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Correlates of children's travel to school in Johannesburg-Soweto—Evidence from the Birth to Twenty Plus (Bt20 +) study, South Africa

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ABSTRACT

Prior work on data obtained from the urban Johannesburg-Soweto based *Birth to Twenty Plus* (Bt20 +) cohort has documented extensive levels of travel to school in the early post-*apartheid* era (1997–2003), with fewer than 20% of children attending the age-appropriate school closest to their home (de Kadt et al., 2014). These extremely high levels of schooling mobility impose costs on children and families, as well as the educational system more broadly, and have contributed to the evolution of contemporary enrolment patterns. This paper analyses the relationship between travel to school and potentially related variables at the individual, family and community level. Our analysis indicates that Black children, children attending higher quality schools, and those living in relatively poor areas were most likely to travel to school. However, while travel to school has a strong and positive univariate relationship with both maternal education and family socio-economic status (SES), this fades out in a multivariate analysis. Our findings highlight the significant costs incurred in the pursuit of high quality education by many Black children and families, as well as those living in poorer areas, in the early post-*apartheid* era. This is despite post-*apartheid* educational policy with an explicit aim of redress. The paper contributes to understanding the challenges of *apartheid's* inequitable geographical legacy in ensuring equitable access to high quality education for all in South Africa, as well as to the growing literatures on the geography of education and school choice in low and middle income countries.

1. Introduction

The geographical location of schools within, and beyond, communities and neighbourhoods is one of the core strands of the growing literature on the geography of education (Collins and Coleman, 2008; Holloway and Jöns, 2012; Pini et al., 2017). Much of this literature has focused on high-income countries (Jarvis and Alvanides, 2008), although low and middle income countries are receiving growing attention. With good reason, much of the work touching on geographical aspects of schooling in these countries remains focussed on issues of access (Burde and Linden, 2013; Holloway et al., 2010; J-PAL, 2017; Porter et al., 2017). However, there is growing recognition that (particularly in urban areas) enrolment decisions, and by consequence distances travelled to school, are also shaped by the preferences of families and children, together with their economic and social resources (Holloway and Jöns, 2012; Holloway et al., 2010; Zoch, 2017; Zuilkowski et al., 2018). Although this trend has been clearly demonstrated for urban South Africa (Bell and McKay, 2011; Hill, 2016; Hunter, 2010, 2016a; 2017; Machard and McKay, 2015; McKay, 2015; Msila, 2005, 2009; Ndimande, 2016), the interrelationship between geographical proximity, school preference and socio-economic resources has been under-researched.

This paper uses population level data, collected from a dense urban area in South Africa's Gauteng province in the early post-*apartheid* era, to explore predictors of the highly variable distances travelled to school by primary school children. Previous work on this cohort documented extensive travel to school, with fewer than 20% of children attending the age-appropriate school closest to their home (de Kadt et al., 2014). This analysis also identified two main patterns of travel to school: children travelling significant distances to attend an advantaged school far from their home, and children travelling far shorter distances to attend a local school other than the one closest to their home. These

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patterns relate to the legacies of *apartheid* in the South African schooling system, as well as in the geography of its cities.

Using data for 1428 primary school children enrolled in the Birth to Twenty Plus (Bt20+) cohort study, this paper documents the relationship between variables at the individual, family, and community levels, and different patterns and extents of travel to school. We also explore how this travel may relate to school choice – the intentional selection of a particular school by families. We find that Black children, those living in poorer (though not the poorest) areas, and those attending more advantaged schools, were significantly more likely to engage in attend schools other than those closest to their homes. These results provide strong evidence that in the early post-*apartheid* period, *apartheid's* geographical legacy resulted in Black children, and those living in less affluent areas, incurring significantly higher costs in the pursuit of high quality education, even while they were least equipped to manage these costs. This is despite, and potentially partly a result of, the considerable efforts during this period to equalise access to high quality education, and provide redress within the educational system for inequalities of the past (Fiske and Ladd, 2004; Pampallis, 2003; Southall, 2016; Woolman and Fleisch, 2006). With little reason to believe that these patterns have shifted strongly in more recent years, these findings speak to the burden that *apartheid's* legacy continues to place on Black children, and those living in poorer areas (de Kadt et al., 2018; Hill, 2016; Moses et al., 2017; Zoch, 2017). This has serious implications for efforts to transform both South Africa's educational system, and its economy as a whole – the ineffectual nature of which are increasingly the subject of social protest (for recent instances, see for example Postman, 2018; Timeslive, 2018; Ngubane, 2018; BBC, 2016).

Our results also strengthen the literature on school choice in urban, post-*apartheid* South Africa, adding further support and nuance for the long-standing contention that school choice in South Africa is fairly widespread and multi-dimensional (Hoadly, 1999; Machard and McKay, 2015; Msila, 2009), and must be conceptualised more broadly than only lengthy commutes to historically White schools (see for example Ndimande, 2016). Finally, by further deepening our understanding of who travels to attend which school, the paper speaks to discussions around what South African families try to achieve for their children and what school communities look like – and the challenges that this poses to social transformation (Hunter, 2016a).

1.1. The geographical legacy of apartheid for education in South Africa

In post-*apartheid* South Africa, the interface between the geographical legacy of *apartheid* and post-*apartheid* educational policies have strongly shaped the geography of education. Apartheid policy reserved central and suburban areas for White residents only, and provided these areas with well-resourced, and generally well performing, public schools. By contrast, the Black population was forced into densely populated outlying areas, termed townships, served primarily by poorly resourced schools offering an intentionally lower quality of education (Fiske and Ladd, 2004; Southall, 2016). Notwithstanding enormous governmental efforts towards educational equity in the post-*apartheid* era, the differentiation of public education in suburban and township areas persists. Fig. 1 illustrates the persistence of these patterns in Gauteng, using school performance data from 2015 (Hamann, 2016).

Overall, children attending suburban schools continue to outperform their peers at township schools (Coetzee, 2014; Hill, 2017; von Fintel, 2015; Zoch, 2017) - despite the challenges faced by Black children in culturally unwelcoming, and sometimes overtly hostile, environments (Hunter, 2016a, b; Ndimande, 2016; Pather, 2016). The public narrative that historically White schools provide higher quality education and more opportunities to children than those based in the townships has been both strong and persistent throughout the post-*apartheid* era, and continues to date[1] (Hunter, 2016a; Msila, 2005; Machard and McKay, 2015; Ndimande, 2016). This motivates families living in township areas to incur significant costs to send their children to suburban schools. Access to these historically advantaged schools is not only in the hands of parents, however – schools have made use of multiple strategies to control enrolment, and preserve the class, culture and ethos of the school, selecting children on the basis of family attributes as well as academic and sporting performance (Hunter, 2010, 2016a).

Even within township areas, there are significant variations between schools, both in terms of performance (Hamann, 2016), as well as perceived quality (Msila, 2009; Hoadly, 1999; Ntombela, 2013; Passmark, 2018). Within disadvantaged areas, schools with better reputations tend to charge slightly higher fees and attract slightly more advantaged learners (Fiske and Ladd, 2004; Msila, 2009; Ntombela, 2013). As with historically advantaged schools, stronger township schools are also not merely passive recipients of children – there is also evidence that these schools (and even, in some instances weaker schools) engage in a process of selection, enrolling children who they believe will further strengthen the school (Hunter, 2010; Hoadly, 1999).

