

3 **School segregation and self-fulfilling prophecies as determinants of academic achievement in Flanders**

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Abstract

This study aims to promote a preventive policy to reduce school dropout by providing insights on the determinants of academic achievement, as students' previous academic performance is a crucial antecedent of school dropout. Our central research question is whether and how school segregation and self-fulfilling prophecies (teacher expectations and student expectations) are related to academic achievement. First, we examine whether school composition is related to teacher expectations. Second, we investigate whether the impact of school composition on pupils' academic achievement is mediated by teacher expectations. Data from a survey of 2,845 pupils and 706 teachers in 68 Flemish primary schools are analysed. The multilevel analysis shows that teachers' teachability expectations are lower in schools with a high share of non-native and working class pupils, and that these teachability expectations have an indirect impact on pupils' achievement, through pupils' feelings of academic futility. Implications for educational policy are discussed.

Keywords: achievement, school segregation, self-fulfilling prophecies

Introduction

A recent study of Van Landeghem & Van Damme (2011) has shown that unqualified school leaving (hereafter, dropout) gradually increased in Flanders during the first decade of the new millennium. However, dropping out of school might have serious negative consequences. For instance, various studies have shown that school drop-outs are more likely to become unemployed and to earn less on average (McCaul, Donaldson, Coladarci & Davis, 1992), to experience psychological problems (Kaplan, Damphousse & Kaplan, 1994), to smoke cigarettes and to use drugs (Mensch & Kandel, 1988), and to be involved in criminal behaviour (Thornberry, Moore & Christenson, 1985). There are negative consequences for society as well as unemployment and lost earnings lower tax revenues and increase demands on social services. One of the most important antecedents of school dropout is academic performance; previous studies have repeatedly shown that students with lower academic achievement are at higher risk of becoming drop-outs (Rumberger, 2001; Orfield, 2004; Rumberger & Lim, 2008). Hence, in order to develop a preventive and proactive educational policy, it is imperative to examine the determinants of students' academic achievement to reduce the number of drop-outs.

Regarding the international educational research on children's academic performance, few topics have received more attention than the consequences of school segregation and the impact of self-fulfilling prophecies. The impact of school ethnic and socio-economic composition on academic achievement has been investigated in hundreds of studies (for meta-reviews see Driessen, 2007; Van Ewijk & Slegers, 2010). On the other hand, after the Second World War a research tradition on teacher expectancy effects started from the core idea that teachers' expectations of pupils' academic achievement can markedly affect pupils' actual level of academic performance (Becker, 1952; Rosenthal & Jacobson, 1968; Brophy, 1983); that is, these expectations can be a self-fulfilling prophecy (Merton, 1968). However, from then onwards, until the contemporary era of multilevel studies, virtually no research has investigated whether teacher expectations and self-fulfilling prophecies account for the impact of school composition on academic achievement (for an exception that implicitly integrated these two research approaches see Rumberger & Palardy, 2005). Consequently we know little about the role of teacher and pupil expect-

tancies with respect to the impact of socio-economic and ethnic school composition on pupils' academic achievement.

We identified three main reasons why these two research traditions have not yet been integrated. First of all, most studies on the impact of school composition focused on its effects on pupils and more specifically, on their academic achievement. However, teachers and their cognition might be equally affected by compositional school characteristics (Lee & Loeb, 2000; Van Houtte, 2011) and only recently have researchers started to investigate these potential effects (e.g. McKown & Weinstein, 2008). Secondly, research on the effects on academic achievement has tended to focus more on the question of *what* the effects of school composition are, rather than to question *why* they might occur. Consequently, the factors that might account for the impact of school composition, including the mediating role of teacher and pupil expectations, have been neglected. Thirdly, most studies on teacher expectation effects have investigated *individual* teacher expectations of individual pupils. However, from a theoretical point of view, school composition might be more strongly related to teachers' expectations at the organizational level (i.e. school-level), and an increasing body of empirical research emphasizes the importance of these *collective* teacher attitudes and beliefs (e.g. Halvorsen, Lee & Andrade, 2009).

The main purpose of this study is to overcome this research lacuna and to investigate whether and how self-fulfilling prophecies account for the impact of school composition on pupils' academic achievement. More specifically, we will investigate whether teachers' individual and collective teachability expectations are shaped by the ethnic and socio-economic make-up of schools and whether these collective expectations mediate the impact of school composition on academic achievement.

Ethnic inequalities and segregation in Flanders

After World War II, Flanders rapidly developed into a multicultural society. To date, the educational achievements of second- and third-generation immigrants from Turkey and North Africa remain far behind those of their native Belgian peers. In fact, the socio-economic inequality and the

achievement gap between immigrants and natives in Flanders are among the highest of Western countries (OECD, 2006). Educational policy-makers argue that this inequality is mainly caused by the linguistic deficiencies of the immigrants, even though there is little scientific evidence for this assumption (Blommaert & Van Avermaet, 2008). For instance, the former Flemish minister of education Frank Vandenbroucke stated that his administration had three policy priorities for creating equal opportunities in education: 'Language, language and language' and the current Flemish minister of education Pascal Smet claimed that linguistic deficiencies are the main – if not the only – cause of underachievement of students (see also Agirdag, 2010).

Previous studies have also pointed out that socio-economic and ethnic school segregation is high here compared to other Western countries (Jacobs et al., 2009). This exceptionally high level of school segregation is related to the specific educational policy of free parental choice. This freedom of school-choice allows parents to choose or avoid schools with a certain composition. As middle class parents have more resources, they tend to avoid schools with a high share of working class and immigrant pupils, even if these schools are situated in their immediate neighbourhood. As a result, ethnic and socio-economic school segregation is high in Belgium (Agirdag & Van Houtte, 2011). In Flanders, schools with a high share of ethnic minority and working class pupils are commonly named 'concentration schools'. In the public discourse, a 'concentration school' is almost a synonym for a school with low instruction quality and weak academic performance (Agirdag & Van Houtte, 2011). However, in Flanders, there is very little scientific evidence regarding the impact of ethnic and/or socio-economic school composition on academic achievement (for notable exceptions, see Jacobs et al., 2009; Verhaeghe, Van Damme & Knipprath, 2011) and there are even fewer empirical explanations of why school composition affects academic performance. Hence, it is vital to address these issues to achieve a better understanding of the potential harms of socio-economic and/or ethnic school segregation. Therefore, four research centres from three Flemish universities started the Segregation in Primary Education in Flanders project (SIPEF) to investigate the extent, the antecedents and the consequences of school segregation. For obvious reasons, not all the different aspects of the larger SIPEF project can be discussed here. We rather focus on the results regarding the consequences

of school ethnic and social composition on pupils' academic achievement and the mediating role of teacher expectancies.

