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**Family Structure, Schooling Outcomes, and Investment
in Education in South Africa**

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Family Structure, Schooling Outcomes, and
Investment in Education in South Africa

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ABSTRACT

This paper examines the relationship among South African children between family structure and schooling outcomes (current enrollment in school, highest grade completed, and number of grades completed per year) and investment in education (school fees). Family structure has important effects for blacks and coloureds; in particular, children who live with neither parent are consistently disadvantaged. For whites, family structure has little or no effect on schooling outcomes. Racial disparities in schooling outcomes largely disappear when background factors are controlled for. The results suggests that variations in family structure are a contributing factor to continued racial inequality in educational attainment in post-apartheid South Africa.

DATASETS USED:

October Household Survey (OHS), South Africa, 1995

South Africa is a nation with a vivid history of racial disparity. While there are high returns to education in terms of both employment and wage income (Case and Yogo 1999, Moll 1998, Mwabu and Schultz 1996), significant racial gaps in educational attainment persist (Anderson, Case and Lam 2001, Thomas 1999), contributing to continued economic disparity across racial groups. This paper extends our understanding of racial economic inequality in South Africa by examining the production of educational inequality. Specifically, this paper examines the relationship between children's family structure and their schooling outcomes, both across and within racial groups.

A number of researchers have investigated some of the proximate mechanisms that influence schooling outcomes in South Africa, including parental characteristics such as education level, income, and aspirations for children's schooling (Cherian 1994, Cherian and Malehase 1998, Fuller and Liang 1999, Lam 1999, Thomas 1996), and community variables such as school quality (Case and Deaton 1999, Case and Yogo 1999, Crouch and Mabogoane 2001, Moll 1998). The relationship between family structure and schooling has been less extensively examined, despite the importance of family structure as a predictor of educational outcomes in more developed countries (e.g., Biblarz and Raftery 1999, DeLeire and Kalil 2002, Haveman and Wolfe 1995). Although several studies have looked at schooling and family structure in South Africa (Cherian 1989, Cherian 1994, Fuller and Liang 1999, Mboya and Nesengani 1999), they have all relied on small, localized, or non-representative samples. In contrast, the present study uses nationally representative data to examine the relationship between family structure and schooling outcomes in South Africa, both for the entire population and separately by racial group as well.

The paper begins with a discussion of the theoretical links between family structure and schooling outcomes. Prior research on education and family structure in the South African context is reviewed. The dataset is introduced, followed by the empirical results. The paper concludes with a discussion of the findings and their implications for future research.

FAMILY STRUCTURE, INVESTMENT IN CHILDREN, AND SCHOOLING OUTCOMES

Investment in children is important because children's outcomes (e.g., education, health) are the result of cumulative investment from other people (parents, teachers, other caregivers) over the course of their lives. Differential outcomes result in part from differential investments in children; all else being equal, children who receive higher levels of investment achieve more positive outcomes. A substantial literature demonstrates that family structure affect children's schooling outcomes, although the majority of this research has focused on the United States (e.g., Biblarz and Raftery 1999, Boggess 1998, Case, Lin and McLanahan 2001, Cooksey and Fondell 1996, DeLeire and Kalil 2002, Downey 1995, Haveman and Wolfe 1995, McLanahan and Sandefur 1994, Pong 1998). In an international context, this relationship has been examined with much less frequency. However, correlations between family structure and educational outcomes have been observed in a number of other settings, including Bolivia (Psacharopoulos 1997), Botswana (Bock 2002), Britain (Cherlin et al. 1991, Ermisch and Francesconi 2001), Hungary (Bereczkei and Csanaky 1996), and Zambia (Jensen and Nielsen 1997), as well as in several multi-national comparative studies (Case, Paxson and Ableidinger 2003, Pong, Dronkers and Hampden-Thompson 2002, Wossmann 2003).

In most cultural settings, the main investors in children are the adults who live with them. However, not all coresiding adults invest equally in children. Unitary models of household preferences, which assume that all members of a household have the same preferences (e.g., Becker 1991), have been criticized in recent years as empirical evidence increasingly suggests that household members often have conflicts of interest over the allocation of household resources (e.g., Alderman et al. 1995; Bergstrom 1996; Maitra and Ray 2003). Investment in children has been recognized as a collective good (Chase 1980; Weiss and Willis 1985, 1993); thus, the observed level of investment a child receives results from a bargaining solution reached by the principals in the household.

Modern evolutionary theory proposes several explanations for conflicts of interest over investment in children. First, the theory of inclusive fitness (Hamilton 1964) predicts that investment will correlate with degree of genetic relatedness; people who are more closely related to the recipient tend to invest more, as they receive greater benefits (in terms of genetic fitness) from doing so. Parents (along with siblings) are the closest relatives a child can have, and are expected to prefer higher investments in children than more distant relatives or non-kin. A household composed of people of varying degrees of relatedness will experience greater conflicts of interest over investments in children than a household containing only genetic parents. Hence, we expect to see decreased investments in children in households containing more distantly related kin than parents, or containing genetically unrelated individuals such as stepparents, who invest less in children in a variety of settings (e.g., Amato 1987, Anderson, Kaplan and Lancaster 1999b, Flinn 1988, Hofferth and Anderson 2003, Marlowe 1999, Marsiglio 1991). In societies where children often coreside with extended family members, or are fostered with more distant kin or non-relatives while parents live elsewhere, greater conflicts of interest over investment in children are expected, resulting in greater variance in children's outcomes.

Evolutionary theory focuses on the role of opportunity costs in conflicts of interest over the allocation of resources within households. Resources (time, money, food) allocated for one purpose (e.g., investment in a particular child) cannot be used for other purposes, such as investment in other children (who may be more closely related to the potential investor), as well as other activities such as one's own health, growth, and well-being (somatic effort), or obtaining or maintaining a relationship with a mate or sexual partner (mating effort). The tradeoffs between somatic effort, mating effort, and parental effort have long been recognized in evolutionary biology (e.g., Low 1978, Trivers 1972), and remain a fundamental theoretical underpinning of the application of evolutionary theory to modern demographic analysis (e.g., Bock 1999, Kaplan 1996, Low and Clarke 2001).

