end of primary school and were rated lower on school investment. These differences became more pronounced toward the end of primary school. To our knowledge, no studies have examined to what extent these differences in developments can be explained by socioeconomic and ethnic characteristics of the classroom.

Hypotheses

The present study examines the influence of class composition on learning gains in academic achievement and changes in students' sense of classroom belonging and motivation from third to sixth grade of primary school. Based on previous research and consistent with the *instructional quality, language contact,* and *social contagion/normative explanations*, it was hypothesised (1) that a high number of low-SES and/or ethnic minority students would negatively affect achievement. Negative effects were expected for the initial levels of achievement in Grade 3 as well as for progress over time, as these effects are expected to accumulate over time. Although previous literature is less clear regarding outcomes other than achievement, based on the strong relationships between motivation, sense of classroom belonging, and achievement (e.g., Hornstra et al., 2013; Wigfield & Cambria, 2010), it was expected that composition effects on motivation and sense of classroom belonging would be in the same direction as composition effects on achievement. Therefore, it was hypothesised that a high number of low-SES and/or ethnic minority students would negatively affect initial levels of and developments in motivation, sense of classroom belonging, and achievement.

Consistent with the *specialisation hypothesis* and previous literature regarding differential effects (e.g., Peetsma et al., 2006), it was hypothesised (2) that the aforementioned effects would only be evident for middle- and high-SES and ethnic majority students and that low-SES and ethnic minority students may actually benefit with regard to achievement from a high number of low-SES and/or ethnic minority students in terms of initial levels and particularly in developments over time. Similar differential effects are expected with regard to motivational outcomes and sense of classroom belonging.

Methodology

Sample and procedure

A subsample of a larger national cohort study (the "COOL" study; Driessen, Mulder, Ledoux, Roeleveld, & Van der Veen, 2009) participated in the present study. The COOL study includes cohorts of students from Kindergarten, Grade 3, and Grade 6, with a total sample size of 36,060 students. The subsample examined in this study consisted of 722 third-grade students from 37 classes across 25 schools located in The Netherlands. This subsample was selected from the Grade 3 cohort of the first wave of the larger COOL study (N = 12,609 students from 550 schools). Students in the COOL study were representative of students in The Netherlands (Driessen et al., 2009), and the composition of schools in the subsample of the present study was representative of schools in The Netherlands (CBS Statline, 2013) ($p < .001$). Moreover, analyses indicated that students in the subsample were comparable to students in the larger COOL study; in Grade 3, the motivation and sense of classroom belonging of students in the subsample did not differ or only slightly differed from that of students in the COOL study (effect sizes between

Table 1. Schematic overview of the data collection waves.

Wave	Grade	Months
1/COOL 1	Half-way through Grade 3	January/February, 2008
2	Beginning of Grade 5	September/October, 2009
3	Half-way through Grade 5	January/February/March, 2010
4	Beginning of Grade 6	September/October, 2010
5/COOL 2	Half-way through Grade 6	January/February/March, 2011

−0.13 and 0.01). Data regarding students' motivation and sense of classroom belonging in third grade and 3 years later in sixth grade were available from the triennial "COOL" study (Driessen et al., 2009). Between the two COOL measurements, three additional waves of data were collected from this subsample. Students and teachers completed questionnaires during each measurement wave. Table 1 provides a schematic overview of the data collection.

During the first COOL measurement, students' average age was 9 years, and the subsample consisted of 361 males (50%) and 361 females (50%). Schools provided information regarding the students' background characteristics. Ethnicity was determined based on the mothers' country of origin. When a student was from a single-parent family, ethnicity was determined based on the ethnicity of this parent. A dichotomy was created between ethnic majority and ethnic minority students from non-Western countries. Although the group of ethnic minority students consisted of students with backgrounds from diverse countries, these students were considered one group in the larger COOL study and in the present study given their similarities (Driessen et al., 2009). Similarly, students with parents from another European or Western country were included in the group of majority students.[1] A total of 78 students (11%) were from ethnic minority backgrounds (primarily Turkish or Moroccan), whereas 642 students (89%) were from Western backgrounds.

Information regarding parental educational levels was also provided by the schools. Although socioeconomic status also depends on family income and occupation (Duncan, Featherman, & Duncan, 1972), parental educational level is considered a suitable proxy for SES, as it is one of the most stable aspects of SES and an indicator of family income (Sirin, 2005). Therefore, parental educational level was considered an indication of students' SES. Three groups were distinguished based on the highest educational level attained by either parent, as follows: (a) 96 students (16%) were considered as low SES (primary school to junior vocational education); (b) the middle category (senior vocational education) consisted of 301 (50%) students, and (c) 204 students (34%) were considered as high SES (higher levels of education). SES information was missing for 121 students. Analyses revealed a significant relation between ethnicity and SES for the students in this sample (*Spearman's Rho* = .112, $p < .05$).

Measures

Motivation and sense of classroom belonging

Questionnaires regarding motivation and sense of classroom belonging were administered to students and their teachers during regular class time. The motivation scales included self-reports on task orientation and academic self-efficacy, and teacher reports on students' investment. Although self-report measures have a number of limitations, such as being susceptible to self-presentation bias (Jobe, 2000), the internal nature of motivational

Table 2. Example items, number of items, and reliabilities of the scales used in the current study.

