

**UNIVERSITY OF THE WITWATERSRAND
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**FAILING AT THE FIRST HURDLE:
A PROFILE OF COLOURED CHILDREN WHO
FAIL THEIR FIRST YEAR AT SCHOOL.
CAN THEY BE IDENTIFIED AND HELPED?**

THESIS

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**MASTER OF SCIENCE
NEURODEVELOPMENTAL
PAEDIATRICS**

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DECLARATION

I declare that this thesis is my own work. It has not been previously submitted to any other Department or University.

The study was approved by the committee for research on human subjects (University of Witwatersrand)

E. U. Rosen

**I dedicate this thesis to the children and their families
who made this work possible**

TABLE OF CONTENTS

	PAGE
CHAPTER 1 - INTRODUCTION	1
CHAPTER 2 - LITERATURE REVIEW	6
1. Models of the Developmental Process	6
2. Physical and Biochemical Factors	8
2.1. Protein Calorie Malnutrition	8
2.2. Iron Deficiency and Developmental Delay	15
2.3. Lead Blood Levels and Cognitive Function	17
3. Gestational and Perinatal Factors	19
4. Psycho-social Factors	25
4.1. Psycho-social factors and cognitive development	25
4.2. Measuring the Quality of the Environment	29
CHAPTER 3 - HYPOTHESIS AND OBJECTIVES OF STUDY.	31
CHAPTER 4 - THE COLOURED POPULATION OF JOHANNESBURG	33
CHAPTER 5 - MATERIAL AND METHODS	41
1. Study Design	41
2. Methods: Variables Investigated	43
2.1. Nutritional Status	43

2.2. Lead Status	46
2.3. Visual Screening	46
2.4. Age at Starting School	48
2. 5. Socio-ecological Setting	48
2.6. Assessment of Developmental Status using the Griffiths Developmental Scales	51
3. School Teachers Questionnaire	51
4. Statistical Analysis	52

CHAPTER 6	RESULTS	53
1. Validation of the excessively high failure rates in the study sample		53
2. The Study Sample		54
3. Evaluation of Nutritional Status		55
3.1. Weight and Height		55
3.2. Body Iron Status		65
4. Evaluation of Lead Status		68
4.1. Serum Lead Estimations		68
4.2. Zinc Protoporphyrin		68
5. Visual Screening		69
5.1. Number Tested		69
5.2. Outcome of Screening Test		70
6. Age at Starting School		
7. Socio-Environmental Investigation		

7.1. Number sampled	72
7.2. Study Specific Questionnaire	72
8. Home Screening Questionnaire	109
Results	
8.1. Total Score	109
8.2. Factorial Analysis	110
9. Analysis of Teachers' Questionnaire	118
9.1. Number Complete	118
9.2. Teachers' Demographics	118
9.3. Reasons for School Failure	119
9.4. Time taken to decide if pupil likely to fail	121
9.5. Teacher Parent Interaction	121
10. School Readiness Tests	122
11. Griffiths Scale of Mental Development	123
11.1. Number assessed	123
11.2. Outcome of Griffiths Testing	123
CHAPTER 7 - DISCUSSION	128
CHAPTER 8 - SUMMARY AND CONCLUSIONS	159
APPENDIX 1	CONSENT FORM & STUDY -SPECIFIC QUESTIONNAIRE
APPENDIX 2	H.S.Q. QUESTIONNAIRE

ABSTRACT

Because such a high percentage of coloured children fail Sub A(grade 1) a study was undertaken in the hope that something could be done to remedy this unhappy situation.

Although it well known that a major underlying cause of poor school performance can be attributed to poor socio-economic circumstances it was hypothesized that the study, by examining certain biological and environmental factors, would enable one to identify the child at risk of failing. Having done so, a full developmental assessment might then be of help in determining the childs areas of weakness and hopefully with the early instituting of appropriate therapy improved academic progress would result.