School composition effects

Ever since James Coleman and his team (1966) published their classic study, the impact of ethnic and socio-economic school composition on pupils' academic achievement has been analysed in hundreds of studies (for meta-reviews see Driessen, 2007; Van Ewijk & Sleegers, 2010). Most have been conducted in the US (e.g. Orfield, 1983; Wells, 1995; Bankston & Caldas, 1996, 1998; Rumberger & Palardy, 2005; Ryabov & Van Hook, 2007). However, the issue is increasingly investigated by European sociologists and educational researchers (for the UK: Strand, 1997; for France: Felouzis, 2003; Boado, 2007; for the Netherlands: Driessen, 2002; for Belgium: Dumay & Dupriez, 2008; Agirdag, Hermans & Van Houtte, 2011; Agirdag, Van Houtte & Van Avermaet, 2012; for Norway: Fekjaer & Birkelund, 2007; for an international comparison: Dronkers, 2010). With a few exceptions, these studies have demonstrated that school socio-economic composition is related to academic achievement; that is, pupils going to schools with a higher share of children from a higher socio-economic background were found to perform better academically. There is less consensus as to the impact of school ethnic composition: while some authors suggest that a higher concentration of ethnic minority and immigrant (non-native) pupils is related to lower academic performance (e.g. Driessen, 2002; Dumay & Dupriez, 2008), others do not find a significant relationship, in particular when individual socio-economic status (SES), ethnic background and previous academic achievement are taken into account (e.g. Van der Slik, Driessen & De Bot, 2006; Fekjaer & Birkelund, 2007).

Existing research on the impact of compositional school characteristics is strongly focused on effects on pupils. However, it is not too far-fetched to hypothesize that the socio-economic or the ethnic make-up of schools may also have an impact on teachers and their cognition. While teachers have general conceptions about teaching, they are inclined to adjust these conceptions to the contextual factors of the school (Finn, 1972). In particular, the compositional features of the school may play a decisive role, as teachers' evaluations are liable to existing social stereotypes regarding schools with certain student compositions (see Van Houtte, 2011).

Starting from the influential work of Rist (1970), it is repeatedly found that a pupil's *individual* social class and ethnic background have a small but important influence on teacher expectations; that is, more favourable teacher expectations are found for ethnic majority and higher SES pupils, even after controlling for actual levels of academic achievement (Harvey & Slatin, 1975; Dusek & Joseph, 1985; Jussim, Eccles & Madon, 1996; Van den Bergh et al., 2010). However, only recently have studies started to examine the effects of socio-economic or ethnic school *composition* on teachers' cognition. Indicative of this type of research are the growing number of works from Valerie Lee and her colleagues (Lee, Dedrick & Smith, 1991; Lee & Loeb, 2000; Halvorsen, Lee & Andrade, 2009) and the works of Mieke Van Houtte (Van Houtte, 2003, 2004, 2011). Lee and colleagues found that teachers' responsibility (i.e. their willingness to hold themselves accountable for the learning of their students) is lower in schools that enrol a higher share of low SES and ethnic minority students, both at the individual teacher level and at the collective school level. In the works of Van Houtte (2004, 2011) collective (school level) teacher beliefs and expectations are conceptualized as a part of *staff culture*, where culture is defined as 'a set of cognitions shared by members of a social unit' (Van Houtte 2011, p. 85). In these studies it is shown that in schools with a higher share of low SES and ethnic minority students, as well as in vocational schools, teacher culture is less academically oriented and teachers exhibit lower levels of trust in their students.

This study's first research objective is to examine whether the composition of the student body has an impact on teachers' cognition. More specifically, we will examine whether teachers' teachability expectations are related to the socio-economic and ethnic composition of the school. Teachability expectations are defined as teachers' school-wide beliefs about the capacities and willingness of their pupils to learn; that is, their expectation regarding how 'teachable' their pupils are (Kornblau, 1982). It should be noted that the concept of teachability is distinct from the more established notion of *teacher efficacy* as the latter refers to teachers' beliefs about their own success in achieving their goals, whereas teachability refers to teachers' expectations about their pupils. We will investigate both teachability expectations at the individual teacher level and at the collective school level. Analogous to Van Houtte (2004, 2011), these collective teachability expectations are conceptualized as *teachability culture*. From what is stated above, we expect that the teachability expectations of indi-

vidual teachers and the staff's teachability culture will be lower in schools that enrol a higher share of low-SES and ethnic minority pupils.