1.2. Policies shaping school enrolment patterns in post-apartheid South Africa

Post-*apartheid* education policy, while explicitly and intentionally focussed on redressing historical wrongs by equalising the public education system, has also, unintentionally, contributed to the persistence of quality variations between schools (Moseneke, 2016; Southall, 2016; Woolman & Fleisch 2016). During the period covered by this paper, schooling and school admissions, were regulated primarily through the National Education Policy Act (NEPA), the South Africa Schools Act (SASA), and the Employment of Educators Act (EEA) (Pampallis, 2003; Maile, 2004; Woolman et al. 2006)[2] . While these policies were structured around the assumption that children would attend the school closest to their home, they did not prevent children from attending other schools. As described in Woolman et al. (2006), policies for school financing and allocation of teaching staff incentivised schools to enrol as many children as possible – and particularly children able to pay fees. Simultaneously, schools, through their school governing bodies, were largely able to design and enforce their own admissions policies, and by extension maintain some degree of control over which learners they enrolled[3] . Policy therefore unintentionally encouraged competition between schools – allowing *apartheid*-era geographical variation in schooling quality to persist, while also fostering variation between schools within townships. These patterns of variation are core to understanding South African learners' school-related travel.

1.3. Children's travel to school in South Africa

Many South African children report attending school relatively far from home, although figures vary significantly across contexts and data sources (Cosser and du Toit, 2002; de Kadt et al., 2014; Hall, 2018;

[1] More recently, and subsequent to the period of analysis in this paper, the expansion of private schooling has begun to add further complexity to how parents assess schools.

[2] In 2012, Gauteng produced its own admissions regulations (currently under review). National Norms and Standards for schools were introduced in 2008, and updated in 2018. Given the persistence of actual and perceived variations between schools in different areas, and the fact that this variation appears to continue to favour white and more affluent children, these policies, and school admissions in general are highly contested, particularly in Gauteng.

[3] Since 2016, the Gauteng Department of Education has begun to constrain the ability of schools to play this role, through implementation of an online admissions system. However, during the period covered by this paper, School Governing Bodies operated with substantially more independence.

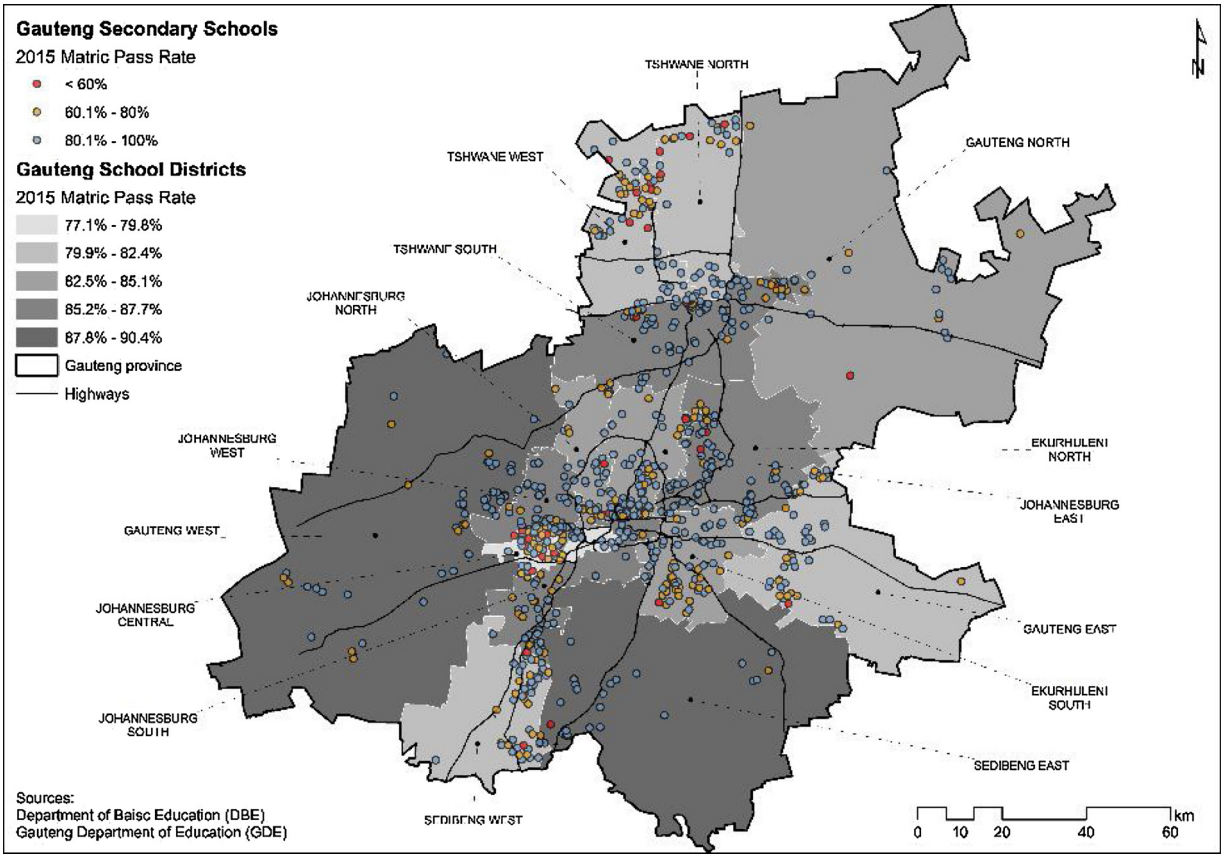

Fig. 1. Geographical distribution of school performance in Gauteng, South Africa (Reproduced with permission from Hamann, 2016).

Nelson Mandela Children's Fund, 2005; Porter, 2017; Sekete and Shilubane, 2001). In rural and outlying areas, this travel is often because schools are far from children's homes – although there has been significant progress in improving proximity over time. In more densely populated urban areas, however, most children live close to a public school. In previous work on the Bt20 + cohort, mean distance to nearest primary school was under 400 m, and no child lived further than 2.8 km from an age-appropriate public school (de Kadt et al., 2014). In such urban areas, children travelling long distances to school is suggestive of an active decision on the part of the family.

The extent of children's travel to school has important implications. Firstly, travel imposes social and material costs on children and families. It is expensive (Machard and McKay, 2015), and in the South African context is often dangerous, regardless of the mode of travel (Porter et al., 2017). Travel often eats into time that both children and parents have for other activities, placing stress on children and family structures, and may interfere with the extent to which children can be fully engaged in the school which they attend. They may struggle to arrive on time, and may not be able to participate fully in extra-curricular activities. In the context of highly unequal performance of schools and the associated long-term implications for labour market outcomes and social mobility (Moses et al., 2017; von Fintel, 2015; Zoch, 2017), parents and children have good reason to accept these costs, and strongly defend their ability to choose to incur them.

