The school day in South Africa*

Martin Wittenberg
School of Economics
University of Cape Town

Abstract

We investigate the time allocation decisions by South African learners using the South African Time Use Survey. We show that punctuality appears to be a problem with around 20% of all learners seeming to arrive late. Punctuality and absenteeism seem to be problems disproportionately among poor learners.

Overall time devoted to schooling and homework does not show a consistent income gradient. Poor learners, however, spend considerable time each day on chores. The distribution of this additional work falls disproportionately on girls.

Some of the findings can be easily explained in terms of a simple human capital production framework, but some of the social constraints seem to require a broader framework in which choices by some individuals create externalities for others.

1 Introduction

The relationship between education and long-run economic growth is among the more established empirical regularities. While there is no doubt that more affluent societies can also afford better quality education, it seems equally clear that a properly skilled workforce is one of the major determinants of economic performance. This relationship seems to hold both at the level of countries, as well as regions within a country (Glaeser and Saiz 2003). At the individual level, the importance of education for access to employment and the level of remuneration is well documented (Card 1999). The literature suggests that the social returns to education may be higher than the private ones (Psacharopoulos 1994), but there is little doubt that there are ample private incentives for acquiring education.

Several authors have recently investigated the relationship between school quality and educational outcomes in South Africa (Case and Deaton 1999, Case and Yogo 1999, Anderson, Case and Lam 2001, Crouch and Mabogoane 2001). These contributions have investigated how characteristics of the schools or of the parents impact on the outcomes of their children. The role of the learners in this process has thus far not been scrutinised. This seems to be an important lacuna given the fact that learners are not simply passive recipients of decisions made by others. This paper is intended to be a first, largely descriptive, foray into the terrain of the students' educational choices. The vehicle for investigating these issues is the South African Time Use Survey (Budlender, Chobokoane and Mpetsheni 2001). We are able to investigate if and when students arrive at school, how much time they devote to school and to home work. We are also able to show what other demands there are on their time.

We will show that many students seem to arrive late or not at all. Many arrive without having eaten breakfast. Girl students in particular have significant domestic responsibilities. In some cases these seem to become a constraint on home work. Boys seem to be able to engage in more structured leisure activities than girls. We conclude that the choices that children make about school and home work seem to be made under constraints emanating from the household and community expectations. Understanding these, and the actual choices that students make might help when policy makers confront the question of what is needed to improve educational outcomes. We will hazard a few suggestions at the end.

*I would like to thank Debbie Budlender for supplying the data, for patiently answering many questions fired at her and for commenting on the first draft of this paper. I would also like to thank Johann Fedderke, Murray Leibbrandt and John Luiz for thoughtful comments. All errors are, of course, my responsibility. Address for correspondence: mwittenb@commerce.uct.ac.za

Although this paper is intended to be mainly descriptive, we anchor the discussion with a simple analytical framework. That is provided in the next section. We use a simple Beckerian Human Capital framework (Becker 1993) and sketch out what factors might affect the time allocation decisions of children. We then (in section 3) discuss the Time Use Survey from which our information is derived. We follow this with a discussion of the determinants of school attendance in section 4. Section 5 presents a description of the typical school day. This is subdivided into a discussion of the length of sleep (5.1), the process of getting ready for school (5.2), the school day itself (5.3), home work (5.4) and other post-school activities (5.5). In Section 6 we reflect on the empirical findings. We show that many of the findings can be reconciled with the human capital framework. Nevertheless there also seem to be "spillover" effects from choices made by others which are less easy to accommodate in this framework. Section 7 concludes.

2 A simple analytical framework

We assume that human capital of the learner is created through a production function of the sort

$$H_L = f\left(H_T, t_s, A_L, y_S\right) \tag{1}$$

where H_T is the human capital of the teacher, t_s is the time spent by the learner at school and doing home work, A_L is the "innate" (genetic) ability of the learner and y_S is the total amount of resources devoted to the process. Some of these resources may come from the state and some from the parents.

We assume that the learner maximises a utility function of the sort

$$U = U\left(I, t_l\right)$$

where I is total life-time income and t_l is leisure consumption. We assume that

$$I = wt_w$$

where t_w is the life-time labour supply and $w = w\left(H_L\right)$ is an increasing function of H_L. We observe that the time budget-constraint is given by

$$t_s + t_w + t_l = t^*$$

where t^* is the total supply of time. Note that we have abstracted away completely from the intertemporal dynamics of this problem.

This static problem can be solved in the usual way. At an interior optimum (i.e. where t_s, t_l and t_w are all positive) we must have

$$\frac{\partial U}{\partial t_l} = \frac{\partial U}{\partial I} w \tag{2a}$$

$$t_w \frac{\partial w}{\partial H} \frac{\partial H}{\partial t_s} = w \tag{2b}$$

These conditions have the obvious interpretation. Equation 2a states that the opportunity cost of an extra unit of leisure (the left hand side) is equal to the utility that could have been gained from the wage foregone (the right hand side). Equation 2b states that the benefit of an additional unit of schooling is the change it ultimately brings about in the wage cumulated over the entire working life of the individual (the left hand side). This must be exactly offset by the opportunity cost of that unit of schooling, which is the immediate wage foregone (the right hand side).

Considering the last equation first, we would expect to see *lower* allocation of times to schooling in situations where the impact of schooling on the expected wage is reduced. In particular, if the impact of the learner's schooling effort is strongly mediated by the teacher's skill H_T and the resources available within the school y_S, then we would expect students to quit the schooling system earlier if H_T and y_S are low. Innate ability has the opposite effect - an increase in A_L should encourage individuals to stay on at school longer. We should take note of this, since it potentially introduces a selection bias in some of the results to be reported below. Children in poor schools and schools with low teacher skill should on average have *higher* ability than the children in better resourced and better quality schools.

This conclusion may be reversed if there are systematic differences in the wage schedules in different parts of the country. In places in which there is excess supply, i.e. low wage rates and high unemployment rates, the opportunity cost of an additional year at school is reduced. In such places many more learners will stay on at school. Equation 2a would lead us to expect much higher levels of leisure time in these contexts also.

Implicit in much of this discussion is the idea that from the learner's perspective teacher quality, school resources and the local labour market conditions are fixed. This may not be true if students have a choice of schools or if their parents can send them elsewhere. Indeed we know that there is some mobility among school-age children in South Africa. Nevertheless the bulk of students will be geographically constrained. Given the fact that there are strong spatial gradients in both teacher qualifications and community resources treating H_T and y_S as exogenous is likely to be a reasonable approximation. High quality teachers and schools operating in very poor environments exist, but they are not the norm.

The model assumes that the choice variables are continuous. Nevertheless some of the choices have discrete elements to them. Schooling is organised in terms of the academic year and the enrolment decision is intrinsically discrete. The actual time allocation decision conditional on being enrolled is, however, more continuous. There are additional complications which arise from the fact that we observe the allocation decisions at a particular point in time, rather than over the entire life span. If we observe someone who is not in school we cannot definitively conclude that they have reached their desired level of schooling. They may simply be taking some time off to deal with short run crises such as illnesses. In the case of home work this is even clearer. To the extent to which students can allocate their overall learning time over the week (perhaps even the year), their optimal allocation may be lumpy - involving heavy study times in some periods and lighter ones in others. We will generally assume that such short-run deviations from the long-run averages will tend to even out statistically over the entire population.

Even though the model is intended to reflect the long-run allocations we will also interpret some of the short run choices in terms of it. For instance a short run increase in the disutility of studying[1] should lead to a short term decrease in the time allocated to school work. We will note below that there are seasonal and day of week variations in the time dedicated to school work, which we will interpret in these terms.

3 The data

The source of our data is the Time Use Survey (Budlender et al. 2001) carried out by Statistics South Africa in 2000. The information is based on recall diaries from about 14 000 individuals. The individuals were selected in a three stage sampling process. In the the first stage 902 primary sampling unit were selected from a set of enumerator areas stratified by location, viz. urban formal, urban informal, commercial farming and ex-homeland rural areas. The urban informal and commercial farming areas were oversampled at this stage. In the second stage dwellings were sampled within these clusters and in the third two individuals (if the household had two or more eligible individuals, otherwise one individual) were selected based on a randomization procedure within the household. Only individuals aged ten above were eligible to be interviewed. Clearly people from households with fewer adults were oversampled relative to people from larger households. Statistics South Africa have provided a set of weights to correct for the different sampling probabilities. These weights are used in all the estimation procedures reported below.

In order to account for some seasonal and weekly variations in time use, the survey was collected in three tranches: February, June and October. Within each tranche attempts were made to collect information across the working week. Unlike with some other surveys, however, no attempt was made to interview the same individual on more than one day. This means that we cannot investigate any day-to-day variation in the choices made (e.g. in relation to home work).

The information was recorded through three different instruments. Once the household had been selected a household level questionnaire was administered to a knowledgeable person. This questionnaire included some basic socio-economic information on the entire household, such as access to services and total household income. A roster of household members provided the basis from which to select the individuals to

[1] We can think of this as a short run increase in the utility of leisure.

be interviewed further. The selected individuals were asked a set of questions about themselves, such as educational attainment, marital status, labour market participation and personal income. The main focus of the personal interviewers, however, was the time diary.

3.1 Measuring time allocation

Individuals were interviewed about their use of time during the previous twenty-four hours. The activities were recorded within half-hour time slots according to an "activity classification system". Provision was made for up to three activities in each slot. The Time Use Survey therefore broadly conforms to best practice as outlined by Juster and Stafford (1991, p.243):

> The methodology for collecting time allocation data has been well developed at this point, and the main characteristics of optimum methodology are not in dispute. The only way in which reliable data on time allocation have been obtained is by the use of time diaries, administered to a sample of individuals in a population and organized in such a way as to provide a probability sample of all types of days and of the different seasons of the year. The time diaries are usually retrospective – they ask respondents for a detailed chronology of the previous 24 hours, with responses coded according to a standard list of activities

One of the questions that arises with a recall diary in the South African context is whether the informants, many of whom do not own watches, are able to give sufficiently accurate information about what happened in particular time slots. The problem is not only forgetting, but the ability to anchor activities to times of the day. Some exploratory work done by Statistics South Africa suggests that there are many ways in which even rural South Africans succeed in doing so[2]. They use radio and T.V. schedules, the passage of buses and trains and information from other individuals to keep track of time. There will undoubtedly be measurement error in many of the responses. The ultimate test, however, is to see whether the data provide a sensible picture of particular social processes. That can only be seen if social scientists start making use of the information. Thus far only a few analyses have appeared (Budlender et al. 2001, Chobokoane 2002). One of the subsidiary aims of this paper is to highlight some of the uses to which this information can be put.

3.2 Definition of the school-going population

In order to analyse schooling we need to know who is (or should be) in school. This is in fact not obtainable in the Time Use Survey. At no stage were individuals asked whether they were currently enrolled in school. This immediately limits certain kinds of analyses. For instance we cannot conclusively tell what school-going individuals do on the weekend, since we cannot tell which members of the age cohort that we observe on weekends would go to school during the working week.

Our main proxy for the school eligible population are individuals aged twenty years and younger who have had incomplete education and who report that they had a "typical" day. The reason for the high age cut-off is two fold. On the one hand it is a fact that many Africans (the bulk of the sample) take several years longer to complete education than one would expect in terms of "normal" progression (Anderson et al. 2001). Secondly being able to increase the sample size improves the precision of many of the estimates. The results do not change substantially with a lower age cut-off.

When we analyse the school day itself, we will restrict the sample further to individuals who actually recorded that they attended "school"[3]. As noted earlier we also generally exclude individuals interviewed on weekends. There are a few individuals who report attending school on the weekend, but they are such exceptional cases (and probably not part of the mainstream schooling system) that little is lost by excluding them.

[2] personal communication from Debbie Budlender

[3] In fact the time use category is "school, technikon, college or university attendance". By restricting the sample to individuals with less than 12 years of schooling we hope to ensure that we are dealing in the main with school students.

	Estimate	Standard error	n
African	.819	.016	2065
Coloured	.762	.036	248
Indian	.906	.045	54
White	.905	.033	128
Urban formal	.851	.019	911
Urban informal	.783	.029	557
Non-farm rural	.822	.023	666
Farm rural: overall	.645	.047	365
Female	.609	.053	198
Male	.679	.052	167

Notes:
All point estimates are weighted. Standard errors are corrected for clustering and stratification by urban formal, urban informal, farm and other rural areas.