Single parents might be expected to experience these tradeoffs more acutely than married couples. Even if they live in households with no other adults (and hence experience no intrahousehold conflicts with other adults over the allocation of resources), single parents face internal conflicts over the appropriate allocation to their children, to the pursuance of mating relationships with other adults, and to their own growth and development. Households with two biological parents might invest more in children due to the self-reinforcing effect of having the other parent present; a parent may invest more in children because the investment has positive effects on their relationship with the child's other parent (Anderson 2000, Hofferth and Anderson 2003, Kalmijn 1999).

With respect to education, family structure is expected to influence schooling outcomes in two ways. Cross-sectionally, the decisions of adults (parents and others) regarding investments in children will influence whether a child attends school, the quality of the school attended, the amount of money spent on schooling, and the outcome (pass vs. fail, specific marks) if enrollment occurs. These investment decisions are expected to be strongly influenced by the composition of the household, with biological parents being the highest investors. Second, because investment is cumulative, there will be cumulative effects as these investment decisions are reiterated year after year; children who receive lower levels of investment each consecutive year will be more likely over time to fail, to fall behind in school, and to drop out of school. Because socioeconomic status tends to vary with family structure (with single parents being especially likely to have reduced income), it is important to control for it when analyzing educational outcomes as a function of family structure.

EDUCATION IN SOUTH AFRICA

Any discussion of schooling attainment in South Africa must acknowledge the influence of apartheid ("separateness"), which from 1948 until 1990 was the official policy of the government of South Africa.

The goal of apartheid was to enforce and increase the de facto racial segregation that already existed in the country.¹ Under apartheid, the government recognized four racial categories: African (black), coloured, Indian (Asian), and white. (In 1991, the population of South Africa was approximately 74% black, 9% coloured, 3% Indian and 14% white [Chimere-Dan 1993].) Legislation enforced racial segregation, so that the quality of employment, education, housing and other opportunities varied greatly across racial groups, with whites having the greatest access to resources and blacks the least. Racial disparities affected every aspect of life from poverty and income (Klasen 1997, Lam 1999) to life expectancy at birth (Chimere-Dan 1993) and physical stunting (Burgard 2002). As a result, South Africa has among the highest rates of unemployment and of wage inequality in the world (Kingdon and Knight 2001, Lam 1999, Leibbrandt, Woolard and Woolard 2000).

South Africa exhibits substantial racial disparities in schooling outcomes; there is a gap of three grades between the completed schooling of whites and blacks as well as whites and coloureds in recent cohorts (Anderson et al. 2001), and blacks have lower numeracy and literacy skills than the other racial groups (Moll 1998). One major reason for this disparity is the extreme variance in school quality and public investment in schooling infrastructure that occurred during the apartheid era. Schools for blacks received far less money per pupil than white schools (Thomas 1996), and they continue to have fewer resources, higher student-teacher ratios, and lower test scores (Case and Deaton 1999, Crouch and Mabogoane 2001, Fedderke and Luis 2002, van der Berg 2001). School quality has significant effects on children's schooling outcomes (Case and Deaton 1999, Crouch and Mabogoane 2001) and subsequent employment and income trajectories (Case and Yogo 1999).

Although the current constitution of the Republic of South Africa (adopted in 1996) guarantees education as a right, it is not free. In addition to the direct costs of school fees (tuition), students and their families must pay the indirect costs of books and supplies, school uniforms, and often transportation to school as well. School fees can be quite expensive in South Africa, and are highly variable across schools, partly due to high variability in school quality. Anderson et al. (2001) report that school fees are negatively correlated with age delays in school, suggesting that children who attend poorer quality schools are more likely to fail and repeat grades. The direct expenses associated with school enrollment means that non-whites are less able to afford the costs of education.²

School enrollment in South Africa is fairly high relative to other African countries; unlike many of its neighbors, nearly all South Africans enroll in (and complete) primary school (Lloyd, Kaufman and Hewett 2000). Although completed levels of schooling within South Africa vary greatly by race, enrollment is high for all population groups. In 1995, for example, over 95% of blacks ages 10-15 enrolled in school, compared with over 98% of whites (Anderson et al. 2001). The fact that blacks and whites are enrolled at nearly equal rates, while blacks complete roughly three fewer grades of school by end of adolescence, implies that blacks are failing and repeating grades at a higher rate than whites (Lam 1999, Anderson et al. 2001). In other words, although nearly all South African children enroll in school, blacks (as well as coloureds) are more likely to fail and repeat grades than white children, and thus advance through school at a lower rate. Grade retention can have important influences on subsequent schooling outcomes, as previous grade failure has been shown to predict subsequent school failure in both the U.S. (Jimerson, Anderson, and Whipple 2002) and South Africa (Anderson, Kaplan and Lam 2003). Thus, grade repetition is a conceptually important educational measure, because it is both an outcome of previous failure and a predictor of subsequent failure (Anderson et al. 2001).

FAMILY STRUCTURE IN SOUTH AFRICA

Apartheid legislation had powerful and long-lasting effects on family structure in South Africa, especially for blacks. Under apartheid, blacks were relocated to quasi-independent "homelands," with severe restrictions on their ability to travel or find work (Jones 1993, Reynolds 1989). Blacks living in cities

within South Africa proper were restricted to townships, small ghettos that generally had inferior housing, utilities, public facilities, etc. (Jones 1993, Younge 1982).

Apartheid legislation contributed to a shift to increased complexity in household organization among blacks (Jones 1998, Niehaus 1994, Preston-Whyte and Zondi 1992, van der Vliet 1991). African adults were often forced to seek employment and to live apart from their spouses and families. As a result of migratory labor patterns and restrictive housing options, women often became de facto heads of household. Migratory labor patterns also meant that one or both of a child's parents were often not present for much of the year, even if they were considered to be current members of the household (Case and Deaton 1998, Reynolds 1984, Siqwana-Ndulo 1998), and many households came to depend heavily on financial remittances sent in from family members employed elsewhere (Leibbrandt et al. 2000, Posel 2001, Spiegel, Watson and Wilkinson 1996). In part due to these migratory labor patterns, divorce and non-marital births increased greatly for blacks during the apartheid era (Burman and Fuchs 1986, Burman and van der Spuy 1996). Parents began to rely increasingly on family members other than spouses for support with the household economy and with raising children (Niehaus 1994, Preston-Whyte 1993), and rates of child fostering increased (Gordon and Spiegel 1993). To a certain extent, blacks began relying less on traditional patrilineal kin for support and more on matrilineal kin and on conjugal relationships (Clark and van Heerden 1992, Jones 1998, Niehaus 1994; but see Russell 2002 for a differing viewpoint). This increased complexity in household structure resulted in increasingly complex bargaining patterns within households, suggesting that unitary preference models are not the best way to model intra-household preferences and resource pooling in South Africa (Bertrand, Mill and Mullainathan 2000, Case and Deaton 1998, Maitra and Ray 2003, Posel 2001).