Secondly, where children go to school has implications for the functioning of individual schools, as well as the educational system as a whole. South African public school admissions policies in the post-*apartheid* era give priority to children living close to a school. A geographically defined 'school community' is thought to promote integration between a school and the area in which it is based, providing benefits for both. If the link between schools and the areas they are based in are weak, these benefits are unlikely to materialise. Furthermore, to the extent that more engaged, educated or advantaged parents – whose children are typically predisposed to better academic performance – avoid particular, typically poorly-performing schools, this can exacerbate the challenges these schools face, weakening them further.

Understanding who engages in travel – and why – can provide insights into how to mitigate the associated costs, and guidance towards policy interventions which might minimise the challenges that this poses to the educational system. While the strong and extensive qualitative work on this topic in South Africa provides good insight into *why* children travel, it is less able to answer the question of *who* travels. Much of the literature draws on data sampled from particular schools, which means it likely focuses only on certain groups of learners. This paper complements these studies by using population-based data for a large urban area of South Africa to explore variables at the individual, family, community and school levels that influenced the extent of children's travel to school in the early post-*apartheid* period.

1.4. Core research question and aim

We explore variables anticipated to shape family capacity to invest in education, as well as those that might shape both need and motivation for travel to access better education. Consequently, the paper analyses the relationship between a range of child, household and community level variables, and travel to school. We explore these relationships using multiple approaches to the measurement of travel to school, given that different forms of mobility may require different levels or types of capacity and investment (de Kadt et al., 2014).

2. Methods

2.1. The Birth to Twenty Plus cohort study

This paper draws on data from the Birth to Twenty Plus (Bt20+) cohort study, which started in 1989 with pilot studies testing the feasibility of long-term follow-up of children's health and wellbeing (Yach and Cameron, 1991). Pregnant women were identified through public health facilities. They were enrolled in their second or third trimester, and interviewed regarding their health and social history, and current circumstances. Children born between April and June 1990, and resident for at least 6 months in the municipal area of Soweto-Johannesburg (n = 3 273), were enrolled into the birth cohort and have been followed up 17 times between birth and 23 years of age (Richter and Norris, 2004, 2007; Richter et al., 2013). Attrition over two decades has been comparatively low (30%), mostly occurring during infancy and early childhood when young children are frequently taken to rural areas to be cared for by relatives. Approximately 2 300 children and their families remained in contact with the study by late adolescence (Norris et al., 2007). The sample is roughly representative of the demographic parameters of urban South Africa with equal numbers of male (49.79%) and female (50.21%) participants. Assessments across multiple domains have been made during the course of the study, including growth, development, psychological adjustment, physiological functioning, genetics, school performance, and sexual and reproductive health. The Bt20+ research programme, including all rounds of data collection, has received clearance by the Ethics Committee on Human Subjects at the University of the Witwatersrand (M010556).

Soweto is a large township adjacent to Johannesburg in the Gauteng province of South Africa. It extends over 150 square kilometres and is home to more than two million residents, almost all of whom are Black African. Under *apartheid*, Soweto was a dormitory town for Black migrant labourers. In 2002, it became part of the City of Johannesburg. While it has experienced substantial economic development since the end of *apartheid* in 1994, it remains one of the more disadvantaged sections of Johannesburg. The densely populated area has a large number of schools, and children's proximity to school is typically not a problem (de Kadt et al., 2014). However, many of these schools are poorly performing. Over time, several have been closed because of their inability to enrol adequate numbers of learners, while many others remain undersubscribed (Passmark, 2018; Southall, 2016).

2.2. Sources of data

To date, the majority of research on children's travel to school in South Africa has explored the topic either by focusing on particular schools, or by making use of a small sample, typically drawn from a fairly geographically constrained area (examples include Hunter, 2010; Hunter, 2016; Machard and McKay, 2015; Msila, 2005, 2009). A more recent body of work draws on secondary analysis of large datasets to explore aspects of school choice, with a particular focus on learner outcomes, but does not focus explicitly on travel to school (see for example Hill, 2016; Zoch, 2017, and Coetzee, 2014). These studies provide valuable results, illuminating the context, and providing a theoretical and conceptual base for the analysis of broader population-based data.

The Bt20+ dataset, drawn from a large urban population, provides an expanded perspective from which to explore early post-*apartheid* patterns of urban school travel. It provides rich data at different stages of children's schooling, and includes both residential address and school enrolment information, which was not available elsewhere at the time[4] . A clear limitation of this dataset, however, is the fact that it covers only the highly urbanised Johannesburg-Soweto region. Findings cannot be generalised to rural areas of the country, and the appropriateness of generalisation to other urban parts of the country should be carefully considered. With the exception of socio-economic status (SES), variables derived from this dataset could be used as is. An SES score was derived through the use of a standard assets index for both the 1997 and 2003 timepoints, using Principal Components Analysis (PCA). While the additional inclusion of income information would have been ideal, this would have resulted in substantially more missing information.

The Bt20+ data was supplemented by data from the South Africa National Census 2001, and the Gauteng Department of Education. Census 2001 spatial data geography, at the Sub-Place (SP) and Main-Place (MP) levels, combined with socio-economic variables, was used to understand the areas learners were moving between when travelling from home to school. The smaller SP level corresponds with residential suburbs or small but distinct areas of a city or township, while the MP level corresponds roughly to small cities or towns, or large but distinct areas within a large city. Each SP is fully contained within a particular MP.

We generated an SP poverty index by running a PCA on selected Census 2001 data, at the SP (neighbourhood) level, using the first component. Variables included were: percent of the working age population employed; average household income; percent of informal dwellings; percent of adults who had no secondary schooling; percent of the area's population who were Black Africans; and percent of households without access to running water, electricity, hygienic toilets, refuse removals and landline telephones.

Data from the Gauteng Department of Education's 2008 Education Management Information System (EMIS) master list provided the GIS coordinates of schools, as well as school resource levels, for 2604 schools (both public and private). A PCA was run on variables related to actual and perceived school quality (school quintile, school fees, school enrolment, percent Black learners, historical status in the Education Department, and pass rate), and the first two components were retained as an index of school quality.

Analysis focused on the years 1997 and 2003. 1997 was the first time point by which the majority of cohort members were enrolled in primary school, while 2003 was the last time point at which the majority of cohort members were still enrolled in primary school. The study sample was limited to 1428 cohort members who did not change residential address during this time, and who were attending schools within the Gauteng province at both time points. The decision to limit the sample in this way was based on challenges in obtaining geo-coordinates for addresses reported prior to 2003. As we were not able to geocode addresses as reported in 1996, it was not possible to compare home location and school location for children who had moved between 1996 and 2003, when the first geocoded addresses were available. Implications of this decision for sample composition were extensively tested (see de Kadt (2011) and de Kadt et al (2014)). Due to the nature of sample definition, no participants were missing residential address data, although GIS coordinates were not available for 27 cases. School enrolment data for each time point was drawn from the relevant wave of Bt20+ data collection, and school names were linked to the EMIS data. This was possible for 1241 of the 1428 study sample members for 1997, and for 1311 children in 2003. Spatial merges of the coordinates of each child's home and school(s) with Census 2001 data completed the analytical dataset.