Table 1: School attendance among people twenty years or younger, with incomplete education having a typical day during the working week

3.3 Household income

In many of the analyses below we will be concerned with the effect of household income. As indicated above this was measured in the household survey through a set of discrete categories. This reduces the variation available. Furthermore there was little probing around the information recorded. We would expect therefore that the quality of the income information is poor. In many of the analyses we use the categories as such. In other cases we have converted the information into a continuous variable, using the midpoints of the categories as our point estimates and twice the top bound for the open category.

3.4 Summary statistics

In Table A1 we present some simple statistics on these subsamples. For the sake of comparison we also provide the statistics for all young individuals (aged twenty years and younger) in column 1. The oversampling of urban informal and farm areas is evident when comparing the raw counts against the best estimate of the population proportions, using the Statistics South Africa weights. We notice also that young women seem to have been oversampled relative to young men.

4 School attendance

Theoretically all South African children are compelled to attend school up to age sixteen. Nevertheless it is clear that enrollment is not universal. In table 1 we show what percentage of people age twenty years and younger with incomplete secondary schooling actually attend school according to the time use survey[4]. One might think that some of these may already have dropped out of school altogether and be active in the labour force.

Nevertheless, as table 2 shows, taking out those young people who are employed or who are actively searching for work changes some of the details but does not affect the overall picture. There are substantial numbers of young South Africans with incomplete education who do not attend school. We observe that there is a racial and a geographic component to this picture. In particular, children on farms are much less likely to attend school. There are, however, no statistically significant gender differences in these raw attendance rates, except on farms; and then only in the case of the estimates reported in table 2.

[4] The essence of the picture does not change if we adopt the cut-off of sixteen years. In order to improve the precision of some of the estimates and analyses later on, we have used the somewhat higher age cutoff.

	Estimate	**Standard error**	**n**
African	.857	.014	1750
Coloured	.864	.029	203
Indian	1.0	0	48
White	.933	.031	110
Urban formal	.882	.016	805
Urban informal	.814	.030	467
Non-farm rural	.869	.020	558
Farm rural: overall	.767	.045	283
Female	.665	.062	170
Male	.886	.037	113

Notes:

All point estimates are weighted. Standard errors are corrected for clustering and stratification by urban formal, urban informal, farm and other rural areas.

Table 2: School attendance among people twenty years or younger, with incomplete education, who are not economically active and having a typical day during the working week

What we cannot deduce from these statistics is whether the children who were not at school were enrolled and playing truant, or whether they were simply not enrolled. The time use survey gives us no direct handle on this question. What it does give us, is a set of questions which were intended to establish the labour market status of the respondents. They were asked whether they did any work, paid or unpaid; whether they were interested in doing any of these kinds of work and if yes, how soon they could start. In addition they were asked whether they had taken any action in the last four weeks to look for work. If they had not they were asked the reasons for not looking for work. Among the reasons listed were "in education and training", "retired or too old to work" and so on. Many not economically active individuals did not give reasons. In table 3 we give the school attendance by labour market status, breaking the not economically active down into categories in so far as this is possible.

Some points are worth noting in relation to this table:

- Firstly, the relationship between labour market status and "attending school"[5] generally behaves as we would hope it would: retired people, housewives and working people generally do not attend school. Nevertheless the relationship is not perfect: some working individuals are also studying. This is clearly possible, since people could be studying in the evenings. It could also be due to an over-generous definition of "working" - some students will have part-time jobs.
- Secondly, it is clear that the category that we have used as proxy for the schooling population, i.e. those not economically active with incomplete education does seem to capture the schooling population very well. Indeed, attendance among people not giving reasons, but who were in this category is higher than in the category which explicitly indicated that they were schooling!
- Indeed the latter group deserves a comment: only 83% of those who explicitly indicated that they were schooling were actually in school on the day indicated. Furthermore, our estimates are for a working day (i.e. Monday to Friday) and we have restricted the sample to include only people who indicated that they had had a "typical" day. The low attendance rate can therefore not be explained by illness. It is unlikely to be entirely explained by vacations, since in the lower panel of table 3 we have broken the attendance rate down by tranche. Even in February and October, when there are no vacations, attendance is only around 85% of those supposedly schooling. This is *prima facie* evidence for a considerable degree of absenteeism. Nevertheless the "excess" absenteeism in June (confirmed through a multivariate analysis discussed below) does suggest that we are picking up some vacations.

[5] remembering that this includes technikon, college and university students

	Estimate	Standard error	n
Working	.096	.011	4424
Searching Unemployed	.027	.009	689
Not economically active:			
Schooling	.829	.031	261
Housework	0	0	200
Retired	0	0	42
Broad unemployed	.052	.023	243
No reasons given:			
school age	.875	.013	1875
non school-age	.138	.015	1351
Schooling			
February	.856	.043	105
June	.755	.072	60
October	.843	.052	96
No reasons, school age			
February	.892	.019	583
June	.847	.026	601
October	.882	.019	691

Notes:
1) All point estimates are weighted. Standard errors are corrected for clustering and stratification by urban formal, urban informal, farm and other rural areas.
2) "Broad unemployment" is defined as either having taken some action to find employment (but not meeting the criteria of "searching unemployment") or indicating that there are no jobs to be had, as reason for not searching.
3) "school age" is defined as 20 years or younger, with less than matric.

Table 3: School attendance by labour market status

- Interestingly enough, there is evidence for lower attendance in June also among those who are school age, but did not supply a reason why they were not searching for work. This is consistent both with our sample containing some school students on vacation, or with simply worse discipline in the winter months. Indeed we will see that punctuality among those who do attend school also drops in winter.

The results are broadly consistent with the framework sketched out in Section 2. The "racial" and location gradients will be highly correlated with school quality and school resources. Where these are worse the incentives to remain in school are clearly reduced. Unfortunately the time use survey does not provide any direct information about the quality of the school or the aptitudes of the individual.

In order to investigate the relationships further we provide a simple "reduced form" probit model of school attendance in table A2. We estimate the probability of observing an individual aged twenty years or younger with incomplete education reporting having been at school during a typical school day. We have included some variables that are particular to the individual, some that take the household context into consideration and some that speak to the context of the school and community. Finally we also have some time-specific variables. We have taken two levels of decision-making into account. In column (1) we consider all alternatives to being at school, including paid employment and searching for work, while in columns (2) and (3) we consider the narrower choice of actually being in school given that the individual is not economically active.

There are some striking patterns in the data. Looking at the individual level variables first, we note that these are all generally very significant. It is a bit tricky to interpret the impact of being in a higher grade, while keeping age constant (and *vice versa*), but the fact that these coefficients are significant in columns (1) and (2) and go in the opposite direction, suggests that non-attendance is most likely among people who are "behind" in the grade for age count. The fact that the quadratic term on age is very strongly significant suggests that the pressures cumulate. Indeed we would expect that once someone has fallen sufficiently behind, they will become permanent drop outs. One question this raises is whether the permanent drop outs may actually be generating this pattern in a purely mechanical way, since by definition they will not be at school and will also be behind in the grade for age stakes. As noted above, we have only a limited capacity for identifying people who are enrolled in school. The best we can do is to use the reason that people supply for not being economically active to identify a subset of individuals who explicitly claim to be schooling, as in column (3). This has drastic implications for the sample size and hence the significance of the results. Nevertheless the point estimate for the marginal effect of age is still negative although somewhat smaller than for the equivalent results in columns (1) and (2) and the effect of years of schooling attained is still positive. This suggests that there is considerable non-attendance even among people claiming to be at school. Furthermore the point estimates confirm that students that have had either less academic success earlier in life or who have had previous bouts of absenteeism are somewhat more likely to be absent from school.

We note that the qualitative results are quite similar. This suggests that the pressures leading to permanent dropping out of school (definitely captured in the first model) are not all that different from the pressures leading to more temporary absenteeism from school. Indeed there is probably a continuum of behaviour - from temporary absences of relative short durations, through longer periods of absenteeism leading to grade repetition to outright dropping out.

Turning to the household composition variables, we note that the coefficient on the household size variable is positive and significant in models (1) and (2), while that on the number of children is negative. The variables are jointly significant at least at the 10% level (the results are shown at the bottom of table A2). An increase in the household size, controlling for the number of children is, of course, equivalent to an increase in the number of adults. The results therefore suggest that the more adults there are in the household, the more likely it is that the individual concerned will be in school. There are a number of mechanisms that might be at play. There may be better monitoring. There may be less pressure to support the household or assist with chores (such as childminding). Having more children in the household seems to offset these potential advantages. The overall effects are, however, weak.

Household income, surprisingly, is even weaker. Indeed it is non-significant. This might suggest that direct costs are not the biggest factor in the schooling decision. Given the fact that we are controlling for community level variables, it may also be the case that household income does not provide a sufficiently big *independent* increase on the productivity of school time to make a big difference to the decision whether or not to stay on at school. More troubling is the possibility that household income may be related to the wage rate w that learners might expect on exiting the school system. This might be the case, for instance, if there was a strong insider-outsider division of the labour market (Wittenberg 2002). In this case low income learners would be faced with a lower opportunity cost of schooling, leading to higher retention rates in the school system than one might otherwise expect.

The community variables also hold some surprises. The "race" variables are never jointly significant. This is somewhat unexpected given that education was historically stratified on race and while this is no longer the case many of the differences between schools persist. Although many African families do send their children to historically "White" schools, this is not possible for the majority. We note, however, that in models (2) and (3) the "Indian" subsample showed 100% attendance, so that a separate coefficient could not be estimated.

The "stratum" variables, by contrast, are always jointly significant, at least at the 10% level. The pattern of the coefficients is also very interesting. When compared to the base category (of urban formal areas), attendance is about two percentage points lower in urban informal areas, five percentage points lower in the previous homeland areas and fourteen percentage points lower in the commercial farm areas. The latter confirms the picture presented in tables 1 and 2, although the relative rankings of urban informal and homeland rural areas in the attendance stakes is reversed from those in the raw tabulations. The worse performance of farm areas in school attendance is true even when we restrict the sample to people not economically active. The reason for low attendance is therefore not simply due to an earlier start of the working life. It suggests worse access to education or perhaps just worse education (i.e. a lower incentive to enrol).

The "provincial" dummies, perhaps surprisingly, are never individually or jointly significant.

Turning to the time variables, we observe that models (1) and (2) suggest that attendance in June is about five percentage points lower than in February or October. In the subsample of people claiming that they were schooling, however, this drop off seems much larger, although like with all coefficients in model (3), the effects are measured quite imprecisely.

Perhaps most interestingly, in models (2) and (3) we observe some day of the week effects. The F-tests for the joint significance of the coefficients come out quite strongly in favour of the existence of such effects, although the individual coefficients are generally not significant. The point estimates suggest that attendance is higher in the middle of the week (Wednesday and Thursday) and lower on Fridays. The fact that these effects are statistically stronger in models (2) and (3) also seems plausible: one would not expect to see day of week effects to feature much in the "big" decision whether to work or attend school.

Taken together the pattern of the coefficients in table A2 presents a reasonably coherent picture of the determinants of school attendance: Access to quality education matters, hence the geographical gradient that we observe in moving from urban formal to urban informal to homeland rural to farm areas. The prospect of future success also matters, hence the importance of the grade for age score. This matters most when considering the relative benefits of entering the labour market versus staying at school, hence the declining marginal effect of age in models (1) through (3). The relationships within the household matter, since they determine some of the opportunity costs of staying on at school. Direct costs seem to matter less, since schooling within the government sector is supposed to be free. Once the big decision whether or not to stay at school is given, the small decision whether or not to attend on a specific day is affected both by the rhythm of the seasons, with attendance smaller in winter, and by the rhythm of the week.

It follows, of course, that the set of people that are attending school on any one day is not a random subset of the set of all individuals who have incomplete education. The people at school are more likely to be relatively successful students, for example. This should be borne in mind when we turn to our analysis of the experience of the school day[6].

