Effective schools, school segregation, and the link with school achievement

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ABSTRACT
This study examines whether 3 teacher-rated aspects of school effectiveness differ across school segregation profiles in Stockholm, and to what extent these indicators are associated with the academic achievement of 9th-grade students. Analyses were based on 2 cross-sectional data collections performed in 2014 and 2016, respectively (147 school units), one among teachers (n = 2,024) and the other among 9th-grade students (n = 9,151). Multilevel analysis was applied, estimating 2-level random intercept linear regression models. Results show that teachers’ ratings of school leadership, teacher cooperation, and school ethos, as well as student-reported marks differ across school segregation profiles. Findings further reveal significant associations between these school effectiveness indicators and student performance, even when taking student family background and the school’s student body composition into consideration. In part, these associations are also identified within segregation profiles. Moreover, results show that school ethos acts as a mediator between school segregation profile and student achievement.

ARTICLE HISTORY
Received 9 February 2017
Accepted 26 April 2018

KEYWORDS
Effective schools; school achievement; school segregation; mediation; school ethos; Sweden

Introduction
During the last decades, the Swedish education system has undergone substantial structural changes, including the shift in responsibility for schools from the state to municipalities and the introduction of school vouchers, enabling all students and their parents to choose freely among publicly and privately run (independent) schools. In this new market-oriented system, established public (municipal) schools found themselves competing for students with the growing sector of independent schools (Böhlmark & Lindahl, 2012), with school principals expected to emerge as leaders with a clear vision for their school, in order to make it competitive in the school choice landscape. In parallel, during the first decade of the new century, clear signs of increased school segregation along socioeconomic and ethnic lines began to emerge, with schools in areas with limited resources becoming increasingly “drained” of students in more favourable socioeconomic and psychosocial situations (Swedish National Agency of Education [SNAE], 2006, 2012). We assume that the recent decades’ development in Swedish schools has had repercussions on schools’ effectiveness in terms of their

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capacity to provide an optimal learning environment and to promote student outcomes, but also that it has led to greater differences between schools in their capability of fulfilling this task. Empirically grounded knowledge about the variation in school effectiveness between Swedish schools with different socioeconomic profiles and to what extent this may matter for student performance is however scarce. Using new data material that includes combined survey information from teachers and students as well as data from official registers, the current study seeks to investigate whether three aspects of school effectiveness – school leadership, teacher cooperation and consensus (hereafter teacher cooperation), and school ethos – differ across school segregation profiles in Stockholm. Further, we examine to what extent these school effectiveness indicators are associated with students’ academic achievement, also when taking family background characteristics and student body composition into account.

An increasingly segregated education system

Since the 1970s, Swedish education has been radically transformed from one of the most state-controlled and unitary schools in the world to a system shaped by a high degree of choice (Trumberg, 2011). While the latest Programme for International Student Assessment (PISA) results for Sweden reveal first improvements after years of declining academic performance (Organisation for Economic Co-operation and Development [OECD], 2016a), the Swedish education system is still facing serious problems, with an alarming teacher shortage and growing inequalities in the distribution of learning outcomes (OECD, 2016a; SNAE, 2015). In line with other countries (Baysu & De Valk, 2012; Benito, Alegre, & Gonzàlez-Balletbò, 2014), Sweden has experienced increased school segregation along socioeconomic and ethnic lines since the first decade of the new century, and between-school variation in school performance has doubled since the late 1990s (SNAE, 2012). Some scholars have specifically attributed this dramatic increase to the marketisation of the school (Bunar, 2010; Östh, Andersson, & Malmberg, 2013), a development that has been observed in Sweden and elsewhere (Perry & Southwell, 2014; Watkins, 2012). In Sweden, as a result of the school voucher system, they maintain, schools in deprived socioeconomic areas are becoming increasingly “drained” of students in more favourable socioeconomic and psychosocial situations (SNAE, 2006), contributing to a growing inequality between schools.

Sweden is an interesting case with regards to school segregation, since all children (and their parents) in comprehensive school are entitled to choose their school, unlike in other contexts such as the United States or the United Kingdom. However, it is primarily motivated students with well-educated parents, ethnic Swedes, and children from advantaged socioeconomic groups that make use of the school choice (Bunar, 2010). Hence, “native/White flight” from some schools can be observed, since majority parents, as well as some minority ones, may select a school that is further away from their home (at times to avoid an undesired school composition in their own catchment area). Others opt to place their child in a queue to obtain a space in a popular independent school (Böhlmark, Holmlund, & Lindahl, 2015). Further, as children from socially disadvantaged groups and immigrant families tend to choose schools in their immediate catchment area, at times, as a consequence of “not choosing“, the neighbourhood composition has come to play a significant role (Szulkin & Jonsson, 2007) despite the universal school
voucher system. Such mechanisms leave more disadvantaged families that lack the knowledge to navigate the complex school choice landscape increasingly isolated (Böhlmark et al., 2015; OECD, 2015a).

In addition to the rising school segregation, the Swedish National Agency of Education has acknowledged that discrepancies in quality between schools are growing, which, combined with transforming teaching methods, has contributed to the increasing between-school variation in performance (SNAE, 2012). In order to examine these variations, we address several dimensions of the educational system corresponding to Scheerens’s (1990) context-input-process-output (CIPO) model, with school segregation representing the overarching higher level contextual element, and features of school effectiveness making up essential process variables (i.e., characteristics that can be altered). The output of interest is student academic achievement, adjusted for individual-level factors.

Undoubtedly, students’ motivation and school performance are directly affected by other students in the school, through peer effects. At the same time, the student body composition can also play a role with regards to other factors, such as the ability to attract and retain competent principals and teachers, as well as teachers’ expectations of students’ abilities (SNAE, 2014). Teacher enthusiasm is also likely to be associated with the level of student motivation and behaviour. Further, schools with motivated students, few socioeconomically disadvantaged children, and a low concentration of psychosocial problems have more advantageous preconditions for creating a stable and stimulating atmosphere (Gottfredson, 2001). Accordingly, school segregation may have a reinforcing effect on schools, teachers, and students through a school’s sociocultural average, contributing to its level of effectiveness.