[4] More recently, some relevant data can be obtained through the General Household Survey (StatsSA, 2018) and the National Income Dynamics Survey (Brophy et al., 2018), as well as directly through the Department of Basic Education (Hill, 2016). These provide new opportunities for analysis of the contemporary period.

2.3. Measuring children's travel to school

We explore four different approaches to measuring children's travel to school, allowing for the possibility that there may be different patterns of travel, with different predictors (de Kadt et al., 2014). The first measure is straight-line distance from the child's home to the child's school. The second is whether the child attends school in the same SP (suburb or neighbourhood) in which the child lives. The third is whether the child attends school in the same MP (small town, or distinct large area of a city). The fourth is whether the child attends the age-appropriate school closest to his or her home.

2.4. Variables considered

2.4.1. Child level variables

Race, defined as *apartheid's* population group categorisations, is theorized to have a strong, though complex, relationship to educational mobility in South Africa, through its relationship to resources and area of residence (Coetzee, 2014; Fiske et al., 2004; Fiske and Ladd, 2005; Moses et al., 2017). Although, on average, Black children live in more densely populated areas, closer to schools, they may travel further due to quality concerns about these schools.

Gender is included as families may approach the education of girls and boys differently. Historically, in South Africa, male education was prioritised. In the post-*apartheid* era, though, girls remain in formal education longer, and tend to outperform boys (Fleisch and Schindler, 2009; Spaull, 2019). However, safety concerns around girls travelling to school are likely to be greater. This leaves the hypothesised direction of the relationship with mobility unclear.

Age at which a child begins formal schooling may relate to parental commitment to education, with more committed parents enrolling children earlier. However, enrolment in schooling at a young age is also used as a strategy to avoid the cost of child care. Consequently, anticipated direction of the relationship with mobility is again unclear.

Grade repetition in the early years of schooling is prevalent in South Africa and in the Bt20+ cohort (Fleisch and Schindler, 2009). The potential relationship with mobility is complex, as it reflects the interaction between a child's academic ability, schooling environment, and family context. Grade repetition may dis-incentivise investment in a child's education, or may encourage parents to find a different schooling environment for a struggling child. Grade repetition may also reflect an inability to access a well-performing school (Lam and Ardington, 2008).

2.4.2. Household level variables

Maternal education is anticipated to have a positive relationship with mobility. More educated mothers are expected to place a higher premium on education, and to have access to more resources to invest in their children's education.

Maternal marital status at the time of the child's birth provides an indicator of the home environment into which a child is born, with marriage typically associated with more stable, socio-economically advantaged home environments.

Household SES is likely to play a core role in shaping travel to school. Access to resources determines how much a family can afford to spend on travel to school, school fees and related expenses. SES was measured

2.4.3. Community and school level variables

Residential area poverty is expected to influence travel to school because of its strong relationship with the quality (both perceived and actual) of local schools, and consequently with whether investment in travel is likely to be seen as worthwhile.

School quality is expected to have a positive relationship with travel to school, as families are more likely to invest in travel to a well-regarded school.

2.5. Data management and analytical approach

Data was managed using Microsoft Access, geospatial analysis was conducted with gvSIG, and statistical analysis with Stata Standard Edition 11. All analysis considered the four different measures of educational mobility listed previously – straight-line distance from home to school; attending school in a different MP; attending school in a different SP; and whether the child attended the school closest to their home. In general, we used non-parametric procedures, as most variables were not normally distributed.

Bivariate analysis involving only categorical variables was conducted using chi-square tests, or a Fisher exact test when the number in any category dropped below 5. Bivariate analysis involving both categorical and continuous variables was conducted using Mann-Whitney (Wilcoxon rank-sum) or Kruskal-Wallis tests depending on the number of groups being compared, while continuous variables were analysed using Spearman rank correlation.

For multivariate analysis, we used linear regression for continuous outcome variables, and logistic regression analysis for binary outcomes. In the linear regression, we used continuous measures of household SES and area poverty, but to reduce specification errors in the logistic models we used quintiles, with the lowest SES and area poverty quintiles as the base category. The only other non-binary categorical variable used was maternal education, with maternal education of Grade 5 or lower as the base category.

3. Results

3.1. Exploratory bivariate analysis

We first provide descriptive statistics for the cohort, and document the bivariate relationships between the various measures of travel to school, and the child, family, community and school variables considered.

3.1.1. Child level characteristics

Of the 1428 households in the study sample, 80.2% were Black African. Due to the small proportion of children from other race groups, we compare Black African to all other race groups combined. The sample was evenly split by gender. Slightly more than half the children enrolled in school for the first time either early or on time for their age (53%), while 47% enrolled late for their age. More than one third (37.3%) of children repeated one or more grade in primary school.

Table 1 presents the significant results of our exploratory bivariate analysis – for purposes of brevity, variables which did not show a significant relationship to travel are omitted. Black children travelled significantly greater distances to school than children of other race groups in both 1997 and 2003. They were also significantly more likely to attend a school outside their area of residence, and less likely to attend the school closest to their home. While girls travelled slightly further than boys to school in 1997 and 2003, this difference is only statistically significant for 2003 (Wilcoxon rank-sum test, $P = 0.0489$), and can be explained by the larger proportion of girls who had already progressed to secondary school. When the analysis is restricted to children still in primary school, the relationship is no longer significant. There were no gender differences for any other measure of mobility. There was no relationship between age at school enrolment and any measure of mobility. However, children who repeated a grade travelled significantly shorter distances to school, and were less likely to attend schools outside of the SP and MP in which they lived.

3.1.2. Household level characteristics

Just under 14% of mothers had no secondary school education, while 77% had completed some or all secondary schooling. The

Table 1
Summary table of significant bivariate relationships at child, household and community levels.