Scale	Example items	*N* of items	Reliability m1–m5
Task orientation from the Goal Orientation Questionnaire (Seegers, Van Putten, & De Brabander, 2002)	*"I like it when I learn something new in school."*	5	.65–.82
Academic self-efficacy from the Patterns of Adaptive Learning Survey (PALS) (Midgley et al., 2000)	*"I can do even the hardest work in school if I try."*	6	.70–.84
School investment (teacher reports) from the COOL student profiles (Jungbluth, Peetsma, & Roeleveld, 1996)	*"This student quickly gives up when he/she does not succeed."* *"This child works accurately."*	3	.82–.85
Sense of classroom belonging (Peetsma, Wagenaar, & De Kat, 2001)	"*I like spending time with other students in my class.*"	6	.76–.85

beliefs supports using self-report as the most suitable measure. Motivated behaviour, however, is a visible part of motivation and was therefore assessed using teacher ratings. This scale included items that represent two key aspects of school investment, which are intensity and perseverance. Similar to task orientation and self-efficacy, students' sense of classroom belonging was measured using self-reports.

All scales were translated into Dutch for use in the COOL study (Driessen et al., 2009; Jungbluth, Roede, & Roeleveld, 2001). All items were on a 5-point Likert scale that ranged from *totally not applicable to me* (1) to *totally applicable to me* (5). More information regarding the scales is reported in Table 2. First, a series of multigroup factor analyses were performed to determine whether the variables reflected the same constructs over time and across groups. To examine measure invariance across the groups (males vs. females, ethnic majority vs. minority students, and low vs. middle vs. high SES), a model was estimated for each variable in which the measurement parameters were held equal across the groups. Likewise, to check for measurement invariance across measurement occasions, multigroup factor analyses were performed with the groups serving as the measurement occasions. All models fit the data well (comparative fit index [CFI] and the Tucker Lewis index [TLI] were all greater than .95), and fit was not significantly better in the less restrictive models.

Cognitive ability

Cognitive ability was included as a control variable in this study. It was measured in Grade 3 using a non-scholastic cognitive ability test, which consists of 85 verbal and non-verbal items across the following five subtests: "composition of figures", "exclusion", "number series", "categories", and "analogies". Factor analyses revealed that these subtests formed one general cognitive ability factor. The reliability of this test was 0.91 (Van Batenburg & Van der Werf, 2004).

Mathematics and reading comprehension achievement

Students' achievements in mathematics and reading comprehension were measured using national tests from the Dutch National Institute for Educational Measurement (Cito). The scores were obtained from school records. These tests are administered to students in The

Netherlands once a year (for reading comprehension) or twice a year (for mathematics) to monitor students' progress. Classroom teachers administer these tests using a standardised procedure. Then, the teachers score the students' answers. The number of correct answers is entered into the Cito computer system, which calculates an "ability score". A large collection of test items was developed by Cito and calibrated using item response theory (IRT) techniques. These techniques equate achievement scores on a common scale for different grades (Feenstra, Kamphuis, Kleintjes, & Krom, 2010; Janssen, Verhelst, Engelen, & Scheltens, 2010; Weekers, Groenen, Kleintjes, & Feenstra, 2011).

Four scores on mathematics tests were available for each student from the end of fourth grade until the middle of sixth grade. The schools used two different versions of this test because the test was updated by Cito in 2007 (Janssen et al., 2010). Six schools in the sample used the older version, whereas 18 schools administered the updated version to their students. The scores from the two versions are not comparable; therefore, the scores from the older version were transformed such that the mean and standard deviation of the scores for this version were the same as those for the newer version. The reading comprehension tests are administered once a year to monitor students' progress. Three scores on these tests were available for each student from the middle of fourth grade until the middle of sixth grade. The reading comprehension tests were updated by Cito in 2008 (Feenstra et al., 2010; Weekers et al., 2011). Sixteen schools in the sample used the older version, whereas eight schools administered the updated version to their students. One school did not administer reading comprehension tests from Cito to their students. Both versions of the test use the same scale, and analyses showed that the scores from both versions were comparable.

The Cito mathematics and reading comprehension tests are valid measures of students' performance and have good reliability ($\alpha > 0.80$) (Evers, 2002; Feenstra et al., 2010; Janssen et al., 2010; Weekers et al., 2011).

Classroom composition

The composition of the class by socioeconomic background was computed by calculating the percentage of students with low SES (i.e., children whose parents have had no more than junior vocational education). This was a scaled variable with scores ranging from 0% (no low-SES students in the classroom) to 100% (only low-SES students in the classroom). The ethnic classroom composition variable was also derived from the individual background characteristics of the students in the classes. However, the percentages of ethnic minority students were not normally distributed across classes. Therefore, the following three types of classrooms were distinguished: (1) classrooms with no ethnic minority students; (2) classrooms with < 50% ethnic minority students; and (3) classrooms with > 50% ethnic minority students. Hence, for both ethnic and socioeconomic classroom composition, a higher score reflected a higher share of either low-SES or ethnic minority students, thus a higher level of classroom disadvantage. To use these scores as class composition variables, it was necessary to verify whether class composition remained stable over the years. For socioeconomic classroom composition, the correlations between the socioeconomic classroom composition at the various measurement time points varied between 0.88 and 0.99. For ethnic classroom composition, all of the participating classes remained in the same category throughout the duration of the study.