An effective school

The school-contextual conditions needed for a well-functioning school are, from the perspective of the Swedish state authorities, largely expected to correspond to ideas that are also raised in the effective school literature (Swedish Governmental Official Reports [SGOR], 2014). This field of research asserts that even when one takes social and other external factors into account, there are differences among schools that can be ascribed to the quality of schooling itself (Edmonds, 1979; Grosin, 2004; Liu, Van Damme, Gielen, & Van Den Noortgate, 2015; Mortimore, 1993; Rutter, Maughan, Mortimore, & Ouston, 1979). Consequently, schools can promote positive outcomes regardless of the composition of the student body (Mortimore, 1993). Michael Rutter and his colleagues (1979) pioneered this field through their empirical studies in the 1970s, showing that some educational environments were more successful than others in the way that the school managed to counteract negative effects of external factors. They also concluded that positive school influences had benefits for both advantaged and disadvantaged students (Rutter et al., 1979).

While the more explicit characteristics ascribed to effective schools tend to vary depending on the study context, this theoretical field is united by the assessment that schools can in fact affect student performance, regardless of the individual’s family background. Further, the pattern of findings from diverse studies examining characteristics of effective schools has been rather constant (Chapman, Muijs, Reynolds, Sammons, & Teddlie, 2016; Preston, Goldring, Guthrie, Ramsey, & Huff, 2017; West, Sweeting, & Leyland, 2004). Some of these characteristics concern the ends of education, such as the promotion of effective learning and the attainment and outcomes of
students. Other studies have focused on the means of effective schools, such as the use of resources, instructional leadership, and teacher quality (Loeb, Kalogrides, & Beteille, 2012; Mortimore, 1993). For instance, Edmonds (1979) emphasised the institutional elements of leadership, high expectations on achievement, and an orderly atmosphere conducive to learning as particularly decisive for student performance. More recently, Wang, Walters, and Thum (2012) created an effective school framework including conducive learning environment, strong instructional leadership, high staff morale, evidence-based decision making, and high level of teacher efficacy. Studies have shown that so-called effective schools are characterised by higher school performance, a lower degree of behavioural problems, and less alcohol and drug use among their students (Gottfredson, 2001). In Sweden, Grosin (2004) presented effects of schools’ pedagogical and social climate on students’ performance and social adaptation. Indicators of effective schools have also been found to contribute positively to students’ psychological health (Sellström & Bremberg, 2006).

According to the Swedish Education Act (Swedish Statue Book, 2010), all children shall have equal access to education regardless of gender, residence, or social or economic factors. The aim is that the prospects of achieving good marks shall be as independent as possible from students’ background or the school that they attend (SNAE, 2012), in line with the effective school theory. Consequently, the school system is not only responsible for assuring that schools maintain equal quality but they also have a compensatory duty with regards to students’ own socioeconomic background (SNAE, 2012). The transformations in the Swedish education system in recent decades are expected to have given rise to greater differences in schools’ capacities to provide a favourable learning environment, particularly concerning school leadership and teachers’ working conditions.

**School leadership**

Studies of effective schools have placed an increasing emphasis on principals in terms of their capacity to articulate a vision for the school and to create the shared meaning and common goals needed to reach this vision. The underlying idea is that higher levels in the school structure should provide the necessary conditions for processes at lower levels to come into force (Blair, 2002). Hence, effective school leadership is considered a key constituent in achieving school improvement (Day, Gu, & Sammons, 2016; Leithwood, Louis, Anderson, & Wahlstrom, 2004; Preston et al., 2017), and a Swedish government report (SGOR, 2014) has identified leadership on various levels as one approach to remedy many of the education system’s problems. Since the 1990s reforms, the municipalities and independent school providers hold the mandatorship for their respective schools (SGOR, 2014). They are in charge of implementing educational activities, organising and operating school services, allocating resources, and ensuring that national goals for education are met (OECD, 2015a). Further, school leadership must also focus on stimulating teacher cooperation in order to develop the quality of teaching according to research and experience and to support inexperienced teachers (OECD, 2015a). Since the municipalisation of the school, principals’ authority and responsibilities have been radically extended, which has placed higher demands on their leadership – some of which they were not prepared for (OECD, 2015a). In this study, we highlight school leadership as one of three effective school factors believed to be associated with
student performance. Indicators used to capture school leadership are, for instance, teachers’ perceptions of the management’s interest in pedagogical questions, quality of school leadership, as well as the alignment between management and teachers regarding school goals and policies.

**Teacher cooperation and consensus**

As part of the effective school scholarship, studies have highlighted the importance of effective communication between teachers, as well as staff consensus and correspondence regarding goals, and methods used to reach these goals (Fuller & Izu, 1986; Roland & Galloway, 2004; Sammons, Hillman, & Mortimore, 1995). Effective schools operate under a more unified and consensual set of organisational goals, creating a social consensus about the school’s mission (Creemers & Reezigt, 1999; Fuller & Izu, 1986), which is expected to benefit student outcomes. Yet, as Corrie (1995) has highlighted, while staff collaboration is considered as an ideal in the context of educational reform, particularly when it is market based, it may be difficult to achieve in practice (see, e.g., Achinstein, 2002).