Variable	Time point	Distance to school	SP (suburb) mobility	MP (area) mobility	Attendance at nearest public school
Individual level					
Race	1997	Wilcoxon rank-sum, P = 0.000 (+ Black)	$\chi^2_{(1)}$ = 28.0354, P = 0.000 (+ Black)	$\chi^2_{(1)}$ = 28.3571, P = 0.000 (+ Black)	$\chi^2_{(1)}$ = 55.3107, P = 0.000 (+ Black)
	2003	Wilcoxon rank-sum, P = 0.000 (+ Black)	$\chi^2_{(1)}$ = 44.8472 P = 0.000 (+ Black)	$\chi^2_{(1)}$ = 59.3700, P = 0.000 (+ Black)	$\chi^2_{(1)}$ = 44.7034 P = 0.000 (+ Black)
Grade repetition 1997–2003	1997	Wilcoxon rank-sum test; P = 0.0000 (-)	$\chi^2_{(1)=}$ 5.1148 P = 0.024 (-)	$\chi^2_{(1)=}$ 12.6441 P = 0.000 (-)	$\chi^2_{(1)=}$ 1.9321 N.S.
	2003	Wilcoxon rank-sum test; P = 0.0000 (-)	$\chi^2_{(1)=}$ 8.3371 P = 0.004 (-)	$\chi^2_{(1)=}$ 8.3578 P = 0.004 (-)	$\chi^2_{(1)}$ = 1.005 N.S
Household level					
Maternal education	1997	Kruskal Wallis test: P = 0.0001 (+)	$\chi^2_{(4)}$ = 16.039 P = 0.003 (+)	$\chi^2_{(4)}$ = 43.1137 P = 0.000 (+)	$\chi^2_{(4)}$ = 10.7994 P = 0.029 (-)
	2003	Kruskal Wallis test: P = 0.0001 (+)	$\chi^2_{(4)}$ = 54.3674 P = 0.000 (+)	$\chi^2_{(4)}$ = 81.4405 P = 0.000 (+)	$\chi^2_{(4)}$ = 26.2851 P = 0.000 (-)
Household SES	1997	Kruskal Wallis, P = 0.0001 (+)	$\chi^2_{(4)}$ = 23.2285 P = 0.000 (+)	$\chi^2_{(4)}$ = 38.2041 P = 0.000 (+)	$\chi^2_{(4)}$ = 5.2706 N.S.
	2003	Kruskal Wallis, P = 0.0001 (+)	$\chi^2_{(4)}$ = 52.6549 P = 0.000 (+)	$\chi^2_{(4)}$ = 92.3332 P = 0.000 (+)	$\chi^2_{(4)}$ = 11.0515 P = 0.026 (-)
Community & school level					
SP (suburb) poverty	1997	Kruskal Wallis: P = 0.0001 (-)	$\chi^2_{(4)}$ = 28.1873 P = 0.000 (+)	$\chi^2_{(4)}$ = 25.9282 P = 0.000 (+)	$\chi^2_{(4)}$ = 35.6747 P = 0.000 (-)
	2003	Kruskal Wallis: P = 0.0133 (-)	$\chi^2_{(4)}$ = 22.6349 P = 0.000 (+)	$\chi^2_{(4)}$ = 25.5792 P = 0.000 (+)	$\chi^2_{(4)}$ = 21.7449 P = 0.000 (-)
School quality component 1[a]	1997	Spearman Correlation: Rho = 0.3367; P = 0.0000 (+)	Wilcoxon rank-sum; P = 0.0001 (+)	Wilcoxon rank-sum; P = 0.0001 (+)	Wilcoxon rank-sum; N.S.
	2003	Spearman Correlation: Rho = 0.4142; P = 0.0000 (+)	Wilcoxon rank-sum; P = 0.0001 (+)	Wilcoxon rank-sum; P = 0.0001 (+)	Wilcoxon rank-sum; N.S.
School quality component 2	1997	Spearman Correlation: Rho = 0.1586; P = 0.0000 (+)	Wilcoxon rank-sum; P = 0.0001 (+)	Wilcoxon rank-sum; P = 0.0033 (+)	Wilcoxon rank-sum; P = 0.0001 (-)
	2003	Spearman Correlation: Rho = 0.1144; P = 0.0004 (+)	Wilcoxon rank-sum; P = 0.0001 (+)	Wilcoxon rank-sum; P = 0.0226	Kruskal Wallis; P = 0.0001 (-)

[a] For 1997, the strongest loadings for school component 1 were historical DET status and percentage Black students, both loading negatively. Component 2 loadings were matric pass rate and school fees, loading positively, and school enrolment, loading negatively. For 2003, historical DET status and percent Black students still loaded strongly and negatively on component 1, but school quintile and school fees loaded heavily positively. School enrolment loaded strongly negatively on component 2, while school fees again loaded positively.

proportion of mothers with any post-school education was low, at just under 9%. Slightly over a third of children were born to mothers who were married at the time of their birth. Household SES was calculated in the form of quintiles, meaning that children were relatively evenly distributed across these categories.

Children with more educated mothers travelled further, on average, than children with less educated mothers in both 1997 and 2003 (Kruskal Wallis test; P = 0.0001), were more likely to travel to attend school in another SP or MP, and less likely to attend the school nearest to their home. There was no consistent evidence for a relationship between maternal marital status and children's mobility.

In both 1997 and 2003, children from more affluent households typically travelled further to school than those from less affluent households (Kruskal Wallis, P = 0.0001). They were also more likely to attend school in another SP or MP at both points in time. There was no significant relationship between SES and attendance at the nearest school in 1997, but by 2003 children from lower SES households were more likely to attend their nearest school. As household SES is strongly correlated with maternal education, the similarities in the relationships of these variables and travel to school are unsurprising.

3.1.3. Community level characteristics

SP-level poverty data was quintile based, meaning that sample members were fairly evenly distributed across categories. Children living in both the wealthiest and poorest quintiles travelled further than those in other areas – although overall, children living in wealthier areas travelled slightly further. This makes sense, as children living in less densely populated, wealthier areas are likely to be located further from schools, and are also more likely to have the economic and social resources for mobility. By contrast, children living in poorer areas, with poorer local schools, almost certainly have far stronger incentives to travel to schools further afield. The patterns of mobility presented here seem most likely to represent this interaction between geography, motivation and capacity for mobility.

As SP poverty rises, children are increasingly likely to attend a school in a different SP or MP, although the relationship is not strictly linear. Children living in poorer SPs are also less likely to attend the school closest to their home. This finding, that children in less affluent areas are less likely to attend their nearest school – even if they still do not travel very far – is of particular importance. In a context where provision of seats in classrooms in poorer areas is largely adequate, but there are concerns about the quality of many of those classrooms, it supports the notion that families in these areas are making an effort to find the best possible school for their children, despite the resource constraints they may face.

Finally, there is clear evidence that children attending higher quality schools travel further, are more likely to attend a school outside of their SP or MP, and are less likely to attend the school closest to home. Much of this effect is likely to be due to higher quality schools mostly being located in suburban areas, while the majority of the Bt20+ cohort lives in township areas. It does, however, support the notion of a relationship between travel to school, and school choice in the urban South African context.

Table 2
1997 and 2003 robust regression predicting straight-line distance travelled to school. Figures in parentheses are standard errors.

	1997	2003
Black African race	2.438 (0.160) ***	2.275 (0.209) ***
Male gender	0.010 (0.084)	−0.212 (0.093) **
Later age at first school enrolment	0.064 (0.086)	−0.003 (0.097)
Maternal education grade 5-7	0.527 (0.227) **	0.152 (0.247)
Maternal education grade 8-10	0.242 (0.183)	0.324 (0.181) *
Maternal education grade 11-12	0.369 (0.192) *	0.378 (0.190) **
Maternal education post-school	0.393 (0.238) *	0.280 (0.240)
Maternal marital status	0.184 (0.095) *	0.064 (0.101)
Household SES 1997	0.026 (0.029)	0.077 (0.094)
School attended component 1	0.696 (0.034) ***	0.746 (0.036) ***
School attended component 2	0.051 (0.044)	0.081 (0.051)
SP poverty (raw score)	0.080 (0.035) **	0.024 (0.037)
Constant	−2.205 (0.226) ***	−1.565 (0.274) ***

*significant at P < 0.1 level. No. of obs = 742. No. of obs = 543.
**significant at P < 0.05 level. F(12, 729) = 52.10. F(13, 529) = 51.80.
***significant at P < 0.01 level. Prob > F = 0.000. Prob > F = 0.0000.