Teacher expectancy effects

Even if teachability expectations are determined by the socio-economic and ethnic composition of schools, they must be associated with pupils' level of achievement in order to account for the impact of school composition on academic achievement. Research on the impact of teacher expectancies dates back at least to the work of Howard Becker (1952), who argued that a problematic teacher-student relationship emerges when working class students do not meet the standards of the 'ideal pupil' which teachers hold. However, the issue of teacher expectations became widely known after the pioneering work of Rosenthal & Jacobson (1968). In their 'Pygmalion experiment' teachers were told that some of their pupils were 'bloomers' and likely to make large progress over the year of the experiment. Although these 'bloomers' were randomly selected, eight months later they did make actually larger progress than other pupils in their school. The Pygmalion study had a large impact on public and scientific thinking. Only 10 years later, Rosenthal & Rubin (1978) were able to conduct a meta-analysis that examined 345 studies on expectancy effects. In the popular press, writers had begun to argue that teacher expectancies are major reasons for racial, social class and gender inequalities (for a review see Wineburg, 1987). However, starting from the early eighties, influential works have shown that these claims are oversimplified and exaggerated (Cooper, 1979; Brophy, 1983; Jussim, 1989; Jussim & Eccles, 1992). While not disproving the idea of the self-fulfilling prophecy, these studies have shown that the size of teacher expectation effects are rather small and that teachers' expectations were more accurate – that is, consistent with pupils' previous achievements – than biased. Therefore when examining teacher expectation effects, we should not expect very large effect sizes and we should control for pupils' previous academic performance. Jussim (1986) provides an integrative theoretical framework of the underlying causal mechanism of teacher expectations and self-fulfilling prophecies. He distinguishes three sequential stages: the first step is that a teacher develops expectations about a pupil's achievement that might be based on information gathered from prior interactions with the pupil, such as

previous achievements, ethnicity, social class or gender. The second step is that a teacher behaves differently according to his or her expectations. This is the most detailed studied part of the self-fulfilling process. For instance, Rosenthal (1973) distinguished four mechanisms by which teachers might hinder students' educational progress, including the social-emotional climate they create around high expectation pupils, the amount of feedback pupils receive, the amount and the quality of the subject material offered and the chances provided to ask or to answer questions. The third and final step is that pupils react consistently with teacher expectations. Regarding this final stage of the self-fulfilling process, Jussim (1986) adds a crucial point: different teacher expectations and treatment may be *indirectly* related to pupils' academic achievement. More specifically, teachers may have an impact through pupils' beliefs. Jussim (1986, p. 439) thus states, 'One of the most important ways differential treatment may influence students is by affecting their perceptions of control over academic outcomes.' The perception of having control over academic success is a strong determinant of academic achievement; many studies have shown that when students do not believe that their effort will lead to success or believe that they are incapable, they will be likely to perform poorly (for a review, see Findley & Cooper, 1983). Therefore it is theorized that pupils who are confronted with low expectations from their teacher will be inclined to believe that they have no control over their academic success, which will ultimately lead to lower levels of performance.

In this study we will investigate whether teachability expectations have an indirect effect on academic achievement via pupils' feelings of having no control over academic achievement. At the pupil level, these feelings of lack of control are assessed as *sense of academic futility*. This concept of sense of futility was launched by Brookover and colleagues as an aspect of school climate (Brookover et al., 1978). The most important items of this factor encompass a similar dimension as Coleman's (Coleman et al., 1966) 'sense of control' variable, but explicitly address the school. As such this measure reflects the pupils' feelings about the possibility of functioning adequately in the school system. A high sense of futility indicates a feeling of having no control over success or failure in the school system. Following the previous conceptualization of culture as a set of cognitions shared by members of a social unit, we also investigate the impact of pupils' shared feelings of lack of control over academic success; i.e. the impact of their *futility culture* (Van Houtte & Stevens, 2010).

Jussim (1986, p. 429) defines a self-fulfilling prophecy as a 'situation in which a teacher's expectations about a student's future achievement evoke from the student performance levels consistent with the teacher's expectation'. It is clear that this definition, as well as most previous studies on teacher expectation effects, is strongly focused on the individual relationship between a teacher and a student. However, teachers do not only have expectations about individual pupils, but also about the group of students in their school (Van Houtte, 2011). According to Brophy (1983), teachers' differential treatment of groups of pupils is as widespread as the differential treatment of individual pupils, and is an equally strong mediator of the effects of expectancy on achievement. Moreover, expectations with respect to a whole group are communicated more directly than expectations of individual pupils (Cooper, 1985). Therefore in this study, our measure of teachability focuses on expectancies regarding the group of pupils in the school rather than on individual pupils.

We are only aware of two studies that have investigated the mediating role of teacher cognitions at school level to explain the impact of school composition on pupils' academic performance. Rumberger & Palardy (2005) have shown that collective teacher expectations (among other process variables) explain the impact of school SES composition on academic performance. Similarly, Van Houtte (2003) has found that academic staff culture accounts for the impact of school SES composition on individual pupils' propensity to fail.

The second research objective of this study is thus to investigate whether the effects of school composition can be explained by self-fulfilling prophecies. Specifically, we will examine whether the impact of socio-economic and ethnic school composition on pupils' academic achievement is mediated by teachers' teachability culture, pupils' sense of futility, and futility culture.

Methodology

Sample

We use data gathered as part of the Segregation in Primary Education in Flanders project (SIPEF). This data was collected during the academic

year 2008–2009 from 2,845 pupils and 706 teachers in a sample of 68 primary schools in Flanders. Multistage sampling was conducted. In the first instance, in order to encompass the entire range of ethnic composition, we selected three cities in Flanders that had relatively ethnically diverse populations. Second, using data gathered from the Flemish Educational Department, we chose 116 primary schools within these selected cities and asked them to participate: 54% of them agreed to. Because the non-response rate was not related to the ethnic composition of schools, the schools in the dataset represent the entire range of ethnic composition, from those with almost no non-native pupils to some composed entirely of non-natives. In all the schools that agreed to participate, our research team surveyed all the fifth-grade pupils present during our visit. Additionally, all teachers in these schools were asked to fill in a questionnaire. If there were fewer than 30 fifth-grade pupils present then we surveyed all the sixth-grade pupils as well. Given a time limitation, we could not test all curriculum subjects; we focused on maths achievement, since a large proportion of the respondents were not native speakers of Dutch and maths tests are less linguistically biased than subjects such as reading (Abedi, Hofstetter & Lord, 2004). To assure that the questions were curriculum-based, the school principals were asked to approve the test. Two schools were removed from the analysis because these schools could not confirm that the test was curriculum-based. Therefore all quantitative analyses represent the remaining 66 schools, including 2,782 pupils and 692 teachers.