Family structure changed for non-black South Africans during the apartheid era as well, although this has been the subject of considerably less scholarly attention. Nonmarital birth rates increased for whites, coloureds, and Asians, though at a much lower rate than for blacks (Burman and van der Spuy 1996). No-fault divorce laws, introduced in 1979, led to increases in divorce for all four groups (Burman and Fuchs 1986). Fertility decreased for all racial groups, leading to smaller families and fewer dependent children. The total fertility rate (TFR) dropped from 3.3 for whites and 6.8 for blacks in 1950 to 1.7 for whites and 4.1 for blacks in 1993 (with coloureds and Indians in between at 2.7 and 2.3, respectively, in 1993) (Chimere-Dan 1993, Chimere-Dan 1997).

FAMILY STRUCTURE AND EDUCATION IN SOUTH AFRICA

The changes in family structure that occurred during the apartheid era undoubtedly had negative effects on children's outcomes. The high rates of nonmarital births and of parental absence due to migrant labor led to a greater proportion of school-aged children living in households with one parent or no parents and in households containing more distant relatives who have great influence on the investment these children receive. Although national statistics on the rate of single parents and fostering are not available, Anderson and Lam (2003) report for a sample in Cape Town that at age 10, 19.9% of blacks live with neither parent, compared with 10.7% of coloureds and 2.7% of whites. These changes in household structure have been correlated with negative consequences for children's health and survival (Burman 1986, Cock, Emdon and Klugman 1986, Jones 1993). For example, children born outside of marriage receive less assistance from other family members, as well as less money from government maintenance grants (Burman 1992, Simkins and Dlamini 1992). Posel (2001) reports that financial remittances from migrant workers are positively correlated with the degree of relatedness between the worker and the household; households containing more distant kin received less money. Anderson (2003) reports that financial expenditures on health care, housing and consumer goods are also correlated with the degree of genetic relatedness within the households children live in. Intergenerational correlations between parental and children's educational outcomes have been demonstrated by Lam (1999) and Thomas (1999), although their data were limited to children living with both parents.

The relationship between family structure and schooling outcomes has not been extensively examined in South Africa. The existing studies that have been done have focused on small, regional, or non-representative samples. Cherian (1989, 1994), studying Xhosa children from the Transkei, finds that children from two-parent homes have higher standardized test scores than children from single-parent families. Mboya and Nesengani (1999), using a sample of high school students in the Northern Province, report lower standardized test scores among father-absent students than father-present students. Fuller and Liang (1999) note that Zulu, Xhosa, and North Sotho girls from father-absent households are less likely to drop out of school than girls from father-present homes. Anderson and Lam (2003), using a sample of young adults living in Cape Town, find significant independent effects of the presence of mothers and fathers on grades passed per year and on the probability of passing a grade.

Little research has been done examining the relationships between family background (including family structure) and school quality, expenditures on school fees, or other forms of direct investment in children. Case and Deaton (1999) found no relationship between the education of household head and student-teacher ratios for both blacks and whites in 1993. Anderson et al. (1999a), using a black school-based sample in Cape Town, report that resident genetic fathers spend more money on children's schooling than both resident stepfathers and non-resident genetic fathers. Anderson et al. (1999a) also report that resident genetic fathers spend more time with children than other father figures, although resident stepfathers spend as much time helping children with homework as resident genetic fathers.

To summarize, investment in children is important for children's outcomes. Because investing in children can be treated as a collective good, and there are tradeoffs associated with investing, a bargaining process within households will determine the allocation of resources to children. We expect greater investments in children if their parents are present, and less investment if the primary caretakers are more distantly related. South Africa, with its complex family structure patterns that resulted from apartheid, offers an opportunity to test this theory. South Africa exhibits great variance in schooling outcomes between racial groups, due largely to failure and grade repetition rather than differential rates of enrollment. The analysis will examine the relationship between family structure, investment in children, and schooling outcomes using a nationally representative sample of South African children.

DATA AND METHODS

The data used in this study are from the 1995 October Household Survey (OHS). The OHS is a nationally-representative two-stage sample of households, which was collected cross-sectionally by the South African government each year from 1994 through 1999. Only the 1995 wave contains data on parental presence and on expenditures on school fees; therefore the analyses are restricted to data from that year. The 1995 OHS includes 130,787 individuals living in 29,700 households. The sample used in the present analysis is restricted to all households containing at least one person ages six through 19 who has not completed secondary school.³ One child was randomly selected from each household sampled. Indians (Asians) were dropped from the analysis due to their small sample size.⁴ Because the OHS household income variable had many missing observations, household income was imported from the 1995 Income and Expenditure Survey (IES), a detailed survey on economic income and expenditures which was conducted for the same sample at the same time (Hirschowitz 1997). The OHS income variable focused solely on wage income, but the IES measures income data from a much wider range of sources, and is thus a more valid construct of household income. Additionally, because the IES income variable contains no missing values and no zero values, no cases are lost when the log of income is used.

After removing children or households with missing data for key variables, the sample used for analysis consists of 16,338 children from 16,338 households. Of these, 12,223 (74.8%) are black (African), 2,408

(14.7%) are coloured, and 1,707 (10.4%) are white. (These percentages are unweighted; sample weights will be used in analysis).

Variables

The four dependent variables I will examine include three measures of schooling outcomes and one measure of investment in schooling. The first dependent variable is the highest grade the person has completed by the time of interview, which is available for the full sample ($N = 16,338$).⁵ The second dependent variable, enrollment in school, is a dichotomous variable, indicating whether the person is enrolled in school for the current academic year ($N = 16,338$). The third schooling outcome, grades completed per year, measures the rate of advancement through school since age six, calculated as [number of grades completed] / [current age minus six]. A value of 1.0 for this variable indicates that the individual has passed one grade for each year of life since age six.⁶ This situation occurs if the person enrolled in school at age six, remained in school each subsequent year, and did not fail or repeat any grades. Values less than 1.0 indicate either non-enrollment or grade repetition. Since enrollment rates are very high in this population, values less than 1.0 are largely due to grade repetition (Lam 1999, Anderson et al. 2001). Grade attainment per year is restricted to ages 9 and older for the analysis ($N = 12,644$), because of the way the OHS measures schooling attainment for grades one through three.