3.2. Multivariate analysis

3.2.1. Straight line distance from to school

We used a log transformation of distance from home to school as the independent variable in an OLS regression, because this provided the closest approximation to a normal curve. Due to concerns about outliers, heteroscedasticity, and non-normal distribution of errors, models were re-run with robust standard errors, and using robust regression which weights cases differentially to minimise the impact of outliers. Results did not change substantially across models, and results for robust regression are presented in Table 2.

The analysis suggest that child race, and the attributes of the school attended, are the most significant predictors of travel distance in both 1997 and 2003, with Black children attending more advantaged schools travelling furthest. In 2003, girls travel significantly further to school than boys, probably due to the higher proportion of girls who have reached secondary school at this point. The relationship between distance and maternal education is complex, and slightly counterintuitive, particularly for 1997, when children whose mothers have very limited formal education (up to grades 5 or 6 only) tend to travel the furthest, followed by those whose mothers have reached grade 11–12. A more linear relationship is evident in 2003, when children with mothers with secondary school education travel furthest. There is weak evidence that children of married mothers travel somewhat further. Interestingly, there is no evidence that household SES shapes distance travelled – likely because the impact of household SES is already captured in other relatively highly correlated variables, such as school quality and poverty of the residential area. There is evidence that children living in poorer areas tend to travel further.

3.2.2. Mobility at SP and MP levels

Full details of the logistic regressions run for travel to schools in a different MP and SP, in both 1997 and 2003, are presented in Appendix A. Regressions were run both with and without robust standard errors. However, as the coefficients in both cases are identical, and significance levels did not change substantially, only the results using robust standard errors are presented in Appendix A. Table 3 provides a summary of the variables which are significantly related to each form of mobility.

3.2.2.1. SP mobility. The coefficients of the logistic regression for SP (neighbourhood) mobility in 1997 indicate that Black children are significantly more mobile than children of other races. There is no evidence of an association between maternal education and mobility. By contrast, the evidence that the attributes of the school attended shape mobility is strong, with the coefficients on both components of

Table 3
Summary of key relationships between variables considered and mobility.

	Distance from home to school	School outside of home SP	School outside of home MP	Not attending nearest school
Variables associated with increased mobility	Black race	Black race	Black race	Black race
	Maternal education		Maternal education Grade 11-12 (1997 only)	Younger age at first school enrolment (1997 only)
			Maternal education post-school school (2003 only)	Very low maternal education (2003 only)
		1997 Household SES quintiles 2 & 4 (1997 only)	1997 Household SES quintile 2 (1997 only)	2003 Household SES quintile 3 (2003 only)
		2003 Household SES middle quintiles		
	Higher school quality	Higher school quality	Higher school quality	Higher school quality
		Poorer SP area	Poorer SP area	Poorer SP area

school attribute scores indicating that children who attended more advantaged schools were more likely to attend a school located outside of their home neighbourhood. Finally, children living in poorer SPs are more likely than peers living in wealthier areas to be attending schools outside of their home neighbourhoods.

The 2003 results are very similar to those for 1997. Black children are less likely to attend a school in their home neighbourhood, as are children attending more advantaged schools, and those living in the highest-poverty SPs. There is again no evidence that maternal education is related to mobility at the neighbourhood level in 2003. Children with mid-range household SES are more likely to be mobile at the SP level, and there is also some indication that children of married mothers may be more mobile at this level.

3.2.2.2. MP mobility. In both 1997 and 2003, Black children living in areas with higher poverty levels, and attending more advantaged schools, were most likely to be attending school outside of the MP in which they lived. Evidence for influence of household SES was limited. In 1997, secondary school level maternal education (grade 11–12) played a small role in MP level mobility. In 2003, post-school level maternal education increased the likelihood of a child attending a school outside of their home community.

3.2.3. Attendance at nearest school

The final model assessed whether or not a child attended the school closest to their home. Constructing this model was a challenge as it was not possible to obtain a particularly good fit for either 1997 or 2003. This may be due to the omission of variables, such as language, that might influence whether a child attends their nearest school, and may also be due to a fairly high level of randomness in this particular outcome. However, given that both models pass all other goodness of fit tests, and give no indication of specification errors, the low R-squared in the context of a logistic regression is not necessarily of great concern. Full model details are provided in Appendix A, while a summary of significant relationships is provided in Table 3.

Again, both the 1997 and 2003 models indicate that Black children are significantly less likely to attend their nearest school. In 1997, children who start school late for their age are more likely to attend their nearest school – the inverse of the bivariate relationship identified. By 2003 there is no longer a relationship with age at school enrolment. For 1997, there is no evidence for a relationship between either maternal education or household SES and attendance at the nearest school. In 2003, there is some evidence that children of mothers with very low levels of education (grades 5–7) may be more likely to attend their nearest school, and also that children with mid-range SES are more likely to do so. For both time points, children attending more advantaged schools are less likely to be attending the school closest to their home. In 1997, children living in areas with mid-range levels of poverty were least likely to attend their nearest school, although those living in the most disadvantaged areas were still less likely to do so than their peers living in the most affluent areas. In 2003, there was a more strongly linear relationship, with those children living in the poorest areas least likely to attend their nearest school.

4. Discussion

Previous work has suggested two patterns of learner mobility: children travelling relatively long distances, at a fairly high economic and social cost, and children travelling more locally, but further than strictly necessary, to attend a school other than the one closest to their home (de de Kadt et al., 2014; Fiske et al., 2004; Hoadly, 1999; Hunter, 2010, 2016a; Msila, 2005, 2009; Southall, 2016). This latter pattern of mobility is typically substantially less resource-intensive, and is a potential option for a broader group of children. Our paper presents the first population-based analysis of predictors of mobility for urban, post-*apartheid* South Africa of which we are aware. Our findings provide some evidence to support these two different forms of mobility, particularly through the variable roles of maternal education in their prediction. Strikingly, however, we do not find clear evidence that, controlling for other variables, household SES can predict the nature or extent of a child's mobility.

Across all measures of mobility examined, there was clear evidence that Black children were significantly more likely to travel further than children of other race groups. This reflects the persistence of *apartheid* era geography into the early post-*apartheid* era, and makes clear the racially differentiated costs imposed on South African families in pursuit of high quality schooling for their children. The finding is consistent with the extensive literature documenting preferences for – and indeed, substantial benefits from – attendance at historically advantaged schools.

However, the evidence for more extensive mobility among Black children is not limited to children who attended historically advantaged schools – even those attending schools within a township were still travelling further than strictly necessary. This provides support for the argument that families and children distinguish between different township schools and actively choose a particular school (Msila, 2009; Fiske et al., 2004). These findings are also in line with Hill (2014), who documents particularly strong engagement in school choice among Black South Africans in the early post-*apartheid* period – although it is important to bear in mind that some mobility may well be explained by children being unable to obtain a place in their preferred school (Hoadly, 1999; Msila, 2009), access to transport networks, and the location of parental employment.

