The Determinants of Educational Attainment

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ABSTRACT: The determinants of educational attainment are considered within Becker's analysis of the supply and demand for human capital at the individual level. The following sources of variation are considered: type of settlement, assortative mating, household demography, reasons for school drop out and the intergenerational transmission of educational attainment. Particular attention is paid to the determinants of higher educational achievement. The analyses suggest considerable intergenerational mobility in educational achievement and little by way of gender inequality. However, settlement type, school attended and liquidity constraints undermine equality of educational opportunity.

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1 Introduction

A companion paper (Simkins, 2001) analyses the stocks and flows of human capital at the aggregate level. In this paper the analysis will be concerned with the determinants of individual educational attainment.

The theoretical framework is provided by Gary Becker's analysis of the supply and demand curves for investment in human capital by individuals (Becker, 1993: Chapter IV). The position of the demand curve is determined by the rate of return to a particular person on each additional rand of investment. The position of the supply curve shows the effective marginal financing cost to him, measured by the rate of interest on each additional rand invested. The person will go on investing in education until the rate of return equals the rate of interest, at which point an equilibrium (the desired level of education) is reached.

The demand curve slopes downward as human capital invested increases, because the human capital is embedded in the person investing. Since memory capacity and ability to use information in each individual is limited, diminishing returns eventually set in as human capital increases. The supply curve would be horizontal if the capital market were perfect; in fact, the market for human capital is highly segmented. There are government subsidies for schools, technical colleges, universities, technikons and colleges all at different rates. There are transactions costs which often make own funds considerably cheaper than borrowed funds. There are limitations on the amounts and rates at which funds can be borrowed for investment in human capital. The cheaper sources of funds are usually rationed so that a person must shift from the cheapest source of funds to the next cheapest and so on as investment in human capital rises. This means that the supply curve slopes upwards.

Between individuals there may be variation in both demand and supply conditions. On the supply side, the variation comes from differences in availability of funds. Cheaper funds are more accessible to some persons than others. Some may receive scholarships. Others may be born into wealthy families, have generous parents, borrow on favourable terms or willingly forego consumption while investing. People with favourable supply conditions would invest relatively large amounts in themselves. On the demand side, there are differences in the capacity to benefit from investment in human capital. Some people are abler than others. The demand curve of an able person lies above that of someone less able; if they both face the same

supply curve, the more able will invest more heavily in human capital.

Becker and Tomes also consider the role of human capital in the rise and fall of families (Becker, 1993: Chapter X). Two mechanisms of particular importance here are:

- Marriage patterns. The propensity of well educated people to marry well educated people and of poorly educated people to marry poorly educated people is termed assortative mating. Assortative mating produces more inequality in ability in the next generation of children than random mating. Imperfect assortative mating produces less inequality in the next generation than perfect assortative mating.

- Regression towards the mean. Parents only partially pass on high or low degrees of ability to their children. Children of high ability parents will have lower abilities than their parents (but, on average, still above the mean) and children of low ability parents will have higher abilities than their parents (but, on average, still below the mean). John Dewey found that upon the average, children of parents who are exceptional, or who deviate from the mean, will themselves deviate from the mean only one third of their parents' deviation. (Dewey, 1889: 333-334).

The degree of regression toward the mean in the achievements of children compared to those of their parents is a measure of the degree of equality of opportunity in a society. When it comes to achievement, factors over and above ability come into play. The level of fertility and degree of altruism by parents also matters, as does the access of family to educational funding opportunities. And if one considers not only educational achievement but also income, then the intergenerational transfer of wealth in forms other than human capital have to be considered. Becker and Tomes cite empirical studies from the United States and Western Europe, most of which indicate that a 10% increase in father's earnings raises son's earnings by less than 2% (Becker, 1993: 282). Family background matters, especially if inequality of income is relatively high. But practically all the advantages or disadvantages of ancestors tend to disappear in only three generations.

It cannot be taken for granted that high-income industrial country outcomes will be reproduced in middle-income countries like South Africa. In South Africa, too, apartheid produced a highly fragmented and unequal educational system. At the beginning of 1994, African education was under

the control of the Department of Education outside the ten homelands, four of which were 'independent' and six of which were 'self-governing'. Each homeland had its own educational system. Moreover, there was a system of farm schools in the rural areas outside the homelands, which by the end of apartheid offered more limited options than schools in the homelands. Coloured, Asian and White education were under the control over three Departments of Education reporting to three separate parliaments.

The entire system has been rationalised into nine provincial school systems since 1994 and measures taken to ensure greater equality in resource allocation between schools. Nonetheless:

- Ratios vary from less than 20 to more than 120 learners per classroom
- Sanitation at schools varies in quality from flush systems to pit latrines and buckets. Many schools in rural areas have no toilets at all. Many schools make use of water sources that are unhygienic
- More than 4 000 out of 27 500 schools have been rated as unsuitable for education or in need of structural attention.
- Almost half of all schools have neither electricity or telephones
- Only 20% of schools have libraries and 25% specialised classrooms such as laboratories, computer rooms etc
- Schools with the highest learner:educator ratios are found in inaccessible or poverty-stricken areas where very few educators reside or would be willing to teach
- Nationally, 75% of the teaching force is appropriately qualified, but there are substantial provincial variations around this average
- Many schools are far from surfaced roads and urban areas, making communication and the distribution of learning resources problematic.

(Bot, Wilson and Dove, 2000: Chapter 4)

The correlation between physical resources and educational outcomes is far from perfect. Bot, Wilson and Dove have constructed an index of physical school resources which maximised its ability to predict the Senior Certificate pass rate. Nonetheless, the index explains only about 30% of the variance in performance (Bot, Wilson and Dove, 2000: 81).

So there is much to investigate. The analysis here will be restricted in some respects:

- The issue of school quality will be left for a later study. Unfortunately, there is no South African data set which enables one to examine simultaneously the effect of settlement type, household circumstances and school quality on educational outcomes. Relationships have to be considered piecemeal.
- Intergenerational transmission of educational advantage will be considered without bringing in household income as an intermediate variable. The relationship between education and income will be left for a later study.
- Time series or panel data are needed to investigate intergenerational transmission issues fully. These do not exist for South Africa as a whole. But we can make considerable progress using cross-sectional data.

Section 2 will consider the gross effects of the type of settlement (formal urban, informal urban, commercial farm, tribal rural and other rural) on levels of educational achievement.

Then the effects of household circumstances on individual achievement will be analysed. There are several mechanisms at work and they need to be identified clearly. Section 3 will deal with the extent of assortative mating (a source of inequality) in contemporary South Africa.

Parent (or grandparent where no parent can be identified) to child transmission of educational achievement is subject to the process of regression of ability to the mean. Regression to the mean is an equalising phenomenon, but its extent is variable across societies. The process of transmission of ability may be liquidity constrained: poor households may only be able to finance increments of education at increasing cost and sometimes not at all.

Complicating the situation is the position of young people (particular attention will be paid to those between the ages of 15 and 29) within households. The loss of parents through orphanhood or other circumstances which lead to the assumption of the role of a household head at an early age may inhibit educational achievement. So may early pregnancy among young women. Accordingly, Section 4 will consider background information on household demography in South Africa as it affects people between the ages of 15 and 24.

The 1998 October Household Survey asked all people between the ages of 15 and 24 who had not completed Grade 12, whether they wished to study further and if so, the reasons for them not doing so. Tabulated against household relationship variables, these data illuminate the effect of household structure on educational achievement and are considered in Section 5.

Section 6 then takes up the theme of intergenerational transmission of education and Section 7 considers the more specialised question of access to higher education. Section 8 then seeks to interpret the statistical findings of this chapter.

Except in Section 5 where the 1998 October Household Survey is used, the data will come from the 10% sample of the 1996 Population Census. In aggregate, the Census sample is large, consisting of more than three and half million records. It is a systematic sample, stratified by province and district council. The 1998 October Household Survey was much smaller and consists of data from 20 000 households drawn in clusters of ten from 2 000 enumerator areas.

2 The influence of settlement type on educational achievement

In addition to race, gender and age, settlement type affects educational attainment, because mean income levels, occupational structures and institutional arrangements vary across them. The tabulations from the 1996 Population Census use a five-fold classification of settlement types:

- Urban formal
- Urban informal
- Commercial farms
- Tribal rural (land held not under individual tenure, but occupied by tribes and allocated by traditional leaders)
- Other rural

Each educational category can be converted into the number of years of education required to achieve it. Appendix One sets out the basis for the

conversion. Only people of age 20 or more (i.e. those who have completed much of their education) are considered.

The number of years of education can then be regressed on:

- Settlement type (represented by five dummy variables - one for each of the five categories)
- Gender (represented by two dummy variables - male and female)
- Age groups (represented by eight dummy variables, one each for the following age groups: 20-24, 25-29, 30-34, 35-39, 40-44, 45-54, 55-64, 65+)

The study on the stocks and flows of human capital demonstrated the similarity of birth date profiles of educational achievement by age 40 for men and women in the cases of Africans, Coloureds and Whites. The birth date profiles of educational achievement by age 40 by men and women are rather different in the case of Asians (Simkins, 2001). The reason for this is that in the first half of the twentieth century, Asian men achieved markedly higher educational levels than Asian women. The gap has all but disappeared since then. Accordingly, the genders have been regressed separately for Asians.

The results of the regression analysis are displayed in Table 1, along with a panel which shows the distribution of people of age 20 or older across settlement types by population group. The purpose of the panel is to show that some settlement type regression coefficients, although significant at the 5% level, affect very few people. There are fewer than twenty thousand people in the each of the following categories:

Urban informal: Asians and Whites

Commercial farms: Asians

Tribal rural: Coloureds, Asians and Whites

Other rural: Asians and Whites

The constant in the regression coefficients is interpreted as the expected number of years of education for men age 20-24 in formal urban areas. They are 11.75 years for Africans, 11.36 years for Coloureds, 13.12 years for Asians (and 13.27 years for Asian women) and 13.87 years for Whites. These values are high and should be interpreted in the light of cautionary comments made

in the human capital stock paper (Simkins, 2001) about possible inflation of educational achievement as reported in the 1996 Population Census.