The final dependent variable, expenditures on school fees, is a measure of direct investment in children's schooling. This variable measures annual expenditures (in rands) on school fees (e.g., tuition) for this child (if enrolled), and excludes other school-related costs such as uniforms, books, transportation, etc. (At the time of this survey, one South African rand was worth approximately US \$0.27.) Because expenditures on school fees are not normally distributed, the natural log of school fees will be used for analysis. The sample size for this variable is 12,840 children.

The major independent variable of interest is family structure, which will be operationalized in terms of which biological parent(s) the child is living with. Family structure is defined as four mutually exclusive categories: 1) living with both biological parents; 2) living with biological mother but not biological father; 3) living with biological father but not biological mother; and 4) living with neither biological parent.⁷ Unweighted sample sizes for each category are presented by race in Table 1. This operationalization of family structure ignores the presence or absence of more distantly related caregivers, such as grandparents or aunts/uncles, as well as unrelated caregivers such as stepparents. The effect of more distant kin on investment in children is dealt with elsewhere (Anderson 2003; see also Case and Deaton 1998, Duflo 2000 for the effects of coresident grandparents on children).

[Table 1 about here]

Individual characteristics of the child that will be controlled for in multivariate analyses include age, gender and race. Household characteristics include the number of people living in the household, broken down into separate age groups (ages 0-5, 6-12, 13-19, 20-60, and 61 and older). Dummy variables for whether the household is rural, whether it occupies a shack/traditional dwelling, and whether anyone in the household completed secondary school will also be used. Logged household income will also be added. Dummies for province of residence are included in the model, but not shown in the results.

The analysis strategy is as follows. Summary statistics are presented for all variables in the analysis, first by race and then by family structure. Multivariate results are then presented in a series of models. For each dependent variable, a simple model controlling only for the child's individual characteristics, as well as current family structure, is run using the full sample (all races combined). A second model adds household characteristics, to see whether the effects of family composition are actually due to different household characteristics, such as socioeconomic status or location. Lastly, the model is applied

separately to each racial group. This presentation is identical for multivariate models across the four dependent variables being examined. All analyses were performed using STATA 7.0.

RESULTS

Table 2 presents summary statistics by race for the variables used in the analysis. The results are weighted, and robust standard errors (in parentheses) adjust for the complex multi-stage design of the sample. Nearly every variable, with the exception of age, gender, and the proportion of children living with father only, varies significantly by race.⁸ Blacks were the least likely to live with both biological parents, and the most likely to live with mother only or with neither parent, while whites were the most likely to live with both parents and the least likely to live with mother only or neither parent. Only the proportion living with father but not mother shows no significant difference by race. Schooling outcomes and investment in schooling also differ greatly by race. Whites have completed more grades than blacks or coloureds, and are the most likely to be currently enrolled in school. Whites also have completed more grades per year, indicating faster progression through school; on average, white have completed 0.91 grades per year, coloureds 0.82 grades per year, and blacks 0.78 grades per year. In terms of financial expenditures on schooling, whites have the most money spent on their school fees, and blacks the least.

[Table 2 about here]

Table 3 presents summary statistics by family structure for all independent and dependent variables. Every variable demonstrates significant differences across family types. In terms of schooling attainment, children who live with father but not mother have completed more grades than other children. Since these children are typically 0.87 years older than children living with both parents, but have completed only 0.40 additional grades, they are not necessarily more academically advanced. Children who live with neither parent are the least likely to be enrolled in school, and have completed the fewest grades per year. Children who live with both parents have the most money spent on their school fees, while children who live with father but not mother have the second highest expenditures on school fees; however this pattern could be due to the observed income differences between these groups, rather than differential investment within the household. To disentangle the relationships between family structure, socioeconomic status, and schooling outcomes, we turn now to multivariate models.

[Table 3 about here]

Multivariate Results

Ordinary least square (OLS) regression models of highest grade completed, taking into account the complex survey structure of the dataset and using robust standard errors, are presented in Table 4. In Model 1, which controls for the youth's individual characteristics as well as family structure, both children living with mother but not father and children living with neither parent have completed significantly fewer grades than children living with both parents. With regards to race, coloured and white children have both completed more grades than black children, while boys have completed fewer grades than girls. Model 2 adds household characteristics. Controlling for these factors, living with mother only is no longer a significantly negative predictor of grade attainment. Living with neither parent retains its negative association; all else being equal, children in these households complete about one third of a grade less than children living with both parents. Additionally, there are no longer significant differences in grade attainment by race once household demographic and socioeconomic factors are controlled.

The next three panels of Table 4 present the full model separately for each racial group. For both blacks and coloureds (Models 3 and 4), children living with neither parent have completed fewer grades, relative to children living with both parents. Living with mother only or with father only has no significant effect

for blacks and coloureds. For whites (Model 5), there is no significant relationship between family structure and grade attainment.

[Table 4 about here]

Table 5 presents a set of logistic regression models of enrollment in school. In Model 1, the reduced model for the full sample, we see that children who live with their father but not their mother are 61% as likely to be enrolled as children living with both parents, while children who live with neither parent are 55% as likely to be in school. Children living with mother only are no different from children living with both parents in terms of their probability of enrollment. With respect to race, coloureds are less likely as blacks to be in school, while whites are not statistically different from blacks. Model 1 also shows that boys are 1.2 times as likely to be enrolled as girls. Adding household characteristics to the model (Model 2) does not change the effect of family structure. Interestingly, when both household and individual characteristics are in the model, both coloureds and whites are less likely to be enrolled in school than blacks, although gender retains its significance.

When each population group is examined separately, the effects of family structure for blacks and coloureds (Models 3 and 4) are similar to the effects for the full sample. Children who live with fathers only are less likely to be in school than children living with both parents, with the effect size being particularly large for coloured children. Children who live with neither parent are also much less likely to be enrolled, relative to children living with both parents. Black and coloured children who live with mother only are not significantly different from those living with both parents. Family structure has no significant effect on enrollment for whites (Model 5).