Data analyses

The data were analysed using multivariate latent growth curve analyses (LGCA) with Mplus (Muthén & Muthén, 2007). In LGCA, two latent variables, which are the initial

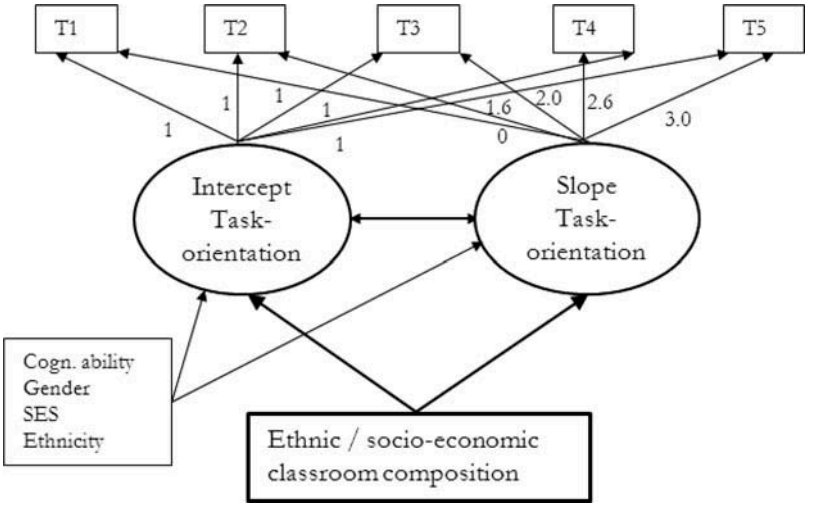

Figure 1. Example model for estimating classroom composition effects on task orientation measured from Time 1 (T1) to Time 5 (T5) with cognitive ability, gender, individual SES, and ethnicity as control variables. Separate models were estimated for ethnic and socioeconomic composition.

rate (i.e., the intercept) and the level of growth per year (i.e., the slope) for each dependent variable (i.e., task orientation, self-efficacy, school investment, sense of classroom belonging, and math and reading comprehension), were estimated for each participant based on the observed scores at each measurement occasion. This analysis allows for examining how classroom composition relates to the initial levels of and developments in the dependent variables. Effects of classroom composition on initial levels indicate that differences between classrooms with different composition were evident in Grade 3 and remained stable at each measurement occasion. Composition effects on growth indicate effects either emerged, increased, or diminished between Grades 3 and 6. Figure 1 provides an example of the models estimated for task orientation. Similar models were estimated for the other outcome variables as well.

All models were first estimated for the total group of students (Hypothesis 1) while controlling for the individual background variables of ethnicity, SES, gender, and cognitive ability. In this first step, the intercepts and slopes were estimated for each of the dependent variables. Both classroom composition variables were included in the model to account for any potential overlap between ethnic and socioeconomic classroom composition. Given that the data have a nested structure (i.e., students within classes), we corrected for the multilevel structure of the data. Non-significant paths were omitted from the model to determine the most parsimonious model. To determine whether classroom composition affected developments in achievement, motivation, and sense of classroom belonging, parameters estimating the effects of the composition variables from the model were removed to examine whether the model fit significantly declined. Model fit was determined using Chi-square difference tests, comparative fit index (CFI), and the root mean square error of approximation (RMSEA). A significant Chi-square difference indicates whether the model fit significantly worsened when an estimate was omitted. A CFI greater than .90 indicates a good fit of a model, and an RMSEA less than .05 indicates good fit, whereas an RMSEA between .05 and .08 indicates reasonable fit (Hu & Bentler, 1999).

To investigate differential effects of classroom composition, multigroup LGCAs were performed. In the first multigroup comparison, the effects of socioeconomic classroom composition were compared for low-, middle-, and high-SES students. In another multigroup comparison, the effects of ethnic classroom composition were compared for ethnic minority and majority students. For these multigroup analyses, the first step involved defining a model with no equality constraints. Equality constraints were then added individually to the model. Fit indices indicated whether the model fit significantly declined with the addition of each equality constraint: A decline would suggest that a parameter differed across the groups. If the model fit did not significantly worsen with the addition of an equality constraint, then this parameter was considered equal across groups.

Participants with missing values were not excluded from the analyses; rather, their missing values were estimated using full-information maximum likelihood estimation (FIML). The FIML estimation is based on the assumption that missing values are missing at random (MAR). MAR assumes that missing values can be predicted from the available data. Removing all cases with missing values (i.e., listwise deletion) is based on the more strict assumption that the missing values are completely at random (MCAR).

To evaluate the size of the relations between classroom composition and developments in motivation, sense of classroom belonging, and achievement, standardised coefficients (i.e., correlations) of the relations were calculated, and the size of the effect was indicated through Cohen's *d*. A standardised correlation of 0.10 indicates a small correlation, 0.30 indicates a medium correlation, and 0.50 indicates a large correlation (Cohen, 1988).

Results

Descriptive statistics

Table 3 provides an overview of the descriptive statistics for each of the dependent variables (i.e., task orientation, self-efficacy, school investment, sense of classroom belonging, math achievement, and reading comprehension achievement) at every measurement occasion.

