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DOI
10.1080/02673037.2020.1829563

Publication date
2022

Document Version
Final published version

Published in
Housing Studies

License
CC BY-NC-ND

Citation for published version (APA):
https://doi.org/10.1080/02673037.2020.1829563
School choice and school segregation in the context of gentrifying Amsterdam

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ABSTRACT
Changes in the school-aged population due to gentrification can have paradoxical effects on school choice dynamics and segregation. This article seeks to understand the changing school choice dynamics in gentrifying Amsterdam. Drawing on individual-level geocoded data, this article reveals the school choice of different groups of parents and how they are contingent on social class composition of their residential neighbourhood. It finds that different groups of parents enrol their children in different types of schools even if they live in the same neighbourhoods. This is in large part due to processes of disaffiliation and selective belonging from the part of ‘white’ middle classes who choose specific schools within and outside of their neighbourhood. Yet, other groups of parents also have their children in schools outside of the neighbourhood thereby contributing to high levels of segregation too. Nonetheless, the article concludes that gentrification paradoxically leads to both greater concentration of highly educated and more mix in other schools.

ARTICLE HISTORY
Received 7 January 2020
Accepted 20 September 2020

KEYWORDS
Gentrification; families; school choice; segregation; geography of education

Introduction
School segregation is to a large extent the result of residential patterns of segregation. Often, where one lives determines to what schools you can send your children. Particularly in the United States and England, but also in other national contexts research has assessed how and to what extent geography structures educational opportunities (Boterman, 2018; Frankenberg, 2013; Hamnett & Butler, 2011; Kosunen et al., 2016; Oberti & Savina, 2019). Literature about the geography of education (Butler & Hamnett, 2007, 2011) stresses the central role of schools in residential mobility decisions of parents. Processes of gentrification are to a large extent shaped by the desire to socially reproduce, not just through cultural capital expressed through specific tastes and practices, but moreover through the intergenerational transfer of capital via schooling (Boterman & Bridge, 2015; Bridge, 2006; Butler &
Robson, 2003). In most urban contexts gentrification as a specific set of socio-spatial practices is difficult to reconcile with the desire to ensure good quality education. Many gentrification neighbourhoods, in spite of their changing social make-up and particularly their improved image, remain highly diverse in terms of both class and ethnicity. Although various strategies are pursued to deal with this diversity, (perceived) quality of education at local schools in gentrification areas remains a major concern for middle class parents (Boterman, 2013).

Gentrification in cities like London (Butler & Hamnett, 2011) Berlin (Noreisch, 2007) Stockholm (Larsson & Hultqvist, 2018) has been revealed to have paradoxical effects on the schooling landscape. On the one hand relatively recent, substantial middle class presence in areas dominated by lower social classes, often of a non-native decent, the issue of school choice may lead to sharper patterns of segregation and processes of disaffiliation and (s)elective belonging (Andreotti et al., 2013; Atkinson, 2006; Pinkster, 2014; Watt, 2009). The high degree of social mix found in gentrifying neighbourhoods may thus cause some middle class parents to avoid lower class and ethnic others, particularly in the domain of education.

On the other hand, increasing middle class presence in the city as a whole and the maturing of gentrification in some areas may relax the conditions for middle class parents. As Vowden (2012) argues, safety comes in numbers, and gentrification delivers the numbers to create sufficient critical mass, locally. Anxieties about the social and ethnic composition of schools may wane, once enough ‘people like us’ may join the ranks of pupils enrolling for a particular school (Crozier et al., 2011; Posey-Maddox et al., 2016). As Boterman (2013) described for middle class parents in Amsterdam, middle parents are very aware of the school composition and also have clear ‘thresholds’ or ‘quota’ in mind when it comes to the maximum number of children of ‘people not like them’. Also the rising numbers of children of middle class backgrounds lifts average test scores, positively changing the reputation of ‘gentrifying’ schools. The effects of expanding gentrification could therefore be hypothesized to have two contrasting effects on school choice and school segregation:

1. The growing number of middle class children creates more social mix in neighbourhoods and higher test scores in schools, leading to higher attendance of neighbourhood schools, reducing overall levels of segregation.
2. The growing numbers of highly educated in mixed neighbourhoods in mixed areas leads to greater disaffiliation and avoidance of local neighbourhood schools, contributing to rising levels of school segregation.

This article aims to cast light on the relationship between the rise of middle class families in the city and dynamics of school choice and school segregation. The key question of this article is:

How does family gentrification affect the dynamics of school choice and consequently mechanisms of segregation?