5 A picture of the school day

5.1 Before school

The typical school day begins with virtually all school students asleep. What do students do after rising? About 38% of them will engage in some form of household chore, such as cooking or cleaning. As Table 4 makes clear, there are strong gender and racial dimensions to the performance of these chores, with African women most likely to have these responsibilities. Indeed, we will see later (see Table 9 below), that African female school students spend, on average over an hour a day cooking.

What is the overall effect of such an early start? We note that in Table 5 there is no real evidence for big racial and gender differences in the total quantity of sleep obtained. On average most school students get about nine hours of sleep during the school week. This suggests that those children who perform early morning chores are more likely to also turn in early. This in turn suggests that the real effect of these chores is to reduce leisure time and perhaps reduce home work time.

The lack of variation in Table 5 is misleading, however, as Table A3, column 1 reveals. This regression suggests that sleep time decreases with age (at a decreasing rate) and education. Roughly speaking a ten year old in grade four would be sleeping 65 minutes more a day than an eighteen year old in grade 12. Given the increasing demands in higher grades this is not surprising. Indeed, the drop in sleep time with age can be seen also in U.S. and Japanese children (Juster and Stafford 1991, Table 4, p.480). More surprising, perhaps, is the fact that sleep decreases strongly with income. A school child in the highest income bracket sleeps three-quarters of an hour less than a child in the poorest category. Part of the reason for this is undoubtedly that richer children have more options than poorer ones: they can watch TV for instance (for a detailed discussion of the income effects on sleep see Biddle and Hamermesh 1990, Szalontai 2004). Another very suggestive feature of the regression is that school students living in the eastern half of the country seem to have about half an hour less sleep than those in the western. This feature would make sense if waking up

[6] This might suggest that we should be doing "sample selection" corrections. It is difficult to think about variables that would help to predict whether someone attends school but that should not directly enter into any of the "effort" variables that we will be measuring.

		Estimate[a]	Standard error	n
Cleaning				
African	Female	.343	.026	936
	Male	.235	.023	871
Coloured	Female	.153	.053	106
	Male	.086	.057	77
Indian	Female	.238	.105	27
	Male	.167	.087	30
White	Female	.136	.054	71
	Male	.140	.065	63
Overall		**.265**	**.017**	**2183**[b]
Cooking				
African	Female	.249	.022	936
	Male	.174	.018	871
Coloured	Female	.132	.059	106
	Male	.073	.030	77
Indian	Female	0	0	27
	Male	.088	.047	30
White	Female	.136	.059	71
	Male	.013	.010	63
Overall		**.191**	**.013**	**2183**[b]

Notes:
a) All point estimates are weighted. Standard errors are corrected for clustering and stratification by urban formal, urban informal, farm and other rural areas.
b) There were two individuals whose race was classified either as "other" or was missing.

Table 4: Household chores before the school day

		Estimate[a]	Standard error	n
African	Female	547.6	4.1	852
	Male	548.8	4.6	806
Coloured	Female	534.8	10.7	94
	Male	551.7	7.7	72
Indian	Female	530.9	17.4	23
	Male	559.1	10.2	27
White	Female	544.8	12.3	61
	Male	532.7	12.0	53
Overall		**547.1**	**2.9**	**1990**[b]

Notes:
a) All point estimates are weighted. Standard errors are corrected for clustering and stratification by urban formal, urban informal, farm and other rural areas. The sample is restricted to individuals who had a "typical" day.
b) There were two individuals whose race was classified either as "other" or was missing.

Table 5: Minutes spent sleeping during the school week

		Estimate[a]	Standard error	n
Personal hygiene prior to school				
African	Female	.990	.004	936
	Male	.983	.008	871
Coloured	Female	.991	.007	106
	Male	.980	.011	77
Indian	Female	.964	.027	27
	Male	.951	.045	30
White	Female	.935	.034	71
	Male	.990	.008	63
Overall		**.984**	**.004**	**2183**[b]
Breakfast prior to school				
African	Female	.661	.027	936
	Male	.723	.023	871
Coloured	Female	.764	.047	106
	Male	.869	.046	77
Indian	Female	.597	.110	27
	Male	.873	.070	30
White	Female	.826	.052	71
	Male	.937	.029	63
Female	Younger[c]	.708	.029	648
	Older[c]	.642	.031	493
Male	Younger[c]	.758	.028	549
	Older[c]	.736	.027	493
Overall		**.714**	**.017**	**2183**[b]

Notes:
a) All point estimates are weighted. Standard errors are corrected for clustering and stratification by urban formal, urban informal, farm and other rural areas.
b) There were two individuals whose race was classified either as “other” or was missing.
c) Younger is defined as 10 to 14 years (inclusive) while older is older than 14 years.

Table 6: Washing and eating before going to school

was affected by daylight, but going to sleep was governed more by TV schedules than by the surrounding light.

5.2 Getting ready

Virtually all school goers engage in some form of personal hygiene prior to leaving for school as can be seen in Table 6. The contrast with the proportion eating breakfast is quite striking (also shown in Table 6). Only about 71% of school children arrive at school haven eaten breakfast. Given that almost all students report having washed prior to school, it is unlikely that this percentage is due to forgetting or bad reporting. Given how important nutrition is for the ability to perform in school (D.McCoy, Barron and Wigton, eds 1997, pp.8–9), this is a rather alarming statistic.

It may be possible that some learners skip breakfast in anticipation of being fed at school. Given that the school nutrition programme is targetted only at primary schools, we would expect that the probability of eating breakfast would in that case increase with age. The results from a probit regression reported in Table A4 column 1, however show that the trend is the reverse. Older learners are more likely to skip breakfast than the younger ones.

We would expect poverty to be a major determinant of whether a learner eats breakfast or not. The

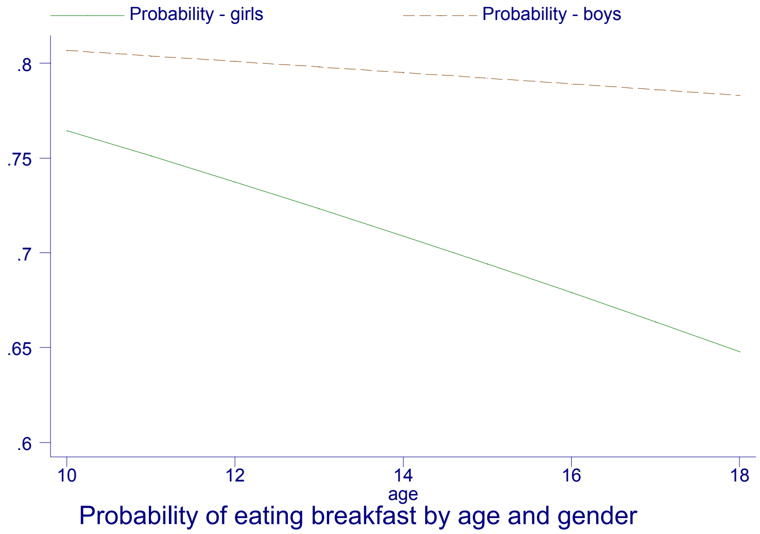

Figure 1: Girls are more likely to skip breakfast than boys - and this gap increases with age. We show the predicted probabilities of having eaten breakfast, evaluated at the means of all the other variables.

regressions support this view, up to a point. The income coefficients in that regression are jointly statistically significant and the point estimates show that individuals in the top two income brackets have a much higher probability of having eaten breakfast. Nevertheless the income coefficients are not as consistent and as strong as one might have supposed. This suggests that there may also be non-economic factors at work. Indeed table 6 points to a strong gender dimension of skipping breakfast. Furthermore, as we observe in the bottom most panel of the table, there is a gender-age interaction, with older girls less likely to arrive at school having eaten than younger girls. The difference is statistically significant at the 5% level, whereas the very small difference between younger and older boys is not statistically significant at all.

This conclusion is reinforced by the probit regression. The coefficients are difficult to interpret as they stand[7] but in Figure 1 we have graphed the predicted probabilities of having eaten breakfast for boys and girls at different ages, keeping all other attributes constant. We have set these at the means of all these variables. It is evident that the coefficient on age for girls (-0.04) translates into roughly a twelve percentage point drop in the probability of having eaten breakfast between the ages of ten and eighteen. The equivalent coefficient for boys, which is the sum of the age coefficient and the age*gender interaction effect, is not statistically significant and amounts to a drop of around two percentage points.

It is hard to escape the conclusion that social processes impacting particularly on teenage girls are producing this gender gap. There are two potential explanations. Teenage girls in poorer households may be more pressed to assist with chores prior to leaving home, reducing the time available to eat[8]. Alternatively, social pressures to reduce weight may be the major issue. Given the fact that girls are less likely to eat even in affluent communities (Whites and Indians) the latter explanation seems more cogent. That raises questions about the impact of such social dynamics on educational outcomes.

5.3 Attending school

In Table 7 we show the cumulative proportion of children who are at school in half-hourly intervals up to 9.30 a.m. The proportions are taken over all children who will at some stage during that day record being at school as one of their activities. Given the fact that there will inevitably be some absentees the proportion

[7] We have not reported the marginal effects for age, age*gender and gender, since the standard calculations are not very meaningful, given the interaction effect.

[8] I thank Debbie Budlender for pointing out this possibility.

Time	Cumulative Proportion	Standard error
Before 7.00 a.m.	.0063	.0022
Before 7.30 a.m.	.0535	.0085
Before 8.00 a.m.	.2419	.0181
Before 8.30 a.m.	.7945	.0157
Before 9.00 a.m.	.9333	.0091
Before 9.30 a.m.	.9714	.0047

Notes:

1. All point estimates are weighted. Standard errors are corrected for clustering and stratification by urban formal, urban informal, farm and other rural areas.
2. The estimates are for individuals younger than twenty, with incomplete education, who attended school during a typical day, Monday to Friday.
3. n=1990

Table 7: Time at which schooling commences

of those enrolled must be smaller. One of the most startling points to emerge is that many South African school students seem to start school late. While one quarter of school students has commenced schooling activities by eight, fully twenty percent have not yet done so by 8h30. Without further information it is impossible to diagnose exactly what is the case: perhaps many students arrive late, or it might be that they wait for the teacher to arrive or perhaps some schools are scheduled to start late. Some initial enquiries at the Ministry of Education suggested that there is no "official school day" and that there is no central information about school opening and closing times. Anecdotal evidence suggests that punctuality at many schools is a serious issue and that this may become a "low level equilibrium": students arrive late in certain schools, knowing full well that the teachers will not start with activities well into the school day. On the other hand in some more rural schools the school day may start later in order to give learners time to walk there.

We investigate these relationships and possible explanations further by means of a probit model. In Table A4, column 2 we estimate the probability that an individual will be doing an activity called "school" by 8.30 a.m. One of the most striking features of those results is the very strong income gradient. Children in households in the higher income brackets are much more likely to be on time. "Punctuality" seems to be a problem mainly in poor households or in the schools serving these communities. The marginal effects show an interestingly progressive pattern. Children from households in the R1200 to R1799 category show a 7 percentage point improvement in the arrival rate over the poorest categories. This goes up to 13 percentage points in the next higher bracket and reaches 16 percentage points at the top. Given a base-line predicted probability of 81% this implies that virtually all students from the richest households are schooling by 8.30 a.m.

We note that the hypothesis about later starts in rural areas is not borne out by the spatial variables. Furthermore we have included a separate variable measuring whether the nearest school was close by (within a half hour walk). The point estimate on this variable suggests that having a school close by improves punctuality, but the effect is not statistically strong. This suggests that it is individual or household level factors rather than community-wide ones that are at play.

There is an interesting temporal dimension: punctuality drops off in June and improves in October. While these coefficients are not individually significant, they are jointly significant. The results are very much in accordance with our expectations: in winter we would expect worse punctuality (six percentage points at the mean). The coefficients on the days of the week also make some sense, with worst punctuality on Mondays, but they are not individually or jointly significant, so we can't draw too many inferences from them.

An interesting question that follows on from this, is how much actual class time there is in the typical school day. In order to calculate this we have simply assumed that the activity recorded as "school" is actual class time. This may, of course, not be correct. In our sample the average time reported was 305 minutes.

By contrast, the length of the average school day was 352 minutes[9].