Research design

The data was made up of a clustered sample of pupils and teachers which was nested within the schools and involved data at different levels (individual and school-level). Multilevel modelling was therefore most appropriate (SAS© Proc Mixed; Singer, 1998). Before explaining how the multilevel models were constructed, three points should be noted. First, there was a very high correlation between SES and ethnic school composition (i.e. between the proportion of working class pupils and non-native pupils at school-level; Pearson $r = 0.885$; see Table 2). This meant that including both variables in the same model could cause severe multicollinearity problems. Therefore, following Dumay & Dupriez (2008), we decided to

include both compositional variables in different sets of models. Secondly, in scale variables, responses were imputed for missing values using item correlation substitution: a missing value for one item is replaced by the value of the item correlating most highly with it (Huisman, 2000). Thirdly, to assess whether it is legitimate to speak of *futility culture* or *teachability culture*, we examined whether an individual-level sense of futility and teachability expectations are shared among respondents within the schools. This is done by calculating an index of 'Mean Rater Reliability' (MRR) based on a one-way analysis of variance:

$$\text{MRR} = \frac{\text{between mean square} - \text{within mean square}}{\text{between mean square}}$$

The MRR must be a minimum of 0.60 to permit an aggregation at the school level (see Shrout & Fleiss, 1979; Glick, 1985). We provided the MRR for *futility culture* and *teachability culture* in the *School-Level Variables* section.

Research Objectives

Research Objective 1. The first research objective is to investigate the impact of schools' ethnic and socio-economic composition on individual teachability expectations. To rule out accuracy and selection effects, we controlled for previous achievement, school denomination and school size at the school level. At the individual teacher level, we controlled for gender, years of experience, parental SES¹ and teacher type (see *Variables* section). Secondly, we investigated the impact of school ethnic and socio-economic composition on teachers' collective teachability culture, controlling for previous achievement, school denomination and school size.

Research Objective 2. The second research objective is to examine the impact of socio-economic and ethnic school composition on pupils' maths achievement. To rule out selection effects, we controlled for previous achievement composition, school denomination and size at the school level; and for gender, grade, parental SES and ethnicity at the individual pupil level. To explore whether school ethnic or socio-economic composition were related to pupils' maths performance, we included teachers' teachability culture in the second model to assess whether it mediates the impact of school composition. In the third model, we included pupils' sense of futility and *futility culture*. Additionally, we provided a path-model diagram to illustrate the indirect effects.

Table 1 Descriptive statistics for variables: frequencies, range, means (for continuous variables) and proportions/percentages (for categorical variables) and standard deviations (SD).

	N	Min	Max	Mean	SD
School level					
Ethnic composition (% non-native)	66	2.63	100	52,669	33,999
SES composition (% working class)	66	3.95	96.15	38,505	22,289
Previous achievement composition (% grade retention)	66	0	72.41	29,293	17,468
School denomination (1 = catholic)	66	0	1	0.485	
School size	66	91	526	225,458	104,528
Pupils' futility culture	66	1.22	3.09	2,092	0.279
Teachers' teachability culture	66	2.64	4.53	3,454	0.378
Individual pupil-level					
Math achievement	2,754	6	60	41,432	10,645
Sense of futility	2,772	1	5	1.99	0.699
Grade (1 = sixth)	2,782	0	1	0.3	
Gender (1 = girl)	2,765	0	1	0.513	
Previous achievement (grade retention)	2,725	0	1	0.269	
Ethnicity (1 = non-native)	2,782	0	1	0.485	
SES					
Blue-collar	2,760	0	1	0.401	
Technicians	2,760	0	1	0.153	
Self-employed	2,760	0	1	0.07	
Lower white-collar	2,760	0	1	0.179	
Service class	2,760	0	1	0.196	
Individual teacher-level					
Teachability expectations	657	1.74	4.93	3,444	0.487
Gender (1 = male)	675	0	1	0.188	
Ethnicity (1 = non-native)	686	0	1	0.061	
Parental SES					
Blue-collar	679	0	1	0.196	
Technicians	679	0	1	0.199	
Self-employed	679	0	1	0.094	
Lower white-collar	679	0	1	0.292	
Service class	679	0	1	0.219	
Years of experience	690	1	41	15,97	10,146
Teacher type (1 = subject)	692	0	1	0.408	

Individual pupil-level variables

Maths achievement. The last dependent variable in our analysis is maths achievement, measured using a test developed by Dudal & Deloof (2004), which is based on standardized educational attainment levels for Flemish students in the fifth grade of their primary education. The test consists of 60 items, covering elementary arithmetic, problem solving, fractions, decimals and long division. The test yielded a Cronbach's alpha of 0.91. In our data pupils achieved on average 44.43 ($SD=10.65$), in a theoretical range from 0 to 60 (Table 1).

Sense of futility. Pupils' feelings of academic futility are measured using the sense of futility scale (Brookover et al., 1978). The four items are 'People like me will not have much of a chance to do what we want to in life,' 'People like me will never do well in school, even though we try hard,' 'At school, students like me seem to be unlucky,' and 'Achievement at school is just a matter of luck.' Each item has five possible responses ranging from 'absolutely disagree' (scored 1) to 'completely agree' (scored 5). While this scale yielded a relatively low Cronbach's alpha (0.62), an explanatory factor analysis revealed that there was one underlying dimension for this scale, explaining 47.46% of the variance. In our data pupils scored 1.99 on average ($SD=0.70$; Table 1).

Grade. Our research concentrated on fifth- and sixth-grade pupils. Therefore in 2009, most of the respondents were aged 11 (about 49%) or 12 (about 36%). Given the high correlation between age and grade (Cramer's $V=0.64$; $p<0.001$), we had to choose one of these two variables for the model. Because the sample was unbalanced in terms of grade, we opted for the grade (Table 1).

Gender. The pupils' sample was divided equally with respect to gender, with around 51% female respondents (boy=0, girl=1; Table 1).

Previous achievements (grade retention). Our data did not include a direct measure of pupils' previous achievement (see *Discussion* section). As an alternative metric, we asked pupils whether they had had to repeat a year in the past. This is because retention is regarded as a reliable indicator of poor previous academic performance (Alexander, Entwisle & Dauber, 1994). Table 1 indicates that 27% of the pupils in our sample are repeaters.