I will draw on the case of primary schools in Amsterdam for the period 2008–2015. The article uses individual level, geocoded, register data from Statistics Netherlands from 2008 to 2015 about the neighbourhood origins of pupils to assess
to what extent and in which ways school selection and segregation is affected by family gentrification.

**Theory**

*Gentrification and school choice*

While not always directly associated with gentrification, many gentrifier households are middle class families, who not only embody the transformation of adult populations but also bear new generations of urban children. As the process of gentrification matures and expands spatially, gentrifiers increasingly settle down in the city when they have children (Boterman *et al.*, 2010; Lilius, 2019). The result of these various forms of, what is referred to as, family gentrification (L. Karsten, 2003) is the emergence of specific neighbourhoods that are increasingly dominated by middle class family households. The rising numbers of middle class families not only affect the appearance and image of neighbourhoods but also have repercussions for consumption spaces and public services, such as child care facilities, sports clubs and most importantly: schools. Changing demographics in the city as a whole and in specific neighbourhoods may change school populations and also trigger new school choice dynamics (Candipan, 2019). The issue of school choice in gentrification areas has been extensively studied. Considering the almost ‘obsessive’ (Butler & Hamnett, 2011) search for good schools, the rising numbers of middle class parents puts tremendous pressure on the absorption capacity of already high-scoring and popular schools. An ‘excess’ number of middle class children may cause parents to settle for second choice schools outside of their neighbourhood, thereby sometimes ‘gentrifying’ schools that have low levels of middle class children. This spill-over effect could have a social and ethnic mixing effect on school populations. However, also the opposite occurs. As has been discussed in various contexts (Boterman, 2013; Butler & Hamnett, 2011; Hamnett & Butler, 2013; Rangvid, 2007; Raveud & Van Zanten, 2007) middle class parents may also try to avoid the diversity of the neighbourhood and send their children to specific schools, within but also typically out of the area. Middle classes in diverse contexts play ‘games of proximity and distance’ (Andreotti *et al.*, 2013) in which exposure to diversity is carefully managed in everyday practices, participating in some aspects of neighbourhood diversity, but opting out of other domains. In several US urban contexts this opting out of gentrifying neighbourhoods is associated with charter and magnet school (Makris, 2018; Renzulli & Evans, 2005), which typically allow white parents to avoid schools with high concentrations of black students (Billingham & Hunt, 2016). Gentrification may thus exacerbate levels of segregation as white middle class parents seek the company of their peers outside of their neighbourhood (Candipan, 2019). Family gentrification could thus be hypothesized to be associated with both rising and declining levels of school segregation.

*School choice and segregation*

It has been established that choice generally exacerbates school segregation (Boterman, 2019; Kosunen *et al.*, 2016; Saporito, 2003; Söderström & Uusitalo, 2010). The mechanisms of choice are however not as straightforward as one may assume.
There are different dimensions to the selection process that are related to parental (and children’s) preferences, parental resources, parental choices and eventual school selection. Expressed preferences of parents may or may not result in eventual allocation. In this process implicit and explicit classed, racial and other kinds of bias produce unequal outcomes. Some of this bias (in favour of white middle classes) has been well documented (Ball, 2003; Bourdieu & Passeron, 1990; Reay et al., 2011; Reay & Ball, 1997). This has led to the conclusion that non-whites and working class kids are playing a middle class game (which they cannot win) (Ball, 2003). Also, a score of studies about school choice strategies (Ball, 2003; Boterman, 2013; Butler & Hamnett, 2011; Ramos Lobato & Groos, 2019) finds that sending children to schools outside their own residential area is a strategy that is often associated with ‘choosing’ and ‘strategizing’ middle class parents. So in addition to the more structural factors favouring middle class habitus in the educational system as a whole, school choice exacerbates this inequality of opportunity because middle class parents actively choose the best school, while other parents are supposedly less invested in schooling and just settle for the local state school. However, the actual preferences for high quality education may not be so differentiated across social class after all (Burgess et al., 2015). Desiring high quality education is not necessarily part of any specific middle class habitus, it is something most parents want for their children. It is suggested that a more crucial factor is the range of school options parents realistically have available to them (Wilson & Bridge, 2019). This range of options is related to parents’ institutional resources, economic resources and also, crucially, spatial resources (Wilson & Bridge, 2019; Burgess et al., 2011). A key factor therefore is the role of the neighbourhood in admission policies. If neighbourhood is central in determining where children can attend schools, the structure of housing market and residential segregation are more important than in contexts where there are multiple options, both within and outside of the neighbourhood.