In Sweden, the transformations in management of the educational system have affected teachers’ working conditions and responsibilities. With the aim to make schools pedagogically and administratively more efficient, the municipalities enforced the regulation of teachers’ work time and place. However, instead of positively transforming teachers’ working habits and encouraging more cooperation among teachers (SGOR, 2014), these changes have meant that teachers are more limited in terms of managing their own time (SGOR, 2014), and they largely tend to work alone. Such a lack of staff cooperation is likely to undermine teacher consensus about school goals and values. In addition, poor working conditions are linked with a high teacher turnover (Simon & Johnson, 2015), which further undermines teacher collaboration. It is thus relevant to examine how teacher-rated staff cooperation and consensus in schools is linked with student performance. In this study, the measurement of teacher cooperation and consensus embodies items such as teacher consistency regarding school goals and disciplinary measures, as well as the intensity of teacher collaboration regarding lessons and work problems.

**School ethos**

The educative importance of school ethos and related concepts such as climate and culture has been widely acknowledged (Allder, 1993; McLaughlin, 2005), particularly in the effective school movement. The concept of ethos, or atmosphere, as an element of effective schools was originally recognised by Rutter et al. (1979), referring to the beliefs, values, and norms permeating a school and manifesting themselves in the way that teachers and students relate, interact, and behave towards each other. However, there may be a mismatch between a school’s official value system and the school’s ethos as actually experienced by staff and students (Carter, 2002).

School ethos and related concepts such as school climate have been found to be positively linked with educational achievement (Banerjee, Weare, & Farr, 2014; Mortimore, Sammons, Stoll, Lewis, & Russel, 1989; Rutter et al., 1979) and negatively associated with health risk behaviours (Bonell, Fletcher, & McCambridge, 2007; Modin &
Östberg, 2009). Rutter et al. (1979) also associate a “good school ethos” with the possibilities to recruit and develop excellent teachers.

In this study, we have developed an exploratory measure of school ethos that we consider to be distinct from school climate. In the literature, school climate generally refers to the social interaction among students and between students and teachers (Shindler, Jones, Williams, Taylor, & Cardenas, 2016). The concept of effective schools represents contextual features emerging from a higher level in the school structure, and thus places a much greater focus on the importance of purposeful leadership, with the school’s ethos being shaped by beliefs, values, and norms that are enforced from a higher level in the school structure (Modin, Låftman, & Östberg, 2017). We have tried to capture this school feature through teacher-rated indicators such as their schools’ clarity of values, the strength of interventions against bullying and violence, the relationship between students and teachers, as well as the level of staff turnover. Thus, we expect that school characteristics related to ethos, as experienced by teachers, provide an indication of differences between schools beyond tangible features such as infrastructure, student composition, or class size.

**Aim and research questions**

The aim of this study is to examine if three aspects related to school effectiveness – school leadership, teacher cooperation, and school ethos – differ across schools with different segregation profiles, operationalised through four distinct clusters of school segregation. Further, we explore to what extent these indicators are associated with school performance at the student level when also adjusting for their sociodemographic background and their attended school’s segregation profile. The research questions are:

1. Do teachers’ ratings of school effectiveness – in terms of school leadership, teacher cooperation, and school ethos – differ across school segregation profiles?
2. Is school segregation associated with student performance when adjusting for students’ gender and sociodemographic background?
3. Are the three features of school effectiveness positively associated with student performance before and after adjusting for students’ sociodemographic background, as well as the school’s segregation profile?
4. Is the hypothesised association between school segregation and student performance mediated and/or moderated by features of school effectiveness?
5. Do features of school effectiveness affect students of different sociodemographic backgrounds differently in terms of performance, depending on the school’s segregation profile?

**Methods**

**Data**

The data material consists of combined cross-sectional information from two data collections performed at middle schools in Stockholm in 2014 and 2016. First, the Stockholm School Survey (SSS), which is conducted every 2 years among ninth-grade students (aged 15–16 years) in all public and most independent schools in the Stockholm municipality as
part of the city’s prevention work with young people’s substance use and criminal behaviour; second, the Stockholm Teacher Survey (STS), which was carried out by our research group via a web-based questionnaire and sent to all teachers (regardless of subject taught) working in Grades 7 to 9 in schools that had agreed to participate. Of the Grade 9 students, 76% and 78% responded to the SSS in 2014 and 2016, respectively (n = 10,757), while the corresponding figure for the STS is 54% (n = 2,262). Our combined teacher-student data cover a total of 169 middle school units.

Full information on all of the variables used in the analyses was available for 9,151 ninth-grade students (n = 4,291 in 2014; n = 4,860 in 2016) distributed over 147 school units (n = 71 in 2014; n = 76 in 2016). School aggregated information on leadership, cooperation, and ethos for these 147 school units was based on a total of 2,033 teacher ratings (n = 1,006 in 2014; n = 1,027 in 2016). Altogether, 53 middle schools took part in both 2014 and 2016 (n = 126). Eight schools only participated in 2014, and 13 schools only took part in 2016.

**Measurements**

**Dependent variable**

*School performance* was defined as the summation of the student’s self-reported marks in core subjects from the previous term, namely, Swedish, English, and mathematics. Response options were “Marks are missing” (5.9%) = 0; “Fail” = 0; “E” = 1; “D” = 2; “C” = 3; “B” = 4; and “A” = 5. Based on marks in these three subjects, an index of 0–15 was created.

**Independent variables**

School effectiveness was measured through teacher ratings of three different aspects of the concept: *school leadership* (10 items), *teacher cooperation* (7 items), and *school ethos* (12 items). Each item had the response alternatives “Strongly agree”, “Agree”, “Neither agree nor disagree”, “Disagree”, and “Strongly disagree”. School-level means for each of the three measures were calculated and merged with student-level data. Detailed information about the specific items is provided in Table 1.

A measure of *school segregation* was obtained by identifying clusters of school units with certain student body composition profiles. Four such clusters were identified according to the following student composition criteria: (1) parents’ average education; (2) proportion of students born abroad; (3) proportion of recently immigrated students (i.e., within the past 4 years); and (4) students’ average academic motivation. Information about the first three criteria was provided by the Swedish National Agency of Education (SNAE, 2016), and information about the fourth criterion was derived from the analysed students’ own ratings in the SSS. Of the 53 schools that took part in both 2014 and 2016, 9 ended up in a different segregation profile in 2016 (moved upward or downward), as the student body composition of these schools had changed.