While the relationship between race and mobility is not surprising in the South African context, the relatively limited relationship between both maternal education and household SES and the various forms of mobility considered is less expected. There is a clear, relatively linear relationship between maternal education and distance travelled to school, suggesting that maternal education is important to the decision to invest fairly substantially in travelling to particularly distant schools. More educated mothers may place a higher premium on education, and may also be better positioned to negotiate access to historically advantaged schools for their children. The lack of a particularly clear relationship between maternal education and other measures of learner mobility, however, suggests that travel to school might vary across levels of maternal education. For example, less-educated mothers may be less able to access more distant, historically advantaged schools, but nonetheless differentiate between more local schools rather than settling for the school nearest to their home. This is in line with the existing literature on school choice (for example Msila, 2009), although it is also possible that it simply reflects a relatively random spatial distribution of children in more local schools.

The absence of an independent relationship between household SES and distance travelled is striking, particularly given the financial cost of daily travel to a relatively distant school. It is important to note that the asset index used as a measure of SES does have important constraints: it does not differentiate well at the lower end, and as women often live with others, household assets may not provide a good reflection of the resources available for a particular child's education. Nonetheless, this finding merits further investigation, and highlights the importance of ensuring that efforts to understand class and privilege in access to education do not focus purely on income or SES. Hunter's work (2016a), in which he documents the persistence of race as an indicator of class in public schools is particularly thought-provoking in this regard. The limited, but complex, relationship between household SES and other measures of mobility again suggests scope for further exploration – but does suggest that race strongly dominates SES in predicting learner mobility in urban post-*apartheid* South Africa.

While there is no relationship between the poverty of the area a child lives in, and the distance travelled to school, there is a relationship with the other measures of mobility that were considered. In some instances, the relationship between area poverty and mobility may

reflect a dearth of local educational opportunities– for example, in relatively new informal settlements schools may simply not have been constructed. However, given that it was established that all children the proximity of all children in the sample were within the range of an age-appropriate public school, this cannot fully explain the relationship between area poverty and mobility. Rather, it is more likely to reflect the persistence of *apartheid*-era geography, with weak schools concentrated in poor and predominantly Black areas providing families with a strong incentive to seek out educational opportunities further afield.

For all measures of mobility, and across both time points, there is clear evidence of a relationship between mobility and higher school quality. This provides strong support for the hypothesis that, in this particular context, mobility reflects efforts by families to access the highest-possible quality of education for their children. It is less likely that these patterns are the result of children being unable to access local schools, or simply enrolling in more distant schools due to location on transport routes or near parental places of employment. It is important to note that as the majority of the cohort lived relatively closer to historically disadvantaged schools, a relationship between mobility and school quality would be inevitable for children travelling outside of the townships. What is significant, however, is that this relationship appears to hold even for those children travelling within township areas.

Overall, these findings indicate that Black children from homes where mothers have secondary education, attending relatively privileged schools, but living in less advantaged areas, tend, overall, to travel somewhat further to school than their peers. This is an important finding in the context of educational policy with an explicit aim of redress: pursuit of high quality education remained fundamentally more costly for Black children living in poor areas in the early years of South Africa's democracy. In the absence of policy which effectively equalised educational opportunities, families made their own efforts to overcome these inequalities. This pattern has clear implications for the speed at which effective transformation of the country's economy and social fabric can be anticipated. The relative similarity of these results between 1997 and 2003, despite the substantial change in the age of the children, suggests that these patterns, and the determinants of mobility more generally, remained fairly consistent over time, throughout primary schooling, and potentially even into secondary schooling.

The extent of mobility described previously for this cohort (de Kadt et al., 2014) raises concerns for the creation of coherent and geographically defined school communities in urban South Africa. However, the extent to which mobility appears to cut across class and other social divides is simultaneously potentially slightly encouraging, as it may offer some protection to disadvantaged schools from the 'race to the bottom' described in Southall (2016).

5. Conclusions

This analysis investigated the relationship between travel to school and a range of individual, household and community level variables for a cohort of children living in early post-*apartheid* Johannesburg-Soweto, South Africa over the period of primary school attendance. Four different approaches to the measurement of travel to school were considered. Although well over a decade has passed since the data used was collected, the analysis remains relevant for two reasons. First, it provides a comprehensive and rich set of insights into patterns of school enrolment and travel to school during the pivotal period in which the structure of South Africa's contemporary public schooling system was established. Secondly, it provides an important baseline against which subsequent trends can be assessed.

Using multivariate regression, clear evidence was presented that both race, and the quality of the school attended, were strongly linked to mobility, with Black children attending high quality schools being most mobile. There is a strong, positive relationship between maternal education and distance travelled to school, but the relationship between other measures of mobility and maternal education was less clear. Finally, while there was no relationship between distance travelled to school, and the poverty of the area in which a child lived, there was a strong relationship with all other measures of mobility, with children living in poorer areas typically being more mobile.

The limited extent of the relationships between mobility and both maternal education and household SES are significant, particularly in the context of the strong relationship between all forms of mobility and higher quality schools. This supports the contention, well-documented in the qualitative literature, that poor and poorly educated parents differentiate strongly between available educational opportunities, and do not simply send their children to the school closest to their home. While this speaks highly to the commitment of South Africans to education, it also highlights the extent to which the least advantaged continue to experience the highest costs in pursuit of high quality education in the early post-*apartheid* period. This is, in many respects, unsurprising given the enormity of the task, and is not a criticism of the policy or those who worked to implement it. However, understanding the intractability of these patterns is key to understanding the very slow pace of social and economic transformation that South Africa has experienced. Addressing the disproportionate burden placed on less advantaged members of society in the pursuit of high quality education, through enhancing both the quality and attractiveness of the schools that are close to where less advantaged children live, remains an essential objective for educational policy. Recent years have seen additional efforts, particularly in Gauteng province, to further address issues of educational inequality, and analysis of the extent to which the burden of costs in securing high quality education have shifted in recent years will be critical in assessing the effectiveness of these efforts.

Finally, these patterns provide some insight into the relationships of schools with the geographically defined communities in which they are located. Clearly, during the period under consideration, many Black children were attending schools in communities in which they did not live. The evidence presented here suggests that more educated families living in less affluent areas tended to send their children to relatively distant, more advantaged schools. This posed a challenge for these historically advantaged schools, typically with a strong and pre-existing school community and culture, in ensuring that children travelling from afar (and often from different social and cultural contexts) are fully integrated into the school community and can benefit from all of the school's resources – a challenge which the literature suggests different schools have met with very different levels of success (Hunter, 2016a; Vandeyar and Jansen, 2008). Weaker schools, and particularly those located in the most disadvantaged areas, faced a different set of challenges: firstly, ensuring adequate enrolment, and secondly maintaining (or even creating) a school community when the school only enrols those who are unable to find a place anywhere else. Exactly who these schools did enrol, and understanding how their efforts to create a school community played out, are research questions which would benefit from further exploration.

5.1. Limitations and subsequent work

The results presented in this paper deepen our understanding of patterns of travel to school in the early post-*apartheid* era, and substantiate for an important urban population arguments developed on the basis of smaller-scale qualitative studies. However, a fundamental weakness of the quantitative analysis presented here is that it is not able to explain the decision making processes of individuals. Further qualitative work with the children (now adults) who were part of the study would allow for the development of more conclusive causal arguments.