Relative to the levels of achievement in urban formal areas, the expected levels in other settlements are lower. For Africans and Asians residence in urban informal areas takes about 1.75 years off the expected level of educational achievement; for Coloureds the gap is larger. The coefficient for Whites is small and insignificant at the 5% level. For Africans and Coloureds, residence on commercial farms implies expected educational achievement of just over four years below that in urban formal areas. The gap is much smaller in the case of Asians and hardly exists for Whites. For Africans and Coloureds, expected levels of educational achievement are higher in the tribal rural areas than on the commercial farms, but still well below those in formal urban areas. For the small numbers of Asians and Whites who live in tribal rural areas, expected educational achievement is the worst of all the settlement types. The picture is more mixed in the case of the heterogeneous category of 'other rural' - for Africans, expected educational achievement here is slightly worse than in urban informal settlements and for other groups slightly better.

These findings are not surprising. One would expect educational achievement in generally poorer and somewhat remote urban informal areas to be lower than in urban formal areas. The size of the gap between urban formal and urban informal areas is substantial - not much smaller than between urban formal and tribal rural areas. Educational provision is worst on commercial farms. Adele Gordon has pointed out that farm schools are among the poorest in physical infrastructure, provision of facilities and services and teaching resources. Retention rates are significantly lower in farm schools than at all other schools. Up until 1987, farmers were entitled by law to withdraw children to work on their farms. The level of education offered in farm schools is haphazard. Most farm schools have multi-grade classes and in some cases these have to cater to speakers of different home languages. And the children of seasonal workers, who move from farm to farm, are particularly disadvantaged (Gordon, 2000: 2 - 10). By contrast, apartheid policy was in favour of educational development in the homelands, in which most tribal rural areas are situated.

The gender gap is small in the case of Africans, Coloureds and Whites - of the order of 0.2 years in each case. This confirms what was found in the human capital stock study (Simkins, 2001).

The coefficients on the age-groups are the outcome of two processes which cannot be statistically distinguished in a cross-sectional analysis. They are: (a) the slight continuing rise in levels of educational achievement in the 25-29 and 30-34 age groups as people complete post-school qualifications and (b) the birth date effects - people belonging to earlier birth date groups have generally lower levels of education. In all cases, the second effect dominates - in the case of Whites, however, one can see the effect of continuing education among the 25-29 and 30-34 age groups showing up as positive coefficients on the age dummies. The coefficients confirm the analysis in the human capital stock study (Simkins, 2001). They also show why the separate regressions for Asian men and women were necessary: the coefficients on the older age-group dummies are more sharply negative in the case of women.

The R-squared coefficients also need interpretation. They represent the proportion of the variance in the dependent variable (years of education) explained by the regression equation. Thus in the case of Africans, 30.2% of the variance in years of education are explained jointly by settlement type, gender and age group. In the case of Whites, only 6.7% of the variance is so explained. Why is there a difference?

In the case of Whites, the effect of settlement type on the expected level of education is weak. Whites live almost exclusively in formal urban settlements and on commercial farms - and for them, the expected educational achievement on farms is only 0.06 years lower than in formal urban areas. The gender effect is also weak, in common with other population groups. And because the White educational pattern has been more stable than among other groups for the past two generations, the coefficients on the age group dummies are also smaller than for other groups. In other words, for Whites, neither settlement type nor gender nor age group has much influence on educational achievement: the causes for 93.3% of the variance in educational level must be sought elsewhere.

In the case of Asians (and more strongly among women than among men) age accounts for much of the variance in educational achievement. In addition, the settlement effects are generally stronger, though the contribution of these to overall variance is limited, since over 96% of Asians of age 20 or more live in formal urban areas. In the case of Coloureds and Africans, both settlement effects and age effects contribute to the relatively high level of explained variance: where you live and when you were born has a substantial effect on educational achievement.

3 Assortative mating

Marriage/partnership data are obtained from two variables in the Population Census: marital status and relationship to household head. Panel A of Table 2 shows the number of people reporting themselves as married (civil/religious), married (traditional/customary) or living together (with partner). For ease of reference, people in any of these categories will be referred to as 'married' throughout this chapter. 5 436 668 men and 6 000 973 women reported themselves as married. The discrepancy arises from three factors:

- Some married people may have partners in other countries, notably Africans of foreign birth who may be living and working in South Africa with a spouse in a neighbouring country
- If the number of same-sex partnerships among men is different from the number of those among women, a discrepancy will arise from this source
- Even when the preceding two factors are taken into account, demographers are familiar with the phenomenon of 'spouse leak', with women generally more eager to claim the status of married than men. This respondent problem is compounded by the Population Census's statistical practice of weighting different people in the same household differently for underenumeration.

The organisation of data in the 1996 Population Census do not always make it possible to identify the spouse of a married person. It is never possible to identify the spouse of a person if the spouse if living in a different household. And even when the spouse is living in the same household, it is only possible to be sure of his or her identity if the person is either the head of household (relationship code 1) or husband/wife/partner (relationship code 2). Of the 11 437 642 married people, 9 959 761 (87%) were household heads or husband/wife/partner of the household head. The remainder must be dropped from the analysis.

Panel B of Table 2 counts up the number of married people in each household who have relationship codes 1 and 2 and cross-tabulates households by these numbers. The logic of the household relationship system means that there should only be one person in each household with code 1. This is by and

large true: 5 393 173 (98.1%) out of 5 495 535 households which contain at least one married person have a single household head. Other households are dropped from the analysis, because of coding problems. Among these 5 393 173 households, 1 439 794 (26.7%) have no code 2 people: either the spouse is residing in another household or marital status is incorrectly reported. 22 470 (0.4%) of households have two or more code 2 people, indicating polygamy or polyandry if the coding is correct. 3 930 909 (72.9%) households have exactly one head and exactly one spouse. Of these households in 10919 (0.3%) both partners are coded as male and in 22 999 (0.6%) both partners are coded as female, leaving 3 896 991 heterosexual monogamous partnerships where both partners can be identified. Of these, 3 866 275 (99.2%) have the races of both partners identified by the Census.

In the South African context, it must be remembered that marriage is almost completely assortative by population group. From 1949 to 1985 the Prohibition of Mixed Marriages Act forbade marriages between members of different population group. Even now, they are rare: Panel B of Table 2 shows that 3 840 645 (99.3%) of marriages under consideration were between members of the same population group. So the relationship between educational levels of husband and wife are investigated by each population group separately and for all mixed marriages together.

Panel C of Table 2 reports the correlation coefficients between the years of education of husbands and wives as well as the number of years by which the education of the wife is expected to rise given a one year increase in the education of the husband. The correlation is lowest in the case of mixed marriages; substantially higher are the correlation coefficients for Africans and Coloureds and higher still are the correlation coefficients for Asians and Whites. The same relations are found between the coefficients estimating the increase in a wife's education for every year of her husband's. Among the best educated groups (Asians and Whites) assortative mating by education is most pronounced and among the most heterogeneous group (mixed marriages) it is the least. As education spreads further among Africans and Coloureds the correlation coefficients for these groups can be expected to rise further.

The second table in Panel C presents the number of marriages by population group in three categories:

- Husband's education more than two years ahead of wife's
- Husband's and wife's education within two years of each other

- Wife's education more than two years ahead of husband's.

74% of marriages fall into the second category - 66% in the case of Africans, 70% in the case of Coloureds, 79% in the case of Asians, 95% in the case of Whites and 65% in the case of mixed marriages. There are slightly more marriages in which the wife's education is ahead of her husband's by more than two years than the other way round in the case of the population as a whole, Africans and Whites. The reverse is true for Coloureds, Asians and mixed marriages. All this is consistent with the other findings in the section.

Mare (1991) carried out an analysis of United States Census and Current Population Survey data from 1940 to 1987 with a view to establishing the structure of, and trends in, educationally assortative mating in that country. He found that marriage between persons with different amount of schooling are less likely for highly educated persons and for persons who marry shortly after leaving the educational system. The association between spouses' schooling increased between the 1930s and 1970s and was stable or decreased during the 1980s. The time gap between schooling and marriage decreased from the 1930s to the 1960s and increased in the 1970s; after this factor was taken into account, there remains some increase in assortative mating between the 1930s and 1980s. This may result in increasing competition in the marriage market for wives with good prospects in the labour market. Mare's table of assortative mating for newlyweds (married within a year before the Census) in 1980 is reproduced in Appendix Two. It represents a situation somewhere between South African Asians and Whites (all lengths of marriage).

4 Household demography

The position of young adults in households may affect their educational achievement through the supply curve for investment in human capital. Finance for such investment is likely to be cheaper if it is supplied by the household, both in terms of payment of the direct costs of education and in terms of provision of subsistence during education. Absence of the pressures of having to earn a living or perform the functions of a head of household also means that more time can be put into making educational investment effective.

Before turning to the analysis of intergenerational transmission of educational achievement, it is necessary to pay some attention to household demography. The position of people aged between 15 and 24 will be focussed upon in order to consider the intergenerational transmission of educational achievement. Educational achievement among people younger than 15 is insufficiently complete and differentiated to be of interest. As age rises beyond 24, large and increasing numbers of people leave their households of origin. On the basis of the data in the Census, it is then impossible to determine the educational achievement of their parents or grandparents.