Ethnicity. Regarding pupils' ethnic background, we distinguished between native Belgians and non-natives. In line with the official Flemish definition of non-native groups (in Dutch: *allochtonen*), the principal

criterion was the birthplace of pupils' grandmothers. If these data were missing, we used parents' birthplaces instead, as most non-native pupils in Flanders are second- or third-generation immigrants. As is common practice, and in line with the official Flemish definition of non-native groups, students of Western European origins were considered to be of native descent. As such, we created a dichotomous variable (0=native, 1=non-native). Table 1 shows that 48% of our respondents are categorized as non-natives.

SES. We measured the family SES of the pupils by assessing the occupational prestige of the father and mother (Erikson, Goldthorpe & Portocarero, 1979). Information about the occupation of the parents was supplied by the students. The highest-prestige occupation of the parents was used as an indicator for the SES of the family. We identified five distinct groups, which are hierarchically ordered with regard to social status: (1) unemployed and blue-collar workers (working class), (2) technicians and supervisors, (3) small proprietors and self-employed workers, (4) white-collar employees, (5) higher-grade professionals and entrepreneurs (service class) (Table 1).

Individual teacher-level variables

Teachability expectations. Teachers' teachability expectations regarding their pupils are measured by 31 items of the 'Teachable Pupil Survey' (Kornblau, 1982). The scale is made up of 31 items assessing expectations of pupil characteristics encompassing school-adjusted behaviours (such as 'concentrate well', 'enjoy school work'), cognitive-motivational behaviours (such as 'intelligent', 'curious'), and personal-social behaviours (such as 'calm', 'confident'). The items such as 'I think that in this school the pupils in general are inquisitive', were rated from 'absolutely disagree' (scored 1) to 'definitely agree' (scored 5). Teachers scored on average 3.44 ($SD=0.49$), whereas the scale ranged between 1.74 and 4.93 (Table 1). Cronbach's alpha for the teachability expectations scale was 0.95.

Gender. Most teachers in our sample were female (81%; Table 1).

Ethnicity. Teachers' ethnicity was determined by self-identification. Teachers were asked to identify themselves as being from native-Belgian or non-native background. 6% of the teachers in our sample identified themselves as being non-native (Table 1).

Parental SES. The parental SES of teachers was measured similarly to those of pupils (cf. supra; Table 1).

Years of experience. Teaching experience was measured by the number of years that a teacher had been working in his/her participating school. On average teachers in our sample had 16 years of teaching experience ($SD=10.15$; Table 1).

Teacher type. We distinguished between those who teach regular classes (code 0) and specific subjects, such as physical education or music (code 1). In our sample, around 60% of the teachers are identified as regular class teachers (Table 1).

School-level variables

Ethnic composition. The ethnic make-up of a school is measured by the percentage of non-native respondents in the school. On average, the percentage of non-native pupils is 52.67% ($SD=34.00$), ranging from 2.63% to 100% (Table 1). We refer to Table 2 for the bivariate correlations among school-level variables.

SES composition. The socio-economic composition of the school was calculated by aggregating the individual family SES of pupils. Specifically, this was done by calculating the percentage of pupils from a working class background. On average, the proportion of these pupils was 38.50% ($SD=22.29$), ranging from 3.95% to 96.15% (Table 1).

Previous achievement composition. The previous achievement composition of a school is measured by the percentage of pupils who are repeaters. On average, the percentage of pupils who had experienced grade retention was 29.29% ($SD=17.47$), ranging from 0% to 72.41% (Table 1).

School denomination. The school denomination variable was split between 34 publicly run schools and 32 privately run Catholic schools. This reflects the educational situation in Flanders, where around half of the schools are Catholic schools. It should be noted that in the Flemish educational system no distinction is made between publicly run schools and privately run (Catholic) schools with respect to state support.

School size. We determined school size from the total number of pupils, using data gathered from the Flemish Educational Department. The number of pupils varied from 91 in the smallest school to 526 in the largest. The schools had an average of 225 pupils ($SD=104.53$; Table 1).

Futility culture. Pupils' futility culture is measured by aggregation of individual pupil-level scores of sense of futility. As mentioned in the *Research Design* section, to examine whether feelings of futility were truly shared within schools, we calculated the index of Mean Rater Reliability (MRR). The sense of futility scale yielded a MRR of 0.73. This means that speaking of futility *culture* is legitimate as feelings of futility are *more* shared within schools than they are shared between schools. The mean futility culture was 2.09 ($SD=0.28$), within a range of 1.22 to 3.09. A one-way analysis of variance shows that the mean sense of futility differs significantly between the schools ($p < 0.001$).

Teachability culture. Teachers' teachability culture was measured by aggregating individual teacher-level scores for teachability expectations. The teachability expectations yielded a MRR of 0.88. This means that speaking of teachability *culture* is also legitimate. The mean score for teachability culture is 3.45 ($SD=0.38$), within a range of 2.64 and 4.53 (see Table 1). A one-way analysis of variance shows that the mean teachability expectation differs significantly among the schools ($p < 0.001$).

Table 2 Bivariate Pearson correlations.

	1	2	3	4	5	6	7
1	1						
2	0.885***	1					
3	0.671***	0.636***	1				
4	-0.026	-0.005	-0.292*	1			
5	-0.299*	-0.354**	-0.398**	0.018	1		
6	0.531***	0.585***	0.475***	0.053	-0.092	1	
7	-0.683***	-0.658***	-0.623***	-0.07	0.207	-0.567***	1

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Notes:

1. Ethnic composition (% non-natives)
2. SES composition (% working class)
3. Previous achievement composition (% grade retention)
4. Denomination (1 = Catholic)
5. Size (more pupils)
6. Futility culture (more feelings of futility)
7. Teachability culture (higher teachability expectations)

Results

Research objective 1

The first research objective is to investigate whether and how school compositional characteristics influence teachability expectations. In order to assess whether the school context matters with respect to these expectations, the variance components from the unconditional models are assessed (Table 3, Model 0). We are particularly interested in school-level variance, computed as the between-school variance component divided by the sum of the within-school and between-school variance [$\tau\sigma/(\tau\sigma+\sigma^2)$]. We calculate that a very large amount of the variance in teachers' teachability expectation lies between schools 46.12% ($p < 0.001$). This justifies the need for a multilevel analysis.