**Control variables**

The analyses were adjusted for a number of student-level variables. *Parental education* was measured by the question “Which is the highest education of your parents?” Four response options were provided separately for mothers and fathers: “Comprehensive school”, “High school”, “Upper secondary school”, and “No school”.

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Table 1. Teachers: description of school effectiveness indicators based on all available ratings from teachers in 211 senior-level school units that took part in both the Stockholm School Survey and the Stockholm Teacher Survey in 2014 and/or 2016.

| Teacher-rated indicators of school effectiveness factors | Loadings | RMSEA | TLI | CFI | Range | Cronbach’s alpha |
|---------------------------------------------------------|----------|-------|-----|-----|-------|-----------------|
| **School leadership (10 items; n = 2,405)**             |          |       |     |     |       |                 |
| The management has an interest in pedagogical questions  | 0.80     |       |     |     | 1–5   |                 |
| The management shows an understanding of my work problems| 0.85     |       |     |     | 1–5   |                 |
| The school leaders have high expectations of me as a teacher | 0.57   |       |     |     | 1–5   |                 |
| When the management takes decisions on important issues they first discuss it with the teaching staff | 0.78   |       |     |     | 1–5   |                 |
| The majority of teachers’ understanding of school goals and policies align with the management’s | 0.77   |       |     |     | 1–5   |                 |
| The management allows room for teachers’ pedagogical freedom | 0.61   |       |     |     | 1–5   |                 |
| I regularly receive feedback from the management about my performance as a teacher | 0.76   |       |     |     | 1–5   |                 |
| The management is a good support for teachers experiencing difficulties with a class | 0.81   |       |     |     | 1–5   |                 |
| The distribution of responsibility between teachers is clear at this school | 0.65   |       |     |     | 1–5   |                 |
| This school is led in a good way | 0.92 | 0.10 | 0.95 | 0.97 | 7–35 | 0.85 |
| **Teacher cooperation and consensus (7 items; n = 2,368)** |          |       |     |     |       |                 |
| Teachers meet regularly to discuss and plan lessons | 0.57 |       |     |     | 1–5   |                 |
| There is consistency in the approach to school goals among teachers | 0.82 |       |     |     | 1–5   |                 |
| Teachers at this school usually use the same methods to deal with students who break school rules | 0.80 |       |     |     | 1–5   |                 |
| Teachers at this school usually use the same methods to deal with and prevent bullying among students | 0.80 |       |     |     | 1–5   |                 |
| There is agreement among teachers in the teaching philosophy of this school | 0.81 |       |     |     | 1–5   |                 |
| Teachers are in agreement that it is important to work well with parents | 0.67 |       |     |     | 1–5   |                 |
| I can discuss work problems with my colleagues | 0.66 |       |     |     | 1–5   |                 |
| **School ethos (12 items; n = 2,335)**                   |          |       |     |     |       |                 |
| At this school we have a value system (värdegrund) which is clear to students | 0.70 |       |     |     | 1–5   |                 |
| At this school the teachers make an effort to provide positive feedback about students’ performance | 0.76 |       |     |     | 1–5   |                 |
| Teachers have high expectations of student performance | 0.77 |       |     |     | 1–5   |                 |
| Teachers take their time with students even if they want to discuss something other than school work | 0.73 |       |     |     | 1–5   |                 |
| At this school we actively work on issues such as violence, bullying, and harassment among students | 0.72 |       |     |     | 1–5   |                 |
| This school provides a stimulating learning environment | 0.64 |       |     |     | 1–5   |                 |
| The teachers at this school have a strong work ethic | 0.80 |       |     |     | 1–5   |                 |
| The teachers work with strong enthusiasm | 0.83 |       |     |     | 1–5   |                 |
| At this school the students are treated with respect | 0.82 |       |     |     | 1–5   |                 |
| The teachers at this school feel confident as classroom leaders | 0.80 |       |     |     | 1–5   |                 |
| At this school students’ motivation is a stimulating part of work | 0.68 |       |     |     | 1–5   |                 |
| There is high staff turnover amongst teachers at this school* | 0.32 |       |     |     | 1–4   |                 |

Response options: (1) Strongly disagree, (2) Disagree, (3) Neither agree nor disagree, (4) Agree, (5) Strongly agree.

*Response options: (1) Agree completely, (2) Agree somewhat, (3) Disagree somewhat, (4) Disagree completely.

“Secondary school”, “University and university college”, and “I don’t know”. The responses were recoded into “No parent with university education or information missing”, “One parent with university education”, and “Two parents with university education”.

The question “How long have you lived in Sweden?” serves as a proxy for migration background with the response alternatives “All my life”, “10 years or more”, “5–9 years”, and “Less than 5 years”. This variable was recoded into “No migration background”, “Lived in Sweden 10 years or more”, and “Lived in Sweden 9 years or less”, in an attempt...
to (roughly) differentiate between children who arrived in Sweden before starting primary school and those who arrived in Sweden during primary school.

All analyses were adjusted for gender, year of survey, and student–teacher ratio. The latter variable is an important control variable as Stockholm schools with the least favourable socioeconomic circumstances are allocated additional resources per student from the municipality. Since schools commonly invest a dominant proportion of these funds in hiring additional teachers, the student–teacher ratio tends to be lower in more socioeconomically deprived schools.

**Statistical method**

Confirmatory factor analyses for the three teacher-rated school effectiveness indicators were performed in Mplus (Muthén & Muthén, 1998–2012), showing good fit indices in terms of the Tucker-Lewis index (TLI), and the comparative fit index (CFI), and reasonable fit for the root mean square error of approximation (RMSEA). All of the three measures also demonstrated high internal consistency in terms of Cronbach’s alpha (Table 1).