The 1996 Population Census contains a variable which indicates the position of an individual within a household. The positions distinguished are:

Head of household

Husband/wife/partner

Son/daughter

Brother/sister

Father/mother

Grandparent

Grandchild

Other relative

Non-related person

Tables 3A and 3B set out the distribution of positions of people between the ages of 15 and 24 in households by population group, gender and age group. Table 4 summarises the percentages for which intergenerational transmission estimates can be made.

Over three-quarters of people aged 15-19 and over half (except in the case of Whites) of those aged 20-24 can be used for estimation of intergenerational transmission of educational achievement.

Table 5 sets out the percentages of people aged 15-24 who are household heads or the same generation as household heads (husband/wife/partner and brothers/sisters).

There remain some people whose generational status in relation to the household head is uncertain. Some people aged 15-24 are recorded as fathers/mothers of household heads - this is hardly plausible. Others are

described as 'other relatives', 'non-related persons' and 'unspecified'. Relationship data was also not collected for people living in institutions (see note to Table 3A). Institutions or collective living quarters include structurally separate and independent places of abode intended for habitation by large groups of individuals or several households and occupied at the time of the Census. Such quarters usually have common facilities, such as cooking and toilet installations, baths, lounge rooms or dormitories that are shared by the occupants.

People become heads of households for the following reasons:

- They marry and establish separate households
- They are orphaned, literally when their parents die or effectively, when they lose touch with their parents (a respondent not knowing whether his or her father or mother is alive is a good indication of this situation) and they do not join another household
- They choose to leave as the attractions of a separate household outweigh the attractions of remaining in the household of origin.

Early marriage and establishment of households, and orphanhood are likely to work against the acquisition of education. It is harder to generalise about people who leave their household of origin for other reasons. Very early departure from the household of origin may indicate that household's dysfunctionality. As age rises, household headship is more likely to denote relatively high education and more secure status.

Table 6 classifies heads of households and their brothers and sisters by marital and orphanhood status. It shows that:

- In the 15-19 age group the proportion of heads of households ever married is relatively low and brother/sisters very low. The proportion of never married complete, paternal or maternal orphans is usually higher and sometimes considerably higher. But more than half the heads of households and brothers/sisters are neither married nor orphaned, but have left their households of origin for other reasons.
- In the 20-24 age group, the proportion of heads of household who are married is much higher; the proportion of never married orphans remains high and the proportions of people who have left their households

of origin for other reasons are generally lower than for the 15-19 age group.

The picture which emerges of the reasons for household headship among young adults is therefore rather mixed and incomplete. The data sources admit of no further probing of the issue.

The statistical difficulty in measuring intergenerational transmission of educational achievement lies in the removal of people from their households of origin into households in which they are the head, spouse/partner or head's brother and sister. If this change in category is a function of the educational achievement of the person concerned we have mutual determination of category and educational achievement, and the assumptions of the standard regression model (which require independent variables not to be determined by the dependent variable) are violated. In effect, a single equation is implicitly part of a simultaneous equation system, for which special estimation techniques are required (Gujerati 1995: Chapter 18). This point will be taken up in Section 6.

5 Leaving the educational system between 15 and 24 without completing Grade 12

Table 7 sets out the position of people aged 15-19 and 20-24 in October 1998 who had not completed Grade 12. The overwhelming majority of people aged 15-19 in this position were still studying: over 80% in the case of Africans and Whites, nearly 80% in the case of Asians and 70% in the case of Coloureds. The proportions drop for people aged 20-24, remaining over 40% in the case of Africans, but dropping below 20% for Asians and Whites and below 10% for Coloureds.

Table 7 shows that, of those aged 15-19 not studying, those not wishing to study were a minority in the case of Africans and a majority in the case of the other three population groups. Sample sizes make the interpretation of the reasons for not studying while wishing to do so difficult in the cases of the minority groups. Nonetheless, it is possible to conclude from Table 7 that:

- For those wishing to study, the main reason for them not doing so was lack of money.

- Young women who wish to study but who cannot do so are subject to all the reasons applying to young men in the same position plus pregnancy during the year of the survey or by having to care for children. If one removes the special factors applying to young women, the number of young women wishing to study but unable to do so is close to the number of young men in the same position in the cases of Africans and Coloureds (where sample sizes are reasonable). Adding pregnancy and child care in, the proportion of women wishing to study but not able to do so is considerably higher than the proportion of men.

The proportions of those not wishing to study were higher for people aged 20-24, but close to half the African men and two-thirds of African women this group who were not studying retained the desire to do so. Lack of money again emerges as the main constraint, with substantial additional pregnancy/child care constraints on women.

Table 8 reports the results of two probit analyses: one for the probability of not studying and the other for the probability of wishing to study while not doing so. The analyses are conducted separately by gender.

When it comes to the probability of not studying, there are significant positive effects for Coloureds, Asians and Whites. This may seem puzzling until it is recalled that these groups either achieve Grade 12 or leave school without it earlier than Africans. Those with Grade 12 do not appear in the probit analysis sample at all. Coloureds, Asians and Whites leaving before Grade 12, as Table 7 shows, are more likely than Africans to have done so because of lack of desire to remain in school.

The coefficient for the 20-24 age group is, as one would expect, strongly positive. The rural coefficient is negative and small but significant; it means that those in rural areas, other things equal, have a slightly higher chance of still studying between the ages of 15 and 24.

Compared with the position of a household head, a son or daughter or a grandchild has a lower chance of not studying, confirming the hypothesis of the importance of remaining in the household of origin for educational achievement. By contrast, the orphanhood coefficients are insignificant, suggesting no direct effect of orphanhood over and above the effect on position in a household.

The education coefficients become more sharply negative with grade, as one would expect. The higher one's level of already achieved level of education, the more likely it is that one would be studying further. Or put

another way: if one has achieved very little education by reaching the 15-24 age group, one's chances of studying at that age are small.

Turn now to the probability of wishing to study while not not doing do. Here the Coloured, Asian and White coefficients are negative, reflecting fewer constraints on choice among these population groups, other things equal. The coefficient on the 20-24 age group is negative: not studying in this age group is more likely reflect the desire to stop. The rural coefficients are positive, but weakly (and in the case of men, insignificantly) so. In the case of men, the relationship coefficients are negative: not studying in the case of children and grandchildren is more likely to reflect a wish to stop. Again the orphanhood coefficients are insignificant. The education coefficients rise with grade: the more education one has, the more one wishes to continue.

6 The intergenerational transmission of educational achievement

The intergenerational transmission of educational achievement will be investigated by considering the highest level of education achieved by people between the ages of 15 and 24 who are known to be:

- of the same generation as the household head
- sons or daughters of household heads
- grandsons and granddaughters of household heads

Excluded from consideration are fathers/mothers of the household head, grandparents of the household head, other relatives and non-related persons, as well as all those whose relationship to the head of household was not specified. The last category includes all people in institutions (see note to Table 3A).

Among all population groups, the majority of the 15-24 age group live with one or both parents: 65% among Africans, 74% among Coloureds, 82% among Asians and 71% among Whites. But the percentage of people living in households with one parent only varies greatly, from 32% among Africans, 21% among Coloureds, 15% among Asians and 11% among Whites.

Table 9 displays the effect of population group, urban/rural residence (in the case of Africans and Coloureds - Asians and Whites are overwhelmingly

urban), gender and position in the household on mean years of schooling completed at ages 19 and 24. What is noticeable is that:

- gender has little effect and more often than not young women are slightly ahead of young men,
- urban vs rural residence the most marked effect,
- age relatively little effect (but this is the result of two factors largely cancelling one another out: higher age means more exposure to educational opportunities, but it also means, in a cross-section, belonging to an earlier and less educated birthdate cohort. Simkins (2001) shows that the expected education by age rises by birthdate for all population groups), and
- position in the household has relatively little effect, and the pattern of the effect is hard to determine from Table 9.

The regression analysis presented in Table 10 allows one to estimate more systematically the influence of:

- age,
- gender,
- urban or rural location
- the position in the household,

(all variables in Table 9) and

- the schooling of the parent or grandparent who is the household head

on the educational attainment of individuals.
Three regressions are run for each population group;

- for people of the same generation as the household head
- for people who are children of the household head
- for people who are grandchildren of the household head.

Age, gender, urban/rural location and the position in the household are treated as categorical variables and the schooling of the household head as a continuous variable. Because nearly all Asians and Whites are urban, the urban/rural variable is left out of their regressions.

As expected the coefficients on the age dummy variables for ages 16 and 24 are positive and mostly rising. When they start to fall for the higher ages, this can be ascribed to birth date effects - earlier birth dates imply worse educational achievement. Within this broad picture, there are some fluctuations which can be ascribed to the imprecision (positive standard error) of statistical estimates. Standard errors of the age coefficients are reported in Table 10. Notice that the age coefficients for young men and women with parents and grandparents rise more rapidly that for young men or women who are heads of households or of the same generation as the head. Parental support helps. This effect is small for Whites.

The coefficient of the female dummy variable is either insignificantly different from zero, or positive, indicating that young women achieve at least as well as young men when the other variables in the regression are taken into account. Usually, the positive coefficients on the female dummy are higher when young women are supported by families than when they are not. This confirms and refines the findings from Table 9.

The effect of urban or rural location is strongest in the case of household heads and the same generation; African and (especially) Coloured young men and women in rural areas who are in these positions have markedly lower educational attainment. This confirms and refines the findings from Table 9. Comparing the results in Table 10 with those in Table 1, one sees that the net rural effect is smaller than the gross rural effect. The reasons that rural pupils attain less than urban pupils is partly a consequence of rural location and partly a consequence of having rural parents whose educational attainment is on average below that of their urban counterparts.