Models 1 and 2 in Table 3 make clear that both ethnic and socio-economic school composition are related to teachers' teachability expectations; i.e. teachers have lower teachability expectations in schools with a higher share of non-native pupils (standardized gamma coefficient $\gamma^* = -0.370$, $p < 0.001$) and a higher share of working class pupils ($\gamma^* = -0.312$, $p < 0.001$). Nevertheless, teachability expectations are almost equally influenced by pupils' previous academic performance ($\gamma^* =$ between -0.266 and -0.330 , $p < 0.01$, Table 3). This means that in schools with a higher proportion of pupils who have experienced grade retention, teachers are inclined to expect their pupils to be less teachable. It should be noted that no individual teacher-level variable included in our models was significantly related to teachability expectations.

We find similar results for teachers' collective teachability expectations; i.e. their teachability culture (see Table 4). A lower level of teachability culture is found in schools with a higher share of non-natives (standardized beta $\beta^* = -0.422$, $p < 0.001$, Model 1) and a higher share of working class pupils ($\beta^* = -0.396$, $p < 0.001$, Model 2). Teachers collective teachability expectations are also strongly related to pupils' average previous achievements ($\beta^* =$ between -0.435 and -0.475 , $p < 0.001$, Table 4).

Table 3 Results of multilevel analysis for teachers' individual teachability expectations. Gamma coefficients (γ), standardized gamma coefficients (γ^*), standard errors (in parentheses) and variance components.

		Model 0	Model 1	Model 2
School Level				
Ethnic concentration (% non-native)	γ	--	-0.005 (0.001)	--
	γ^*		-0.370***	
SES composition (% working class)	γ	--	--	-0.007 (0.002)
	γ^*			-0.312***
Previous achievement composition	γ	--	-0.007 (0.003)	-0.009 (0.003)
	γ^*		-0.266**	-0.330***
School denomination (1 = Catholic)	γ	--	-0.141 (0.064)	-0.145 (0.067)
	γ^*		-0.146*	-0.150*
Size	γ	--	0.000 (0.000)	0.000 (0.000)
	γ^*		-0.04	-0.065
Teacher level				
Gender (1 = female)	γ	--	0.049 (0.040)	0.046 (0.040)
	γ^*		0.04	0.037
Ethnicity (1 = non-native)	γ	--	0.094 (0.064)	0.088 (0.065)
	γ^*		0.046	0.044
SES (ref=service class)				
Blue-collar	γ	--	0.073 (0.049)	0.071 (0.049)
	γ^*		0.059	0.057
Technicians	γ	--	0.053 (0.047)	0.052 (0.047)
	γ^*		0.043	0.042
Self-employed	γ	--	-0.011 (0.059)	-0.015 (0.059)
	γ^*		-0.007	-0.009
Lower white collar	γ	--	0.029 (0.042)	0.030 (0.042)
	γ^*		0.027	0.028
Year teaching experience	γ	--	-0.002 (0.002)	-0.002 (0.002)
	γ^*		-0.033	-0.032
Teacher type (1 = non-regular)	γ	--	0.050 (0.032)	0.050 (0.032)
	γ^*		0.051	0.05
Variance components				
Between schools	τ_0	0.119***	0.042***	0.047***
Within school	σ_2	0.139***	0.137***	0.137***

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 4 Results of regression analysis for teachers' collective teachability culture. Beta coefficients (β), standard errors (in parentheses) and standardized beta coefficients (β^*).

		Model 1	Model 2
School Level			
Ethnic concentration (% non-native)	β	-0.005 (0.001)	--
	β^*	-0.422***	
SES composition (% working class)	β	--	-0.007 (0.002)
	β^*		-0.396***
Previous achievement composition	β	-0.009 (0.003)	-0.010 (0.003)
	β^*	-0.435***	-0.475***
School denomination	β	-0.157 (0.067)	-0.154 (0.069)
(1 = Catholic)	β^*	-0.207*	-0.204*
Size	β	0.000 (0.000)	0.000 (0.000)
	β^*	-0.091	-0.114
Adjusted R ²		0.542***	0.536***

** $p < 0.05$, * $p < 0.01$, *** $p < 0.001$

Research objective 2

Given that teachers hold lower teachability expectations in schools with a high share of non-native and working class pupils, we examine next whether collective teachability culture might account for the potential impact of ethnic and SES composition on pupils' maths achievement. The variance components from Model 0 (Table 5) indicate that 26.33% ($p < 0.001$) of the variance in pupils' math achievement occurs between schools. This justifies the need for a multilevel analysis. In Model 1 (Table 5), we examine the impact of ethnic school composition on pupils' maths achievement, controlling for several variables at the individual and school levels. The percentage of non-native pupils at school is *not* significantly related to pupils' maths achievement ($\gamma^* = -0.120$, $p = 0.13$). Additional analyses have shown that pupils' previous achievements and individual-level SES are particularly responsible for the initial negative association between ethnic school composition and maths achievement (analyses not shown here). In Model 2 (Table 5), we redo this analysis for the school SES composition. Our results indicate that even when control variables are taken