In Table A3, columns 2 and 3, we report regression in which we try to explain the length of the school day and the number of minutes spent in class. They give fairly similar results. Some of the coefficients are as one would expect: the length of the school day increases with grade, but not with age. Perhaps the most surprising result is that income does not have much of an effect on the overall length of time spent on school - except for a marked discontinuity in the top income bracket. Since most of these individuals are White (69% in our sample), this coefficient is off-set to some extent by the negative "White" coefficient. This might suggest that the gap in schooling hours between poor and rich Black children is larger than the gap between poor and rich White ones. Given the small sample size in this category one is probably advised to discount this particular effect.

In view of the fact that poorer children seem to start the school day later, it is interesting that there seems to be little impact on the overall time spent schooling. There seem to be two explanations for this. On the one hand the pressures which lead to poorer children arriving later (e.g. lack of private transport) may also lead them to hang around at the school a bit longer. Alternatively we may be picking up systemic factors - that entire schools servicing poorer children start later and close later. If it is the former, then clearly time at school is a bad measure of time devoted to learning.

Again there is a seasonal effect, with somewhat shorter hours in winter. This suggests that at least some of what we are picking up in these measures is not only the rules of these institutions, but also the punctuality of the students.

5.4 Doing home work

In Figure 3 we explore some of the temporal patterns associated with home work. It should be noted that each of the graphs derives from an independent cross-section. In order to provide some benchmarks for comparison we have also indicated a two standard deviation band around the point estimates[10]. The patterns that emerge seem eminently reasonable, with the peak in each graph around 8.00 p.m. with the exception of Saturdays. It also seems clear that there are pronounced day of week effects, with Monday being a particularly high demand day. There are some amusing features that somehow ring true. Sunday nights seem to show higher levels of home work than Friday nights and there is a small cluster of last minute cramming happening around 6.00 am on Friday morning.

Restricting attention to individuals who are recorded as actually attending school, about 56% of these will also be doing home work on that day (see Table 8). The average time spent on home work is 53 minutes, but since this includes a lot of people who do zero minutes home work, perhaps the more useful statistic is that the average among those who do any home work is ninety four minutes (Table 8). These aggregate statistics conceal an important outlier, however. Indian girls distinguish themselves not only by having a greater probability of doing home work on any given day (around 90%) but they also spend much longer doing it. As a result the average time spent per day on home work is over an hour longer than for the population average (124 minutes as against 53 minutes). This cannot be simply a function of the demands of the schools in which these girls find themselves, since we would then expect the boys to face similar demands.

The special circumstances of Indian (and to a lesser extent White) girls is confirmed in the regressions reported in columns 4 and 5 of table A3. Column 4 reports an OLS regression in which the zeros are treated as ordinary observations. This is clearly problematic as the distribution is censored to the left. There undoubtedly are individuals who would like to spend negative time on home work, but that is just not possible! To estimate the model without the zeros would be incorrect, as it would suggest that these observations are not supplying any useful information. One approach would be to estimate a sample selection model, in which we would estimate the probability of doing home work in the first stage and then estimating the minutes spent doing home work, conditional on doing home work, in the second. In order for such a procedure to provide properly identified coefficients we would need to have variables in the first stage which do not belong in the second stage. It seems very doubtful that there could be factors which influence whether or not someone does home work, but not influence how much time they spend on it. Indeed unless the home

[9] We calculated this by assuming that students are at school from the beginning of the first period at which they mention "school" as an activity to the end of the last period in which they do so.

[10] The standard errors have been calculated correcting for the clustered design and stratification.

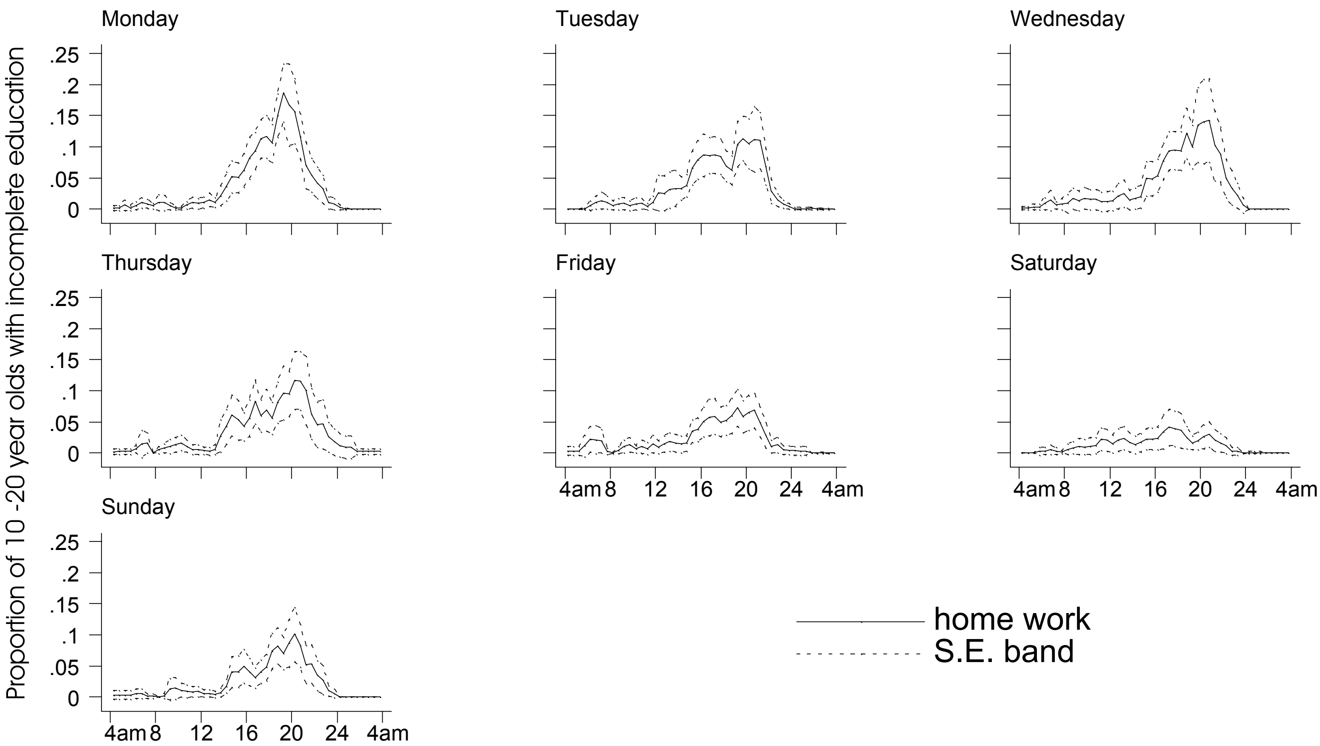

Figure 2: Distribution of homework load over the week.

	Proportion doing homework	**Minutes spent, conditional on doing homework**	**Minutes spent**	**n**
African female	.5718	90.11	51.52	852
	(.0261)	(3.266)	(3.525)	
African male	.5153	94.47	48.68	806
	(.0290)	(3.821)	(3.502)	
Coloured female	.5495	104.63	57.49	94
	(.0727)	(12.907)	(10.177)	
Coloured male	.6658	77.75	51.76	72
	(.0648)	(9.445)	(8.111)	
Indian female	.9024	137.89	124.43	23
	(.0758)	(17.851)	(18.31)	
Indian male	.4754	89.25	42.42	27
	(.1260)	(8.251)	(12.168)	
White female	.8295	106.86	88.64	61
	(.0566)	(11.309)	(12.225)	
White male	.5910	124.18	73.39	53
	(.1402)	(21.508)	(23.186)	
Overall	**.5600**	**94.60**	**52.97**	**1990**
	(.0186)	(2.582)	(2.432)	

Notes:

1. All point estimates are weighted. Standard errors are given in brackets. These are corrected for clustering and stratification by urban formal, urban informal, farm and other rural areas.
2. The estimates are for individuals younger than twenty, with incomplete education, who attended school during a typical day, Monday to Friday.

Table 8: Time spent doing homework

work is prescribed for the very next day, individuals can plan the time to be devoted to home work over a number of days. There is even some support for this idea in Table 8 above: White boys seem to do home work less frequently than White girls, but when they do, they spend longer on it. Figure 2 of course provides yet more evidence of such intertemporal reallocation.

Instead of estimating a sample selection model, we opted for a simple tobit model (reported in column 5 of table A3). For what it is worth, we also report a probit model of the probability of doing home work in column 3 of table A4. The main conclusions from all these analyses are fairly similar. Household income is again not significant at all. Children in higher grades have a higher probability of doing home work and when they do it they tend to spend more time on it. This is not surprising if the effort required to acquire an additional unit of human capital is increasing in H_L, i.e. if $\frac{\partial^2 H_L}{\partial t_s^2} < 0$, which would be a fairly normal assumption. Indeed it could also be explained in terms of the strongly convex returns to education function that seems to characterise the South African labour market (Lam 1999).

There seems to be significantly more home work in the June period than in either February or October and the probability of doing home work as well as the length of time devoted to it, decreases over the school week.

The special situation of Indian girls emerges even more spectacularly in the regression results in Table A3[11]. It seems clear that the effect we are tracing here must be related to "cultural" expectations of the appropriate behaviour of girls. It is not simply an income effect, because the income variables are not significant. It seems very much as though for Indian girls (and to a lesser extent for White girls) the value of home work time exceeds the value of other uses of time *within their relevant choice sets*. The key question is what these choice sets are: do these girls have the option of spending their time on leisure, or are they expected to help with chores if they do not do home work? The relevant trade-off may therefore be not so much between home work and leisure as between home work and chores.

If this is, indeed, the case we may ask why Indian girls are so special. Why don't we see similar sort of trade-offs in the case of African girls? In fact Table 9 makes it clear that African school girls are exceptional in the quantity of chores expected of them: more than an hour a day, devoted to cooking alone. This suggest that the choice set of African girls is even more limited than that of Indian ones: time for home work may be residual, in the sense that the chores have to be performed first. Multivariate regressions, reported in columns 6 and 7 of table A3 and in column 4 of table A4 confirm the special situation of African women. They also indicate that the pressures are relieved to a limited extent in larger households and that the expectations of the amount of work performed change with the age of the individual.

5.5 Other post-school activities

The difference between girls and boys can be seen also when we consider the typical timing of home work and how this relates to other activities. In 3 we see that girls tend to do their home work somewhat earlier than boys, frequently before supper. A substantial number of boys spends the afternoon in games, recreational activities or simply socialising with friends (see 4). It is interesting to note that girls not only do their home work earlier, they also seem to switch the TV on earlier. The patterns in Figure 4 are consistent with parents exercising more control over their daughters and restricting their movements to either organised games or acivities that can be carried out within the house. As noted above, many girls are also expected to help with the cooking (see Figure 5). All of these support our conjecture above that girls structure their activities within much tighter constraints than boys. The alternative would be to suppose that girls and boys simply have different preferences over the desirability of recreation or socialising with friends. It is therefore not surprising that the pattern and timing of home work is different among boys and girls.

One noteworthy feature to emerge from Figure 4 is the extent to which TV is part of the daily routine of school goers. This is brought home even more forcefully in Table 10. It is startling to observe that over half of all school students watch TV during the school week and among those who do, the mean time in front of the TV is close to two and a half hours per day! Furthermore the TV time which is used here is corrected for multiple activities occurring, i.e. if an individual reported both watching TV as well as eating

[11] The probit model for doing homework was also estimated with a full set of race and gender interaction effects. The point estimate on the coefficient for Indian girls was very high, but not statistically significant. Those results are available from the author on request.

	Proportion who cook	**Minutes spent, conditional on doing cooking**	**Minutes spent**	**n**
African female	.710	90.53	64.24	852
	(.0219)	(3.544)	(3.069)	
African male	.352	53.59	18.85	806
	(.0258)	(3.296)	(1.832)	
Coloured female	.519	50.79	26.38	94
	(.0713)	(6.412)	(4.413)	
Coloured male	.220	43.00	9.44	72
	(.0595)	(7.329)	(3.436)	
Indian female	.253	36.54	9.24	23
	(.1104)	(5.511)	(4.233)	
Indian male	.168	30	5.05	27
	(.0699)	(0)	(2.098)	
White female	.272	41.90	11.40	61
	(.0638)	(4.388)	(2.730)	
White male	.071	55.42	3.930	53
	(.0349)	(11.97)	(1.967)	
Overall	**.489**	**75.32**	**36.81**	**1990**
	(.0162)	(2.652)	(1.855)	

Notes:

1. All point estimates are weighted. Standard errors are given in brackets. These are corrected for clustering and stratification by urban formal, urban informal, farm and other rural areas.