The data used in this paper also places some limitations on our work. Firstly, our decision to use the Bt20 + dataset does mean that our analysis is constrained to Johannesburg-Soweto, and does not cover the full country. While this is a large and densely populated area, and important in its own right, it is important to emphasise that it is

distinctly urban, and our findings cannot speak to the rural South African context. We cannot be sure about whether out findings generalise well to other urban areas of the country, and additional work in this regard would be informative. Caution should certainly be applied in generalising findings to other contexts.

Secondly, an important limitation of the work presented here is that it was not possible to obtain the language of learning and teaching for the schools attended by the children. In the context of a South African township, where children have many different home languages, language is likely to be a factor in decision making. Inclusion of this variable may well have strengthened several of the models, and would have clarified the extent to which more local mobility may have been due to language.

Having established patterns of mobility in the early post-*apartheid* period, it will be important to explore more contemporary patterns. *Apartheid* geography remains persistent, and continues to be accompanied by massive unemployment and social and educational inequality, suggesting that the incentives for mobility remain in place. However, there is also evidence that educational inequality within the public sector may be falling, particularly in Gauteng, which together with a growing demand for the decolonisation of education may push against mobility. The recent explosion in the level of private school enrolment in Gauteng (StatsSA, 2018) further complicates the picture.

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Appendix A

Summary of 1997 and 2003 logistic regression results for main place and sub place mobility and whether the nearest school was attended. Figures in parentheses are standard errors

	SP mobility: Logistic regression with robust errors	MP mobility: Logistic regression with robust errors	Nearest school attendance: Logistic regression with robust errors
Black African race			
1997	−3.314 (0.480) ***	−3.820 (0.533) ***	−2.251 (0.431) ***
2003	−3.422 (0.725) ***	−6.816 (3.574) *	−1.477 (0.643) **
Male gender			
1997	−0.222 (0.173)	0.037 (0.255)	−0.138 (0.199)
2003	0.005 (0.229)	−0.019 (0.292)	0.145 (0.263)
Grade repetition			
1997	NA	NA	NA
2003	0.015 (0.245)	−0.091 (0.350)	−0.181 (0.285)
Later age at school enrolment			
1997	−0.233 (0.178)	−0.305 (0.244)	0.504 (0.201) **
2003	0.280 (0.238)	−0.002 (0.341)	−0.150 (0.280)
Maternal education grade 5-7			
1997	−0.624 (0.434)	−1.064 (0.802)	−0.617 (0.509)
2003	−0.276 (0.573)	−0.465 (1.043)	1.110 (0.641) *
Maternal education grade 8-10			
1997	−0.413 (0.358)	−1.057 (0.700)	−0.371 (0.385)
2003	−0.458 (0.436)	−0.441 (0.649)	0.151 (0.512)
Maternal education grade 11-12			
1997	−0.266 (0.380)	−1.340 (0.707) *	−0.388 (0.424)
2003	−0.566 (0.471)	−0.529 (0.626)	0.242 (0.539)
Maternal education post-school			
1997	−0.258 (0.463)	−1.254 (0.773)	−0.325 (0.553)
2003	−0.231 (0.539)	−1.472 (0.735) **	0.636 (0.657)
Maternal marital status			
1997	−0.164 (0.197)	−0.056 (0.269)	−0.242 (0.241)
2003	−0.433 (0.248) *	−0.137 (0.339)	0.100 (0.280)
Household SES quintile 2			
1997	−0.554 (0.244) **	−0.985 (0.389) **	−0.281 (0.300)
2003	−0.531 (0.323)	−0.243 (0.504)	−0.215 (0.356)
Household SES quintile 3			
1997	−0.182 (0.250)	−0.484 (0.390)	−0.326 (0.323)
2003	−1.130 (0.330) ***	−0.798 (0.519)	−0.858 (0.416) **
Household SES quintile 4			
1997	−0.468 (0.274) *	−0.449 (0.403)	0.194 (0.318)
2003	−0.269 (0.342)	−0.505 (0.518)	−0.172 (0.397)
Household SES quintile 5 (most advantaged)			
1997	−0.468 (0.376)	−0.598 (0.511)	0.062 (0.421)
2003	0.249 (0.391)	0.029 (0.546)	−0.311 (0.481)
School attended attributes component 1			
1997	−0.947 (0.102) ***	−1.324 (0.116) ***	−0.626 (0.099) ***
2003	−1.240 (0.131) ***	−1.931 (0.202) ***	−0.711 (0.143) ***
School attended attributes component 2			
1997	−0.202 (0.099) **	0.042 (0.110)	−0.233 (0.102) **
2003	−0.443 (0.147) ***	0.133 (0.180)	−0.658 (0.172) ***
SP poverty quintile 2 (relatively low area poverty)			
1997	−1.033 (0.349) ***	−1.532 (0.611) **	−0.693 (0.333) **

2003	−0.983 (0.627)	−2.466 (0.812) ***	−0.566 (0.582)
SP poverty quintile 3			
1997	−0.690 (0.422)	−1.883 (0.694) ***	−1.550 (0.433) ***
2003	−0.684 (0.645)	−3.013 (0.820) ***	−1.263 (0.587) **
SP poverty quintile 4			
1997	−0.975 (0.427) **	−2.018 (0.708) ***	−0.962 (0.403) **
2003	−1.409 (0.669) **	−3.410 (0.809) ***	−1.291 (0.599) **
SP poverty quintile 5 (highest poverty areas)			
1997	−1.474 (0.464) ***	−3.033 (0.723) ***	−0.914 (0.436) **
2003	−2.059 (0.698) ***	−3.716 (0.836) ***	−1.612 (0.658) **
Constant			
1997	3.967 (0.535) ***	8.188 (0.904) ***	1.477 (0.541) ***
2003	3.602 (0.760) ***	11.037 (3.790) ***	0.349 (0.733)
1997	No. of obs = 742	No. of obs = 742	No. of obs = 738
	Wald chi2(18) = 94.79	Wald chi2(18) = 201.40	Wald chi2(18) = 87.39
	Prob > chi2 = 0.0000	Prob > chi2 = 0.0000	Prob > chi2 = 0.0000
	Pseudo R-squared = 0.1940	Pseudo R-squared = 0.4315	Pseudo R-squared = 0.1241
	Log likelihood = −410.34555	Log likelihood = −232.40251	Log likelihood = −327.56921
2003	No. of obs = 543	No. of obs = 543	No. of obs = 541
	Wald chi2(19) = 124.39	Wald chi2(19) = 201.40	Wald chi2(19) = 67.58
	Prob > chi2 = 0.0000	Prob > chi2 = 0.0000	Prob > chi2 = 0.0000
	Pseudo R-squared = 0.2849	Pseudo R-squared = 0.56102	Pseudo R-squared = 0.1631
	Log likelihood = −252.24727	Log likelihood = −148.17552	Log likelihood = −207.7699

*significant at P < 0.1 level. No. of obs = 742. No. of obs = 543.
**significant at P < 0.05 level. F(12, 729) = 52.10. F(13, 529) = 51.80.
***significant at P < 0.01 level. Prob > F = 0.000. Prob > F = 0.0000.

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