In response to the inequalities in access to education, municipal and other state authorities may develop programmes that give parents of school-going children the opportunity to choose schools that would otherwise be difficult to attend. The key objective of many of those programme’s is increasing parental choice. Voucher programmes in the US, choice-based programmes in the UK are all mainly aimed at creating greater possibilities for parents (Saporito, 2003), often of lower social classes and ethnic minorities, to choose a school thereby supposedly assuaging existing social inequalities (Burgess et al., 2015; Renzulli & Evans, 2005). Lifting some of the financial and spatial constraints is isolation of the ways in which the whole social-spatial system of education works, has not been found to be very effective. As Wilson & Bridge (2019) demonstrate, allocation mechanisms for schools are contingent on the local interplay of admission policies, school choice dynamics and its geography. In other words: understanding how school segregation is produced we need to understand how differently positioned parents navigate the entire educational landscape.

The educational landscape of gentrifying Amsterdam

Gentrification and residential segregation in Amsterdam

In the past decades Amsterdam has been gentrifying rapidly (Boterman & Van Gent, 2014; Hochstenbach & Van Gent, 2020; Savini et al., 2016). Notwithstanding, from
an international perspective, also due to a large social rental sector, income segrega-
tion is still relatively modest (Hochstenbach & Van Gent, 2020). Furthermore, about
half of the total population has a non-native Dutch background making the city also
ethnically highly diverse (Savini et al., 2016). Paradoxically perhaps, gentrification
processes are currently even increasing levels of ethnic and social mix in many parts
of the city (Hochstenbach & Van Gent, 2020). Yet, the combination of a large social
sector and a gentrifying private sector increasingly polarises the social structure of the
city (Musterd et al., 2020). In many neighbourhoods differences between social ten-
ants, often with lower incomes and relatively often of non-Dutch descent, and middle
class homeowners or tenants in the liberalized rental sector can be rather stark. This
is even more the case for family households than for the general population. Larger
family homes are scarce and consequently increasingly unaffordable, unless if within
the regulated rental sector. Children are therefore much more segregated than the
general population (Boterman, 2020), a phenomenon also observed in other urban contexts (Bråmå & Andersson, 2020; Owens, 2016, 2020). The residential segregation
of families between middle class children in ownership and low-income social tenants
also strongly intersects with racialized categories, making race-class relations crucial
for understanding school-choice dynamics (Boterman, 2013, 2019).

School segregation in Amsterdam
The substantial levels of residential segregation of children are exceeded by even
higher levels of school segregation. A recent overview study of school segregation in
Dutch cities (Inspectorate of Education, 2018) has demonstrated that higher levels of
school segregation than residential imbalances is a nation-wide phenomenon in the
Netherlands. The Hague is the most segregated city, but also Amsterdam ranks
among the strongest segregated school contexts, both in terms of migration back-
ground and social class (see also Boterman, 2018; Ladd et al., 2011).

Most studies of school segregation in the Netherlands, suggest free parental choice
is the key factor (Ladd et al., 2011; S. Karsten et al., 2003, 2006). The Dutch schooling
system is indeed characterized by a high degree of freedom to express the preference
for any school. Schools do not impose any serious financial barriers and in principal
accept all children. Nonetheless, schools have specific religious, demographic, and
pedagogical profiles that appeal to specific groups of parents, who differ in terms of
their social class and ethnic backgrounds (S. Karsten et al., 2003). The highly diverse
landscape and the presence of for instance Islamic, Jewish and Hindu schools is also
mentioned as significant factors in school segregation (Boterman, 2019). Parents
search for a ‘match between home and school’, that they find in the curriculum and
denomination offered at a particular school (S. Karsten et al., 2003). Moreover,
parents are also selecting schools based on the perceived quality of education. In the
Dutch school context however few metrics are available to parents to assess the qual-
ity of a school. Only standardized test scores are publically easily accessible and are
hence used to gauge the quality of schools. Despite the fact that average test scores,
uncorrected for any population characteristic, mainly tend to reflect the share of chil-
dren with parents with financial and cultural means to support children in extra-
school learning, they do establish a hierarchy of school popularity. In sum, the
literature generally considers the highly varied educational landscape and parental school choice the most important factors for the high levels of school segregation. However, most primary aged children attend a school in the close vicinity of their home. In a recent study it is concluded that if children were to attend the closest school to their home, segregation in schools would remain at about 70–80% of the observed levels (Boterman, 2019). Despite freedom of school choice, also in the Dutch context, where one lives strongly determines which (primary) school one attends. Furthermore, geography also plays into the distribution of schools across neighbourhoods. Schools with ‘good’ or ‘bad’ reputation and with specific pedagogical/religious profiles have a distinct, historically grown geography, which makes the range of options for parents not the same. Furthermore, geographies of education also evolve according to (expected) demand from parents. Newly founded Islamic schools for instance are almost exclusive found in neighbourhoods with high concentrations of Muslim families, in the bigger cities (Driessen & Merry, 2006). Correspondingly, reputedly ‘good schools’ (based on average test scores and enrolment at high academic tracks at secondary schools) are often located in middle class neighbourhoods. When neighbourhoods gentrify, this may also affect the reputation of some particular local schools, which may then kick start a feedback loop of gentrification of these schools too. It is especially those schools that due to a combination of improving reputation and a changing social and ethnic composition may enjoy greater popularity and hence change the school choice dynamic.