A group of coloured children who had failed in their first school year whilst attending one of 3 schools run by the erstwhile Department of Coloured Education in the vicinity of Coronation Hospital were studied. As controls, children who were the top 5 in each Sub A class at the same schools were enrolled.

Variables studied were firstly nutritional status as exemplified by weight and height for age as well as body Iron and Hemoglobin levels. Blood samples were also examined for lead levels.

A battery of visual screening tests were administered to both study and control children so that the incidence of visual problems in the study and control groups could be evaluated

Psycho-social variables were examined by the administration of a questionnaire to the parents of a sample of the children. The

questionnaire, which was drawn up by the researcher, endeavoured to cover areas reflecting socio-economic status, family functionality including attitudes to education and expectations for the child, as well as ante-, peri- and post-natal events of the relevant pregnancy.

Simultaneously an American questionnaire which concentrated on the home environment and is designed to screen for the child at risk of failing was also completed.

Because school teachers are germane to the problem of children being referred to a developmental assessment clinic timeously a questionnaire was developed and administered to the Grades I and 2 teachers at each of the 3 schools used for the study.

A small number of children in the study were subjected to a Griffiths Scale of Developmental Assessment test and the results of study subjects and controls were compared.

The results of the study showed that nutrition did not seem to play a major role in determining scholastic success at the first hurdle. Visual problems in the first year of school did not affect academic achievement probably because writing on the black board is so large that it negates problems of accommodation.

Failure was largely influenced by children commencing school, at too young an age, by lack of stimulation in the home, by a culture of failure as expressed by the poor school record of older siblings and low expectations of parents. Dysfunctional or disorganised families as epitomised by untidy, messy and poorly furnished homes also contributed to school failure as did an excessive number of days of absence from school.

The American Home Screening questionnaire with an adjusted scoring system appeared to be a useful tool for picking out the child at risk for

school failure.

The outcome of the Griffiths Scale of Developmental Assessment showed that many of the children had problems which would respond to timeous occupational or speech therapy.

It is strongly felt that a compulsory year of pre-school at minimal or no cost to the parents combined with no child being allowed to start formal schooling before the age of 7 years would be useful in improving the academic outcome as well as being cost effective. Children who have problems at the end of the pre-school year should be referred for a developmental assessment.

CHAPTER 1

INTRODUCTION

Now, as never before in the history of South Africa, has the importance of education for the masses of underprivileged children of this country become such a burning issue. For our economically disadvantaged populations to advance socially and financially and attain an acceptable standard of living, the way forward lies in ensuring that the present generation of children receive a solid education which will allow them to participate meaningfully in the South Africa of the 21st century.

To say that the educational facilities for the non-white populations have for many years been in a parlous state, is to totally understate the case. With 18 different educational bodies and the disadvantageously disparate funding of all educational requirements for people of colour(1,2), the poor standards achieved by them in the past, have left an enormous backlog to be made up, hopefully, in the not too distant future. However, successful education programmes are not achieved merely by providing schools with competent teachers, but by ensuring that once pupils get there, they are able to cope with the demands made on them so that both their self-esteem is boosted and a culture of learning is engendered.

Many studies (3,4 5,6) have highlighted the high rate of failure

in the first year of formal schooling which exists in some sections of South Africa's population. Most of these have focused on the Black African community, which has, up to now, been the most deprived and the least successful, scholastically. The percentages of "Coloured" and African children who repeat or drop out of Grade 1(Sub-A) ranges from 25-35%, (4,6,7,8) a figure which is totally unacceptable when compared to the corresponding figure of 7% found among the white community.

Several possibilities have been suggested for the failure of these disadvantaged children. These include socio-economic status, structural features of the family and a child's interpersonal and physical milieu (9, 10). Mild mental retardation ($IQ < 70$ and > 50) only occurs in 2.5% of the school going population(11) and thus alone cannot account for the excessive failure rates which occur at the Sub-A level in this group of children.