Latent growth curve analyses were performed in which each variable's intercept and growth curve were estimated for each student individually. Table 4 displays the variance components of the estimated intercepts and growth curves for each variable at both the individual and classroom level. These are latent variables, as their estimates are based on the observed scores at each measurement. The correlations between the intercept and slope of each variable are also displayed. Intraclass correlations (ICCs) indicated that between 3.81% to 24.48% of the variance in the intercepts was situated at the classroom level. For the growth curves, the degree of variance at the classroom level was higher. Between 6.42% to 58.46% of the variance in the growth curves was situated at the classroom level. The variance percentages at the classroom level for both intercepts and slopes were relatively low, particularly with regard to the motivation variables and sense of classroom belonging, when compared to the individual-level variance percentages, which is consistent with the results of similar studies (e.g., Konu et al., 2002). The ICCs indicated that the classroom-level variance was larger for the achievement variables compared to the motivation variables and sense of classroom belonging, particularly for the growth curve of mathematics. Previous multilevel longitudinal research has also found high estimates of school and classroom-level variances for growth curves, sometimes even up to 80% (Dumay, Coe, & Anumendem, 2013). Although classroom-level variances for the motivation variables and sense of classroom belonging were relatively low, these

Table 3. Descriptive statistics and correlations for task orientation (TO), self-efficacy (SE), school investment (SI), sense of classroom belonging (CB), math, and reading comprehension (RC) (N = 722).

		M	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1.	TO Gr 3	4.11	0.60	1.00														
2.	TO Gr 5_1	4.05	0.54	.07	1.00													
3.	TO Gr 5_2	3.92	0.60	.09*	.50**	1.00												
4.	TO Gr 6_1	3.92	0.59	.05	.41**	.59**	1.00											
5.	TO Gr 6_2	3.85	0.61	.04	.33**	.43**	.57**	1.00										
6.	SE Gr 3	3.71	0.62	.44**	.04	.06	.02	.01	1.00									
7.	SE Gr 5_1	3.62	0.61	.06	.47**	.27**	.27**	.21**	.07	1.00								
8.	SE Gr 5_2	3.65	0.57	.03	.34**	.43**	.32**	.21**	.02	.56**	1.00							
9.	SE Gr 6_1	3.72	0.57	.07	.31**	.41**	.48**	.34**	.02	.49**	.66**	1.00						
10.	SE Gr 6_2	3.76	0.61	.02	.27**	.25**	.34**	.52**	−.01	.40**	.52**	.61**	1.00					
11.	SI Gr 3	3.38	0.89	.15**	.04	.02	−.01	.02	.06	.02	.01	.02	.03	1.00				
12.	SI Gr 5_1	3.43	0.93	.07	.10*	.13**	.14**	.13**	.12**	.13**	.15**	.09*	.15**	−.02	1.00			
13.	SI Gr 5_2	3.44	0.97	−.03	.07	.11**	.11*	.10*	.04	.15**	.15**	.09*	.13**	.01	.77**	1.00		
14.	SI Gr 6_1	3.43	0.88	.01	.11*	.21**	.20**	.15**	.02	.17**	.15**	.14**	.17**	.06	.58**	.60**	1.00	
15.	SI Gr 6_2	3.53	0.87	.06	.09	.15**	.17**	.16**	.02	.15**	.14**	.16**	.20**	.11*	.57**	.63**	.70**	1.00
16.	CB Gr 3	3.38	0.89	.28**	.07*	.05	.01	.03	.25**	.07	−.01	.09*	.01	.12**	.01	−.04	−.05	−.05
17.	CB Gr 5_1	3.44	0.93	−.02	.23**	.15**	.17**	.13**	−.01	.17**	.14**	.12**	.08**	.02	.07	.10**	.06	.02
18.	CB Gr 5_2	3.44	0.98	−.01	.19**	.25**	.23**	.14**	−.04	.14**	.25**	.19**	.10**	.05	.13**	.12**	.12**	.08
19.	CB Gr 6_1	3.43	0.88	.08	.15**	.13**	.24**	.17**	.01	.13**	.18**	.26**	.17**	.01	.11*	.09*	.06	.07
20.	CB Gr 6_2	3.53	0.87	.06	.11*	.14**	.17**	.21**	−.06	.08	.16**	.14**	.18**	.00	.12**	.13**	.11**	.13**
21.	RC Gr 4	34.42	13.36	.10	.04	.04	.01	−.04	.12*	.11*	.16**	.11*	.09	.01	.37**	.27**	.26**	.27**
22.	RC Gr 5	43.78	13.86	.01	.04	.14**	.08	−.01	.08	.18**	.25**	.21**	.15**	.01	.40**	.40**	.38**	.42**
23.	RC Gr 6	57.75	16.10	−.04	.02	.13**	.06	.01	.00	.19**	.30**	.21**	.17**	−.01	.41**	.42**	.32**	.37**
24.	Math Gr 4_2	85.78	15.22	.01	.06	−.01	−.06	−.03	.05	.28**	.22**	.17**	.19**	−.01	.26**	.27**	.15**	.13*
25.	Math Gr 5_1	95.58	15.43	.02	.04	.02	−.02	.00	.15*	.27**	.25**	.21**	.22**	.05	.26**	.27**	.21**	.23**
26.	Math Gr 5_2	103.22	12.46	−.01	.08	.12*	.02	.03	.00	.39**	.36**	.32**	.27**	.00	.37**	.38**	.34**	.38**
27.	Math Gr 6_1	107.71	15.13	−.04	.10	.06	.03	.06	−.08	.23**	.23**	.23**	.22**	−.02	.11	.11	.19**	.22**

(*continued*)

Table 3. (*Continued*).