2. The estimates are for individuals younger than twenty, with incomplete education, who attended school during a typical day, Monday to Friday.

Table 9: Time spent cooking

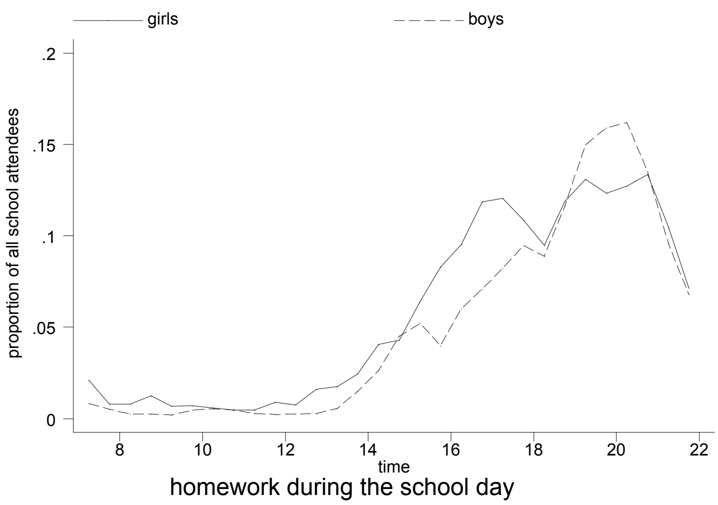

Figure 3: Girls tend to do their homework somewhat earlier than boys.

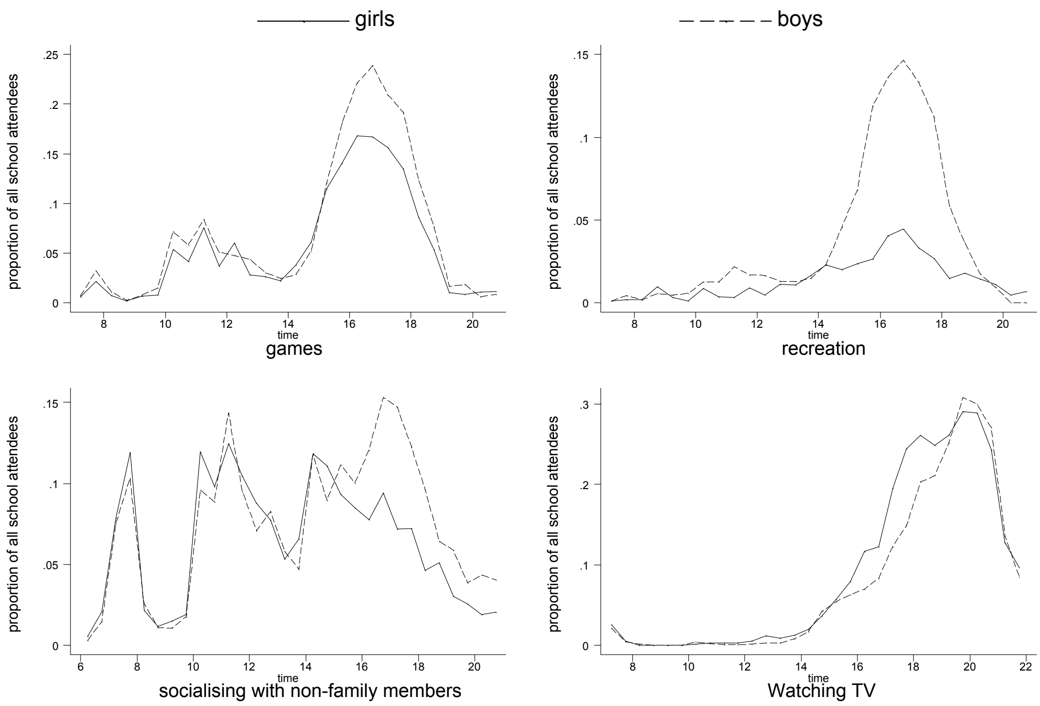

Figure 4: Boys tend to spend the post-school hours in more public pursuits than girls.

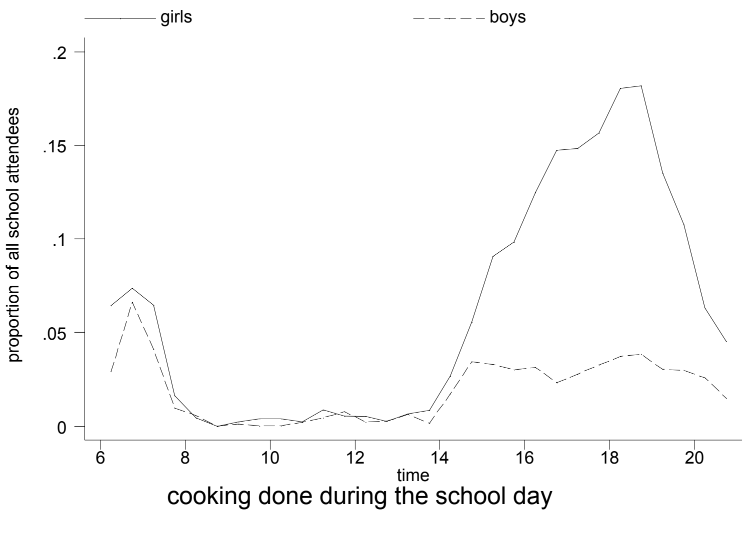

Figure 5: Many school girls have cooking responsibilities in the evening.

	Proportion who watch TV	**Minutes spent, conditional on watching TV**	**Minutes spent**	**n**
African female	.491	157.50	77.34	852
	(.0353)	(6.125)	(6.446)	
African male	.496	133.77	66.30	806
	(.0326)	(5.271)	(4.791)	
Coloured female	.882	163.31	144.04	94
	(.0361)	(12.664)	(12.322)	
Coloured male	.875	149.37	130.70	72
	(.0525)	(13.471)	(14.368)	
Indian female	.849	151.88	128.93	23
	(.0978)	(21.502)	(22.903)	
Indian male	.964	131.98	127.27	27
	(.0364)	(21.528)	(21.335)	
White female	.845	139.95	118.32	61
	(.0686)	(15.956)	(16.429)	
White male	.941	169.41	159.49	53
	(.0349)	(24.830)	(25.448)	
Overall	**.554**	**147.28**	**81.66**	**1990**
	(.0251)	(4.130)	(4.455)	

Notes:

1. All point estimates are weighted. Standard errors are given in brackets. These are corrected for clustering and stratification by urban formal, urban informal, farm and other rural areas.
2. The estimates are for individuals younger than twenty, with incomplete education, who attended school during a typical day, Monday to Friday.

Table 10: Time spent watching TV

supper in a half-hour period, then only fifteen minutes would be counted as TV time. To the extent to which students are multi-tasking, the actual TV time may be even higher. This is unlikely to be beneficial from an educational point of view - even if the TV is only running in the background..

The main source of variation in the mean TV time in Table 10 arises from the different propensities to watch TV, rising from 49% in the case of African women to 96% among Indian males. We would expect there to be a strong income component to this gradient. However, as the multivariate analyses reported in columns 8 and 9 of Table A3 and column 5 of Table A4 show, the relationship is more of an inverse U: TV consumption rises rapidly with income, but then drops down again in the highest income groups. The decline at the top end of the income distribution is very interesting, but we have not investigated thus far what to attribute this to. It is possible that these children consume more expensive forms of entertainment.

The other coefficients in those regressions behave fairly much as expected. Location matters a lot. TV consumption is higher in urban formal areas than in urban informal areas and much higher than in the rural areas. This probably reflects the availability of electricity as well as differences in the clarity of reception. Consumption increases with age, at a decreasing rate and depends on household composition. Consumption is higher in households made up mainly of adults. This suggests that there are at least some externalities from other people's consumption of TV. If older siblings or parents have switched on the TV, then this would tend to increase the consumption of the younger members of the household also.

6 Reflecting on the findings

We began this discussion with a simple analytical time allocation model. Some of the patterns that we have found are in accordance with that framework:

- School enrolment is lowest in parts of the country where we would expect school quality and resources available to the schools to be lowest.
- Punctuality improves significantly with household income.
- The probability of enrolment is lower among people who are behind in the grade for age and hence have lower revealed ability or lower prospect of successful completion.
- The effort put into school work and home work increases with grade. We would expect this on at least two counts. Firstly the human capital "production function" may have decreasing marginal returns to effort, requiring additional study time to acquire an extra year's qualification. Secondly the earnings function shows strongly increasing returns to education suggesting that the additional time is well worth it.
- Some of the temporal patterns can also be explained within a "short-run" version of the framework. If the disutility of schooling (or utility of leisure) increases in winter and towards the end of the school week, it is not surprising to find attendance and punctuality dropping off.

Some non-results can also be reconciled with that framework:

- Household income does not seem to be a strong independent predictor of enrolment. This would be the case if the main determinants in the human capital production function are community level ones.
- Household income does not seem to significantly affect home work time or school time. This could be explained in several ways. Firstly, we may be dealing with a selection issue, where poor children that are remain enrolled in the school system perhaps have better motivation and ability on average. Secondly, we may be faced with a measurement issue. It is not clear whether the quality of the time devoted is equivalent. If it is true that children who arrive later also drift home later, we may be including some "dead" time as part of our measured school time. This would be even more true if the teachers do not spend a full day teaching. Thirdly, it may be the case that household income permits the purchase of inputs (such as computers) which affect the productivity of time put in to study, thus reducing the value of additional time put in to school work.
- These non-results seem to run counter to our finding that punctuality *is* predicted by income. We can reconcile these findings if the value of punctuality to rich parents is different to the value of punctuality to poor parents. This might be, for instance, if richer parents personally drop their children off at school on their way to work. In this case the high value of the parents' time may reflect itself in greater punctuality for their children. Poor parents, by contrast, might rely on children getting themselves to school.

Some additional results can be interpreted through simple extensions of the time allocation framework:

- The lower sleep/higher leisure time characterising richer children can be explained in a richer model in which sleep and different varieties of leisure feature in the utility function (Wittenberg 2005). The larger variety of activities on offer to richer kids may stimulate substitution away from sleep if the elasticity of substitution is sufficiently high.
- The higher prevalence of chores performed by poorer children can be explained in a model in which the overall household maximises its utility by allocating times to home production, production in the work place, school work and leisure. If work performed by poor children is seen as a "bad" in the household utility function, it will be lower in high income households.

What is much harder to accommodate in this sort of framework is the particularly gendered nature of the chores performed. It seems clear that girls perform more work and boys play more. It is hard to escape the conclusion that they operate under different constraints. These constraints seem to arise from cultural expectations about appropriate behaviour. A different area where such expectations seem to matter is in the nutrition choices of teenage girls.

It may be the case that such constraints are simply accepted by everyone within the household and they become part of the background against which the time allocation decisions take place. However, if our interpretation of the excessive quantities of "home work" performed by Indian girls is correct, then the reality seems less simple. It looks as though the choices made by some household members have strategic elements to them – responses to preferences and choices by other household members. It appears as if there are intra-household bargaining games about the distribution of chores, "work" and leisure.

The possibility that the choices by some agents create externalities for the decisions of others is an important lesson. Indeed it is possible that spillovers are pervasive in the education system. Lazear (2001), for instance, has suggested that learners potentially create negative spill-over effects for each other. If one person in a class is "behind" and asks questions that are obvious for everyone else, then this person delays the learning process[12]. If the disruption occurs at a high enough frequency, then the incentive to learn for the others in the class diminishes. The quality of the schooling is therefore not simply a function of the qualifications of the teacher or the physical resources available, but also of the characteristics of the peers.

This possibility would increase the salience of some observations made earlier:

- the high rate of grade repetition among poor South African learners (see Anderson et al. 2001). If repeaters have lower ability this may create disruptive class-room effects for the rest of the learners.
- the lower level of punctuality among poor learners. If students drift in to lessons this is bound to have a disruptive effect.
- the lower rates of attendance in poorer areas in the country. If these rates are not made up exclusively of permanent drop-outs, then this truancy could also interfere with the learning process of the rest of the class.