Amsterdam school choice and enrolment

The dynamics of school choice, including preferences, the availability of certain options for parents, and the resources they command to realize their preferences are spatially contingent (Wilson & Bridge, 2019). In the highly segregated school landscape of Amsterdam school choice is a complex interplay of residential patterns, geography of schools, enrolment policies and school choice behaviour of different groups of parents. First, in Amsterdam no city-wide enrolment procedure was in place during the time of this research.1 In Amsterdam parents could choose any school within and even outside of the municipality. Schools/school boards autonomously decided on their admission policies. Generally, whether children were admitted to the school depend on the available capacity of the preferred school. Given the strong increase in numbers of children between 2008 and 2015 some schools had to decline prospective pupils due to over-demand. In case of lack of supply, schools admitted children according to priority rules of which have older siblings in school is the most important. A second criterion is related to the postal code of the home address of the prospective pupil. While not a very common practice, for some schools de-facto catchment areas existed.

Second, in Amsterdam most children have several schools to choose from, also within their own neighbourhood. In addition, parents also often send their children to schools outside of their own residential area, especially in search of specific religious and pedagogical principles, but also school composition. Reports from Amsterdam’s statistical office (Cohen et al., 2016, 2017) reveal that at individual level
both migration background and educational attainment of parents impacts on the distance parents are travelling for schools. Interestingly, the same reports also indicate that the distance travelled depends on the interactions of residential areas and individual characteristics. Figure 1 is taken from this report as it very clearly illustrates that substantial numbers of highly educated parents send their children elsewhere, especially from areas in which they do not constitute a numerical majority.

This map shows that highly educated parents relatively often choose schools outside of their early gentrifying, socially mixed neighbourhood. It also suggests they travel shorter distances when they live in socially homogenous areas. This is in line with qualitative studies that have suggested that parents develop different strategies for school choice depending on their economic and cultural resources and their residential and local school landscape (Boterman, 2013; Butler & Hamnett, 2012). This article investigates the neighbourhood-school dynamic in greater detail for groups of parents with different intersections of educational attainment and migration backgrounds.

Data and methods

To investigate the relationships between the demographic changes due to family gentrification and school choice and segregation, this article draws on register data from the system of Dutch Statistical Social Databases (SSD), containing individual-level
geocoded data of the entire Dutch population. The SSD consists of a large number of separate databases that can be interlinked utilizing an encrypted identifier for individuals. These individuals can also be attributed to also anonymized institutions such as schools and businesses, and also to (non-anonymized) spatial units, allowing for mapping and other spatial analyses.

For the analyses of this article, the entire population of pupils at Amsterdam primary schools for the years 2008 and 2015 was selected, who were then coupled with their (legal) carers/parents. The database was enriched with data on household income, parental educational attainment, migration background, and test scores of individual pupils for both years separately. This information was aggregated at both the neighbourhood and school level, creating a multi-level dataset with individual and school and neighbourhood data. The final dataset contains 55,896 pupils in 2008 and 61,936 pupils in 2015.

**Individual characteristics**

Pupils are divided into six groups that are combinations of migration background and educational attainment of parents. Highest level of educational attainment of their parents is divided into three groups: (1) lower than vocational; (2) vocational and (3) higher education. Migration background is defined by the countries of birth of the parents. I classified parents into two groups (1) parents either born in the Netherlands or Western countries or (2) in non-Western countries (of which Morocco, Turkey and Surinam account for the majority of these backgrounds).

**School and neighbourhood characteristics**

Neighbourhoods here are defined as 4-digit postal code areas. These areas are loosely used as school districts and remain stable between the two years compared. Residential neighbourhoods are divided into four categories based on the share of the children with highly educated parents (Bachelor’s degree and higher) (less than 25%, 25–50%, 50–75% and more than 75%).

Schools are defined by a combination of their BRIN-number and the location of the school. Schools are also classified according to their denomination (Public, Protestant; Catholic; Particular pedagogies; e.g. Waldorf/Steiner, Montessori); Smaller faith-based schools (Islamic, Hindu); and Other. For schools based on the school population of previous years the share of children of highly educated parents is calculated based on the same classification as for neighbourhoods.