		M	*SD*	16	17	18	19	20	21	22	23	24	25	26	27
16.	WB Gr 3	3.38	0.89	1.00											
17.	WB Gr 5_1	3.44	0.93	.11**	1.00										
18.	WB Gr 5_2	3.44	0.98	.01	.61**	1.00									
19.	WB Gr 6_1	3.43	0.88	.07	.50**	.60**	1.00								
20.	WB Gr 6_2	3.53	0.87	.05	.47**	.52**	.65**	1.00							
21.	RC Gr 4	34.42	13.36	.01	−.02	.00	−.07	−.04	1.00						
22.	RC Gr 5	43.78	13.86	.02	.08	.09	.03	.05	.69**	1.00					
23.	RC Gr 6	57.75	16.10	−.08	.03	.03	.03	.04	.53**	.68**	1.00				
24.	Math Gr 4_2	85.78	15.22	.05	.04	.00	.00	.00	.36**	.41**	.48**	1.00			
25.	Math Gr 5_1	95.58	15.43	.08	.07	.01	−.02	−.05	.24**	.42**	.36**	.61**	1.00		
26.	Math Gr 5_2	103.22	12.46	.09	.02	.04	−.02	−.02	.35**	.52**	.54**	.64**	.70**	1.00	
27.	Math Gr 6_1	107.71	15.13	.05	−.06	.03	−.03	.01	.15*	.26**	.25**	.44**	.45**	.59**	1.00

Note: **$p < 0.01$ level (2-tailed); *$p < 0.05$ level (2-tailed).

Table 4. Correlations, variance components and standard errors for the estimated individual intercepts and growth curves (slopes) at the individual and classroom level (N = 722).

	Task orientation		Self-efficacy		School investment		Sense of classroom belonging		Reading comprehension		Mathematics	
	Intercept	Slope	Intercept	Slope	Intercept	Slope	Intercept	Slope	Intercept	Slope	Intercept	Slope
Variance component												
Individual-level variance												
Variance	0.018*	0.015*	0.018*	0.016*	0.057*	0.026*	0.023*	0.015*	88.31*	4.98*	98.68*	1.48*
Standard error	0.001	0.001	0.001	0.001	0.003	0.001	0.001	0.001	4.96	0.28	6.62	0.64
Classroom-level variance												
Variance	0.001*	0.001*	0.001*	0.001*	0.004*	0.002*	0.002*	0.002*	21.10*	1.48*	31.99*	2.08*
Standard error	0.000	0.001	0.000	0.000	0.002	0.001	0.001	0.001	6.34	0.42	11.07	0.63
ICC (in %)	5.59%	7.37%	3.81%	6.42%	6.54%	7.29%	9.48%	9.89%	19.29%	22.91%	24.48%	58.46%
$r_{\text{int\_slope}}$	0.31*		0.39*		0.98*		0.65*		−0.53*		0.07	

Note: *$p < 0.05$ level (1-tailed).

estimates were statistically significant at both the individual and classroom level, indicating that classroom-level predictors (such as classroom composition) may explain existing differences between classes in both initial levels and growth of motivation, sense of classroom belonging, and achievement. Given these outcomes, the analyses were performed while controlling for the multilevel, nested structure of the data.

Socioeconomic and ethnic classroom composition effects on developments in motivation, sense of classroom belonging, and achievement

The first analysis examined whether, across all students, a high share of ethnic minority or low-SES students in a class would negatively affect initial levels of and developments in achievement, motivation, and sense of classroom belonging. The results from the latent growth analyses regarding the direct relations between the socioeconomic and ethnic classroom composition, and initial levels of and developments in motivation, sense of classroom belonging, and achievement are presented in Table 5. Across all analyses, we controlled for individual SES, gender, ethnicity, and cognitive ability to examine whether classroom composition affected motivation, sense of classroom belonging, and achievement beyond these individual background variables. Fit indices indicated that each of the models fitted the data well.

Socioeconomic classroom composition

The outcomes presented in Table 5 show that, after controlling for students' individual SES and other individual background variables, the percentage of low-SES students in a class did not relate to the intercept, whereas this percentage did relate to growth in task orientation. Thus, in classes with high numbers of low-SES students, students had similar initial levels of task orientation compared to classes with fewer low-SES students but showed more progress in task orientation toward the end of primary school. In other words, when students had more "disadvantaged" classmates, they showed more growth in task orientation. Socioeconomic classroom composition explained 10% of the growth in task orientation. The effect size for this finding was small to medium. Additionally, being in a socioeconomically disadvantaged class related negatively to initial levels of achievement in reading comprehension, indicating that reading comprehension scores were lower across all grades in classes with more low-SES students. Having disadvantaged classmates thus negatively relates to scores in reading comprehension. It is important to note that these results were evident after controlling for individual SES, ethnicity, gender, and cognitive ability. Socioeconomic classroom composition explained 4% of the variance in initial levels of reading comprehension. The effect size for this relation was small to medium. No relations with regard to the growth rate of reading comprehension were evident. Socioeconomic classroom composition did also not relate to initial levels of or developments in self-efficacy, school investment, sense of classroom belonging, or math achievement.

Ethnic classroom composition

Table 5 also shows that, after accounting for individual ethnicity, SES, gender, and cognitive ability, ethnic composition significantly related to students' initial levels of self-efficacy, suggesting that self-efficacy was higher on average for each measurement in classes with more ethnic minority students. Therefore, students who have more ethnic

Table 5. Standardised estimates of socioeconomic and ethnic classroom composition effects on the intercepts and slopes (growth a year) for motivation, sense of classroom belonging, and achievement across all students.