In short there are ample indications that the educational process may function less well in the poor parts of the country. A troublesome prospect is that these peer-effects work in ways that amplify the "natural" time allocation processes. In areas where teacher quality is not that high and schools are underresourced, the lower level of effort by some students creates negative peer effects that magnify these problems. It is also easy to see how selection processes operating on teachers may accelerate these effects yet further. Good teachers may find such disruptive environments less conducive to teach in and may be bid away by better resourced, richer schools. This is possible even in the public education system, where richer parents can find unofficial incentives to keep or attract better teachers.

If processes like these are at work in South Africa then it should emerge quite clearly in some of the observable output variables, like matric pass rates or matric grades. From the published matric results it is clear that vast differences exist between different types of schools. The old "White" school system still performs much better in ensuring that students pass – and pass in the technical and scientific subjects necessary for economic development. Unfortunately the time use survey has no such information available. Consequently we cannot see how the results achieved correlate with the efforts supplied. The best that one can do with this data set is the sort of assessment of the level of "effort" supplied by students. The "education production function" cannot be read off from these data.

Nevertheless in terms of "effort" there is clearly some good news. Even learners in poor environments seem to be putting in similar times into studying and into school work. Whether it is at the level appropriate is a different matter.

[12]Lazear notes that students may also create positive spill-over effects. He argues, that if these were dominant, then the school authorities would have the incentive to increase class size. The range of class sizes we observe in practice are therefore likely to be where the negative effects predominate.

7 Conclusion

Many aspects of the choices made by young South Africans can be interpreted within a Human Capital framework. The tradeoffs between school work, leisure and work in the labour market seem broadly in line with that theory. Nevertheless it also seems clear that South Africa's learners are making their educational choices within a set of contexts heavily shaped by others. TV consumption, performance of chores, time devoted to homework and school attendance are all influenced by what happens within the household and the community. Similarly, whether or not learning happens on an empty stomach is influenced both by the income of the household and a set of cultural values communicated to adolescent girls. Although we do not have measures of educational outcomes, it would be surprising if these influences operated in ways to maximise learning.

Evidently some of these pressures are more amenable to policy intervention than others. In particular, it seems that the geographical gradients in school attendance might be addressed. If rural people have better access to quality education this might provide the appropriate incentives to stay on at school.

A more troubling set of issues is raised by the possibility that learners may be creating negative peer effects for each other. Given the high rate of grade repetition among South Africa's learners (see Anderson et al. 2001) it is not implausible that these disruptive effects exist. Furthermore we have shown that repeaters have worse records for attendance than non-repeaters.

These connections should be investigated more thoroughly with the appropriate instruments. What we hope to have shown is that the time spent by learners is an important part of the way in which the educational system functions and deserves to be analysed as such. We also hope to have shown that time use data is a useful adjunct to other forms of information. Indeed it is surprising quite how rich these data can be. For instance, the seasonal and day of week effects identified in the regressions are all plausible and resonate with our intuitive understanding of these processes. Despite all the misgivings about data quality mentioned at the outset, the overall picture presented is surprisingly coherent. Certainly these data merit further analysis.

References

Anderson, Kermyt G., Anne Case, and David Lam, "Causes and Consequences of Schooling Outcomes in South Africa: Evidence from Survey Data," *Social Dynamics*, 2001, *27* (1), 37–59.

Becker, Gary S., *Human Capital: A Theoretical and Empirical Analysis with Special Reference to Education*, 3 ed., Chicago: University of Chicago Press, 1993.

Biddle, Jeff and Daniel Hamermesh, "Sleep and the allocation of time," *Journal of Political Economy*, 1990, *98* (5, Part 1), 922–943.

Budlender, Debbie, Ntebaleng Chobokoane, and Yandiswa Mpetsheni, *A Survey of Time Use: How South African men and women spend their time*, Statistics South Africa, 2001.

Card, David, "The causal effect of education on earnings," in Orley C. Ashenfelter and David Card, eds., *Handbook of Labor Economics*, Vol. 3A, Amsterdam: Elsevier, 1999, pp. 1801–1863.

Case, Anne and Angus Deaton, "School inputs and educational outcomes in South Africa," *Quarterly Journal of Economics*, 1999, *114*, 1047–1084.

——— **and M. Yogo**, "Does School Quality Matter? Returns to Education and the Characteristic of Schools in South Africa," Working Paper 7399, NBER October 1999.

Chobokoane, Ntebaleng, "Activities over time," 2002. unpublished paper, Statistics South Africa.

Crouch, Luis and Thabo Mabogoane, "No Magic Bullets, Just Tracer Bullets: The role of learning resources, social advantage, and education management in improving the performance of South African schools," *Social Dynamics*, 2001, *27* (1), 60–78.

D.McCoy, P. Barron, and A. Wigton, eds, "An Evaluation of South Africa's Primary School Nutrition Programme," Health Systems Trust 1997. www.healthlink.org.za.

Glaeser, Edward L. and Albert Saiz, "The Rise of the Skilled City," Working Paper 10191, NBER 2003.

Juster, F. Thomas and Frank P. Stafford, "The Allocation of Time: Empirical Findings, Behavioral Models, and Problems of Measurement," *Journal of Economic Literature*, 1991, *29* (2), 471–522.

Lam, David, "Generating Extreme Inequality: Schooling, Earnings and the Intergenerational Transfer of Human Capital in South Africa and Brazil," PSC Research Report 99-439, Population Studies Centre, University of Michigan 1999.

Lazear, Edward P., "Educational Production," *Quarterly Journal of Economics*, 2001, *116* (3), 777–803.

Psacharopoulos, G., "Returns to investment in education: A global update," *World Development*, 1994, *22*, 1325–1343.

Szalontai, Gabor, "The Demand for Sleep: A South African Study," Master's thesis, School of Economics and Business Sciences, University of the Witwatersrand 2004.

Wittenberg, Martin, "Job Search in South Africa: A Nonparametric Analysis," *South African Journal of Economics*, 2002, *70* (8), 1163–1198.

—, "Industrialisation and surplus labour: A general equilibrium model of sleep, work and leisure," 2005. mimeo. School of Economics, University of Cape Town.

Table A1: Summary Statistics

	(1)		(2)		(3)	
	Younger than 20		Younger than 20 with incomplete education on a typical day during school week		Younger than 20 with incomplete education attending school on a typical day during school week	
tranche	n	Estimated proportion	n	Estimated proportion	n	Estimated proportion
February	1323	0.357	861	0.371	710	0.384
June	1274	0.323	788	0.301	587	0.285
October	1327	0.320	850	0.329	693	0.331
day of week						
Monday	728	0.190	620	0.258	495	0.267
Tuesday	628	0.164	544	0.222	435	0.213
Wednesday	554	0.126	482	0.170	384	0.167
Thursday	452	0.115	389	0.155	319	0.163
Friday	537	0.144	464	0.195	357	0.189
Saturday	387	0.096				
Sunday	621	0.166				
race						
African	3174	0.820	2065	0.848	1658	0.845
Coloured	401	0.082	248	0.070	166	0.065
Indian	92	0.024	54	0.024	50	0.026
White	248	0.073	128	0.057	114	0.062
Other	6	0.001	3	0.001	1	0.001
gender						
Female	2061	0.499	1312	0.510	1031	0.499
Male	1863	0.501	1187	0.490	959	0.501
stratum						
urban formal	1511	0.411	911	0.385	770	0.399
urban informal	840	0.076	557	0.077	429	0.074
other rural	1037	0.467	666	0.489	549	0.489
farm	536	0.046	365	0.048	242	0.038
labour market status						
employed	576	0.168	328	0.148	186	0.117
unemployed	108	0.023	50	0.017	4	0.003
not econ active	3240	0.809	2121	0.835	1800	0.879
income						
0-399	858	0.211	567	0.221	422	0.203
400-799	1166	0.334	771	0.360	607	0.358
800-1199	560	0.139	364	0.140	303	0.147
1200-1799	413	0.100	258	0.088	203	0.084
1800-2499	234	0.067	140	0.062	115	0.068
2500-4999	266	0.073	156	0.066	136	0.070
5000-9999	143	0.050	76	0.044	67	0.046
10000+	66	0.025	33	0.020	32	0.024
years of schooling						
0	36	0.007	20	0.006	5	0.001
1	43	0.011	27	0.014	20	0.013
2	131	0.035	91	0.039	81	0.042
3	320	0.091	223	0.100	194	0.109
4	426	0.115	301	0.131	261	0.138
5	410	0.109	263	0.104	221	0.110

6	458	0.122	310	0.135	259	0.143
7	502	0.128	335	0.128	248	0.112
8	448	0.110	306	0.116	233	0.115
9	342	0.075	237	0.079	179	0.075
10	339	0.087	233	0.087	168	0.079
11	256	0.063	153	0.063	121	0.062
12	199	0.047				
Subsample size	**3924**		**2499**		**1990**	

Notes:
The proportions are calculated using the Statistics South Africa weights

Table A2: Probability of attending school - probit model

	(1)			(2)			(3)		
	Coefficient		Marginal Effect	Coefficient		Marginal Effect	Coefficient		Marginal Effect
age	0.3210 (0.1729)	+	-0.039	0.3222 (0.1821)	+	-0.024	-0.1542 (0.6633)		-0.014
age^2	-0.0185 (0.0057)	**		-0.0164 (0.006)	**		0.0020 (0.021)		
gender	0.1758 (0.0857)	*	0.032	0.1686 (0.1011)	+	0.027	0.3492 (0.3958)		0.050
Years of schooling	0.1285 (0.028)	**	0.024	0.0907 (0.032)	**	0.015	0.1583 (0.1157)		0.023
household size	0.0722 (0.034)	*	0.013	0.0582 (0.0334)	+	0.009	0.0037 (0.0864)		0.001
no of children	-0.0601 (0.0458)		-0.011	-0.0092 (0.0465)		-0.001	-0.0440 (0.158)		-0.006
log household income	0.0513 (0.0709)		0.009	0.0409 (0.0691)		0.007	-0.1531 (0.1554)		-0.022
Coloured	-0.3524 (0.1844)	+	-0.078	-0.0608 (0.2115)		-0.010	-0.0450 (0.5886)		-0.007
Indian	-0.0371 (0.3729)		-0.007	NA		NA	NA		NA
White	0.0711 (0.3002)		0.013	0.2252 (0.3258)		0.032	NA		NA
Urban informal	-0.1249 (0.1525)		-0.025	-0.1422 (0.1634)		-0.025	-1.2268 (0.506)	*	-0.319
"Other rural"	-0.2847 (0.1515)	+	-0.053	-0.1638 (0.1634)		-0.027	-0.5985 (0.3733)		-0.088
Farm	-0.5828 (0.1564)	**	-0.144	-0.4793 (0.1873)	*	-0.102	-1.7888 (0.5809)	**	-0.542
E. Cape	-0.0490 (0.2048)		-0.009	0.0223 (0.2445)		0.004	-0.1458 (0.6576)		-0.022
N. Cape	0.0056 (0.1973)		0.001	0.0437 (0.2207)		0.007	NA		NA
Free State	-0.0564 (0.2365)		-0.011	-0.1421 (0.2577)		-0.025	-0.6282 (0.6725)		-0.129
KwaZulu Natal	0.1062 (0.2228)		0.019	0.0596 (0.2523)		0.009	1.2211 (0.6815)	+	0.113
North West	-0.0531 (0.2697)		-0.010	-0.0052 (0.2772)		-0.001	NA		NA
Gauteng	-0.2174 (0.2223)		-0.044	-0.2483 (0.2349)		-0.045	-0.8160 (0.6085)		-0.172
Mpumalanga	0.1257 (0.2333)		0.022	0.0820 (0.2562)		0.013	0.8379 (0.579)		0.071
Limpopo	0.4584 (0.2494)	+	0.069	0.3961 (0.2635)		0.053	0.4144 (0.8284)		0.048
Tranche 2: June	-0.2521 (0.1385)	+	-0.050	-0.2884 (0.1475)	+	-0.050	-1.4454 (0.478)	**	-0.306
Tranche 3: October	0.0003 (0.1303)		0.000	0.0041 (0.1363)		0.001	0.8399 (0.467)	+	0.101
Tuesday	-0.1308 (0.1575)		-0.025	-0.1543 (0.1709)		-0.026	-0.3240 (0.3785)		-0.053
Wednesday	0.0318 (0.1627)		0.006	0.2801 (0.1727)		0.040	1.0768 (0.5979)	+	0.096
Thursday	0.2081 (0.1694)		0.035	0.2520 (0.1747)		0.036	0.5676 (0.4319)		0.062
Friday	-0.2105 (0.1753)		-0.042	-0.1844 (0.1795)		-0.032	-0.0822 (0.4837)		-0.012
Intercept	-0.7950			-1.0423			3.4643		

Table A2: Probability of attending school - probit model

	(1)		(2)		(3)	
	Coefficient	Marginal Effect	Coefficient	Marginal Effect	Coefficient	Marginal Effect
	(1.4006)		(1.486)		(4.6786)	
Predicted probability at means	0.8927		0.9105		0.9239	
n	2362		1964		161	
F-test: household composition	2.54+		3.44*		0.06	
p-value	0.0794		0.0324		0.9404	
F-test: stratum	4.98**		2.18+		4.23**	
p-value	0.0020		0.0885		0.0055	
F-test: day of week	1.79		3.51**		2.37+	
p-value	0.1281		0.0074		0.0512	

Notes:

Significance levels: ** 1% * 5% + 10%

and stratification.