The effect of the type of household varies by population group. Whether there are two parents, one male parent or one female parent matters not at all in the case of Whites. In the case of Asians, two parents are better than one for educational attainment. In the case of Coloureds, being the child of a single female parent seems to be best, whilst among Africans, a single female parent does about as well as two parents and both do better than a single male parent. If one is brought up by grandparents, a female household head is better for Africans, a male household head is better for Asians and for Coloureds and Whites, it doesn't matter whether grandfather

or grandmother is in charge.

The chief new insight from Table 10 is that the schooling of parents and grandparents have a relatively weak effect of the educational achievement of young men and women. In all cases, an additional year of educational achievement of grandparents has a smaller effect than an additional year of educational achievement of parents. But even in the case of parents, an additional year of parental achievement by parents translates only into about one-fifth of an additional year of schooling by young adults in the case of Africans and Coloureds and only one-tenth in the case of Asians and Whites.

Because of the rising proportion of household heads in the total as age increases, the regressions were run separately for the 15-19 and 20-24 age groups for people who were children or grandchildren in the household head. The coefficients on the educational achievement of the head were all somewhat higher for the 20-24 age group than for the 15-19 age group, suggesting that part of the mechanism by which relatively high educational achievement is passed from one generation to the next is longer residence in the household origin while higher levels of education are achieved. It is also possible that transmission effects are stronger at the upper levels of the educational achievement spectrum. This hypothesis will be explored in the next section.

7 The determinants of higher educational achievement

In this part of the analysis, the educational achievement of people aged 20-29 who have completed Grade 12 will be considered. The dependent variable will be educational achievement of four ordered categories:

- Grade 12
- Senior Certificate plus a further certificate
- Senior Certificate plus a diploma
- Senior Certificate plus a degree

The model used will be an ordered probit model. This is appropriate when the dependent variable consists of ordered categories. Like a regression model, coefficients for the independent variables are calculated. These can

be combined with the variable values themselves to calculate a score. An ordered probit model also provides cut points for the score, which indicate the ranges corresponding to each of the dependent variable categories. The score can be compared with these cut points to find the dependent variable category corresponding to set of independent variables.

An ordered probit analysis is most easily interpreted if all the independent variables are categorised and represented by dummy variables. The dependent variables are:

- age from 20 to 29
- gender
- urban/rural (in the cases of Coloureds and Africans only)
- type of household, and
- education of parent or grandparent divided into six categories:
- Complete primary education or less
- Incomplete secondary education
- Grade 12 only
- Senior Certificate plus certificate
- Senior Certificate plus diploma
- Senior Certificate plus degree

Regressions are carried out for people of the same generation as the household head, children of household heads and grandchildren of household heads in the case of Africans. For the three minority groups regressions are carried out for people of the same generation as the household head and children of the household head. The sample sizes for the analysis of the achievement of grandchildren in the cases of the three minority population groups are too small to yield useful results.

The results, set out in Table 11, show fairly regular progress in the age dummy coefficients; the patterns are more erratic in the case of minorities because of smaller sample sizes. The effect of gender is often not significantly

different from zero and where it is, the effects are small. The urban/rural effect is somewhat bigger, but is not large. Also insignificant are the category coefficients - in terms of higher education achievement, whether one comes from a one-parent or two-parent family or whether one is a grandchild in a male or a female headed household does not make much, if any difference, to educational achievement.

What matters much more than gender, urban/rural location and category of household is the education of the household head. In the case of Africans and Coloureds, the additional help having a parent with some higher education himself or herself is considerable. For Asians and Whites, the progression is more regular and the gaps between the educational coefficients more even.

The cut points indicate that, generally speaking, it does not take a markedly higher score to achieve a diploma compared with a certificate. The gap between the score required for a degree and that required for a diploma is always considerably larger.

8 Comparison of findings with an earlier analysis

Thomas (1996) has investigated intergenerational mobility using a data collected by Donald Treiman from nearly 9 000 households within randomly chosen clusters in (the whole of) South Africa between 1991 and 1993. Unlike the 1996 Population Census where data on parents'/grandparents' education was only available if there was co-residence, data on the education of parents was available for all adults between the ages of 20 and 70 in the Treiman data set. Unlike the analysis above, Thomas did not consider the effects of position within households on educational attainment.

Thomas found that 22% of educational attainment of Whites could be explained by parental education alone. In the case of Africans and Coloureds and Asians, the proportion of variance explained rose to 35%, 37% and 41% respectively (Thomas, 1996: Table 2). He also found that the effect of father's and mother's education on that of children has been dropping for Africans, Coloureds and Asians born since 1950.

Thomas's findings and the analysis above both find that African and Coloured transmission of educational achievement is greater than transmission among Whites. The findings for Asians are different; Thomas's analysis puts them with Africans and Coloureds, whereas the analysis above puts them with Whites. Thomas's intergenerational transmission coefficients are

generally higher than those yielded by the analysis above. This may partly due to the fact that the mean birth date of children in his analysis is earlier than in the analysis above, so the discrepancy is in the direction one would expect if intergenerational transmission has been dropping over time. Moreover, it has to be borne in mind that the specifications in the analysis above are more complex than in the Thomas analysis, so the coefficients are not strictly comparable.

9 Interpretation

Interpretation of the results of the statistical analyses in this paper is helped by the identification of a number of themes.

9.1 Years of education as a measure of educational attainment

The weakness of using highest educational level achieved converted to years of schooling is that it is weakly related to educational output in the form of demonstrated competence. The problem is not so much with educational levels above Senior Certificate, although there are grounds for concern about inflated reporting (see Simkins, 2001). It is rather with the variation in competences between pupils in different schools at a particular grade level.

Historically, some of this variation has been associated with population group. Malherbe reports that the application of mechanical and problem-solving arithmetic tests and an English vocabulary test to over 11 000 African pupils in Standard 6 and above in 1935-36 produced the finding that they were scholastically two years behind White pupils in the same standards. He also reported that subsequent studies showed that Standard 6 in African schools was considerably below Standard VI in white schools. The same inferiority was found also at the Standard 8 level (Malherbe, 1977: 318)

More recently, the Project for Statistics on Living Standards and Development tested respondents for literacy and numeracy in 1993-94 (Fuller, Pillay and Sirur, 1995). 2 407 people between the ages of 13 and 50 were tested using 14 items assessing language comprehension and 6 items assessing numeracy at the Standard 5 level. The comprehension items were both in mother-tongue and in English. The average scores are reported in Table 12:

From our point of view, it is unfortunate that the scores are not adjusted

for educational level. There is some analysis of the effect of educational attainment on the literacy score for Africans and Coloureds, which suggests that about 0.5 can be added for every extra year of schooling in the case of Africans (Fuller, Pillay and Sirur, 1995: Tables 6 - 9) and perhaps half that in the case of Coloureds (Table 10). This would imply continuing population group differences in adjusted scores.

Of the 489 298 candidates (excluding those waiting for results) who wrote the 2000 Senior Certificate as full-time students offering six or more subjects, 283 294 or 57.9% passed. This average conceals enormous variations in the performance of secondary schools. Of the 5 651 schools presenting candidates:

9.9% had between 0% and 20% of candidates passing

24.8% had between 21% and 40% of candidates passing

24.6% had between 41% and 60% of candidates passing

18.6% had between 61% and 80% of candidates passing

22.2% had between 81% and 100% of candidates passing

(Department of Education, 2000: Tables 1 and 6)

Schools in which less than 40% of candidates pass clearly have a much lower average level of competence in Grade 12 than schools in which more than 80% of candidates passed. It is unlikely that all this differential emerges in Grade 12 alone. Differentials can be expected all the way down the grades.

Whether or not the transmission of educational advantage would turn out higher or lower if the dependent variable at levels up to and including Senior Certificate were a better indicator of output than input is an open question.

9.2 Gender

Gender effects are measured in Table 1, where the gender differential in years of educational attainment after population group, place of residence and age are taken into account is estimated at about 0.2 years in favour of men. Table 7 shows that the proportion of young women between 15 and 24 who have not completed Grade 12 and who wish to study but are prevented from doing so is higher than the proportion of young men in the same position. The factors which prevent young men from studying when they wish to do so apply to young women with much the same force, but young women are

additionally prevented from studying by pregnancy and the need to care for children.

Table 10 shows that when educational attainment of a parent/grandparent head of household and the form of the household is taken into account as well as age and urban/rural residence, young women have an advantage in educational attainment. Table 11 deals with the more specialised case of higher educational attainment; in this case the gender effects are not significantly different from zero or slightly in favour of women.

9.3 Urban/rural residence

Table 1 indicates the gross effect of urban/rural residence. The effects are large in the case of Africans and Coloureds. Further analysis which takes household relations and intergenerational transmission of educational achievement into account generally shows that the net effect of the urban/rural divide is lower than the gross effect. Part of the reason that rural people are less well educated than urban people is that their parents and grandparents were less well educated.

9.4 Age

The effects of age are evident on educational achievement in Tables 1, 10 and 11. Among young adults (from age 15), the effect of additional year of age is generally to add to educational achievement. After a number of years the size of the effect drops off, for two reasons:

- people increasingly leave educational institutions with or without a qualification
- in a cross-sectional sample (i.e. one taken at a single point in time), increasing age also means earlier birth dates. Since the general educational level has been rising by date of birth, higher age means lower education for that reason.

9.5 Household membership and position

The greatest interpretive challenge lies in understanding the effects of the type of household and position in it. We have identified two effects which

dominate the discussion of intergenerational transmission of educational achievement:

- assortative mating, which matches people of similar educational achievement. This phenomenon makes for more unequal outcomes in the next generation than random mating, since high educational achievement by fathers is matched by high achievement by mothers, both fostering an environment in which children are helped to high levels of achievement.

- regression to the mean in the transmission of ability from parents to children. This means that the average level of ability of children born to high ability parents will be between that of the parents and the mean for the society as a whole and therefore lower than that of the parents. Equally, the average level of ability of children born to low ability parents will be higher than that of their parents. Regression to the mean is an equalising mechanism when it comes to educational achievement.