into account, the percentage of pupils from a working class background at school level is negatively related to pupils' maths achievement ($\gamma^* = -0.235$, $p < 0.01$). Therefore in Model 3 we examine whether teachability culture mediates the impact of SES composition on pupils' maths achievement. However, Model 3 indicates that teachability culture is not significantly related to maths achievement ($\gamma^* = 0.057$, $p = 0.49$). Nevertheless, in Model 4 it becomes clear that pupils' sense of futility ($\gamma^* = -0.213$, $p < 0.001$) and futility culture ($\gamma^* = -0.258$, $p < 0.001$) are negatively associated with pupils' maths achievement. Most importantly, after these variables are entered into the model the effect of SES composition is noticeably reduced and SES composition is no longer significantly related to maths achievement ($\gamma^* = -0.103$, $p = 0.15$). Thus, while pupils' individual and shared feelings of having no control over academic success account for the impact of socio-economic composition on maths achievement, teachers' teachability culture does not have a *direct* significant impact. However, a multilevel path analysis (see diagram in Figure 1) shows that teachers' teachability culture is instead *indirectly* related to pupils' maths achievement. Figure 1 shows that in schools with a higher share of working class pupils, teachers have a reduced teachability culture ($\gamma^* = -0.396$, $p < 0.001$). In turn, a greater teachability culture is related both to lower futility culture ($\gamma^* = -0.241$, $p < 0.05$) and a lower sense of futility among pupils ($\gamma^* = -0.106$, $p < 0.05$). A greater sense of futility and futility culture ultimately result in lower maths achievement (Figure 1).²

Table 5 Results of multilevel analysis for math achievement. Gamma coefficients (γ), standardized gamma coefficients (γ^*), standard errors (in parentheses) and variance components

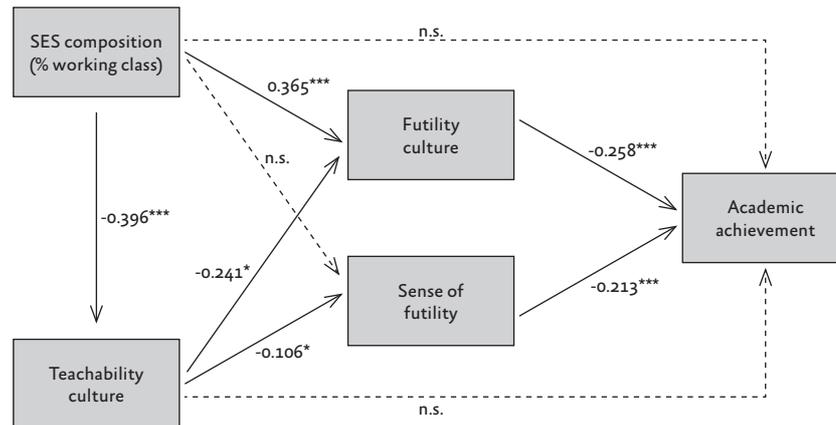
		Model 0	Model 1	Model 2	Model 3	Model 4
School Level						
Ethnic composition (% non-native)	γ	--	-0.037 (0.025)	--		--
	γ^*		-0.12			
SES composition (% working class)	γ	--	--	-0.110 (0.035)	-0.100 (0.038)	-0.048 (0.032)
	γ^*			-0.235**	-0.214**	-0.103
School denomination 1 = Catholic)	γ	--	2,266 (1.258)	2,748 (1.178)	3,020 (1.254)	3,486 (1.016)
	γ^*		0.107	0.130*	0.143**	0.165***

		Model 0	Model 1	Model 2	Model 3	Model 4
Size	γ	--	0.007 (0.006)	0.006 (0.006)	0.006 (0.006)	0.008 (0.005)
	γ^*		0.071	0.057	0.063	0.078
Previous achievement composition	γ	--	0.037 (0.053)	0.077 (0.048)	0.095 (0.055)	0.104 (0.045)
	γ^*		0.06	0.126	0.155	0.170*
Teachability culture	γ	--	--	--	1.582 (2,283)	-0.878 (1,898)
	γ^*				0.057	-0.031
Futility culture	γ	--	--	--	--	-9,890 (2,258)
	γ^*					-0.258***
Pupil level						
Grade (1 = sixth)	γ	--	5,534 (0.529)	5,552 (0.537)	5,569 (0.539)	4,825 (0.502)
	γ^*		0.238***	0.239***	0.240***	0.208***
Gender (1 = girl)	γ	--	-1,833 (0.407)	-1,815 (0.406)	-1,823 (0.406)	-1,774 (0.393)
	γ^*		-0.086***	-0.085***	-0.086***	-0.083***
Previous achievement (grade retention)	γ	--	-5,808 (0.416)	-5,825 (0.422)	-5,829 (0.422)	-5,217 (0.422)
	γ^*		-0.241***	-0.242***	-0.242***	-0.217***
Ethnicity (1 = non-native)	γ	--	-0.958 (0.586)	-0.853 (0.592)	-0.854 (0.589)	-0.693 (0.539)
	γ^*		-0.045	-0.04	-0.04	-0.033
SES (ref: service class)						
Blue-collar	γ	--	-5,139 (0.572)	-5,048 (0.573)	-5,034 (0.573)	-3,978 (0.558)
	γ^*		-0.236***	-0.232***	-0.231***	-0.183***
Technicians	γ	--	-5,119 (0.669)	-5,057 (0.672)	-5,045 (0.671)	-4,167 (0.655)
	γ^*		-0.173***	-0.171***	-0.170***	-0.141***
Self-employed	γ	--	-3,522 (0.743)	-3,503 (0.743)	-3,501 (0.743)	-2,864 (0.718)
	γ^*		-0.084***	-0.083***	-0.083***	-0.068***
Lower white collar	γ	--	-2,171 (0.596)	-2,130 (0.594)	-2,129 (0.594)	-1,509 (0.544)
	γ^*		-0.079***	-0.077***	-0.077***	-0.055**
Sense of futility	γ	--	--	--	--	-2,798 (0.220)
	γ^*					-0.213***
Variance components						
Between schools	τ_0		30,469***	16,686***	13,998***	14,261***
Within schools	σ^2		85,231***	65,922***	65,813***	65,822***

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

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Figure 1 Path diagram of multi-level analysis on pupils' math achievement using SES composition: standardized gamma coefficients (γ^*) as path coefficients.