School segregation clusters were identified through latent class analysis (LCA). The choice of cluster solution was based on the combined use of various types of model fit statistics in Mplus, including the Akaike information criterion (AIC), and the Bayesian information criterion (BIC). Both are indicators of relative goodness of fit where lower values correspond to better fit (Kuha, 2004). Entropy scores were also reported, ranging between 0 and 1: the closer to 1, the higher the quality of the cluster solution. Despite a somewhat better fit for solutions containing five, six, and seven clusters, these solutions had problems with empty or very small clusters and were therefore dismissed. On the basis of a subsequent ocular examination of the remaining solutions, it was determined that the four-cluster solution had the most interpretative meaning (in addition to having the best fit), and it was therefore chosen.

The statistical package used for the multilevel analysis was Stata/SE 13.1. Two-level random intercept linear regression models were used when analysing combined school- and student-level data (Rasbash, Steele, Browne, & Goldstein, 2012), using the “xtmixed” command. Further, we tested for mediation with the “ml_mediation” command (Krull & MacKinnon, 2001).

**Results**

Table 2 provides information about student composition for each of the four school segregation profiles, which hereafter will be referred to as privileged, typical, deprived, and deprived immigrant schools. Of the ninth graders under study, 17.4% belong to any of the 20 schools classified as privileged. These schools are characterised by higher average parental education and student motivation compared to the other three segregation profiles. Further, schools in this cluster have very low proportions of foreign-born and recently immigrated students. The majority of schools in this study (n = 71) fall into the cluster labelled typical, covering 56.5% of the analysed students. These schools distinguish themselves as the least segregated in our data, with levels of parental education, foreign-born, and recently immigrated students falling somewhere in between the privileged and the two deprived segregation profiles. Student motivation is, however, lower than in the two deprived clusters. The 23 schools constituting the deprived cluster host 11.6% of the students. These schools have a much lower mean
parental education than typical schools. Schools in this cluster also contain considerably higher proportions of foreign-born and recently immigrated students than those in the privileged and typical clusters. Deprived immigrant schools, finally, comprise 14.5% of the students and 33 schools. These schools stand out with the lowest average parental education and the highest proportions of foreign-born and recently immigrated students, but with the second highest level of student motivation.

Table 3 provides descriptive statistics of the student-reported information used in this study, including mean marks in the three core subjects ($M = 8.6$), which is the dependent variable. A little more than half of the participating students proclaim that they have at least one parent with university education. The great majority have lived in Sweden all of their lives, but 8.5% report having a migration background. In all, 4% immigrated to Sweden during the past 9 years.

The distribution of school effectiveness indicators and student characteristics across the four segregation profiles is presented in Table 4. Results show that school effectiveness differs significantly between the four school clusters. In privileged schools, teachers’ mean ratings point to a higher level of leadership, teacher cooperation, and school ethos

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**Table 2.** Schools: description of the four identified school clusters of segregation (based on 147 school units comprised of 9,151 ninth-grade students in Stockholm municipality in 2014 and 2016).

| School characteristics (standardized indices, mean = 0, SD = 1) | Privileged | Typical | Deprived | Deprived immigrant |
|---------------------------------------------------------------|------------|---------|----------|--------------------|
| Parents’ average education (mean)$^a$                          | 1.16       | 0.28    | −0.88    | −1.75              |
| Proportion of students born abroad (mean)$^a$                  | −0.75      | −0.44   | 0.40     | 2.06               |
| Proportion of recently immigrated students (mean)$^a$          | −0.59      | −0.42   | 0.96     | 1.63               |
| Students’ average motivation (mean)$^b$                        | 1.26       | −0.37   | −0.26    | 0.02               |
| Number of schools                                             | 20         | 71      | 23       | 33                 |
| Number of students                                            | 1,594      | 5,172   | 1,062    | 1,323              |
| Number of teachers                                            | 280        | 1,055   | 304      | 392                |
| Proportion of students (%)                                     | 17.4       | 56.5    | 11.6     | 14.5               |

$^a$Data from the Swedish National Agency for Education.

$^b$Student aggregated information from the Stockholm School Survey.

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**Table 3.** Students: descriptive statistics of the student-level variables used in the statistical analyses (based on 9,151 ninth-grade students distributed across 147 school units in Stockholm municipality in 2014 and 2016).

| Dependent variable                                             | Mean | SD  | Range         |
|---------------------------------------------------------------|------|-----|---------------|
| Average marks in core subjects                                | 8.6  | 3.7 | 0–15          |
| Swedish                                                       | 2.8  | 1.3 | 0–5           |
| English                                                       | 3.2  | 1.4 | 0–5           |
| Mathematics                                                   | 2.7  | 1.5 | 0–5           |
| Independent variables of interest                             | N    | %   |               |
| Gender                                                        |      |     |               |
| Boys                                                          | 4,579| 50.0|               |
| Girls                                                         | 4,572| 50.0|               |
| Parent(s) with university education                           |      |     |               |
| None or information missing                                    | 3,805| 41.6|               |
| One                                                           | 2,030| 22.2|               |
| Two                                                           | 3,316| 36.2|               |
| Migration background                                          |      |     |               |
| No                                                            | 8,368| 91.5|               |
| In Sweden 10 years or more                                    | 415  | 4.5 |               |
| In Sweden 9 years or less                                     | 368  | 4.0 |               |
relative to the other clusters. By contrast, in the deprived and deprived immigrant schools, teachers’ mean ratings indicate the lowest levels of effectiveness except when it comes to school leadership, where typical schools have a somewhat lower average rating. Students’ accounts of parental education and migration background vary extensively between the four school clusters, which is not unexpected considering that school-level information presented above (albeit from the National Agency of Education) about these aspects were used as criteria for determining the clusters.