In the South African context, one finds that for the two population groups for which assortative mating is the strongest, the effect of the education of the head of household is weaker, or at least not stronger, on children's/grandchildren educational achievement than for the two population groups where assortative mating is weaker. This can be seen from Table 10 which refers to educational achievement in general and from Table 11 which refers to achievement of higher education. Assortative mating, though present, does not seem to contribute to inequality of educational outcomes. If, as well it might, Coloured and African assortative mating becomes more marked this may have no impact on inequality of educational achievement.

Rational investors in human capital invest up to the point where the capitalised value of additional future earnings associated with the last investment equals the cost of the educational investment (both direct and opportunity cost - earnings foregone and the difficulty of mastering the relevant skills). Other things equal, low ability people will find it harder to master skills and will invest less in human capital than high ability people.

But other things may not be equal. If capital markets were perfect, all people would face the same cost in financing a unit of education, whether they financed it themselves or borrowed to finance it. But capital markets are not perfect and poorer households often find themselves liquidity constrained:

although it would be rational to invest more in the education of their younger members, they either cannot do so or they can do so only at considerably higher cost than richer households. Low educational achievement may be the result of low ability, but it may also be the result of liquidity constraints.

The analysis in Section 5 confirms that liquidity constraints are significant among people aged 15 to 24 who have not completed Grade 12. For both young men and women who wanted to continue but were prevented from doing so, the lack of money was cited most often as the reason. On this view, an important transmission mechanism from poor education of household head to poor education of child would lie in the higher probability that the household could not finance the continuation of education beyond a certain point, even though the ability of the child means that a high rate of return would be earned on additional educational investment. Liquidity constraints do play a role in educational achievement and are likely to be stronger among the poorer population groups - Africans and Coloureds - than among Asians and Whites.

There are three ways in which educational achievement of parents and grandparents are passed on to children and grandchildren. The first is via the maintenance of a household which limits the duties of children and grandchildren, enabling them to concentrate on getting an education. Table 10 shows that this effect is strongest among Africans and Asians. Accordingly, it is probable that early marriage (before about age 20 in the case of the minorities and two or three years later for Africans, who move through the educational system more slowly) and assumption of household headship at an early age because of orphanhood or other reasons have adverse effects on educational achievement. The difficulty is that what constitutes 'too early' an assumption of household headship varies from individual to individual. Someone who gains Senior Certificate at age 17 and takes three more years to complete a degree may well be in a position to marry and establish a household at 21; in his or her case, early separation from the household of origin would be a consequence of educational success. Someone else may have achieved Grade 11 only at age 21 and separation from the household of origin at that age may have much more limiting effects on final educational achievement.

The second way is that well-educated parents are better able to co-operate with and supplement school education than poorly-educated parents. The third way is that highly educated parents are likely to pass on abilities (though, on average, in attenuated form) to their children. The second and

third effects cannot be distinguished statistically from one another given the data at our disposal.

Four points on intergenerational transmission are worth noting:

- Intergenerational transmission is weaker from grandparents to grandchildren than from parents to children.

- Intergenerational transmission is somewhat stronger for children and grandchildren aged 20-24 than for those aged 15-19. It is also quite strong for young people who achieve success in higher education (Senior Certificate plus certificate, diploma or degree). For Africans and Coloureds, the advantage conferred by the head of household himself or herself having higher education is marked; the effects are smaller for Asians and Whites.

- One can conjecture an explanation of the low rate of intergenerational transmission of educational achievement in general (dominated by achievement in primary and secondary schools) and the rather higher rate when it comes to higher education. The direct cost of schooling (fees, books, uniforms etc) is low in both primary and secondary schools. With youth unemployment high, the opportunity cost of school attendance is low. Moreover, South Africa's schools are now quite retentive and retention is not particularly dependent on ability. So up to conclusion of Grade 12, the system is so completely socialised that the individual calculation of whether the benefits of an additional year of schooling are worth the costs hardly arises among school pupils. People do drop out, but there is a great mass who do not. The first serious selection mechanism is the Senior Certificate itself.

- Once the Senior Certificate is behind one, the parameters change. First, the direct cost of higher education is much more substantial than that of secondary schooling. The opportunity cost also rises as education-specific unemployment rates drop and wage rates rise. Secondly, the chances of failure and exclusion rise, particularly at universities and technikons, from whom slightly more people drop out than graduate each year. The rational higher education has to think about his or her abilities more carefully; moreover, liquidity constraints bite harder here, though there is a loan scheme for university and technikon students.

Students entering higher education are much more likely than school pupils to make the standard human capital calculations.

- The proportions of the variance in educational achievement explained by the various models are modest. Unexplained variance is inevitable: unsystematic individual variations in ability and determination will always play a major role in determining educational achievement.

9.6 Limitations of this analysis

It is a great weakness of Population Census and October Household Survey data that they have not collected information on the Senior Certificate directly. Effectively, we cannot separate people who have attended Grade 12 but who have not gained a Senior Certificate from those who have gained a Senior Certificate.

Any study of the determinants of Senior Certificate passes should ideally include consideration both of individual and household characteristics and consideration of school quality. The range of school performances in the Senior Certificate is massive and is not likely to be explained by background characteristics of individuals alone. School quality remains to be considered in another study.

9.7 Policy implications

One should not underestimate the extent to which the results of this analysis read together with the analysis of the stocks and flows of human capital (Simkins, 2001) are grounds for optimism about the South African educational system. Average levels of education are rising for all population groups and the gaps are narrowing. Disadvantage in an earlier generation does not translate into much disadvantage in the current generation. Equality is improving.

But this study has identified two groups of agtergeblewenes for which improved policies are needed. The first group consists of children on commercial farms, whose constitutional right to nine years of general education is often not being respected. Once those nine years are completed, there should be two ways forward. The first is an academic education which is likely to take young people out of farm life altogether. Outmigration from commercial farms has been substantial over the last half century and special

assistance should be available to settle some young farm people in off-farm schools. For those who wish to stay in farming life, special attention should be paid to developing farm learnerships under the Skills Development Act to transfer skills effectively to the next generation of commercial farm workers after their general education has been completed.

The second group consists of young people who wish to undertake further education but are prevented from doing so by lack of money. Often these people will end up being unable to afford further education because something has gone wrong with the household of origin. Either the household will have collapsed or it will be so dysfunctional that it fails to perform the duty of support normally expected for adolescents or young adults. Where there is need of this kind and demonstrated ability to complete further education successfully, bursaries should be available to remove the liquidity constraint. Public higher education already has a system of bursaries and loans which performs the same function.

References

Becker, Gary S.,1993. *Human Capital: a Theoretical and Empirical Analysis with Special Reference to Education*, Third Edition, The University of Chicago Press

Bot, Monica, Daniel Wilson and Sandy Dove., *The Education Atlas of South Africa 2000*, The Education Foundation, Johannesburg

Department of Education., Report on the Senior Certificate Examinations 2000, Released on 28 December, Pretoria

Dewey, John., 1889 Galton's statistical methods, *Publications of the American Statistical Association*, 1(7): 331-334

Fuller, Bruce, Pundy Pillay and Neeta Sirur., 1995 Literacy trends in South Africa: Expanding education while reinforcing unequal treatment, Southern Africa Labour and Development Research Unit, University of Cape Town

Gordon, Adele., 2000., Providing quality education in schools on commercial farms, Paper prepared for a conference on farm schools convened by the Minister of Education, 13 May

Gujerati, Damodar N., 1995, *Basic Econometrics*, Third Edition, McGraw-Hill International Editions: Economic Series

Malherbe, E G, 1977, *Education in South Africa Volume II*: 1923-75, Juta, Cape Town

Mare, Robert D., 1991, Five decades of educational assortative mating, *American Sociological Review*, 56(1): 15-32

Simkins, Charles., 2001 South Africa's stock of human capital, Econometric Research Southern Africa, Working Paper, Department of Economics, University of the Witwatersrand, Johannesburg

Thomas, Duncan, 1996., Education across generations in South Africa, *American Economic Review,* May, 86(2): 330-334

Table 1: Determinants of number of years of education
People 20 years or older

Numbers	Africans	Coloureds	Asians	Whites	**Total**
Settlement type					
Urban formal	5,470,572	1,548,234	586,519	2,422,758	10,028,083
Urban informal	1,991,955	55,203	4,691	3,737	2,055,586
Commercial farms	954,009	269,386	13,086	229,781	1,466,262
Tribal rural	6,261,611	8,401	1,986	3,139	6,275,137
Other rural	419,477	36,228	1,603	14,163	471,471
Total	15,097,624	1,917,452	607,885	2,673,578	20,296,539

Regression coefficients	**Africans**	**Coloureds**	**Asians**		**Whites**
			Men	**Women**	
Constant	11.75	11.36	13.12	13.27	13.87
Urban informal	-1.70	-2.45	-1.74	-1.82	*-0.23*
Commercial farms	-4.37	-4.06	-1.14	-1.28	-0.06
Tribal rural	-2.72	-2.13	-2.56	-3.46	-2.10
Other rural	-2.12	-0.90	-1.27	-0.92	-0.50
Women	-0.20	-0.20			-0.21
25-29	-0.59	-0.35	*0.04*	-0.39	0.18
30-34	-1.64	-1.11	-0.45	-1.23	0.04
35-39	-2.59	-1.71	-0.86	-2.09	-0.09
40-44	-3.60	-2.29	-1.50	-3.09	-0.32
45-54	-4.60	-2.95	-2.39	-4.77	-0.58
55-64	-5.90	-3.94	-3.70	-7.08	-1.11
65+	-6.85	-5.27	-5.51	-8.92	-1.84
R squared	0.302	0.253	0.213	0.388	0.067
Number of observations	1,348,629	173,021	27,146	29,916	241,449