Notes:

At school level controlling for: previous achievement composition, denomination and school size

At pupil level controlling for: grade, gender, ethnicity, SES, previous achievement

Discussion

Conclusions

As academic performance is one the most important determinants of school dropout, it is imperative to reduce disparities in academic achievement to prevent school dropout. The aim of this study was to explore the role of school segregation and self-fulfilling prophecies. To be more specific, we examine whether and how self-fulfilling prophecies mediate the impact of school composition on pupils' academic achievement. We investigate whether school composition contributes to teachers' teachability expectations at the individual teacher level and the collective school level (i.e. teachability culture). In addition, we examine whether teachers' teachability culture accounts for the impact of school composition on pupils' maths achievement. As it is theorized that teacher expectancies might especially have an impact on pupils' academic achievement through pu-

pils' perceptions of control over their achievement, we investigate the role of pupils' sense of academic futility and collective school-level feelings of academic futility (i.e. futility culture).

First, the results of multilevel regression analysis have shown that both teachability expectations and teachability culture are dependent on the socio-economic and ethnic composition of schools. While being mainly accurate (i.e. related to the previous achievement composition of schools), teachability expectations and culture are found to be lower in schools with a higher share of non-native and working class pupils. Regarding our second research objective, the results of the multi-level analyses has shown that socio-economic composition is related to pupils' maths achievement. More specifically, we found that pupils perform less well in schools with a higher share of working class pupils. While teachability expectations were not directly related to pupils' maths achievement, the path analysis showed that teachability expectations are indirectly related to pupils' academic performance, more specifically through pupils' sense of futility and futility culture. Most importantly, we demonstrated that pupils' individual and shared feelings of having no control over academic success accounts for the impact of socio-economic school composition; that is, after controlling for sense of futility and futility culture, socio-economic composition was no longer significantly related to pupils' maths achievement.

Limitations of the study

Before we discuss the policy implication of our results, it is important to mention two weaknesses in this study. First, our data included only maths achievement and consequently we do not have evidence on how school composition affects other achievement. However, Driessen (2002) has demonstrated that the ethnic and socio-economic make-up of primary schools in the Netherlands have more effect on language achievement than on maths achievement. Therefore, it is possible that we underestimate the impact of school composition on academic achievement.

A second potential limitation of this study relates to the cross-sectional design of our data: we could only indirectly rule out selection effects. For instance, we only had a limited metric for pupils' previous academic achievement; i.e. grade retention. Initially, our intention was to measure

previous achievement using pupils' grade point average (GPA) from previous years. However, it turned out that many schools did not use GPA anymore. As such, many schools could not provide pupils' GPA, so we were unable to include this in our model. A second strategy could be using scores from previous standardized tests on maths achievement that are collected by the schools. However, in Flanders, schools are not required to conduct standardized tests. Hence, these data were generally unavailable. Therefore, grade retention was the only standardized measure we could use as a metric of previous achievements. While grade retention is a limited measure, our data show that it has a large impact on academic achievement and it largely reduced the initial impact of ethnic and socio-economic composition. As such, the empirical results point out that grade retention partly captures the impact of pupils' previous achievements. However, future research with longitudinal data could mostly overcome this problem.

Policy implications

The likelihood of early school leaving is much higher among disadvantaged students than it is among socio-economically advantaged students. An educational policy which aims to *prevent* dropout should improve the educational achievement of students in schools with a high share of socio-economically disadvantaged students, as previous academic achievement is an important contributor of early school leaving. Indeed, our study does clarify that the social class composition of the student body has an impact on students' academic achievement. However, school desegregation may not be needed if it is possible to reform schools with a larger share of working class pupils so that they become more like schools that produce favourable teacher expectations and less feelings of futility among students³.

In order to increase academic achievement in segregated schools, and thus reduce early school leaving, we would like to stress the role of both educational policy-makers and teacher education programmes. First, earlier in this chapter we noted that education policy-makers put forward that (alleged) linguistic deficiencies are the ultimate cause of poor educational performance of disadvantaged groups. Teachers do mostly take over these stereotypes and this explains why they expect their students to be less

teachable in segregated schools (Agirdag, Van Avermaet & Van Houtte, 2013). This might also clarify why students have more feelings of futility in segregated schools. As most students in segregated schools have different linguistic backgrounds (i.e. they speak immigrant languages and non-standard Dutch) the public discourse on alleged linguistic deficiencies might also have an impact on their self-image. Pupils did not *choose* their own linguistic backgrounds. As such enduring associations of their linguistic background with poor achievement might trigger feelings of futility; i.e. feelings of having no control over academic future. Hence, a strategy to increase achievement in segregated schools is to focus less on linguistic deficiencies, while paying more attention to the potential benefits of the multilingual abilities of pupils. Even if multilingual instruction is not feasible due to legal and practical constraints, the valorisation of multilingualism might be striven for (see Agirdag, 2010).

Secondly, teacher education programmes can play an important role. In order to reduce dropout in segregated schools, we need teacher education programmes that prepare teachers who are trained to work in multicultural and multilingual contexts. However, to date, teacher education programmes in Flanders pay little attention to processes such as teacher and pupil expectations and social justice is rarely the main focus in these programmes. We believe that teacher education programmes – whether reformed or newly established – should pay more attention to the causes and consequences of both teacher and pupil expectations. Lower teachability expectations and higher feelings of futility play an important role in segregated schools. Therefore, teacher education programmes should consider teaching strategies to improve teacher expectations and to reduce these feelings of futility. Because when teachers expect their students to be less teachable in certain contexts and students think they do not have control over their own academic future, this will certainly negatively affect students' academic career.

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Endnotes

- 1 We control for parental SES of teachers because the social class discrepancy between teachers and pupils might negatively affect teachers' perceptions.
- 2 It should be noted that the direct effect of teachability culture on achievement (which was positive but not statistically significant in Model 3) is suppressed by the extensive set of control variables. For instance, teachability culture significantly correlates with ethnic composition, SES composition, and previous achievement composition (see Table 2).
- 3 However, the decision whether or not to desegregate schools might not be based solely on the criterion of educational achievement. For the impact of school segregation on non-cognitive outcomes in Flanders, see Agirdag, Van Houtte & Van Avermaet, 2011; Agirdag, Demanet, Van Houtte & Van Avermaet, 2011.