**Analysis**

First, the article analyses the relationship between the composition of the residential neighbourhood and the composition of schools, based on educational level of parents. Second, the article describes the types of schools pupils with different backgrounds and in different residential areas attend. Here, schools are classified according to the share of final year students that are tracked into the highest levels of secondary
school (general higher education (HAVO) and preparatory academic education (VWO). Although it is recognized that parents select schools also on other criteria, test scores and population composition are among the key determinants of school choice, also in the Amsterdam context. The schools are classified into less than 25% higher tracks; 25–50%; 50–75%; and more than 75%.

The final part of the analysis draws on the same individual level data for both 2008 and 2015 to assess the individual factors that affect school, conditional on the share of highly educated in the neighbourhood and denomination of the school. The first model estimates the difference in the share of highly educated in the neighbourhood and in the school, introducing control variables of (1) individual characteristics (gender, migration background, household income (based on national quartiles), educational attainment; (2) school characteristics (the denomination) and; (3) the share of children of highly educated parents in the four-digit postal code. I use a mixed level generalized linear model (MEGLM) in which the share of highly educated in the neighbourhood is allowed to vary also for the random effect. The second model estimates the share of HAVO/VWO advice at the school attended by the children also using MEGLM and the same control variables. For the sake of intuitive interpretation I have calculated predicted probability using margins post-estimate commands and where not feasible due to the mixed effect structure of the model, I have manually calculated the predicted probabilities for the main independent variables: educational attainment level of parents and migration background.

**The effect of family gentrification on the educational landscape**

Suburbanization of mainly middle and upper middle income families in the 70’s and 80’s had a profound effect on the number of school-aged children. In 1985 only 45,072 (6.7%) children attended regular primary school, compared to 104,899 (12.1%) in 1964. Since the mid-eighties the number of young children started to grow again, although it would never reach the numbers from the post-war decades. Initially this upsurge was primarily due to higher fertility among lower educated immigrants, but since the mid-nineties particularly higher educated parents contributed to this growth (Boterman et al., 2010). Figure 2 reveals the fast population change of the Amsterdam school population (2008–2015). It becomes clear that the growth of highly educated, native-Dutch and people with a migration background in Western countries has been substantial, while the number of children with lower educated parents and a background in non-Western countries is in decline (Figure 2: Total bars). Figure 2 also shows that that the increase in highly educated children is spatially variegated across different types of neighbourhoods. The biggest changes occurred in areas that have a majority highly educated parents. In areas that have more than 75% children of highly educated parents, the number even more than doubled (3700 to 8200). Correspondingly, the share of children with lower educated parents and a non-Western background dropped most dramatically in areas where they were most concentrated. This presents a complicated image of desegregation of lower educated but also a simultaneous disaffiliation in terms of the growing concentration of highly educated, mostly white, in increasingly homogeneous areas.
The effect of this family gentrification is reflected in the upward trend of school test scores and, correspondingly, more children tracked into higher levels of education (Merry & Boterman, 2020). Although clearly test scores are related to cognitive abilities as well as quality of teachers and school administrations, the class background of parents is a crucial factor for educational performance of children. It is evident that the rise in number so highly educated parents changes the educational landscape of the city. How local school choice dynamics play out is however always contingent on the neighbourhood context. The next section will demonstrate how the school-neighbourhood dynamics changed as a result of the population change associated with gentrification.

**Neighbourhood-school dynamics**

This section quantitatively assesses the different residential-school mobility of children with different backgrounds. It starts by describing the patterns of neighbourhood to school mobility.

Figure 3(a) maps the share of children that attend a school in the own neighbourhood and Figure 3(b) maps the percent point difference between the attendance of
neighbourhood schools of children of highly and lower educated parents. It becomes clear that in most centrally located neighbourhoods the share of children of highly educated parents is substantially larger than the share of children of lower educated parents. Most post-war areas in the periphery of West and South East show the inverse image.

To analyze how this is correlated with the neighbourhood composition, Figure 4 presents the nexus of residential neighbourhood composition and the composition of the school. It reveals that there are substantial differences in school attendance between the six identified groups. Even when children live in the same (type of) neighbourhood, they do not attend the same schools. For instance in areas with a minority of highly educated, almost half of the children of highly educated Western - often white - parents attend schools with a majority highly educated, compared to less than 10% of the children of lower educated parents, who in vast majorities attend schools with small minorities of highly educated. There is also a substantial contrast between different migration backgrounds. Correspondingly, in homogeneously highly-educated neighbourhoods, parents that reflect the neighbourhood in terms of their own educational attainment, in vast numbers attend schools in those areas (about 80%) or otherwise attend schools in slightly more mixed areas (15–17%). The more disadvantaged children of non-Western descent, who are living in very privileged areas, also often attend middle class schools in such areas. Nonetheless substantial numbers of children (almost 40%) attend a school with a majorities of lower

Figure 4. Share of children in different categories of schools in 2015, by different groups of parents (education/migration background) (Source: SSD; own calculations).