Figure 1 further reveals that students’ average marks in core subjects decrease in a sequential and significant manner with each consecutive school cluster even when individual students’ gender and sociodemographic background have been adjusted for.

Table 5 contains results from random intercepts models with students’ sum school marks as the dependent variable and the three teacher-rated indicators as independent variables embodying characteristics of effective schools. Model 1 adjusts for gender, student–teacher ratio, and year of survey, Model 2 adds parental education and migration background, and Model 3 further adjusts school segregation as a final control variable to account for the school’s sociodemographic composition.

The intraclass correlation coefficient (ICC) for the empty model reveals that 18.4% of the total unexplained variance in students’ school marks is accounted for by school-level, rather than student-level, differences (ICC = 0.184). Results show that one standard deviation increase in school leadership is associated with a 0.31 ($p = .007$) unit increase in student marks (Model 1). When further adjusting for students’ sociodemographic background, the estimate for leadership decreases to 0.24 ($p = .005$), and when school segregation is added in the final model the estimate drops to 0.14 ($p = .029$).

The results furthermore show that students in schools with higher levels of teacher cooperation perform significantly better than those in schools where teachers rate cooperation as lower, corresponding to an average increase in average marks of 0.40
Figure 1. Average student performance according to school segregation profile (adjusted for student gender, migration background, and parental education, as well as the school’s student–teacher ratio and year of survey).
This advantage is reduced to 0.29 \( (p < .001) \) and 0.14 \( (p = .027) \), respectively, when sociodemographic background and school segregation profile are further controlled for.

The third school effectiveness aspect – school ethos – emerges as the strongest predictor of student performance, with an increase in student marks of 0.67 \( (p < .001) \) for each standard deviation increase ethos. The estimate decreases somewhat when parental education and migration background are controlled for in Model 2 \( (b = 0.49, p < .001) \). When further adjustment is made for school segregation profile, the association with student marks still remains statistically significant, indicating that each standard deviation increase in school ethos is associated with a decrease in student marks of 0.26 units \( (p < .001) \). From the fully adjusted model it is also evident that school segregation significantly predicts student performance in an independent manner.

Among the three indicators of school effectiveness, school ethos clearly gives rise to the largest drop in ICC vis-à-vis the empty model \( (\text{ICC} = 0.113) \), followed by teacher cooperation \( (\text{ICC} = 0.133) \) and school leadership \( (\text{ICC} = 0.138) \). Predictably, the ICC declines slightly when controlling for students’ sociodemographic background, and even more so when further controlling for the school’s segregation cluster. Nonetheless, the results indicate that even after adjusting for student composition and school segregation, a small but significant

\[ \text{Table 5. Two-level random intercept linear regression models. Student-reported school performance according to teacher-rated school leadership, teacher cooperation, and school ethos (based on 9,151 ninth-grade students distributed across 147 school units in Stockholm municipality in 2014 and 2016).} \]

\[
\begin{array}{lcccc}
\text{Empty model} & \text{Model(s) 1} & \text{Model(s) 2} & \text{Model(s) 3} \\
\hline
\text{School leadership} (b) & 0.31** & 0.24** & 0.14* \\
\text{School segregation profile} \\
\text{Privileged (ref.)} & 0 & \text{n.s.} \\
\text{Typical} & -1.17*** & \text{n.s.} \\
\text{Deprived} & -1.82*** & \text{n.s.} \\
\text{Deprived immigrant} & -2.84*** & \text{n.s.} \\
\text{ICC} & 0.184*** & 0.138*** & 0.082*** & 0.035*** \\
\text{Interaction leadership*segregation} & \text{n.s.} \\
\text{Mediating effect of leadership}\dagger & \text{n.s.} \\
\text{Teacher cooperation} (b) & 0.40*** & 0.29*** & 0.14* \\
\text{School segregation profile} \\
\text{Privileged (ref.)} & 0 & \text{n.s.} \\
\text{Typical} & -1.16*** & \text{n.s.} \\
\text{Deprived} & -1.75*** & \text{n.s.} \\
\text{Deprived immigrant} & -2.80*** & \text{n.s.} \\
\text{ICC} & 0.184*** & 0.133*** & 0.070*** & 0.035*** \\
\text{Interaction cooperation*segregation} & \text{n.s.} \\
\text{Mediating effect of cooperation}\dagger & \text{n.s.} \\
\text{School ethos} (b) & 0.67*** & 0.49*** & 0.26*** \\
\text{School segregation profile} \\
\text{Privileged (ref.)} & 0 & \text{n.s.} \\
\text{Typical} & -1.01*** & \text{n.s.} \\
\text{Deprived} & -1.57*** & \text{n.s.} \\
\text{Deprived immigrant} & -2.54*** & \text{n.s.} \\
\text{ICC} & 0.184*** & 0.113*** & 0.065*** & 0.031*** \\
\text{Interaction ethos*segregation} & \text{n.s.} \\
\text{Mediating effect of ethos}\dagger & \text{n.s.} \\
\end{array}
\]

\*Significant at the 5% level \( (p \leq 0.05) \). **Significant at the 1% level \( (p \leq 0.01) \). ***Significant at the 0.1% level \( (p \leq 0.001) \).

\daggerTest for mediation in the relationship between school segregation profile and school performance.

Model 1: Adjusted for gender, student–teacher ratio, and year of survey.
Model 2: Model 1 + parental education and migration background.
Model 3: Model 2 + school segregation profile.

\( (p < .001) \) units for each standard deviation increase in teacher cooperation (Model 1). This advantage is reduced to 0.29 \( (p < .001) \) and 0.14 \( (p = .027) \), respectively, when sociodemographic background and school segregation profile are further controlled for.
variation in student performance between schools still remains, ranging between 3.1 and 3.5%, depending on whether the additional role of school leadership, teacher cooperation, or school ethos are taken into consideration.