Many of the disadvantaged are at risk of what is termed developmental failure. Although they do not belong to the category of children who are regarded as educably subnormal, they fail in school attendance, reading and mathematical performance, yearly promotion, completing high school and, ultimately occupational performance. Their social skills are also impaired and they show traits of delinquency and aggressiveness (12).

The causes of developmental dysfunction are almost certainly multifactorial but many of these must be rooted in cultural or economic variances. Cultural differences from those of the more scholastically successful white community would obviously be more marked in the Black African child than in those children who are considered to be Coloured.

The Coloured people of South Africa, because of the past political dispensation in that country, have perforce had to develop along their own lines. Their racial antecedents consist of a mixture of most of the other race groups that are found in the R.S.A. with a predominance, perhaps, of Khoisan, Caucasian, Bantu-speaking and Malaysian blood lines. Denied identification with the white population and failing to integrate with the Bantu speaking people, they became ghettoised and developed a culture and patois of their own. In the latter there are obvious linguistic ties with Whites and many of the cultural influences such as religion are also derived from Western European sources.

In addition, in the racial hierarchy of schooling under the Apartheid regime, the Coloured children's position fell midway between the superior provisions for Whites and Asians and the inferior ones for Blacks (1,2).

Thus children from the coloured community differ culturally far less significantly from the advantaged, scholastically more successful, white children than do their black counterparts. Consequently, using coloured children as a study group, when seeking the causes of excessive school failure among disadvantaged communities, one can largely discount cultural differences if white children form the gold standard against which they are to be measured.

The unifying factor in the failure of all children from disadvantaged backgrounds would appear to lie in the "culture of poverty"(13). However, in spite of a disparate cultural and/or a poor economic

background, some children of the deprived group manage, possibly with the help of their parents, to rise above their circumstances, overcome whatever handicaps from which they may suffer and succeed scholastically.

So, when seeking the cause of excessive school failure in a group of such children, there are at least two possible ways of tackling the problem. One can either look for factors that lead to failure or one can endeavour to determine the positive forces which help the child to succeed. Finally it is possible to combine these approaches and thus probably obtain a more comprehensive viewpoint.

In summary, it was concluded that in a disadvantaged community, the excessive failure rate at the end of the first year of formal schooling indicated a propensity to developmental dysfunction from whatever cause. In the Coloured community, the high incidence of school dysfunction has been validated by figures obtained from the Department of Statistics (14). These indicate both a high school failure and drop out rate amongst Coloured pupils as well as poor occupational performance in adulthood when compared to the white, mostly middle class, population.

In spite of being disadvantaged, some of the children manage to become successful achievers in the educational system to which they are exposed. These, it was felt, would form a good control group for any study of school failure in their communities.

In addition, both the culture and the structure of the Coloured peoples' school system accorded better with that of the educationally more successful group (the Whites) than that of the other major disadvantaged

group of people in this country. Thus variables pertaining to these factors (i.e. culture and structure of school system) could prove to be more easily discountable when investigating the causes of the poor scholastic performance of Coloured children compared to their white counterparts.

Lest any misconceptions should still occur as to the reason for using a specific racial group for purposes of this study, coming as it does out of a country which until recently has been notorious for its antediluvian discriminatory attitudes towards people of different skin colour, it is important to clarify certain issues. The group of children studied were not primarily used because of their genetic status which, one can assume with certainty plays no role in their poor school function. Rather, they were studied because the whole history of racial discrimination in South Africa which culminated in the system of Apartheid, ensured that they would come from a socio-economically deprived background often with poor family dynamics, live in the same area using strictly segregated facilities, speak one of two languages and attend the same schools. Thus the children studied formed a relatively socio-culturally homogeneous group which would help to exclude a large number of interfering variables which might confound a study in a more diverse population.