	Socioeconomic composition				Ethnic composition				Fit indices		
	Intercept	R^2	Slope	R^2	Intercept	R^2	Slope	R^2	χ^2 (*df*)	CFI	RMSEA
Task orientation	*ns*		0.25	10%	*ns*		*ns*		47.076 (25)	.974	.029
Self-efficacy	*ns*		*ns*		0.15	2%	*ns*		20.871 (25)	1.000	.000
School investment	*ns*		*ns*		*ns*		*ns*		50.622 (33)	.977	.027
Sense of classroom belonging	*ns*		*ns*		*ns*		*ns*		47.496 (28)	.978	.031
Mathematics	*ns*		*ns*		*ns*		*ns*		34.995 (22)	.900	.029
Reading comprehension	−0.25	4%	*ns*		0.23	4%	*ns*		28.839 (11)	.954	.047

Note: Control variables: individual SES, ethnicity, gender, and cognitive ability. For self-efficacy, a quadratic model fit the data better than a linear model. Therefore, a quadratic model was estimated. Given that the ethnic and socioeconomic classroom composition did not significantly relate to the quadratic growth term, only the relations with the intercept and slope are displayed.

minority classmates seem to have higher self-efficacy. This effect explained 2% of the variance in initial levels of self-efficacy. The effect size for this finding was small. No relation was evident for the growth rate of self-efficacy. After controlling for individual ethnicity and other individual background variables, ethnic classroom composition also positively related to initial levels of reading comprehension. During each measurement, students with similar background characteristics showed greater achievement in classes with a larger share of ethnic minority students when compared to classes with fewer ethnic minority students. The effect size for this relation was small to medium. Ethnic classroom composition did not relate to initial levels of or developments in task orientation, school investment, sense of classroom belonging, or math achievement.

Differential effects of socioeconomic and ethnic classroom composition on developments in motivation, sense of classroom belonging, and achievement

After examining the composition effects across all students, differential effects were examined to compare the effects of classroom composition across groups. Fit indices indicated that each of the models had reasonable to good fit to the data.

Differential effects of socioeconomic classroom composition

The outcomes presented in Table 6 show that there were both similar and different effects of socioeconomic classroom composition for low-, middle-, and high-SES students. The relation between socioeconomic classroom composition and growth for task orientation was similar across these groups. Thus, being in a classroom with more low-SES students was associated with greater progress in task orientation, regardless of students' own socioeconomic background. For low-SES students, this composition explained more of the variance in growth in task orientation than for middle- and high-SES students (7%, 3%, and 1%, respectively). Effect sizes were small to medium.

For middle- and high-SES students, a significant effect of socioeconomic classroom composition on growth in self-efficacy was found, whereas socioeconomic classroom composition did not relate to growth in self-efficacy for low-SES students. For both the high- and middle-SES students, a larger share of low-SES classmates was associated with more growth in self-efficacy, explaining 1% to 3% of the variance, respectively.

Table 6 also shows that only for low-SES students, developments in sense of classroom belonging were affected by the socioeconomic classroom composition. Although initially no differences in the relation between classroom composition and sense of classroom belonging were found, results revealed that low-SES students' sense of classroom belonging decreased between third and sixth grade when their fellow students also had low-SES backgrounds, explaining 15% of the variance in growth in sense of classroom belonging. The effect size of this relation was medium to large.

Finally, Table 6 shows that only for low-SES students the initial levels of reading comprehension related to socioeconomic classroom composition, explaining 15% of the variance in the intercept for reading comprehension. The outcomes reveal that, when low-SES students were taught in classes with a higher share of low-SES students, their reading comprehension scores were lower at each measurement occasion than when they were taught in classes with high numbers of middle- and high-SES classmates. The effect size for this relation was medium.

Table 6. Standardised estimates of ethnic classroom composition effects for the intercepts and slopes (growth per year) of motivation, sense of classroom belonging, and achievement across all students and separately for low-, middle- and high-SES students.

	Socioeconomic background												Fit indices		
	Low				Middle				High						
	Intercept	R^2	Slope	R^2	Intercept	R^2	Slope	R^2	Intercept	R^2	Slope	R^2	χ^2 (*df*)	CFI	RMSEA
Task orientation	*ns*		0.26	7%	*ns*		0.26	3%	*ns*		0.26	1%	81.740 (79)	.996	.013
Self-efficacy	*ns*		*ns*		*ns*		0.10	3%	*ns*		0.17	1%	121.143 (77)	.974	.055
School investment	*ns*		*ns*		*ns*		*ns*		*ns*		*ns*		99.030 (80)	.983	.032
Sense of classroom belonging	*ns*		−.39	15%	*ns*		*ns*		*ns*		*ns*		119.826 (74)	.948	.055
Mathematics	*ns*		*ns*		*ns*		*ns*		*ns*		*ns*		91.285 (47)	.919	.068
Reading comprehension	−.35	15%	*ns*		*ns*		*ns*		*ns*		*ns*		52.674 (32)	.960	.057

Note: Control variables: individual ethnicity, gender, and cognitive ability.

Differential effects of ethnic classroom composition

The outcomes presented in Table 7 show the differential effects of ethnic classroom composition. Table 7 shows that, after controlling for individual background variables, the majority students in classrooms with high numbers of ethnic minority students showed higher initial levels of task orientation, self-efficacy, math achievement, and reading comprehension, explaining 1% to 13% of the variance. Effect sizes were all small, and the effect size was medium for self-efficacy. For majority students, ethnic classroom composition did not relate to growth rates for any of the dependent variables.