Figure 3. (a) Share of children in Amsterdam attending a school in their own neighbourhood (Source: SSD; own calculations). (b) Difference of share of children of highly educated and lower educated parents children who are attending a school in their own neighbourhood. (Source: SSD; own calculations).
educated parents. Among the lower educated Western - often ‘white’ - parents the share that attends a privileged school is much higher (more than 60%). This is even higher than non-Western vocationally trained parents. Among the highly educated in these privileged areas, migration background plays a much smaller role.

Also in the more mixed areas contrasts are clear: children with lower educated parents go to schools where there is are lower shares of highly educated and for children of highly educated parents this is the converse. These findings point to a tendency to sort into spaces that are similar to oneself, or class homogamy as it has been referred to (Musterd et al., 2016). It appears that there are also clear intersections of class and migration background: also within educational categories migration background correlates with school choice (enrolment).

### School choice and quality of schools

When the types of schools children living in different residential neighbourhoods attend is analyzed, a similar picture emerges. Figure 5 demonstrates the share of pupils of the six groups of parents that attends schools, classified based on the share of HAVO-VWO advice), split across residential neighbourhood. For all neighbourhood types children of highly educated parents more frequently attend high scoring schools where a large share of the pupils will receive a high school advice based on their test score. More interestingly, there are large differences between the highly educated Western and the lower educated children with a non-Western migration background in terms of what types of schools they attend when they live in the same types of neighbourhood. As Figure 6 demonstrates, highly educated Western parents who live in areas where they do not constitute a majority, send their children in vast numbers to high performing schools: 40% of them have their children in schools with at
least 50% HAVO-VWO advice, compared to a mere 4% of the children with lower educated non-Western parents. The massive disaffiliation of -mostly ‘white’- highly educated parents is not matched by other highly educated parents. Perhaps the most striking fact is presented by the neighbourhoods where children of highly and lower educated parents are quite equally represented. In areas with 25–50% highly educated, the vast majority (about 65%) of middle class Western parents send their kids to a school where at least 50% received the highest school advices, whereas for the vocationally trained parents in the same neighbourhoods this is only about a third and only 18% for lower educated non-Western parents. What is also very surprising is that when children of lower educated non-native parents live in a homogenously middle class area where many of the high scoring schools are located, their children still often attend a school with much lower scores (about 30%) which is often not in the same neighbourhood (not shown).

Figure 6. Predicted probabilities for the difference in highly educated in neighbourhood and school for the main independent variables: parental educational attainment and migration background.
**Statistical analyses: Model 1 neighbourhood-school dynamics**

To assess to what extent the difference between school composition and neighbourhood composition can be explained by individual and neighbourhood characteristics and also how this changed over time, this final empirical section presents the outcomes of two different statistical models for 2008 and 2015. First the outcomes of the mixed level model that estimated the difference between the share children of highly educated parents in the neighbourhood and the school are presented. Table 1 summarizes the estimated coefficients of the mixed effect model for 2015 (for 2008 is also run but not displayed here). It shows that high income and highly educated parents, especially with Western backgrounds, are indeed much more likely to attend schools with higher shares of highly educated than their neighbourhood. Also school profile has a distinct significant effect.

To present this more intuitively, Figure 6 shows the predicted probabilities for the difference in highly educated in neighbourhood and school for the main independent variables: parental educational attainment and migration background. The figure reveals that the estimated difference of the share of highly educated in the neighbourhood and school differs strongly between different groups of parents. Children of lower educated parents with a non-Western background on average attend schools that have fewer highly educated children than in their neighbourhood. In areas that are dominated by highly educated the difference is estimated to be as high as thirty percent points. For children of highly educated parents with a Western background the image is very different. In 2015, these children attend schools that are generally more middle class than their neighbourhood. Only when neighbourhoods have a majority of about 65% highly educated, the difference is flipped. In strong concentrations of middle class parents, the share of highly educated in the neighbourhood is higher than that in schools, also for middle class ‘white’ kids.

For the 2 years analyzed some differences can be observed: differences in 2015 are on average slightly less stark (both the level and the steepness of the lines are somewhat lower). Also, the differences between the six groups are smaller in 2015. By and large, however, the patterns as described above remained fairly similar and still point to a strong neighbourhood-school nexus in school choice dynamics.