CHAPTER 2

LITERATURE REVIEW

1) MODELS OF THE DEVELOPMENTAL PROCESS

It has been proposed that there are three models of the developmental process of children(12,15). The first is the purely biological model in which it is suggested that the child's development is totally contingent on the biological status of the organism. The latter would include the genetic endowment , both as regards physical habitus and intellectual potential as well as any factors which might impact on these, such as biological insults resulting from disease processes such as meningitis, poisoning or malnutrition.

The second model only takes into account environmental factors that would mould the organism. Thus, in the home or micro-environment, parental attitudes, socio-economic disruptions, family stability etc. would determine the child's development. The home environment is obviously affected by the greater world outside it i.e. the macro-environment. Thus in the words of Bronfenbrenner(16) the effective environment of the organism is made up of a series of nested structures, each interacting with one another.

The third and most acceptable model of development is the transactional one which includes both biological and environmental factors. It hypothesises that an early deficit will lead to poor or dysfunctional interactions between the infant and the physical and/or social world. Further outcomes will be contingent on the response of the organism and the environment to the original insult.

When examining the literature as to the causes of poor intellectual functioning and subsequently school failure, a number of major areas are highlighted. Most studies conducted by physicians concentrate on the physical and biochemical changes which influence development. Papers written by educational psychologists are primarily involved in the psycho-social aspects which might affect cognitive outcomes(4,6,10). The present study will attempt to investigate aspects of both physical and psychosocial characteristics of children who failed to be promoted at the end of their first year of schooling.

2. PHYSICAL AND BIOCHEMICAL FACTORS

2.1. Protein-Calorie-Malnutrition

Since the seminal articles by Dobbing(17, 18) and Stein et al(19) in the late sixties and early seventies there have been a spate of papers endeavouring to link poor intellectual development with under- nutrition. The major problem with most of these papers has been the difficulty of finding suitable control groups. These would enable one to separate the role of interfering variables such as poor parenting, nonstimulatory environment, family failure to value education and low parental expectations from the specific effects of malnutrition.

The human organism is affected by multiple factors in the ecosystem in which it is conceived and matures. Both macro- and micro-environments impinge on the developing child. To be able to isolate the effects of a single factor from such a plentitude of environmental as well as genetic variables gives rise to a problem, which in the words of Dobbing, "is of such enormous complexity that it defies analysis"(17). A recent Medline search indicated that at least 1100 studies on the effects of early malnutrition on brain and brain function have been published since 1966(20).

Research in this field has fallen into 3 major categories:-

a). Determination of whether or not malnutrition per se affects

brain growth and or development. If it does, then at what stage is the brain most vulnerable to this form of metabolic deprivation ?

b). Establishment of whether the effects of malnutrition are temporary or permanent.

c). Is the affect of malnutrition on the brain of such a nature that it affects the functional(including motor and intellectual) ability of the organism either in the short or the long term?

2.1.a). Brain growth and Development related to Malnutrition

2.1.a).1. Studies on Animals:

As early as 1920 Jackson and Steward(21) demonstrated that in baby rats, a period of malnutrition for a few weeks after weaning, led to reduced brain weight. Since then a large body of work carried out largely on baby mice and piglets has shown that the earlier in the postnatal period the malnutrition occurred the more severe the effect(22, 23,24). In addition, if the period of malnutrition in the rat was the first 21 postnatal days, then the effect on brain growth appeared to be permanent. This gave rise to the speculation that there was a critical period of brain growth in animals during which the

organ was most susceptible to malnutrition (25).

Dobbing (17) felt that the smaller brain might partially reflect a general diminution of body size which always results from such a nutritional restriction, the functional implications of which he was uncertain. He maintains that, as the brain develops, there are periods when even mild under-nutrition may result not only in deficits but also in distortions of the developing brain, giving rise to the concept of vulnerable, rather than critical, periods in developmental neurobiology. Thus in the vulnerable period one should be able to show that the normal physiological or neurohistological changes predestined to occur are inhibited or perverted by nutritional deficiency imposed at that time.