For ethnic minority students, growth rates for task orientation and sense of classroom belonging were higher in classes with a higher share of ethnic minority students, suggesting that ethnic minority students show a positive development in their task orientation and sense of classroom belonging when taught in classrooms with other ethnic minority students. This effect explained 10% and 16% of the variance in growth rates, respectively. Effect sizes were both medium. For ethnic minority students, a medium-sized negative effect of the share of ethnic minority students on initial levels of mathematics achievement was found, indicating that the presence of fellow minority students was associated with lower mathematics performance at each measurement occasion. This explained 10% of the variance in the intercepts for mathematics achievement. In contrast, results indicated that ethnic minority students showed greater achievement on reading comprehension at each measurement occasion in classrooms with a higher share of fellow ethnic minority students. Ethnic classroom composition explained 10% of the variance in the intercepts of reading comprehension.

Discussion

This study examined socioeconomic and ethnic classroom composition effects on developments in achievement, motivation, and sense of classroom belonging from Grade 3 to Grade 6. Furthermore, this study examined whether these effects differed across various groups of students. In contrast to our first hypothesis suggesting that there would be negative effects of having a disadvantaged classroom composition, our results suggest that ethnic majority students and middle- and high-SES students were not negatively affected by high shares of ethnic minority or low-SES students in a class. Consistent with our second hypothesis, differential effects were found with ethnic minority students mostly benefiting from the presence of fellow ethnic minority students. However, low-SES students were negatively affected by the presence of fellow low-SES students. Next, these results will be discussed separately for findings regarding achievement, on the one hand, and motivation and sense of classroom belonging, on the other hand.

Classroom composition effects on achievement

The results demonstrated that initial achievement levels of students with more privileged backgrounds (i.e., middle- and high-SES students and ethnic majority students) were not negatively affected by the presence of disadvantaged peers in the classroom. Therefore, the commonly held fear that disadvantaged students "will bring down the rest" was not supported. For low-SES students, reading comprehension scores were lower in classes with higher shares of fellow low-SES students. This result was evident after controlling for individual background characteristics. This negative effect on achievement in reading comprehension could be accounted for by the *instructional quality hypothesis*. That is,

Table 7. Standardised estimates of ethnic classroom composition effects for the intercepts and slopes (growth per year) of motivation, sense of classroom belonging, and achievement across all students and separately for ethnic majority and ethnic minority students.

	Ethnic background										
	Majority				Minority				Fit indices		
	Intercept	R^2	Slope	R^2	Intercept	R^2	Slope	R^2	χ^2 (*df*)	CFI	RMSEA
Task orientation	0.13	2%	*ns*		*ns*		0.32	10%	71.236 (50)	.969	.034
Self-efficacy	0.35	13%	*ns*		*ns*		*ns*		84.135 (45)	.957	.049
School investment	*ns*		*ns*		*ns*		*ns*		84.954 (53)	.976	.041
Sense of classroom belonging	*ns*		*ns*		*ns*		0.39	16%	82.136 (49)	.966	.043
Mathematics	0.11	1%	*ns*		−0.28	10%	*ns*		87.372 (34)	.926	.066
Reading comprehension	0.08	1%	*ns*		0.08	10%	*ns*		61.091 (23)	.944	.068

Note: Control variables: individual SES, gender, and cognitive ability.

teachers may lower their instructional level when there are more disadvantaged students in their classes (Beckerman & Good, 1981), their expectations for their students may be lower (Jussim et al., 1996), and they may set lower standards. Moreover, consistent with the *language contact hypothesis*, low-SES students in classes with many fellow low-SES students may not be able to benefit from the language abilities of children from different social backgrounds who are used to more academic types of language (Driessen et al., 2003). Thus, in classes with many low-SES students, these students may be deprived of language opportunities that they would have in classes with higher numbers of students with more privileged backgrounds. These results were only evident for low-SES students, which suggests that low-SES students may be more sensitive to contextual effects and more vulnerable to negative effects than their more privileged peers (a suggestion also made by Hamre & Pianta, 2005).

In contrast to the aforementioned effect of SES composition, initial reading comprehension scores were higher in classes with more ethnic minority students. This result was evident after controlling for individual background characteristics. As there is an overlap between socioeconomic and ethnic classroom composition, these effects may often cancel each other out and go undetected in research. This result also indicates that socioeconomic and ethnic classroom characteristics, although sometimes overlapping, are distinctly different and affect students in different ways. Therefore, these characteristics are important to study separately. Language delays may be more prominent and visible in schools with a high share of ethnic minority students (who often speak Dutch as a second language). Consistent with the *specialisation hypothesis,* teachers may adapt their language instruction to these students, and financial resources in these schools may be specifically allocated to language to benefit both ethnic minority and majority students. Due to this form of specialisation, the negative effects hypothesised by *the language contact hypothesis* may be counterbalanced. It seems that the additional funding that schools in The Netherlands used to receive for ethnic minority students (OECD, 2012) has been successfully invested in combatting language delays. Funding policies have recently changed, and funding is now only based on the educational level of the parents (Roeleveld et al., 2011). Ethnic minority students in classes with high numbers of fellow ethnic minority students showed less progress in mathematics achievement. Thus, when schools with high shares of ethnic minority students specifically focus on language, this may be at the expense of mathematics achievement for these students. This explanation is in line with the *instructional quality* hypothesis, as teachers may invest greater effort in combatting language delays and quality of mathematics instruction may be lowered; however, this could also be due to *social contagion* or *normative processes*, given that students in classes with lower overall levels of mathematical ability have fewer opportunities to develop their skills in mathematics.