Notes: (1) The omitted categories in the regressions are: Urban formal, Men and 20-24

(2) Regression coefficients in italics are not significantly different from zero at the 5% level

Source: 1996 Population Census, 10% sample

Table 2: Assortative mating statistics, 1996

Panel A

Married People			
	Head of household or spouse of head	Other position in household	Total
Male	4,672,093	764,575	5,436,668
Female	5,287,668	713,305	6,000,973
Total	9,959,761	1,477,880	11,437,642

Panel B

Number of people who are household heads or spouses per household				
	Number of spouses			
Number of household heads	0	1	2 or more	Total
0		68,677	17,413	86,090
1	1,439,794	3,930,909	22,470	5,393,173
2 or more	14,511	1,434	328	16,273
Total	1,454,305	4,001,019	40,210	5,495,535

Households in which there is one head and one spouse	
Total	3,930,909
Both partners male	10,919
Both partners female	22,999
Monogamous Heterosexual	3,896,991
Missing population Group information	30,716
Marriages analysed	3,866,275

Population group of husband vs population group of wife					
	Pop group of wife				
Pop group of husband	African	Coloured	Asian	White	Total
African	2,287,616	10,946	233	662	2,299,456
Coloured	5,721	431,410	908	609	438,648
Asian	251	2,309	175,534	411	178,505
White	1,119	1,735	726	946,766	3,866,275
Total	2,294,708	446,400	177,401	947,766	3,866,275

Panel C

Correlation and regression coefficients		
	Correlation coefficient	Increase in wife's education for every year of an increase in husband's education
Africans	0.697	0.644
Coloureds	0.669	0.610
Asians	0.779	0.779
Whites	0.795	0.768
Mixed Marriages	0.577	0.484

Marriages by differences in educational level					
	Husband more than two years ahead of wife	Husband and wife within two years of each other	Wife more than two years ahead of husband		Per cent with total husband and wife within two years of each other
Africans	319,313	1,507,651	460,652	2287,616	65.9%
Coloureds	68,076	303,516	59,818	431,410	70,4%
Asians	27,561	137,943	10,031	175,534	78.6%
Whites	24,628	894,905	26,552	946,085	94.6%
Mixed marriages	4,585	16,701	4,343	25,629	65.2%
Total	444,162	2,860,717	561,396	3,866,275	74.0%

Source: 1996 Population Census 10% sample

Table 3A: Position in household by population group, gender and age group, 1996

	Africans				Coloureds			
	Male		Female		Male		Female	
	15-19	20-24	15-19	20-24	15-19	20-24	15-19	20-24
Head of household	67677	219149	73925	170529	3268	22747	2006	8823
Husband/wife/partner	7821	13551	41751	221359	950	2274	4811	30951
Son/daughter	1032909	753211	1069648	792382	121358	95549	121106	94582
Brother/sister	102455	128353	99130	105262	3843	5925	3682	5901
Father/mother	10171	8146	11297	11046	185	168	240	256
Grandchild	249820	116484	247319	114216	19298	9359	18873	8735
Other relative	71714	82455	92033	114752	9050	11583	9662	12289
Non-related person	25533	44442	29079	47773	5078	8914	5443	9306
Unspecified	30893	72028	26018	27714	1867	2414	1696	1655
NA: Institution	32144	69563	28179	38845	10694	9776	7724	2919
Total	1631137	1507382	1718379	1643878	175591	168709	175243	175417

	Asians				Whites			
	Male		Female		Male		Female	
	15-19	20-24	15-19	20-24	15-19	20-24	15-19	20-24
Head of household	502	5853	354	1564	3112	43098	2711	20457
Husband/wife/partner	265	553	1049	10905	1484	3184	5400	55013
Son/daughter	42221	35898	40890	27909	136274	86480	129437	66141
Brother/sister	1058	1862	1060	1487	2292	4126	2423	3427
Father/mother	292	306	349	322	333	349	490	421
Grandchild	2174	999	2059	794	2908	1604	2548	1145
Other relative	1674	3451	2448	6837	2054	4606	2242	4148
Non-related person	450	1156	451	956	5014	17039	5472	14460
Unspecified	236	332	168	204	1660	2938	1792	2872
NA: Institution	863	901	857	817	20790	9268	16312	7977
Total	49735	51311	49685	51795	175921	172692	168827	176061

Note: South Africans who lived in institutional settings, such as hostels, compounds, prisons, hospitals and the like were enumerated on a special institutional questionnaire in the 1996 Population Census. This questionnaire collected no information on relationships

Source: 1996 Population Census, Full Data set

Table 3B – Number of people between the ages of 15 and 24 by population group, sex, and position in household, 1996

Africans	Male		Female		Total	Percent
	15-19	20-24	15-19	20-24		
Head and same generation	178,184	359,846	215,540	497,098	1,250,668	22.3%
Children: two parents	523,280	364,183	540,601	366,879	1,794,943	32.0%
Children: one parent - male	76,891	66,017	71,516	62,068	276,492	4.9%
Children: one parent - female	427,854	320,086	454,866	360,037	1,562,843	27.9%
Grandchildren: grandfather head	80,169	36,001	78,065	34,049	228,284	4.1%
Grandchildren: grandmother head	168,816	79,647	169,604	80,223	498,290	8.9%
Total	1,455,194	1,225,780	1,530,192	1,400,354	5,611,520	100.0%

Coloureds	Male		Female		Total	Percent
	15-19	20-24	15-19	20-24		
Head and same generation	8,004	31,866	10,530	46,657	97,057	16.7%
Children: two parents	89,527	66,087	89,884	63,045	308,543	53.0%
Children: one parent - male	4,528	5,099	4,253	4,837	18,717	3.2%
Children: one parent - female	26,693	24,612	27,422	25,101	103,828	17.8%
Grandchildren: grandfather head	8,228	3,394	7,898	3,115	22,635	3.9%
Grandchildren: grandmother head	10,665	5,323	9,933	5,392	31,313	5.4%
Total	147,645	136,381	149,920	148,147	582,093	100.0%

Asians	Male		Female		Total	Percent
	15-19	20-24	15-19	20-24		
Head and same generation	1,690	8,684	2,409	14,319	27,102	15.0%
Children: two parents	35,293	28,703	34,131	21,388	119,515	66.2%
Children: one parent - male	1,199	1,400	1,325	1,058	4,982	2.8%
Children: one parent - female	5,542	6,556	5,278	5,403	22,779	12.6%
Grandchildren: grandfather head	977	415	1,233	445	3,070	1.7%
Grandchildren: grandmother head	1,057	562	997	415	3,031	1.7%
Total	45,758	46,320	45,373	43,028	180,479	100.0%

Whites	Male		Female		Total	Percent
	15-19	20-24	15-19	20-24		
Head and same generation	7,149	51,785	11,277	80,562	150,773	26.7%
Children: two parents	112,451	70,926	106,398	52,370	342,145	60.5%
Children: one parent - male	5,221	3,697	3,773	2,543	15,234	2.7%
Children: one parent - female	13,893	11,062	14,682	9,498	49,135	8.7%
Grandchildren: grandfather head	1,809	843	1,238	539	4,429	0.8%
Grandchildren: grandmother head	1,318	689	930	554	3,491	0.6%
Total	141,841	139,002	138,298	146,066	565,207	100.0%

Source: 1996 Population Census, 10% sample

Table 4: Children and grandchildren of household heads as a percentage of percentage of persons aged 15-19 and 20-24, 1996

	Africans	Coloureds	Asians	Whites
15-19: Children	63	69	84	77
Grandchildren	15	11	4	2
20-24: Children	49	55	62	44
Grandchildren	7	5	2	1

Note: The percentages do not add up to 100, since some young adults may have another or an unspecified relationship with the household head.
Source: Table 3B

Table 5: Household heads, spouses/partners and brothers/sisters as percentages of people aged 15-19 and 20-24, 1996

	Africans	Coloureds	Asians	Whites
15-19: Household heads	4.2	1.5	0.9	1.7
Spouses/partners	1.5	1.6	1.3	2.0
Brothers/sisters	6.0	2.1	2.1	1.4
Total: same generation	11.7	5.2	4.3	5.1
20-24: Household heads	12.4	9.2	7.2	18.2
Spouses/partners	7.5	9.7	11.1	16.7
Brothers/sisters	7.4	3.4	3.2	2.2
Total: same generation	27.3	22.3	21.5	37.1

Source: Table 3A

Table 6: Proportions of household heads and brother/sisters ever married and orphaned, 1996