This is exactly what was shown in experimental animals. The cerebellum normally grows much faster than the remainder of the brain. However, when malnutrition occurred, it grew more slowly, resulting in a distortion of brain proportions. Inhibition of cell formation leads to a deficit of neural material. These changes have been shown to be permanent(18).

2.1.a).2. Studies on Humans:-

One of the earliest papers to address brain growth in children with malnutrition was that by Brown in 1965 (26). This was a report on brain weight at autopsy in so-called malnourished and well nourished children with an age range from 1 month to 15 years. The study was seriously flawed in that the time of initiation of the episode of malnutrition and its

duration and severity were not documented. In addition no attempt was made to exclude the myriad of additional pathologies which might also have affected the brain and could possibly have accounted for the demise of the malnourished child. Virtually, all other later papers on the same topic suffered from many of the same defects. The problem of finding suitable controls also remains a persistent one.

However, if one is prepared to extrapolate brain size from head circumference (27) then there certainly have been a number of studies (27,28) which have shown that children, who have suffered either acute or chronic malnutrition, have a mean smaller head size than their well nourished peers. Although these studies again suffer from the defects which were mentioned above, the consistency of this finding must give pause for thought.

A number of researchers have also linked small head size with lack of academic success or lower achievement on various psychomotor tests (29). This conclusion must be suspect as it is well known that brain size and intellect do not have a direct correlation except where there is pathological microcephaly (30). In addition intellectual function is dependent on a web of variables making it virtually impossible to tease out the effect of a single factor.

2.1.b). The Possible Permanence of Changed Brain Morphology due Malnutrition

2.1.b).1. Animal Studies:-

It was thought that the earlier in the period of maximum brain growth an episode of malnutrition occurs, i.e. when the increase of brain cell number is still occurring, the more likely are the effects of malnutrition to be permanent as the number of brain cells will remain permanently diminished. However Leuba and Rabinowicz showed that the only neural defects that fail to recover with refeeding are the reduced numbers of cortical dendrites (31). Synapse formation, a later stage of brain development, also appears to have the potential for recovery once nutritional rehabilitation occurs. (32). Functionally interrupted brain maturation due to malnutrition also appears to have a permanent effect on animal behaviour though this aspect is difficult to quantify (33).

Thus the effect of malnutrition on the brain of immature experimental animals, appears to have both qualitative and quantitative effects of which a limited number appear to be permanent.

2.1.b).2. Human Studies:-

An intensive literature search has failed to uncover any studies on the morphology of brains of humans who had demised many years after a period of malnutrition. However, a number of studies exist which have shown that the mean head size of people who had been malnourished in childhood was less than those of controls who had never had overt malnutrition (27,28,29).

A study, which used CAT scans to study the brains of children with kwashiorkor, demonstrated the cerebral atrophy which had been

seen in the acute phase of the disease was no longer discernable a year after the acute episode(34,35). This was confirmed by other workers using both CT and PET scanning (36). However findings in a 20 year developmental study showed that 5/20 children who were initially malnourished showed underdevelopment in the temporo-parietal region combined with visuo-motor deficits in central neuro-integration(25).

2.1.c). Long Term Functional Effects of Malnutrition on the Growing Brain

The long term effects of malnutrition experienced from the time of the third trimester through to the end of the second year of life were initially discussed by Stein et al (19). They found that the products of pregnancies which occurred in Holland during a period of the Second World War were functioning intellectually at the same level as controls 18 years after the period of nutritional deprivation. A paper by Bartel et al (37) supported this view as did those of other authors who were not using IQ as an outcome measure (38).

However Stoch et al (25) in their longitudinal study provided conflicting results which have been supported by a number of other authors including , most recently, those of Hertzog et al (39) and Wagstaff et al (5) . These authors found that children who were, or are, malnourished tend

to function less well than their better nourished controls. Griesel et al (40) showed that malnourished children showed a small but consistent retardation of electro cerebral maturity.