Additionally, we found no accumulating effects of classroom composition on achievement in reading comprehension or mathematics over time. It is possible that composition effects on achievement were already present in Grade 3 and that they remained stable throughout the years. Composition effects on achievement may appear in earlier years of primary school when students start to develop important basic skills with regard to mathematics and reading. The first measurement of our study, which is what we refer to as the "initial level", took place during Grade 3. However, the actual initial level of schooling begins prior to this time point, as it is during Kindergarten or first grade that students start their formal schooling in mathematics and reading. Unfortunately, we do not have insight into the developmental processes that have occurred prior to the start of our study. A recent study by Dumay et al. (2013) showed that longitudinal estimates of

students' performances, particularly growth curve estimates, may lead to less reliable predictions. This could account for the lack of significant relations with regard to achievement growth evident in this study and suggests that results based on growth curve estimates should be interpreted with caution.

Classroom composition effects on motivation and sense of classroom belonging

With regard to developments in motivation, we found that the presence of low-SES and ethnic minority students positively related to students' task orientation and self-efficacy, and neither ethnic nor socioeconomic classroom composition related to developments in school investment. Specifically, all students, especially ethnic minority students, became more task oriented over time when their class consisted of high numbers of low-SES or ethnic minority students. Previous research (Hornstra et al., 2013) has shown that ethnic minority students report higher levels of motivation on average. A positive process of *social contagion* (Erbring & Young, 1979; Kelly, 2009) may explain these composition effects. Furthermore, contrary to our expectations but consistent with the *big-fish-little-pond* effect, students in classes with high numbers of ethnic minority or low-SES students, who – on average – perform lower, showed more positive developments in their self-efficacy. Majority students reported higher self-efficacy from Grade 3 and onwards when they were in classes with higher shares of ethnic minority students, and middle- and high-SES students became more self-efficacious over time when they were in more socio-economically disadvantaged classrooms.

Ethnic minority students in particular appeared to benefit from being taught in classes with other ethnic minority students in terms of motivation and sense of classroom belonging. These results are consistent with the *specialisation* explanation (Driessen et al., 2003), suggesting that teachers are better able to meet the specific needs of their student population in disadvantaged classes. Moreover, low-SES students benefited from being taught among fellow low-SES students with regard to their motivation, whereas this negatively affected their sense of classroom belonging. Several explanations may account for these findings. One possibility is that, consistent with the *specialisation hypothesis* (Driessen et al., 2003), teachers in segregated classes are better able to meet the specific motivational needs of their classroom population, in this case low-SES students. However, previous studies have found that the classroom climate is more negatively perceived and conflicts are more likely to occur in classes that have many students from socioeconomically disadvantaged backgrounds (Allodi, 2002; Opdenakker & Van Damme, 2001). This may simultaneously result in negative developments in their sense of classroom belonging.

The finding that relations of classroom composition with initial levels of achievement and motivation were distinct from relations with progress in achievement and developments in motivation highlights the relevance of focusing on longitudinal developments. In upper primary school, students become increasingly aware of and concerned with what their peers think about them (Molloy, Gest, & Rulison, 2011). Therefore, peer group effects on motivation and sense of classroom belonging may become particularly important as students get older. Moreover, estimates of variance showed that developments in motivation and sense of classroom belonging had more variation at the classroom level compared to initial levels of these variables, suggesting that classroom effects on motivation and sense of classroom belonging are especially relevant when explaining growth. Therefore, considering longitudinal developments in motivational and social aspects of learning is a fruitful direction for future research on classroom and school effects.

Limitations

Apart from the previously discussed limitations, a number of other limitations should be noted for the present study. In this study, the number of classes with high shares of ethnic minority or low-SES students was relatively limited in comparison to the number of other classes. However, our results were consistent with previous longitudinal studies examining classroom composition (e.g., Peetsma et al., 2006). Second, this study examined the relation between classroom composition and each separate aspect of motivation and achievement. We did not take into account these different aspects simultaneously. A larger sample would have allowed for these types of statistical analyses and could have strengthened the results of the present study. Finally, the greatest limitation of the current study may be that the processes through which the classroom composition affects developments in students' achievement outcomes, motivation, and sense of classroom belonging were not examined. Future research should aim to identify the processes that occur within classrooms with varying classroom composition to provide further insight into the current findings.

In spite of the aforementioned limitations, the present study provided interesting novel insights due to its longitudinal design and its focus on aspects other than just achievement. The findings of the present study do not support commonly held fears that high numbers of disadvantaged students bring down other students. Students who are performing relatively well will continue to do so regardless of the composition of the class. Furthermore, ethnic segregation in schools can benefit ethnic minority students; however, this does not imply that we should aim to have more segregated schools. There are other arguments that may perhaps weigh more heavily on this topic, such as a desire for social integration to continue to aim for schools with balanced student populations.

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Note

1. Additional analyses of variance (MANOVAs) revealed that the different ethnicities *within* the groups of ethnic minority and majority students did not significantly differ with regard to their sense of classroom belonging, self-efficacy, task orientation, and school investment.

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