[Table 5 about here]

OLS models of grades completed per year are presented in Table 6. As discussed above, the number of grades per year is largely influenced by previous failure and grade repetition rather than non-enrollment (Anderson et al. 2001, Lam 1999). In Model 1, children living with mother only or with neither parent have completed fewer grades per year than children living with both parents, while children living with fathers only are not significantly different in terms of rate of advancement. Coloured and white children advance through school at significantly faster rates than black children, while boys progress at a slower rate than girls. In Model 2, which adds household characteristics, the influence of family structure has changed; living with neither parent remains a significant negative predictor of rate of advancement through school, but living with mother only loses significance. This result suggests that the effects of living with mother only in Model 1 were due to the socioeconomic circumstances associated with this family type. The negative effect of being male remains in Model 2, while the effects of race changes (coloured children are no longer different than blacks, while white children progress at a slower rate through school than blacks).

In each of the regressions run separately by race (Models 3 through 5), children living with mother only or with father only are not statistically distinguishable from children living with both parents. Black and coloured children who live with neither parent, however, progress through school at a significantly slower rate than children living with both parents (Models 3 and 4). For whites (Model 5), the effect of living with neither parent is negative but only marginally significant ($p = 0.076$).

[Table 6 about here]

We now examine whether there are effects of family structure on direct investments in schooling. Table 7 presents a set of OLS models of logged expenditures on school fees for the sampled child, if the child is enrolled in school. Model 1 shows that family structure is a significant predictor of schooling

expenditures; children living with mother but not father and with neither parent have significantly less money spent on their school fees, while children living with father only are not significantly different from children living with both parents. White and coloured households spend significantly more money on children, relative to black households, but there is no significant effect of the child's gender. After adding household characteristics (Model 2), living with mother only loses significance; only children living with neither parent have less money spent on school fees. Race retains its importance in this model; in addition, gender attains significance, with boys having less money spent on their school fees.

Looking at each race separately, black children living with neither parent have less money spent on them than children living with both parents, while neither mother only nor father only households are significantly different (Model 3). For coloured children (Model 4), children living with mother only and children living with neither parent both have less money spent on school fees, while children living with father only are not significantly different from children living with both parents. The pattern for whites is strikingly different (Model 5): living with neither parent has a statistically significant effect, but it is positive. This is the opposite of the expected direction, the only such result found in this analysis.

[Table 7 about here]

DISCUSSION

In contrast to most previous work on schooling in South Africa, this research focused specifically on the role of family structure in children's schooling outcomes, using a nationally representative sample of children from the three most populous racial groups in South Africa. The study tested a theoretical model which predicted that children who did not live with both parents would receive lower levels of investment, leading to poorer schooling outcomes. The reasons for reduced investment when both parents are not present include increasingly complex household bargaining dynamics as well as parental tradeoffs over the allocation of resources to children versus other ends. South Africa, in which a substantial number of children do not live with both parents, and a significant fraction live with neither, offers an excellent opportunity to test the model.

The theoretical model was supported by the empirical results, which show family structure has significant effects on schooling outcomes, although the effects vary by race. For blacks and coloureds, the main effect of family structure is that children who live with neither parent are the most disadvantaged, in terms of the probability of enrollment, the highest grade completed, the rate of grade attainment, and expenditures on school fees. Black and coloured children living with mothers but not fathers or with fathers but not mothers are not disadvantaged relative to children living with both parents, suggesting a protective effect of the presence of a parent. In terms on schooling, children benefit from having a parent present, but do not obtain additional benefits from having two parents. There are two exceptions to this pattern. First, for school enrollment, black and coloured children living with father but not mother and children living with neither parent are significantly less likely to be in school. Second, for financial expenditures on schooling, coloured children living with mother but not father *and* children living with neither parent have less money spent on school fees.

For whites, no consistent effects of family structure emerged from the analysis. White children who live with neither parent advance through school at a marginally slower rate, but have more money spent on their school fees. Family structure appears to have no effects on enrollment in school or grade attainment.

Although white schools receive far greater per capita allotments than black or coloured educational institutions (Fedderke and Luis 2002), when socioeconomic background as well as individual and household demographic factors are controlled, race becomes much less important in schooling outcomes. Race is not a significant predictor for highest grade completed in the full multivariate model; blacks

complete fewer grades than whites, but this gap disappears when income, household size, and family structure are controlled. When background factors are controlled, the racial pattern for enrollment in school and rate of advancement through school actually reverses itself: whites and coloureds are less likely to be enrolled in school than blacks, while whites advance through school at a slightly slower rate (and coloureds are not significantly different from blacks). Race is still an important factor for expenditures on school fees; blacks spend significantly less on children's school fees than whites or coloureds. These results suggest that a significant proportion of the observed racial gap in schooling outcomes is due to differential socioeconomic and demographic factors between racial groups in South Africa.

A few limitations of the dataset and of the analysis must be addressed. The current analysis focuses exclusively on family structure in terms of the presence or absence of parents. The presence of other family members is controlled for indirectly in the analysis through household size and age composition variables, because larger households (and households containing more adults) are likely to contain more distant kin. Other researchers have shown that the presence of other family members, especially grandparents, can have positive impacts on children's wellbeing (Case and Deaton 1998, Duflo 2000) and on investments in children (Anderson 2003).

The dataset is cross-sectional, meaning we have observations for family type and schooling outcomes only for the time of the survey (October 1995). Caution must be used when ascribing causal relationships with cross-sectional data. Additionally, censoring is an important issue. Many of the key variables used in the analysis (including family structure and schooling outcomes) are likely to vary over time, and would ideally be investigated using discrete event history analysis. Because the acquisition of human capital is a cumulative process, it would be desirable to examine how events at a certain age (such as investment received and schooling outcomes) influence outcomes in subsequent years. Unfortunately the OHS, like other national South African surveys, contains no retrospective data on children's educational backgrounds, family structure or investment received.