**Statistical analyses: Model 2: School quality**

The final model estimates the average share of children that received a HAVO or VWO advice at a school. Table 1 summarizes the estimated coefficients of the mixed effect model for the share of highest academic tracks in schools in 2015 (model 2). Although academic tracking is strongly correlated with neighbourhood composition and school characteristics, still substantial differences between children of different backgrounds can be observed. To facilitate easy interpretation once again the predicted probabilities based on this model are presented in Figure 7. Here it is shown that on average children with highly educated parents with a Dutch or other Western background are estimated to be in schools with about 60% HAVO/VWO advice. This is substantially and significantly higher than the 43/44% for non-Western, lower SES kids. It seems, however, that between 2008 and 2015 the differences between groups,
**Table 1.** Estimations of MEGLM models for the difference in the share of highly educated in the residential postal code and school (model 1) and the average share of advice for higher tracks (HAVO/VWO) of secondary education (model 2).

<table>
<thead>
<tr>
<th>Model 1: difference share highly educated in postal code and school</th>
<th>Model 2: share of highest academic track advice in school</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient</td>
<td>$p &gt; z$</td>
</tr>
<tr>
<td>----------------------------------</td>
<td>--------</td>
</tr>
<tr>
<td>Lower educated (Vocational = ref)</td>
<td>2.9</td>
</tr>
<tr>
<td>Highly educated</td>
<td>-13.6</td>
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<tr>
<td>Unknown</td>
<td>0.5</td>
</tr>
<tr>
<td>Female (Male = ref)</td>
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<tr>
<td>Non-Western (Western = ref)</td>
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<tr>
<td>Non-Western*lower educated</td>
<td>-1.0</td>
</tr>
<tr>
<td>Non-Western*highly educated</td>
<td>1.9</td>
</tr>
<tr>
<td>Non-Western*unknown</td>
<td>3.3</td>
</tr>
<tr>
<td>Second quartile (first quartile = ref)</td>
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<td>Protestant (ref = Public)</td>
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<tr>
<td>Catholic</td>
<td>1.9</td>
</tr>
<tr>
<td>General particular education (e.g. Montessori; Steiner)</td>
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</tr>
<tr>
<td>Smaller religious schools (e.g. Islamic, Hindu)</td>
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</tr>
<tr>
<td>Other types</td>
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</tr>
<tr>
<td>Share highly educated in postcode</td>
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</tr>
<tr>
<td>School in own neighbourhood</td>
<td>-</td>
</tr>
<tr>
<td>Lower educated*Share highly educated in postcode</td>
<td>0.1</td>
</tr>
<tr>
<td>Highly educated*Share highly educated in postcode</td>
<td>0.1</td>
</tr>
<tr>
<td>Unknown*Share highly educated in postcode</td>
<td>0.0</td>
</tr>
<tr>
<td>Constant</td>
<td>-13.9</td>
</tr>
<tr>
<td>Postcode: var (Share highly educated in postcode)</td>
<td>0</td>
</tr>
<tr>
<td>Postcode: var (constant)</td>
<td>18.4</td>
</tr>
<tr>
<td>var(Residual)</td>
<td>289.6</td>
</tr>
</tbody>
</table>
especially those across migration background, have lessened: especially children with non-Western backgrounds are estimated to have higher shares of HAVO/VWO advice in their school. It is important to stress however, that this is a characteristic of the school, intended here as a proxy for how parents may perceive school quality. It does not say anything about whether at the individual level children are also more likely to obtain a high academic school advice.

**Discussion**

The rise of middle class families in the city, associated with gentrification (L. Karsten, 2003; Lilius, 2019), causes a transformation in the school population of the city as a whole but manifests itself most clearly in specific neighbourhoods. The geography of this family gentrification ties into the geography of education in Amsterdam in ways that are highly complex. The complexity is related to the specific school choice patterns of different groups of parents, including highly educated gentrifiers. Moreover, it is also highly contingent on the residential-school dynamics depending on both neighbourhood, school and household characteristics. This article has revealed some of this complexity, by demonstrating that different groups of parents have their children in different types of schools even if they live in the same neighbourhoods. Highly educated, often ‘white’, parents not only have a much bigger chance of living in high status areas and having kids go to school there, but they also manage to having their kids in higher SES and high performing schools if they live elsewhere. While unequal resources and residential patterns are found to be very important, different groups of parents also make different choices that -at a system level- lead to school segregation. Several qualitative studies (Boterman, 2013; Bridge, 2006; Butler & Hamnett, 2012) suggested which mechanisms may be responsible for explaining the homogeneity of

![Figure 7. Predicted mean of share of advice for highest academic tracks at secondary education, by educational attainment and migration background.](image-url)
schools for this group. The image emerging from this study, however, is more complex. Lower educated parents, particularly of non-Western descent, also have their kids in different schools than middle class parents, even if they live in predominantly middle class neighbourhoods. Whether this is based on different preferences or more related to social and institutional exclusion is unclear at present. What is clear, however, is that the high levels of school segregation in Amsterdam are not exclusively the result of middle class parents ‘opting out’ of neighbourhood schools, although this is clearly an important explanation (cf. Candipan, 2019). The school segregation patterns are the result of relational dynamics in which residential dimensions, choice and the geography of schools are all relevant explanations.