	Ever married	Never married			
		Complete orphan	Paternal orphan	Maternal orphan	Non-orphan
15-19					
Male					
African					
Head of household	3.8%	4.6%	19.0%	3.9%	68.7%
Brother/sister	0.6%	8.4%	22.9%	5.2%	62.9%
Coloured					
Head of household	25.7%	4.9%	11.9%	4.6%	52.9%
Brother/sister	1.0%	13.4%	17.9%	9.3%	58.5%
Asian					
Head of household	18.0%	5.9%	15.4%	2.6%	58.1%
Brother/sister	1.3%	8.8%	25.4%	3.3%	61.2%
White					
Head of household	17.4%	3.3%	8.4%	2.6%	68.2%
Brother/sister	1.9%	3.8%	11.5%	4.0%	78.7%
Female					
African					
Head of household	7.2%	3.9%	19.7%	3.5%	65.8%
Brother/sister	1.3%	8.4%	22.8%	5.2%	62.4%
Coloured					
Head of household	11.3%	7.4%	14.8%	5.6%	60.8%
Brother/sister	2.0%	13.6%	19.7%	9.3%	55.4%
Asian					
Head of household	14.4%	4.0%	10.5%	4.0%	67.1%
Brother/sister	2.5%	5.4%	24.3%	6.0%	61.9%
White					
Head of household	8.6%	3.2%	9.0%	1.9%	77.3%
Brother/sister	3.8%	2.2%	10.2%	3.9%	79.8%
20-24					
Male					
African					
Head of household	22.5%	5.9%	18.8%	4.1%	48.7%
Brother/sister	3.0%	12.3%	25.0%	5.5%	54.2%
Coloured					
Head of household	62.0%	3.4%	7.7%	3.3%	23.6%
Brother/sister	4.4%	18.9%	20.9%	10.5%	45.2%
Asian					
Head of household	67.2%	2.3%	7.4%	1.2%	21.9%
Brother/sister	10.1%	10.3%	27.7%	4.0%	47.9%
White					
Head of household	50.2%	1.1%	5.4%	1.7%	41.6%
Brother/sister	5.6%	4.1%	14.8%	4.8%	70.7%
Female					
African					
Head of household	26.2%	5.8%	19.2%	4.1%	44.8%
Brother/sister	5.3%	13.8%	24.6%	6.0%	50.3%
Coloured					
Head of household	24.3%	7.1%	14.6%	7.0%	47.0%
Brother/sister	6.7%	17.8%	20.3%	10.7%	44.5%
Asian					

Head of household	32.1%	3.8%	11.8%	4.2%	48.2%
Brother/sister	14.1%	11.3%	26.8%	3.7%	44.1%
White					
Head of household	15.3%	1.4%	7.5%	2.8%	73.0%
Brother/sister	10.6%	3.1%	10.0%	4.1%	72.3%

Source: 1996 Population Census, Full count

Table 7 - People aged 15-24 who have not completed Grade 12: October 1998

	Africans		Coloureds		Asians		Whites	
	Male	Female	Male	Female	Male	Female	Male	Female
15-19								
Total	1686347	1751570	161505	156820	35757	40937	142068	132824
Studying	1452052	1443690	116488	106866	27542	31997	125167	115120
Percent studying	*86.1%*	*82.4%*	*72.1%*	*68.1%*	*77.0%*	*78.2%*	*88.1%*	*86.7%*
Not studying	234295	307880	45017	49954	8215	8940	16901	17704
Non-response	42945	39749	4403	3952	1516	1022	4425	3316
Do not wish to study	82242	60891	30132	28592	4689	4789	5696	8356
Percent of not studying not wishing to study	*43.0%*	*22.7%*	*74.2%*	*62.2%*	*70.0%*	*60.5%*	*45.7%*	*58.1%*
Wish to study	109108	207240	10482	17410	2010	3129	6780	6032
Non-response	6822	6691	835	1477	0	354	0	561
Subtotal excluding child care and pregnancy	*100789*	*117865*	*9647*	*10282*	*2010*	*2775*	*6780*	*1918*
Not enough money	71207	73572	7904	8933	1454	2065	5328	870
Distance	4986	4351	285	189				
Child care	1497	24988		4695				
Other family	8049	12860	441			511		
Pregnancy during year		57696		956				3553
Poor health	12134	17060	671			199		
Lack of facility	683	5772		731				
Work	856	717					1049	1048
Other	2874	3533	346	429	556		403	
Number of observations	3504	3802	464	404	72	77	239	206
20-24								
Total	1238242	1311437	116974	118781	15729	11297	33129	36803
Studying	572902	560163	8212	8766	3528	525	8244	4151
Percent studying	*46.3%*	*42.7%*	*7.0%*	*7.4%*	*22.4%*	*4.6%*	*24.9%*	*11.3%*
Not studying	665340	751274	108762	110015	12201	10772	24885	32652
Non-response	62786	64933	7051	9005	496	2776	5991	7167
Do not wish to study	309135	232906	82265	72169	7563	6872	14373	14349
Percent of not studying not wishing to study	*51.3%*	*33.9%*	*80.9%*	*71.4%*	*64.6%*	*85.9%*	*76.1%*	*56.3%*
Wish to study	293419	453435	19446	28841	4142	1124	4521	11136
Non-response	9478	18611	1777	1658	522	0	1	0
Subtotal excluding child care and pregnancy	*283113*	*300783*	*17669*	*19938*	*3620*	*1124*	*4520*	*8794*
Not enough money	198626	213551	10488	16338	2637	1124	2155	4211
Distance	7976	14690	511	774				
Child care	828	51295		4090				2342
Other family	29348	29558	2301	1891	496		1043	1756
Pregnancy during year		82746		3155				
Poor health	17915	23472	486	725				
Lack of facility	9701	12312	1397	210				
Work	14550	1597	1875				1322	2827
Other	4997	5603	611		487			
Number of observations	2123	2521	242	252	30	21	37	40

Source: October Household Survey 1998

Table 8: Probit analyses of whether people are studying or not and of whether they wish to study but are unable to do so. People aged 15-24 who hav not completed Grade 12: October 1998

	Probability of not studying		Probability of wishing to study while not studying	
	Male	Female	Male	Female
Population group				
Coloured	0.862	0.859	-0.825	-1.050
Asian	0.889	0.682	-0.825	-1.403
White	0.304	0.262	-0.795	-1.100
Age group				
20-24	1.501	1.269	-0.414	-0.337
Settlement type				
Rural	-0.225	-0.114	*0.011*	0.172
Relationship to household head				
Son/daughter	-0.428	-0.657	-0.216	*0.067*
Grandchild	-0.596	-0.764	-0.412	*0.235*
Orphan				
Paternal	*-0.120*	*0.099*	*-0.065*	*-0.144*
Maternal	*-0.062*	0.372	*-0.055*	*-0.214*
Not	*-0.258*	*-0.014*	*-0.048*	*-0.167*
Education				
Grade 1	-0.919	*-0.259*	*-0.036*	
Grade 2	-1.179	*-0.479*	*-0.693*	*0.501*
Grade 3	-0.532	-0.880	*0.202*	*0.173*
Grade 4	-0.701	-0.613	*-0.098*	*0.311*
Grade 5	-0.961	-0.995	*0.065*	0.466
Grade 6	-1.244	-1.061	*0.107*	0.414
Grade 7	-1.364	-1.266	*0.000*	0.574
Grade 8	-1.632	-1.522	0.334	0.761
Grade 9	-1.914	-1.600	0.581	0.837
Grade 10	-1.827	-1.817	0.565	0.918
Grade 11	-2.314	-2.014	0.675	1.133
R squared	0.294	0.266	0.079	0.117
Number of observations	5892	6332	1529	1901

Note: (1) The omitted categories are African, 15-19, Urban, household head, Both maternal and paternal orphan, No education

(2) Coefficients in italics are not significantly different from zero at the 5% level of significance

Source: October Household Survey, 1998

Table 9 - Mean years of schooling completed at ages 19 and 24, by population group, gender, and position in household, 1996

Age 19	Africans				Coloureds				Asians		Whites	
	Urban		Rural		Urban		Rural					
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Head and same generation	8.67	8.98	7.86	8.13	9.20	9.25	6.69	6.55	11.07	11.49	11.64	11.55
Children: two parents	9.25	9.65	8.06	8.46	9.81	10.31	7.31	7.59	11.44	11.55	11.48	11.74
Children: one parent - male	8.63	9.51	7.72	8.20	9.59	9.43	6.68	7.11	11.25	11.55	11.39	11.65
Children: one parent - female	8.93	9.40	8.10	8.56	9.45	9.91	8.61	8.48	11.20	11.54	11.40	11.65
Grandchildren: male head	8.76	9.57	7.73	8.42	9.34	9.97	9.23	7.41	11.79	12.13	10.97	11.59
Grandchildren: female head	8.95	9.47	7.81	8.49	9.61	9.96	8.80	6.86	11.63	12.08	11.48	11.28
All the above	8.98	9.42	7.98	8.41	9.65	10.06	7.38	7.29	11.38	11.56	11.48	11.68
Number of observations	9,184	10,393	14,608	15,641	1,939	1,983	312	364	794	788	2,222	2,074

Age 24	Africans				Coloureds				Asians		Whites	
	Urban		Rural		Urban		Rural					
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
Head and same generation	9.02	9.20	7.53	7.40	9.86	9.96	6.35	5.88	11.59	11.62	12.37	12.38
Children: two parents	9.81	10.08	8.30	8.36	9.68	10.17	7.69	7.65	11.64	12.07	12.25	12.55
Children: one parent - male	9.39	9.86	8.08	8.06	9.41	9.32	6.06	6.79	11.94	13.00	12.63	12.57
Children: one parent - female	9.68	9.95	8.02	8.42	9.16	9.53	8.36	7.72	11.20	11.51	11.77	12.67
Grandchildren: male head	9.03	9.83	8.00	8.43	8.38	8.71	2.59	5.52	11.81	11.52	11.01	11.86
Grandchildren: female head	9.51	10.11	7.88	8.25	8.46	9.54	8.89	8.82	10.46	11.77	12.14	10.85
All the above	9.38	9.60	7.93	7.97	9.57	9.90	6.85	6.50	11.57	11.78	12.29	12.43
Number of observations	10,611	12,115	9,445	11,976	2,092	2,277	418	525	855	783	2,661	2,903

Source: 1996 Population Census 10% sample

Table 10: Regression coefficients: educational attainment on age, gender, urban/rural residence and position in household, 1996