Models (1) and (2): estimated over people age 20 and younger with incomplete education, describing a "typical" day during the school week (Monday to Friday)

Models (3) and (4): estimated over people age 20 and younger with incomplete education and classified as not economically active, describing a "typical" day during the school week (Monday to Friday)

economically active who gave "schooling" as the reason for not being economically active, describing a "typical" day during the school week.

F(x=0) is reported. The means are calculated for the subpopulation (1). Age2 was set to the square of the mean age.

ML coefficient would be + infinity.

Table A3: Minutes spent on selected activities

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Sleeping	At school	School work	Homework	Homework (tobit)	Cooking	Cooking (tobit)	Watching TV	Watching TV (tobit)
age	-11.80	3.13	2.45	-1.18	14.39	22.01 **	45.94 **	8.00	8.02
	(11.8341)	(9.7767)	(8.4652)	(6.4691)	(11.6311)	(5.1603)	(10.6222)	(9.857)	(18.5072)
age^2	0.28	-0.18	-0.16	0.13	-0.36	-0.63 **	-1.37 **	-0.38	-0.49
	(0.4162)	(0.3267)	(0.2878)	(0.2269)	(0.3906)	(0.1782)	(0.3582)	(0.3344)	(0.6231)
gender	0.44	-0.87	2.28					-3.13	1.04
	(4.5722)	(4.3212)	(4.1192)					(5.0755)	(9.2196)
Years of schooling	-4.10 *	5.72 **	4.92 **	5.40 **	9.62 **	0.84	2.14	2.65	6.56
	(1.793)	(1.8978)	(1.7099)	(1.2202)	(2.238)	(1.0879)	(2.0835)	(1.8665)	(3.4251)
household size	-1.40	1.01	3.38 *	-0.26	0.70	-2.24 *	-3.82 *	4.83 *	9.68
	(2.0697)	(1.5392)	(1.4068)	(1.3338)	(2.4776)	(0.9362)	(1.8777)	(2.0033)	(3.4107)
no of children	1.40	-1.61	-4.32 *	-0.90	-2.65	0.06	-0.09	-6.24 *	-12.21
	(2.4262)	(1.9218)	(1.7805)	(1.6249)	(3.2652)	(1.3415)	(2.6204)	(2.6654)	(4.9584)
Household Income: R400-R799	-7.06	1.84	-1.94	4.10	9.53	-0.83	-0.15	13.39 *	27.52
	(6.6849)	(7.0092)	(6.1838)	(5.33)	(9.96)	(4.3489)	(7.9189)	(6.1235)	(14.3647)
R800-R1199	-11.21	-12.19	-11.21	1.63	0.76	-2.71	1.97	29.84 **	58.20
	(6.8966)	(9.5209)	(8.3117)	(5.8432)	(11.4689)	(5.1693)	(8.8688)	(8.7838)	(16.6883)
R1200-R1799	-8.92	10.84	-4.69	2.67	7.19	-14.65 *	-21.57 +	35.65 **	64.81
	(9.8001)	(10.647)	(8.1929)	(6.9226)	(12.2093)	(6.4682)	(11.4756)	(10.9614)	(17.9055)
R1800-R2499	-28.32 *	20.38	9.73	7.76	17.61	-6.18	-6.30	30.82 **	62.95
	(12.3646)	(12.4265)	(9.1763)	(8.4105)	(13.5704)	(5.8121)	(11.267)	(10.6913)	(18.8263)
R2500-R4999	-30.28 **	-3.66	-1.92	20.48 +	23.92	-9.46	-11.58	67.98 **	104.89
	(8.9993)	(10.1954)	(9.3627)	(11.6194)	(17.6806)	(6.3844)	(13.9026)	(13.9387)	(20.7414)
R5000-R9999	-34.56 **	-1.43	-2.11	-3.36	-10.25	-12.88 +	-24.17	49.35 **	85.23
	(12.7797)	(18.1891)	(16.0268)	(15.1667)	(22.6187)	(6.8219)	(17.9906)	(17.992)	(23.6932)
R10000+	-47.59 *	68.86 **	52.14 *	-6.54	-8.99	-13.29 +	-12.21	4.80	26.48
	(20.2557)	(22.8464)	(21.9469)	(19.3699)	(30.8605)	(7.1596)	(19.8696)	(24.7867)	(31.3928)
Coloured	4.67	-5.45	0.88					18.93	23.17
	(10.5062)	(14.2769)	(13.8452)					(13.5927)	(16.9943)
Indian	15.68	26.55 **	15.63 +					11.76	28.50
	(13.0982)	(9.9624)	(9.4081)					(15.1504)	(20.7312)
White	30.46 *	-39.80 *	-26.46 +					7.71	8.89
	(13.6513)	(18.3432)	(15.8482)					(20.2982)	(23.9843)
Coloured female				0.61	1.19	-34.57 **	-55.29 **		
				(12.8872)	(22.0453)	(7.6742)	(15.2253)		
Indian female				77.32 **	102.14 **	-44.81 **	-82.07 **		
				(21.2394)	(28.5164)	(7.4028)	(25.2677)		
White female				28.71	51.14 *	-45.69 **	-95.34 **		
				(18.6752)	(25.7654)	(6.1642)	(17.2323)		
African male				-0.98	-7.02	-47.12 **	-84.35 **		
				(4.2604)	(7.9623)	(3.1548)	(6.107)		
Coloured male				-2.00	6.04	-53.81 **	-112.68 **		
				(11.4243)	(19.3523)	(6.2797)	(18.2643)		
Indian male				-4.21	-1.91	-43.13 **	-102.81 **		
				(16.9375)	(29.1593)	(6.1739)	(19.0939)		
White male				16.99	26.33	-52.38 **	-150.27 **		
				(18.9645)	(29.2629)	(6.3077)	(23.4511)		
Urban informal	6.95	0.71	2.64	-5.40	-5.52	1.31	-0.16	-23.77 *	-31.77
	(7.3329)	(8.9554)	(9.397)	(5.8447)	(9.9672)	(5.1499)	(8.963)	(11.2383)	(16.3367)
"Other rural"	11.39	8.57	7.88	-1.56	-6.77	6.37	9.80	-62.62 **	-121.12
	(7.1826)	(7.438)	(6.3905)	(5.254)	(9.1771)	(4.527)	(8.2588)	(9.1222)	(18.3014)
Farm	1.40	9.59	9.09	0.94	2.07	3.19	9.56	-53.79 **	-95.72
	(7.7836)	(8.9465)	(8.0564)	(6.3406)	(9.7755)	(4.3826)	(9.5076)	(10.1117)	(18.2173)
E. Cape	-0.86	20.53 +	32.39 **	-9.64	-12.06	11.91 +	15.89	-4.41	-8.00
	(11.979)	(11.6728)	(11.4243)	(9.5757)	(17.4308)	(6.9028)	(14.0334)	(13.2711)	(21.0788)
N. Cape	-7.74	16.90	29.57 **	5.47	12.00	3.99	0.27	-9.02	-5.00
	(11.404)	(11.5332)	(8.8814)	(9.9479)	(15.7131)	(5.2579)	(13.346)	(15.7452)	(21.2003)
Free State	4.31	-31.08 *	-11.17	8.44	15.68	-3.00	-8.68	5.07	9.11
	(11.6706)	(14.0933)	(13.8361)	(10.1533)	(17.2984)	(5.8258)	(13.4408)	(14.1038)	(18.6737)
KwaZulu Natal	-21.84 +	18.83 +	28.03 *	6.99	18.90	-6.99	-15.55	-15.86	-41.62
	(11.6146)	(11.3128)	(10.9786)	(9.3922)	(16.2771)	(5.6887)	(13.1224)	(12.8206)	(20.719)
North West	-26.28 +	7.19	16.13	6.64	17.15	-4.79	-6.07	15.87	35.73
	(15.3704)	(13.4567)	(12.8239)	(10.8206)	(18.9894)	(6.6032)	(15.1817)	(16.0538)	(24.8804)
Gauteng	-33.07 **	-11.79	-8.18	17.65	24.89	-2.45	-4.58	17.09	20.84
	(12.4497)	(15.1118)	(14.5934)	(11.3718)	(18.5738)	(5.8606)	(13.3854)	(14.5693)	(18.0166)
Mpumalanga	-43.45 **	-1.33	8.72	6.03	18.40	-2.45	-6.34	35.84 +	59.18
	(11.8552)	(12.0806)	(11.4616)	(9.6339)	(16.784)	(7.0572)	(15.3713)	(18.2499)	(27.8979)
Limpopo	-17.49	21.88 +	26.39 *	14.16	33.78 +	-7.39	-12.50	3.23	19.45
	(13.3218)	(13.1071)	(12.7395)	(9.8564)	(17.2935)	(6.6825)	(14.7748)	(14.3147)	(24.4056)
Tranche 2: June	2.40	-15.33 *	-12.10 +	20.78 **	26.62 **	1.48	4.25	-7.96	-14.86