Since there are significant differences in school performance between several of the segregation clusters, we also test for moderating and mediating effects of the school effectiveness features between clusters of school segregation and student performance (see Table 5). We did not find any significant moderation effects, but school ethos was found to have a significant mediation effect \( (b = -0.145, p = .001) \), with an estimated mediating proportion corresponding to 8.9% of the total effect of school segregation on student performance.

In Table 6, we explore whether features of school effectiveness affect students of different sociodemographic backgrounds differently in terms of performance depending on the school’s segregation profile. For the privileged school cluster, the results indicate that for one standard deviation increase in school leadership, we can expect a 0.46 \( (p = .027) \) and a 0.36 \( (p = .035) \) increase in student marks, respectively, before and after adjusting for student’s sociodemographic background.

A similar effect can be observed in deprived immigrant schools, where student marks increase on average by 0.30 \( (p = .045) \) for each standard deviation increase in school leadership before controlling for student background characteristics. This estimate remains unchanged in the fully adjusted model, albeit with a somewhat stronger \( p \) value \( (p = .020) \). Remarkably, deprived and typical schools do not point to any association at all between leadership and student performance.

The findings for teacher cooperation are similar. On average, students’ marks in privileged school increase by 0.37 \( (p = .050) \) and 0.31 \( (p = .052) \) units, respectively, for each standard deviation increase in teacher cooperation before and after adjusting for students’ sociodemographic background. The corresponding estimates for deprived immigrant schools are 0.29 \( (p = .015) \) and 0.25 \( (p = .017) \). As with leadership, however, there does not seem to be any association between teacher cooperation and student performance in the typical and deprived school clusters.

Regarding school ethos, finally, results show that the performance of students in privileged schools increases significantly with improving ethos \( (b = 0.69, p < .001) \) even when student background characteristics are taken into consideration \( (b = 0.55, \)

| Table 6. Two-level random intercept linear regression models. Student-reported performance according to levels of teacher-rated school leadership, teacher cooperation, and school ethos, respectively, for each school segregation profile separately (based on 9,151 ninth-grade students distributed across 147 school units in Stockholm municipality in 2014 and 2016). |
|---------------------------------|--|--|--|--|--|--|--|--|--|
| **School segregation profiles** | **Privileged** | **Typical** | **Deprived** | **Deprived Immigrant** |
| **School effectiveness indicators:** | **Model 1** | **Model 2** | **Model 1** | **Model 2** | **Model 1** | **Model 2** | **Model 1** | **Model 2** |
| School leadership | 0.46* | 0.36* | 0.09 | 0.06 | -0.02 | -0.04 | 0.30* | 0.30* |
| Teacher cooperation and consensus | 0.37* | 0.31^ | 0.05 | 0.04 | -0.04 | -0.01 | 0.29* | 0.25* |
| School ethos | 0.69*** | 0.55*** | 0.36** | 0.28** | -0.06 | 0.02 | 0.22^ | 0.23* |

^Significant at the 10% level \( (p \leq 0.10) \). *Significant at the 5% level \( (p \leq 0.05) \). **Significant at the 1% level \( (p \leq 0.01) \). ***Significant at the .1% level \( (p \leq 0.001) \).  
Model 1: Adjusted for gender, student–teacher ratio, and year of survey.  
Model 2: Adjusted for gender, student–teacher ratio, year of survey, migration background, and parental education.
In line with the findings for school leadership and teacher cooperation, this association also applies to students who attend deprived immigrant schools, both before \( b = 0.22, p = 0.076 \) and after \( b = 0.23, p = 0.041 \) adjusting for students’ socio-demographic background.

The level of school ethos also appears to play a role in typical schools, where significantly higher student performance is found in schools with higher levels of school ethos \( b = 0.36, p = 0.002 \), even when adjusting for individual students family background \( b = 0.28, p = 0.009 \).

**Discussion and conclusion**

This study has shown that Stockholm schools shaped by high proportions of students who have recently immigrated, are less motivated, have a foreign background, and/or lowly educated parents appear to fare worse on the three independent variables embodying characteristics of effective schools than schools composed mainly of native students with parents whose education level is relatively high and who display a stronger motivation.

Thus, a school’s segregation profile is linked with contextual features of school effectiveness. In addition, school segregation as manifested in the school’s student body composition is significantly linked with student performance even when adjusting for their sociodemographic background. The former unitary system in Sweden that largely ensured that all children had equal chances to succeed regardless of where they lived and who their parents were, has been transformed. Today, the education system is not only more segregated, but, at least in Stockholm, schools with an intake of more socially advantaged students appear to present more favourable contextual characteristics in terms of school leadership, cooperation among teachers, and the school’s ethos.

On the basis of previous research, this association may relate to mechanisms such as peer effects (Black, Devereux, & Salvanes, 2013; Lynch, Lerner, & Leventhal, 2013), the recruitment and retaining of qualified teachers (Bonesrønning, Falch, & Strøm, 2005; Clotfelter, Ladd, & Vigdor, 2005), teacher motivation and expectations (SNAE, 2014), and the maintenance of successful leadership (Leithwood et al., 2004).

Scheerens (1990) has suggested that process indicators offer explanations on why certain schools perform better than others do. Our findings show that the teacher-reported indicators school leadership, staff cooperation, and school ethos are positively associated with students’ average school achievements, even when controlling for student gender, sociodemographic background, student–teacher ratio, and the school’s segregation profile. This suggests that when teachers identify a school’s leadership as strong and supportive and teachers in a school work together and are in agreement regarding goals and approaches towards teaching, students perform better, regardless of their own sociodemographic background. The same applies to students in schools with a strong teacher-rated ethos.