	Africans			Coloureds		
	Same	Child	Grandchild	Same	Child	Grandchild
Schooling of head :15-24		0.18	0.11		0.21	0.14
Schooling of head :15-19		0.15	0.10		0.18	0.11
Schooling of head :20-24		0.21	0.13		0.26	0.18
Age 16	0.48	0.63	0.61	0.58	0.79	0.63
	(0.05)	(0.02)	(0.03)	(0.25)	(0.04)	(0.11)
Age 17	1.05	1.30	1.30	1.04	1.46	1.18
	(0.05)	(0.02)	(0.04)	(0.24)	(0.04)	(0.13)
Age 18	1.28	1.73	1.75	1.30	1.93	1.95
	(0.05)	(0.02)	(0.04)	(0.24)	(0.05)	(0.12)
Age 19	1.56	2.05	2.11	1.80	2.22	2.43
	(0.05)	(0.02)	(0.04)	(0.22)	(0.05)	(0.14)
Age 20	1.50	2.23	2.23	1.70	2.42	2.31
	(0.05)	(0.02)	(0.05)	(0.22)	(0.05)	(0.16)
Age 21	1.57	2.39	2.48	1.79	2.36	2.11
	(0.05)	(0.02)	(0.05)	(0.21)	(0.05)	(0.16)
Age 22	1.53	2.47	2.37	1.85	2.35	2.06
	(0.05)	(0.02)	(0.06)	(0.20)	(0.05)	(0.19)
Age 23	1.50	2.46	2.47	1.72	2.28	2.06
	(0.05)	(0.02)	(0.07)	(0.20)	(0.06)	(0.20)
Age 24	1.41	2.38	2.37	2.04	2.17	1.68
	(0.05)	(0.03)	(0.07)	(0.20)	(0.06)	(0.26)
Female	0.18	0.49	0.59	0.06	0.43	0.41
Rural	-1.22	-0.58	-0.83	-3.47	-1.23	-0.77
Child - 2 parents		0.04			-0.19	
Child - Male parent		-0.22			-0.19	
Grandchild - Male head			-0.12			*0.00*
Constant	7.42	5.96	6.38	7.74	5.74	6.37
R-squared	0.049	0.162	0.145	0.244	0.243	0.160
Number of observations	108,844	317,024	63,587	8,345	37,301	4,611
	Asians			**Whites**		
	Same	Child	Grandchild	Same	Child	Grandchild
Schooling of head :15-24		0.09	*-0.03*		0.10	0.06
Schooling of head :15-19		0.05	*-0.04*		0.06	0.06
Schooling of head :20-24		0.13	*-0.02*		0.16	0.07
Age 16	*0.51*	0.90	0.95	*0.52*	1.01	0.92
	(0.42)	(0.06)	(0.22)	(0.30)	(0.03)	(0.31)
Age 17	1.00	1.81	1.65	1.86	1.99	2.43
	(0.43)	(0.07)	(0.28)	(0.24)	(0.03)	(0.26)
Age 18	1.84	2.58	2.30	2.51	2.76	2.93
	(0.36)	(0.06)	(0.26)	(0.22)	(0.03)	(0.29)
Age 19	2.22	2.99	3.29	3.10	3.30	3.41
	(0.32)	(0.06)	(0.20)	(0.20)	(0.04)	(0.27)
Age 20	2.14	3.01	3.33	3.19	3.47	3.45
	(0.31)	(0.07)	(0.18)	(0.20)	(0.04)	(0.30)
Age 21	2.12	3.10	2.53	3.40	3.59	3.78
	(0.30)	(0.07)	(0.35)	(0.20)	(0.04)	(0.30)
Age 22	2.34	3.29	3.39	3.69	3.85	3.71
	(0.30)	(0.07)	(0.24)	(0.20)	(0.04)	(0.44)
Age 23	2.23	3.35	2.29	3.82	3.95	4.09
	(0.30)	(0.07)	(0.55)	(0.20)	(0.05)	(0.60)

Age 24	2.48	3.34	2.69	3.89	4.09	3.49
	(0.29)	(0.08)	(0.72)	(0.20)	(0.06)	(0.51)
Female	*-0.03*	0.21	0.14	*0.03*	0.23	*0.04*
Child - 2 parents		0.12			*-0.02*	
Child - Male parent		*-0.01*			*-0.03*	
Grandchild - Male head			0.28			*-0.09*
Constant	9.14	7.49	8.56	8.47	7.03	7.32
R-squared	0.043	0.277	0.317	0.112	0.405	0.338
Number of observations	2,472	13,447	551	13,148	34,893	665

Notes: (1) Coefficients in italics are not significantly different from zero at the 5% level
(2) The quantities in brckets below the age coefficients are the standard errors of those coefficients
(3) The schooling of head 15-19 and 20-24 coefficients come from separate regressions on subsamples of the main regression results reported here. Other coefficients from these separate regressions are not reported
(4) The omitted categories are age 15, male, urban, child in a household with one female parent, grandchild in a female-headed household

Source: 1996 Population Census, 10% sample

Table 11: Higher educational achievement regressed on age, sex, urban/rural residence and educational achievement of parents and grandparents, 1996

	Africans			Coloureds	
	Same	Child	Grandchild	Same	Child
Parent/grandparent					
Incomplete secondary		0.26	0.23		0.32
Senior Certificate only		0.36	0.33		0.41
SC plus certificate		0.88	0.76		0.83
SC plus diploma only		0.91	0.88		1.04
SC plus degree		1.20	0.74		1.28
Age					
21	*0.11*	0.20	*0.13*	*0.07*	*0.13*
22	0.25	0.36	0.38	*0.07*	0.34
23	0.40	0.47	0.36	0.36	0.54
24	0.59	0.58	0.58	0.52	0.64
25	0.68	0.66	0.70	0.55	0.74
26	0.71	0.79	0.75	0.59	0.76
27	0.79	0.91	0.62	0.71	0.84
28	0.91	0.92	0.77	0.71	0.85
29	0.97	1.02	1.02	0.72	0.79
Gender					
Female	*0.02*	*0.02*	*0.01*	*-0.01*	0.08
Urban/rural					
Rural	-0.13	-0.11	-0.20	*-0.13*	-0.21
Category					
Children: two parents		0.06			*0.01*
Children: one parent- male		*-0.06*			*-0.07*
Grandchildren: male head			-0.12		
Cutpoints for					
Certificate	1.59	2.05	1.94	1.19	1.85
Diploma	1.73	2.19	2.12	1.40	2.05
Degree	2.50	2.90	2.91	2.14	2.67
Pseudo R squared	0.026	0.061	0.051	0.014	0.061
Number of observations	43,329	57,414	6,456	5,671	8,763
	Asians			**Whites**	
	Same	Child		Same	Child
Parent/grandparent					
Incomplete secondary		0.14			-0.24
Senior Certificate only		0.39			*-0.02*
SC plus certificate		0.61			0.32
SC plus diploma only		0.78			0.53
SC plus degree		1.05			0.68
Age					
21	*0.21*	0.15		0.25	0.29
22	0.52	0.45		0.61	0.67
23	0.64	0.55		0.78	0.87
24	0.66	0.60		0.88	1.02
25	0.68	0.70		0.91	1.08
26	0.77	0.70		0.97	1.01
27	0.84	0.62		1.03	0.99
28	0.80	0.61		1.01	1.06
29	0.86	0.66		1.01	1.00
Gender					

Female	*-0.04*	0.20	-0.03	0.14
Category				
Children: two parents		*-0.05*		*0.00*
Children: one parent- male		*-0.10*		*-0.13*
Grandchildren: male head				
Cutpoints for				
Certificate	1.42	1.60	1.19	1.46
Diploma	1.56	1.77	1.39	1.67
Degree	2.07	2.23	1.91	2.14
Pseudo R squared	0.010	0.044	0.016	0.078
Number of observations	4,315	6,173	27,877	13,943

Note: Coefficients in italics are not significantly different from zero at the 5% level

Source: 1996 Population Census, 10% sample

Table 12: Literacy and numeracy test results at the Standard 5 level, 1993-94

	African	Coloured	Asian	White
Number of respondents	1647	209	72	212
Average literacy score (max 14)				
– Male	5.0	7.5	10.5	9.8
- Female	4.8	6.9	10.5	9.6
Average Numeracy score (max 6)	1.9	2.8	4.2	3.9
- Male				
- Female	1.8	2.4	4.1	3.9
Average years of schooling	5.2	5.8	8.3	8.1
-Male				
- Female	5.6	5.3	7.6	7.7

Source: Fuller, Pillay and Sirur (1995): Table 2

Appendix One

Number of years of education associated with highest levels of education achieved	
None/Grade 0	0
Sub A/Grade 1	1
Sub B/Grade 2	2
Standard 1/Grade 3	3
Standard 2/Grade 4	4
Standard 3/Grade 5	5
Standard 4/Grade 6	6
Standard 5/Grade 7	7
Standard 6/Form 1/Grade 8	8
Standard 7/Form 2/Grade 9	9
Standard 8/Form 3/Grade 10 National Technical Certificate I	10
Standard 9/Form 4/Grade 11/NTC II	11
Standard 10/Form 5/Grade 12/NTC III/Matric	12
Less than Matric plus certificate or diploma	11
Matric plus certificate	13
Matric plus diploma	14
Bachelor’s degree	15
Bachelor’s degree plus Honours	16
Bachelor’s degree plus diploma	16
Master’s degree	17
Doctor’s degree	19

Appendix Two

Assortative mating by educational achievement for newly-weds in the United States
Percentage distribution, 1980

Wife's years of schooling	Husband's years of schooling					
	<10	10-11	12	13-15	>=16	Total
<10	2.68	1.51	1.92	0.44	0.09	6.65
10-11	1.51	3.16	5.00	0.94	0.16	10.77
12	2.23	4.33	25.51	8.26	3.03	43.35
13-15	0.42	1.03	7.08	9.48	5.51	23.52
>=16	0.09	0.14	1.66	3.37	10.46	15.72
Total	6.93	10.17	41.16	22.48	19.26	100.00
Number of observations				13,152		

Source: Mare (1991) Table 2