Table A3: Minutes spent on selected activities

	(1) Sleeping	(2) At school	(3) School work	(4) Homework	(5) Homework (tobit)	(6) Cooking	(7) Cooking (tobit)	(8) Watching TV	(9) Watching TV (tobit)
	(6.747)	(7.2155)	(6.3111)	(4.8789)	(8.2723)	(3.9273)	(7.338)	(7.6091)	(14.2557)
Tranche 3: October	5.22	7.17	11.29 +	0.13	-3.96	2.04	10.27	4.76	10.43
	(6.4818)	(6.6381)	(5.9972)	(4.3163)	(7.9196)	(3.5408)	(6.9567)	(7.7688)	(15.1564)
Tuesday	-6.80	9.75	4.58	-7.74	-8.11	4.45	8.27	12.23	22.02
	(7.0573)	(6.1361)	(6.3127)	(6.3287)	(10.321)	(4.7591)	(8.3305)	(8.1516)	(16.7463)
Wednesday	4.33	12.38	2.40	-14.48 *	-21.28 +	-1.72	-4.29	7.03	14.87
	(9.1695)	(8.8181)	(8.3048)	(6.6772)	(11.0821)	(4.4518)	(9.2603)	(8.8091)	(18.3837)
Thursday	-9.90	9.69	3.53	-12.49 +	-24.42 *	1.35	6.15	-1.06	-5.47
	(8.5638)	(7.342)	(6.893)	(6.6429)	(11.2464)	(4.3246)	(8.7472)	(8.5817)	(18.8887)
Friday	-7.35	-0.33	-8.26	-29.62 **	-57.27 **	1.73	3.99	26.35 *	30.90
	(8.1256)	(8.7373)	(7.7729)	(6.1446)	(10.7254)	(4.7396)	(9.413)	(10.4866)	(19.5521)
Intercept	707.79 **	291.58 **	245.64 **	10.05	-170.35 *	-106.60 **	-306.62 **	22.17	-36.78
	(82.2953)	(69.372)	(59.9401)	(46.0184)	(84.7107)	(35.3691)	(74.4006)	(70.7745)	(131.9728)
n	1884	1884	1884	1884	1884	1884	1884	1884	1884
F-tests:[a]									
age & age^2	2.73+	1.06	1.28	2.15	3.91[a]	15.24**	25.77[a] **	2.34+	5.6[a] +
p-value	0.0655	0.3475	0.2797	0.1171	0.1417	0.0000	0.0000	0.0966	0.0609
household composition	0.23	0.35	3.24*	0.91	1.12[a]	8.62**	13.05[a] **	3.02*	8.11[a] *
p-value	0.7962	0.7037	0.0397	0.4044	0.5700	0.0002	0.0015	0.0491	0.0173
income	1.95+	2.72**	1.86+	0.74	5.57[a]	1.27	7.13[a]	4.9**	34.55[a] **
p-value	0.0597	0.0087	0.0738	0.6384	0.5908	0.2633	0.4152	0.0000	0.0000
race/race-gender interaction	1.74	5.04**	2.34+	2.48*	18.48[a] **	35.79**	240.01[a] **	0.79	3.28[a]
p-value	0.1563	0.0019	0.0721	0.0159	0.0100	0.0000	0.0000	0.5019	0.3505
stratum	0.96	0.74	0.79	0.36	0.98[a]	0.70	2.22	18.58**	57.75[a] **
p-value	0.4129	0.5267	0.4988	0.7853	0.8068	0.5510	0.5274	0.0000	0.0000
province	6.2**	3.74**	5.42**	2.3*	15.2[a]+	1.43	10.77[a]	2.23*	18.87[a] *
p-value	0.0000	0.0003	0.0000	0.0195	0.0554	0.1788	0.2150	0.0233	0.0156
tranche	0.33	5.44**	8.16**	10.11**	12.79[a] **	0.18	2.21[a]	1.42	3.02[a]
p-value	0.7225	0.0046	0.0003	0.0000	0.0017	0.8374	0.3307	0.2422	0.2204
day of week	1.06	1.08	0.81	6.77**	33.02[a] **	0.42	2.39[a]	2.32+	5.22
p-value	0.3737	0.3632	0.5190	0.0000	0.0000	0.7923	0.6646	0.0558	0.2652

Notes:

(a) The figures reported for the tobit models are for a chi-square statistic

Significance levels: ** 1% * 5% + 10%

All estimates have been weighted. Standard errors (shown in parentheses) have been corrected for clustering and stratification.

The sample, in all cases, consists of people age 20 years and younger, with incomplete education, who report having been in school during a "typical" day during the school week (Monday to Friday)

Table A4: Probit models - eating breakfast, arriving at school, doing homework, cooking and watching TV

	(1) Eat breakfast		(2) Start school on time		(3) Doing homework		(4) Cooking		(5) Watching TV	
	Coefficient	Marginal Effect	Coefficient	Marginal Effect	Coefficient	Marginal Effect	Coefficient	Marginal Effect	Coefficient	Marginal Effect
age	-0.0426 *		-0.0007	0.000	0.0207	0.008	0.0355	0.014	-0.0653 *	-0.026
	(0.0216)		(0.0253)		(0.0281)		(0.0237)		(0.0265)	
age*gender	0.0321									
	(0.0315)									
gender	-0.1758		0.0910	0.024	-0.1348	-0.053	-0.9425 **	-0.362	0.1194	0.047
	(0.4599)		(0.1007)		(0.0955)		(0.0967)		(0.0923)	
Years of schooling			-0.0266	-0.007	0.1124 **	0.044	0.0542 *	0.022	0.0728 *	0.029
			(0.0295)		(0.0294)		(0.0275)		(0.0309)	
Household size	0.0482	0.015	0.0411	0.011	0.0231	0.009	-0.0533 +	-0.021	0.0737 *	0.029
	(0.0307)		(0.0287)		(0.0335)		(0.0301)		(0.0339)	
no. of children	-0.0305	-0.010	-0.0762 +	-0.021	-0.0377	-0.015	0.0239	0.010	-0.0740	-0.029
	(0.0452)		(0.0439)		(0.0447)		(0.0403)		(0.048)	
School is close to home			0.0479	0.013						
			(0.1203)							
Household Income: R400-R799	-0.0914	-0.029	0.2152 +	0.056	0.1413	0.055	0.0405	0.016	0.1702	0.066
	(0.1184)		(0.129)		(0.1243)		(0.1216)		(0.1216)	
R800-R1199	0.2861 +	0.083	-0.0057	-0.002	-0.0091	-0.004	0.1574	0.063	0.4131 **	0.155
	(0.1471)		(0.1566)		(0.1441)		(0.1359)		(0.1508)	
R1200-R1799	0.0730	0.022	0.3267 *	0.077	0.1510	0.059	-0.0917	-0.036	0.5423 **	0.197
	(0.152)		(0.1661)		(0.1617)		(0.1667)		(0.179)	
R1800-R2499	-0.0243	-0.008	0.6420 **	0.131	0.4062 *	0.152	0.0168	0.007	0.5969 **	0.213
	(0.1843)		(0.2309)		(0.1886)		(0.1745)		(0.2092)	
R2500-R4999	0.1364	0.041	0.7978 **	0.151	0.1032	0.040	-0.0173	-0.007	0.8609 **	0.288
	(0.1863)		(0.1841)		(0.1879)		(0.22)		(0.2202)	
R5000-R9999	1.1278 **	0.223	0.6155 *	0.125	-0.0696	-0.028	-0.1877	-0.074	1.1023 **	0.338
	(0.2663)		(0.2927)		(0.2571)		(0.2665)		(0.3311)	
R10000+	0.4579	0.121	0.9943 *	0.162	0.0928	0.036	0.1385	0.055	0.4413	0.162
	(0.2966)		(0.3868)		(0.3898)		(0.3304)		(0.4041)	
Coloured	0.3568 +	0.100	0.1674	0.042	0.0639	0.025	-0.4657 *	-0.179	0.3620 +	0.136
	(0.1894)		(0.2511)		(0.2284)		(0.2084)		(0.2034)	
Indian	-0.4210	-0.148	0.1291	0.033	0.3676	0.138	-0.5667 *	-0.213	0.7353 *	0.250
	(0.2954)		(0.3123)		(0.3154)		(0.2693)		(0.3389)	
White	0.3647	0.101	0.0588	0.015	0.4920 +	0.181	-1.1459 **	-0.381	0.1127	0.044
	(0.2412)		(0.2827)		(0.2666)		(0.2251)		(0.2953)	
Urban informal	-0.1859	-0.062	-0.0459	-0.013	0.0515	0.020	-0.0429	-0.017	-0.3629 *	-0.144
	(0.1292)		(0.1729)		(0.1241)		(0.1255)		(0.1554)	
"Other rural"	0.4019 **	0.126	-0.0079	-0.002	-0.0852	-0.034	0.1422	0.057	-1.0475 **	-0.393
	(0.1222)		(0.1353)		(0.1104)		(0.1168)		(0.1533)	
Farm	-0.0227	-0.007	0.1144	0.029	0.1221	0.048	0.1343	0.054	-1.0030 **	-0.371
	(0.142)		(0.1542)		(0.1186)		(0.1442)		(0.1649)	
E. Cape	0.0954	0.029	0.3806	0.091	0.0161	0.006	0.1684	0.067	-0.2042	-0.081
	(0.2091)		(0.2314)		(0.2245)		(0.2161)		(0.2345)	
N. Cape	0.1586	0.047	0.8738 **	0.152	0.2652	0.101	-0.0550	-0.022	-0.1624	-0.064
	(0.2024)		(0.272)		(0.2088)		(0.207)		(0.266)	
Free State	0.0745	0.023	0.1882	0.047	0.1954	0.075	-0.0620	-0.025	-0.0716	-0.028
	(0.2111)		(0.2169)		(0.2194)		(0.2167)		(0.2078)	
KwaZulu Natal	0.3503	0.103	0.3688 +	0.090	0.3181	0.123	-0.1869	-0.074	-0.5032 *	-0.198
	(0.2128)		(0.2131)		(0.2165)		(0.2163)		(0.2229)	
North West	-0.1528	-0.050	0.7437 **	0.147	0.2120	0.082	0.0603	0.024	0.2141	0.082
	(0.2405)		(0.2727)		(0.2411)		(0.2498)		(0.2777)	
Gauteng	0.2147	0.064	0.3588	0.085	0.0763	0.030	-0.0189	-0.008	0.0970	0.038
	(0.2096)		(0.2388)		(0.2281)		(0.2192)		(0.2191)	
Mpumalanga	-0.2015	-0.067	0.7725 **	0.148	0.2694	0.103	-0.1045	-0.042	0.1186	0.046
	(0.2178)		(0.2924)		(0.2199)		(0.2362)		(0.2744)	
Limpopo	-0.8222 **	-0.294	0.4169	0.099	0.4921 *	0.185	-0.0865	-0.034	0.1005	0.039
	(0.2235)		(0.2547)		(0.2413)		(0.2297)		(0.2529)	
Tranche 2: June	0.0165	0.005	-0.2094	-0.059	0.0142	0.006	0.0499	0.020	-0.1609	-0.063
	(0.1118)		(0.1283)		(0.1071)		(0.0997)		(0.1388)	
Tranche 3: October	0.1573	0.049	0.1717	0.045	-0.1806 +	-0.071	0.1967 +	0.078	0.0775	0.030
	(0.1054)		(0.127)		(0.0959)		(0.1004)		(0.1535)	
Tuesday	0.0764	0.024	0.0924	0.024	0.0907	0.036	0.1846	0.074	0.1858	0.072
	(0.1114)		(0.1449)		(0.129)		(0.1222)		(0.1758)	
Wednesday	0.1458	0.044	0.1564	0.040	-0.1387	-0.055	-0.0004	0.000	0.1344	0.052
	(0.1414)		(0.1528)		(0.1363)		(0.1341)		(0.1925)	
Thursday	0.0425	0.013	0.1547	0.040	-0.2660 *	-0.106	0.2070	0.082	-0.1411	-0.056
	(0.1517)		(0.167)		(0.1301)		(0.1362)		(0.1906)	
Friday	-0.0899	-0.029	0.2375	0.060	-0.6224 **	-0.244	0.1520	0.061	-0.0379	-0.015
	(0.1385)		(0.1543)		(0.1187)		(0.1383)		(0.1788)	
Intercept	0.5773		0.1800		-0.8921 *		-0.2602		0.6616 +	
	(0.4034)		(0.3721)		(0.3627)		(0.3435)		(0.372)	

Table A4: Probit models - eating breakfast, arriving at school, doing homework, cooking and watching TV

	(1) Eat breakfast	(2) Start school on time	(3) Doing homework	(4) Cooking	(5) Watching TV
	Coefficient / Marginal Effect	Coefficient / Marginal Effect	Coefficient / Marginal Effect	Coefficient / Marginal Effect	Coefficient / Marginal Effect
Predicted probability at means	0.7545	0.8125	0.5647		0.5735
n	1884	1884	1884	1884	1884
F-tests:					
age*gender & gender	6.8**	-	-	-	-
p-value	0.0012				
income	3.94**	4.24**	1.04	0.49	3.95**
p-value	0.0003	0.0001	0.3972	0.8175	0.0007
race	2.58+	0.19	1.32	8.75**	2.36+
p-value	0.0526	0.9059	0.2669	0.0000	0.0706
stratum	6.25	0.29	0.93	0.98	21.96**
p-value	0.0003	0.8351	0.4263	0.4012	0.0000
province	7.68**	2.61**	1.53	0.91	2.05*
p-value	0.0000	0.0079	0.1435	0.5079	0.0379
tranche	1.24	4.04*	2.06	2.04	1.47
p-value	0.291	0.0179	0.1279	0.1300	0.2304
day of week	0.69	0.65	10.47	1.15	1.02
p-value	0.5973	0.6251	0.0000	0.3336	0.3968

Notes:

Significance levels: ** 1% * 5% + 10%

All estimates have been weighted. Standard errors (shown in parentheses) have been corrected for clustering and stratification.

The sample, in all cases, consists of people age 20 years and younger, with incomplete education, who report having been in school during a "typical" day during the school week (Monday to Friday)