The finding that all these three features of school effectiveness are associated with student performance is consistent with the notion that higher levels in the school structure are understood as a foundation for processes at lower levels (Blair, 2002). Yet, only school ethos appears to act as a mediator between school composition and student academic achievement, with the proportion of total effect mediated corresponding to 8.9%. This finding suggests that the sociodemographic composition of a
school’s student body either enables or inhibits the development of a conducive school ethos, which in turn has an effect on student performance. Perhaps there is indeed no corresponding mediating effect of leadership and teacher cooperation, or we have not been able to capture these features accurately in this study.

In line with the effective school theory, therefore, we further investigated potential compensation effects of schools. Whereas no significant moderation effect of school effectiveness characteristics could be established, their association with student performance nevertheless differed across school segregation profiles. While clear associations were found in the most segregated schools (the privileged and deprived immigrant clusters), hardly any such effects could be found in schools with typical or deprived segregation profiles. Results for the deprived immigrant schools revealed that the association between school effectiveness features and student performance hardly decreased at all when students’ socioeconomic and migration background were adjusted for. Thus, in deprived immigrant schools, the links between these effectiveness features and student performance do not seem to depend on the individual student’s family background. These findings are in contrast with those found for privileged schools, and point to a potential compensation effect of school effectiveness on student performance among sociodemographically disadvantaged youth attending deprived immigrant schools in Stockholm.

The complete absence of an association between effectiveness features and student performance in schools within the deprived segregation profile presented an unexpected finding. One explanation might be that some schools with this particular profile are yet to benefit from ongoing initiatives meant to uplift schools located in areas shaped by social exclusion. Accordingly, the schools in this cluster require closer investigation in order to understand why they diverge from the expected pattern.

Our results nevertheless lend support to the notion that school segregation in Stockholm is associated with features of school effectiveness to the benefit of more privileged schools. This points towards obvious implications for students’ chances to succeed academically, and thus for their future opportunities and wellbeing. The latest investigation by PISA has identified that in Sweden, the gap between students with the highest and lowest performance has increased over the years and is currently higher than the OECD average (OECD, 2016a). There are also increasing differences in performance between socioeconomically disadvantaged students and more advantaged students, as well as between students with foreign background and other students (OECD, 2016b). At the same time, research (Jonsson & Rudolphi, 2011) reports that children of immigrants are often determined to pursue academic studies, which could potentially explain the relatively high levels of motivation that we found in schools with a deprived immigrant profile. Explanations include high parental expectations for academic studies, or the possibility of unrealistic judgement of success (Jonsson & Rudolphi, 2011). Nonetheless, it is critical to cultivate these aspirations by providing a conducive school context for all students, even if the segregated school landscape per se cannot be amended in the short term.

The structural conditions that create and maintain a certain student composition of a school, as well as its consequences for equality in the education system, has become a priority on the political and academic agenda in Sweden (OECD, 2015b). In recent years, there have been extensive reforms and compensatory measures that aim to increase the quality and reduce inequity in the Swedish education system. Such measures include the
introduction of a new school law in 2011; a stronger focus on the assessment of student knowledge; measures to improve teacher training, strengthening the appeal of the teaching profession and enhancing pedagogical leadership; increased monitoring and evaluation; and an emphasis on discipline in the classroom (Bunar, 2015). In Stockholm, since the early 2000s, a series of measures aimed at tackling school segregation and equalising social conditions have been implemented in areas marked by social exclusion and high proportions of inhabitants with a migrant background (Bunar, 2015). However, evaluations of effects of the most recent reforms on equality and quality have concluded that outcomes are still uncertain and that it takes time for such measures to “settle” (Bunar, 2015).

**Strengths and limitations**

By using new data material that combines survey information from both teachers and students in Stockholm, this study makes a unique contribution to the effective school literature, examining not only essential features of effective schools but also the effects of a segregated school landscape. Obtaining data from two independent sources also considerably decreases the bias related to common method variance (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003).

Yet, due to an uneven distribution between the number of schools and students in the respective clusters, we were not able to establish a significant interaction effect between features of effective schools and segregation profile. In addition, the fact that the data were cross-sectional prevents us from making interpretations about causality that are grounded in the data. Furthermore, with findings based on data from the municipality of Stockholm, the generalisability of the results to other contexts is not straightforward, and, hence, further studies are needed to corroborate the findings.

**Tasks for future research**

Future research should further investigate the potential compensation effects of attending schools that are high in effectiveness for students from less favourable family backgrounds. This study tentatively indicates that students in schools that correspond to the principles of effective schools perform better than students in schools with a similar student composition that have received low levels of teacher ratings on these indicators, particularly in the most segregated clusters. This could suggest a certain ability of these schools to compensate for students’ family background by adapting school contextual features. This compensation effect of the school requires a more in-depth analysis, not least since there is also research that is inconsistent with the findings presented in this study (see, e.g., Driessen & Sleegers, 2000). On the basis of the gender discrepancies observed in the latest PISA study (OECD, 2016b), it may also be pertinent to pay closer attention to whether boys and girls are affected differently by school contextual features. Further, considering the mutual relationship between school achievements and psychological wellbeing (Gustafsson et al., 2010) and the ongoing deterioration of young people’s psychological health (Public Health Agency of Sweden, 2014), the association between features of effective schools and students’ psychological health symptoms should be examined.
Acknowledgements

We would like to thank the Stockholm City Administration and the Stockholm School Survey steering group for giving us access to the data material. Further, we are grateful to the students and teachers who participated in the data collections.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

The study was supported by a joint grant from Vetenskapsrådet (Swedish Research Council), Forte (Swedish Research Council for Health, Working Life and Welfare), Vinnova and Formas (The Swedish Research Council for Environment, Agricultural Sciences and Spatial Planning [2014-0107]; Forskningsrådet om Hälsa, Arbetsliv och Välfärd; Svenska Forskningsrådet Formas.

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