The key question of this article is how family gentrification affects the dynamics of school choice and consequently mechanisms of segregation in Amsterdam. It seems that both hypotheses formulated at the beginning of this article can be – partly – confirmed. First, it seems that the increase in children with high-income and highly educated parents changes demands for particular schools and also in specific areas. Also, the changing demographics in gentrification areas affect the composition of neighbourhood schools thereby boosting their test scores and making them more attractive for highly educated groups. Family gentrification thus changes the educational landscape, which in turn affects patterns of school choice. It seems that the growth of highly educated groups in parts of the city where they used to be underrepresented leads to desegregation of schools. The over-demand for popular schools may force mainly middle class parents to settle for second choice schools both within and outside of their neighbourhood, thereby sometimes ‘gentrifying’ schools that have low levels of middle class and ‘white’ children. This spill-over effect thus indeed has a mixing effect on some school populations and causes the social segregation levels, measured as an imbalance of the distribution of pupils across schools in the city to drop (Boterman, 2019). This partly confirms findings from other studies who also observed desegregation in the context of finding a critical mass (Posey-Maddox et al., 2016; Vowden, 2012); but also contradicts other studies on gentrification and school choice pointing to avoidance of local public schools (Candipan, 2019; Noreisch, 2007). The current desegregation may, however, be a temporary phenomenon. As the gentrification of central Amsterdam continues to intensify - as it currently does - mixed areas and mixed schools will tip over to more homogenously affluent and highly educated thereby increasing segregation once more. Nonetheless, as it stands now the recent waves of gentrification seem to have reduced school segregation to some degree.

Interestingly, the second hypothesis of increasing disaffiliation the middle classes could also be confirmed. This is mainly a matter of absolute numbers. While middle class parents are increasingly represented in schools without a majority middle class, in terms of real numbers there are substantially more children going to school in homogenously middle class schools. This is the direct result of the sheer numbers of children of high SES and Western backgrounds attending Amsterdam schools. As has been demonstrated elsewhere (Boterman, 2018) the isolation index of highly educated indeed increased substantially. From this perspective, segregation of middle classes is increasing, due to a growing exposure to their ‘own group’ in schools and neighbourhoods. Also the fact that the vast majority of highly educated (often white) parents chooses a school where the composition is typically more middle class than their own
neighbourhood points to processes of disaffiliation and selective belonging, albeit that this discrepancy is decreasing (Andreotti et al., 2013; Atkinson, 2006; Watt, 2009).

Finally, this article has revealed that school selection is differentiated at the intersections of ethnicity and class. While much of the school segregation debate focuses on race or ethnicity, it appears that both class and ethnicity both play a role in school choice dynamics. These dynamics are associated with different preferences and opportunities among parents. The educational landscape is shaped by local circumstances and outcomes of school selection processes are both relational and spatially and historically contingent (Bridge & Wilson 2019). The population composition of a school has different meanings for different parents depending on their social and ethnic positionality. This article demonstrates that even when opportunities are (or at least appear) similar, children with different social and ethnic backgrounds attend different schools (Burgess et al., 2011). Tackling school segregation is a much more complex challenge than expanding or limiting parental choice. The Dutch context demonstrates that freedom of school choice and limited institutional barriers for parents to choose high performing schools does not lead to low levels of segregation. What does seem to have an effect, however, is neighbourhood desegregation, not for the population as a whole, but of the school-aged population.

Notes
1. The school boards and municipality agreed to centralize admissions to primary schools for new cohorts of children from the autumn of 2015. To do this parents can list up to eight preferred schools on which they are prioritized based on their home address. Since the first cohort of late 2015 on average between 95%-99% of all pupils are admitted to schools in their top 3 (BBO, 2018).
2. BRIN number is the official registration number of schools receiving State funding (which almost all primary schools receive).
3. Western is defined in a rather odd way by Dutch official statistics as including Europe, US, Australia, Canada, Japan and Indonesia (former Dutch colony of Dutch East Indies). Here Western and native Dutch are taken together and labelled ‘Western’.

Disclosure statement
No potential conflict of interest was reported by the authors.

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