The analysis of schooling outcomes by family structure presented in this paper is likely to underestimate the effects of living with neither parent, or with single parents, because of self-selection effects. Children are not randomly assigned to different households; they may be sent to live with neither parent if their situation there (in terms of financial resources, proximity of decent schooling, etc.) is likely to be as good or better than living with one or both parents. It would be desirable to know why children are not living with their parents, as well as additional details on nonresident parents such as whether or not the parent has remarried, his or her education, employment status, income, etc. Unfortunately these data are not available in the OHS.

Future research and data collection projects will hopefully be able to analyze the relationships examined in this paper in more detail. Direct measures of school quality (such as student/teacher ratio, availability of textbooks and other resources, etc.) would greatly assist analysis of the role of school choice in human capital production. Additionally, it would be desirable to have information on whether the children are receiving any financial aid to attend school. More detailed information on non-resident parents would allow us to examine the tradeoffs parents make between seeking employment and direct investment in children, as well as richer explorations of the intergenerational transfer of educational inequality. Lastly, more detailed measures of investment in children, such as time involvement and expenditures on items besides schooling, would provide a fuller picture of how adults contribute to the growth and human capital acquisition of children. Taken together, these steps will increase our understanding of the educational disparity by race in South Africa, with important long-term impacts on overall racial inequality in South Africa.

ENDNOTES

1. Apartheid laws were largely abolished by 1990, and democratic non-racial elections were held in 1994 and 1999. From 1990 until 1994, South Africa was ruled by an interim government, composed of members of the old government and members of formerly banned opposition parties, most notably the African National Congress, which was the primary winner in the subsequent national elections.
2. In Uganda, the national cancellation of school fees for primary schooling led to a dramatic increase in school enrollment, suggesting the cost of school fees had been an important impediment to enrollment among the poor (Deiningner 2003).
3. The ages six through nineteen were chosen because those are the main years of primary and secondary school enrollment. The sample is restricted to persons who have not completed secondary school because only they are at risk of enrollment in primary or secondary school, one of the main dependent variables to be analyzed.
4. Only 543 (3.2%) of the sampled children were Indian. Of these, 449 lived with both parents, 53 lived with mother only, 7 with father only, and 34 with neither parent.
5. The OHS measures completed schooling in terms of standards, which were converted to grades to make the results more accessible to an international audience. (Standard 10 = grade 12, Standard 9 = grade 11, etc.) The OHS collapses the lowest three levels (Sub-A, Sub-B, and Standard 1, equivalent to grades one through three) into a single schooling level, which is treated as grade 2 in the current analysis.
6. Over 62% of children in the sample are enrolled in school at age six. At age seven, enrollment increases to 92%, and remains over 90% for all races through age 16.
7. The OHS defines a household member as “a person who normally resides at least 4 nights a week in this household.” Parents who are not household members are counted as not present; it is not necessarily clear if their absence is due to migration, divorce, death, or other reasons.
8. Because no whites in the sample live in shacks, this variable is omitted from multivariate analysis using the white subsample.

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Table 1. Unweighted sample size, by family structure and race

	Black	Coloured	White	Total
Both parents	5,493 (44.9%)	1,412 (58.6%)	1,427 (83.6%)	8,332
Mother only	3,873 (31.7%)	563 (23.4%)	147 (8.6%)	4,583
Father only	331 (2.7%)	52 (2.2%)	36 (2.1%)	419
Neither parent	2,526 (20.7%)	381 (15.8%)	97 (5.7%)	3,004
Total	12,223 (100.0%)	2,408 (100.0%)	1,707 (100.0%)	16,338

Note: percentages add within columns.

Table 2. Summary statistics for variables in the sample, by race

	Black	Coloured	White	F
Family structure				
Lives with both parents	0.458	0.604	0.830	389.83***
Lives with mother only	0.318	0.238	0.095	221.23***
Lives with father only	0.026	0.019	0.024	2.08
Lives with neither parent	0.198	0.139	0.052	142.10***
Age	12.108 (0.040)	12.089 (0.099)	12.000 (0.114)	0.40
Male	0.501	0.502	0.518	0.65
Number in household ages 0-5	0.778 (0.011)	0.609 (0.018)	0.271 (0.016)	334.09***
Number in household ages 6-12	1.286 (0.012)	1.137 (0.023)	0.960 (0.026)	73.25***
Number in household ages 13-19	1.166 (0.011)	0.980 (0.022)	0.856 (0.026)	76.87***
Number in household ages 20-60	2.436 (0.018)	2.505 (0.036)	2.027 (0.017)	163.96***
Number in household ages 61 and older	0.342 (0.007)	0.258 (0.014)	0.085 (0.009)	248.92***
Lives in rural area	0.673	0.168	0.066	943.18***
Lives in shack/informal housing	0.359	0.044	0.000	743.75***
Anyone in household completed high school	0.310	0.291	0.819	578.87***
Log of household income	9.591 (0.017)	10.042 (0.030)	11.468 (0.027)	1681.25***
Highest grade completed	4.861 (0.037)	5.046 (0.086)	5.633 (0.104)	25.08***
Ego is enrolled in school	0.902	0.862	0.936	21.17***
Grades per year completed since age six ^a	0.781 (0.004)	0.816 (0.007)	0.911 (0.007)	132.43***
Log of school fees, if enrolled ^b	3.14 (0.021)	3.65 (0.059)	6.66 (0.032)	4275.84***
N	12,223	2,408	1,707	

Note: For categorical variables, weighted proportions are reported. For continuous variables, weighted means and robust standard errors (in parentheses) are reported.

a. N = 9482, 1855, and 1307, respectively

b. N = 9769, 1641, and 1430, respectively

*** p < 0.001

Table 3. Summary statistics for variables in the sample, by family structure

	Both parents	Mother only	Father only	Neither parent	F
Race					
Black	0.728	0.891	0.836	0.899	156.60***
Coloured	0.110	0.077	0.071	0.073	16.13***
White	0.161	0.033	0.093	0.029	95.51***
Age	11.918 (0.050)	11.968 (0.065)	12.786 (0.216)	12.710 (0.083)	7.53***
Male	0.512	0.503	0.526	0.474	3.75*
Number in household ages 0-5	0.658 (0.012)	0.820 (0.017)	0.540 (0.046)	0.716 (0.020)	26.72***
Number in household ages 6-12	1.224 (0.013)	1.291 (0.017)	1.074 (0.058)	1.224 (0.024)	6.67***
Number in household ages 13-19	1.074 (0.013)	1.133 (0.016)	1.078 (0.044)	1.227 (0.021)	13.86***
Number in household ages 20-60	2.566 (0.015)	2.401 (0.029)	2.271 (0.082)	1.954 (0.033)	105.27***
Number in household ages 61 and older	0.170 (0.006)	0.354 (0.011)	0.406 (0.035)	0.621 (0.015)	329.89***
Lives in rural area	0.513	0.619	0.550	0.638	30.48***
Lives in shack/informal housing	0.254	0.350	0.303	0.318	25.56***
Anyone in household completed high school	0.409	0.321	0.367	0.272	46.28***
Log of household income	10.111 (0.022)	9.513 (0.019)	9.884 (0.058)	9.465 (0.021)	226.60***
Highest grade completed	4.990 (0.045)	4.819 (0.054)	5.386 (0.178)	5.013 (0.071)	4.59***
Ego is enrolled in school	0.916	0.907	0.875	0.856	21.03***
Grades per year completed since age six [a]	0.825 (0.004)	0.789 (0.005)	0.793 (0.015)	0.739 (0.007)	42.21***
Log of school fees, if enrolled [b]	3.87 (0.038)	3.21 (0.027)	3.65 (0.106)	3.12 (0.035)	100.14***
N	8,332	4,583	419	3,004	

Note: For categorical variables, weighted proportions are reported. For continuous variables, weighted means and robust standard errors (in parentheses) are reported.

a. N = 6343, 3490, 356, and 2455, respectively

b. N = 6662, 3667, 316, and 2195, respectively

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

Table 4. OLS regression of highest grade completed

	1. All races		2. All races		3. Black		4. Coloured		5. White	
	Coeff.	<i>p</i>	Coeff.	<i>p</i>	Coeff.	<i>p</i>	Coeff.	<i>p</i>	Coeff.	<i>p</i>
Family structure (reference = both parents)										
Lives with mother only	-0.10	0.007	-0.02	0.631	-0.04	0.320	-0.02	0.792	-0.09	0.371
Lives with father only	-0.13	0.149	-0.13	0.140	-0.13	0.202	-0.08	0.767	-0.14	0.498
Lives with neither parent	-0.41	0.000	-0.31	0.000	-0.31	0.000	-0.45	0.000	-0.24	0.132
Age	0.95	0.000	0.93	0.000	0.88	0.000	1.12	0.000	0.88	0.000
Age squared	-0.01	0.000	-0.01	0.000	-0.01	0.000	-0.02	0.000	0.00	0.824
Male	-0.24	0.000	-0.26	0.000	-0.27	0.000	-0.25	0.000	-0.21	0.000
Race (reference = Black)										
Coloured	0.15	0.002	0.06	0.405	—		—		—	
White	0.74	0.000	-0.03	0.597	—		—		—	
Number in household ages 0-5	—		-0.10	0.000	-0.10	0.000	-0.09	0.020	-0.02	0.698
Number in household ages 6-12	—		-0.09	0.000	-0.07	0.000	-0.03	0.503	-0.10	0.023
Number in household ages 13-19	—		0.05	0.002	0.04	0.042	0.05	0.236	0.02	0.776
Number in household ages 20-60	—		-0.06	0.000	-0.07	0.000	-0.03	0.254	0.00	0.933
Number in household ages 61 and older	—		0.00	0.907	-0.01	0.705	-0.02	0.782	-0.03	0.712
Lives in rural area	—		-0.20	0.000	-0.17	0.001	-0.71	0.000	-0.03	0.819
Lives in shack/informal housing	—		-0.22	0.000	-0.21	0.000	-0.40	0.013	—	
Anyone in HH completed high school	—		0.51	0.000	0.58	0.000	0.31	0.000	0.21	0.036
Log of household income	—		0.17	0.000	0.16	0.000	0.31	0.000	-0.02	0.727
Intercept	-4.64	0.000	-5.68	0.000	-5.21	0.000	-8.44	0.000	-4.55	0.000
N	16,338		16,338		12,223		2,408		1,707	
F	4267.27		1545.00		1211.9		329.82		636.5	
<i>p</i>	0.000		0.000		0.000		0.000		0.000	
R-squared	0.715		0.736		0.715		0.781		0.900	

Note: data are weighted, robust standard errors are used, and the estimation controls for correlations within sampling clusters. Dummies for province are included in the analysis, but not shown in the results.

Table 5. Logistic regression of enrollment in school

	1. All races		2. All races		3. Black		4. Coloured		5. White	
	Odds ratio	<i>p</i>	Odds ratio	<i>p</i>	Odds ratio	<i>p</i>	Odds ratio	<i>p</i>	Odds ratio	<i>p</i>
Family structure (reference = both parents)										
Lives with mother only	0.95	0.474	0.96	0.628	0.96	0.634	0.79	0.256	0.79	0.665
Lives with father only	0.61	0.010	0.54	0.001	0.56	0.005	0.16	0.001	0.93	0.942
Lives with neither parent	0.55	0.000	0.52	0.000	0.50	0.000	0.53	0.006	0.54	0.234
Age	6.62	0.000	6.77	0.000	5.71	0.000	14.82	0.000	30.62	0.000
Age squared	0.93	0.000	0.93	0.000	0.93	0.000	0.89	0.000	0.87	0.000
Male	1.20	0.003	1.18	0.011	1.23	0.004	1.13	0.436	1.05	0.871
Race (reference = Black)										
Coloured	0.54	0.000	0.61	0.000	—	—	—	—	—	—
White	1.14	0.313	0.45	0.000	—	—	—	—	—	—
Number in household ages 0-5	—	—	0.91	0.005	0.91	0.012	0.94	0.537	0.93	0.743
Number in household ages 6-12	—	—	1.13	0.004	1.11	0.020	1.29	0.045	1.22	0.463
Number in household ages 13-19	—	—	1.11	0.009	1.12	0.008	1.05	0.711	0.75	0.189
Number in household ages 20-60	—	—	0.91	0.000	0.90	0.000	0.88	0.110	0.71	0.184
Number in household ages 61 and older	—	—	1.17	0.009	1.21	0.003	0.94	0.662	0.58	0.282
Lives in rural area	—	—	0.72	0.000	0.72	0.001	0.34	0.000	0.52	0.255
Lives in shack/informal housing	—	—	0.79	0.005	0.80	0.009	0.47	0.005	—	—
Anyone in HH completed high school	—	—	2.20	0.000	2.30	0.000	1.55	0.043	3.25	0.003
Log of household income	—	—	1.31	0.000	1.31	0.000	1.62	0.000	1.05	0.855
Intercept	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000
N	16,338		16,338		12,223		2,408		1,707	
Chi-squared	1268.57		1606.95		1183.02		349.17		195.95	
<i>p</i>	0.000		0.000		0.000		0.000		0.000	

Note: data are weighted, robust standard errors are used, and the estimation controls for correlations within sampling clusters. Dummies for province are included in the analysis, but not shown in the results.

Table 6. OLS regression of number of grades completed per year

	1. All races		2. All races		3. Black		4. Coloured		5. White	
	Coeff.	<i>p</i>	Coeff.	<i>p</i>	Coeff.	<i>p</i>	Coeff.	<i>p</i>	Coeff.	<i>p</i>
Family structure (reference = both parents)										
Lives with mother only	-0.02	0.003	0.00	0.487	-0.01	0.343	0.01	0.558	-0.02	0.317
Lives with father only	-0.02	0.326	-0.02	0.312	-0.01	0.512	-0.02	0.608	-0.03	0.318
Lives with neither parent	-0.06	0.000	-0.05	0.000	-0.05	0.000	-0.06	0.002	-0.05	0.076
Age	0.08	0.000	0.08	0.000	0.06	0.000	0.14	0.000	0.17	0.000
Age squared	0.00	0.000	0.00	0.000	0.00	0.000	-0.01	0.000	-0.01	0.000
Male	-0.05	0.000	-0.05	0.000	-0.05	0.000	-0.05	0.000	-0.03	0.004
Race (reference = Black)										
Coloured	0.03	0.001	0.02	0.130	—		—		—	
White	0.11	0.000	-0.02	0.034	—		—		—	
Number in household ages 0-5	—		-0.02	0.000	-0.02	0.000	-0.01	0.039	-0.02	0.196
Number in household ages 6-12	—		-0.01	0.013	-0.01	0.007	0.01	0.225	0.00	0.709
Number in household ages 13-19	—		0.00	0.247	0.00	0.380	-0.01	0.189	-0.01	0.329
Number in household ages 20-60	—		-0.01	0.000	-0.01	0.000	-0.01	0.055	0.00	0.899
Number in household ages 61 and older	—		0.00	0.631	0.00	0.514	-0.01	0.452	0.00	0.756
Lives in rural area	—		-0.03	0.000	-0.03	0.001	-0.10	0.000	0.01	0.563
Lives in shack/informal housing	—		-0.03	0.000	-0.03	0.001	-0.05	0.046	—	
Anyone in HH completed high school	—		0.08	0.000	0.09	0.000	0.02	0.080	0.02	0.396
Log of household income	—		0.03	0.000	0.03	0.000	0.06	0.000	0.02	0.082
Intercept	0.34	0.000	0.14	0.058	0.31	0.000	-0.55	0.001	-0.40	0.047
N	12,644		12,644		9,482		1,855		1,307	
F	113.98		68.90		50.31		16.47		6.55	
<i>p</i>	0.000		0.000		0.000		0.000		0.000	
R-squared	0.060		0.138		0.129		0.180		0.105	

Note: data are weighted, robust standard errors are used, and the estimation controls for correlations within sampling clusters.

Dummies for province are included in the analysis, but not shown in the results.

See text for definition of number of grades per year.

Table 7. OLS regression of logged school fees

	1. All races		2. All races		3. Black		4. Coloured		5. White	
	Coeff.	<i>p</i>	Coeff.	<i>p</i>	Coeff.	<i>p</i>	Coeff.	<i>p</i>	Coeff.	<i>p</i>
Family structure (reference = both parents)										
Lives with mother only	-0.16	0.000	-0.02	0.389	0.00	0.952	-0.18	0.022	-0.10	0.315
Lives with father only	-0.02	0.834	-0.04	0.514	-0.07	0.375	0.15	0.439	0.12	0.353
Lives with neither parent	-0.27	0.000	-0.08	0.011	-0.07	0.043	-0.28	0.014	0.28	0.005
Age	-0.06	0.009	-0.03	0.111	-0.03	0.212	-0.06	0.386	-0.02	0.716
Age squared	0.01	0.000	0.00	0.000	0.00	0.000	0.01	0.059	0.00	0.626
Male	-0.03	0.205	-0.05	0.010	-0.04	0.053	-0.13	0.072	-0.06	0.178
Race (reference = Black)										
Coloured	0.50	0.000	0.22	0.002	—		—		—	
White	3.46	0.000	2.48	0.000	—		—		—	
Number in household ages 0-5	—		-0.03	0.014	-0.02	0.048	-0.10	0.014	-0.04	0.397
Number in household ages 6-12	—		-0.08	0.000	-0.09	0.000	-0.06	0.180	-0.08	0.067
Number in household ages 13-19	—		-0.07	0.000	-0.06	0.000	-0.11	0.004	-0.02	0.553
Number in household ages 20-60	—		-0.07	0.000	-0.07	0.000	-0.07	0.029	-0.06	0.335
Number in household ages 61 and older	—		-0.07	0.000	-0.07	0.000	-0.04	0.621	-0.03	0.721
Lives in rural area	—		-0.16	0.000	-0.13	0.002	-0.32	0.062	-0.03	0.777
Lives in shack/informal housing	—		-0.07	0.029	-0.07	0.028	0.00	0.995	—	
Anyone in HH completed high school	—		0.28	0.000	0.27	0.000	0.33	0.000	0.18	0.009
Log of household income	—		0.29	0.000	0.27	0.000	0.41	0.000	0.29	0.000
Intercept	3.12	0.000	0.92	0.000	1.11	0.000	0.09	0.910	3.49	0.000
N	12,840		12,840		9,769		1,641		1,430	
F	1110.4		474.28		68.35		13.13		5.82	
<i>p</i>	0.000		0.000		0.000		0.000		0.000	
R-squared	0.472		0.577		0.268		0.214		0.127	

Note: data are weighted, robust standard errors are used, and the estimation controls for correlations within sampling clusters. Dummies for province are included in the analysis, but not shown in the results.