What remains contentious is, firstly, whether poorer functioning is really due to suboptimal nutrition or to other adverse factors in the individual's macro or micro eco-system; secondly, if changes are present whether they are reversible.

Emotively it seems reasonable to suppose that the effects of malnutrition on the developing brain must have permanent negative implications for the child's future intellectual development . It is this sentiment which has kept researchers engaged in an impossibly difficult field since the 1960s. Regrettably, at present, we are no closer to a definite answer than we were three decades ago.

However, at this time, it still seems worthwhile considering the state of nutrition as a possible factor when dealing with school failure or dysfunction in a third world situation as there are too many papers, be they somewhat imperfect, that have come up with a positive association between these variables.

2.2. Iron Deficiency and Developmental delay

Iron and the role it plays has been described as "the backbone of vertebrate physiology"(41). Although the prevalence of associated iron deficiency (I.D.) and iron deficiency anaemia in generalised malnutrition is very variable (42), it often occurs in children as an isolated phenomenon. Even in developed countries the prevalence of anaemia (mostly due to I.D.) in children of under 6 years of age, is estimated to be in the region of 12%. In undeveloped countries in Africa the corresponding figure quoted is 56%.(43). In Gauteng (formerly Transvaal) surveys have shown a prevalence of anaemia in children of 5 years and less to range from 13.3 to 40.7 %, the prevalence being highest among children less than 2 years of age (44,45). If we look at the prevalence of I. D. per se, it is approximately 30% higher than that of actual anaemia due to lack of iron(46).

The prevalence of anaemia due to I.D. in six year olds in Gauteng is to the best of my knowledge not available. However figures from the UN ACC/SCN indicate that 38% of school going children in developing countries suffer from I.D. anaemia(47).

Since the pioneering paper by Oski et al (48) in 1978, many studies have implicated I.D., and especially I.D. anaemia, in early childhood as a cause of impaired development and scholastic achievement (49,50,51,). Psychological and behavioural disturbances such as inattention, fatigue, insecurity, etc. have also been linked to I.D. states.

What remains a matter of debate is whether or not

these disturbances leave permanent residua in spite of the correction of the iron deficiency anaemia. A carefully designed study by Idjradinata and Pollit found that developmental status as gauged by using the Bayley scales, returned to normal after iron therapy (52). This repudiated the finding of those who claimed that in spite of iron therapy, permanent residua were evident (53,54,)

Of major importance is that most experts agree that there is a strong negative correlation between iron deficiency anaemia, cognitive function g and educational attainment (53,55,56,57,). In addition Pollit when discussing the covariance between protein energy malnutrition and iron deficiency anaemia, suggests that it is the iron deficiency, rather than lack of protein and calories, which may be the primary cause of developmental impairment and delay(58).

Thus determining the iron status of children shortly after school entry can, at worst, only reflect their current situation and at best, possibly also give one some indication of their earlier iron status with the implication that I.D. may have been present for a long time.

2.3. Blood Lead Levels and Cognitive Function

Chronically increased lead absorption most commonly occurs in the USA among preschool children who live in old poorly maintained dwellings which were built prior to 1950. The primary route of absorption of lead is through the gastro-intestinal tract; the source of the lead being mainly wall paint and putty for sealing windows(59). Sniffing leaded petrol, which is still in use in South Africa, characteristically causes a toxic encephalopathy. This, however, is a problem mainly among older children and adolescents(60).

Sources of lead that may result in a mild to moderate increased blood lead level include household dust, interior paint removal in older homes and contamination from lead pipes. A sustained blood level of $> 15\mu\text{g}/100\text{ml}$ is associated with an increased risk of neurodevelopmental and cognitive deficits(61).

In the RSA, von Shirnding et al (62) investigating blood lead levels of inner city children, found that 13% of mixed race children but no white children had blood lead level of greater than or equal to $25\mu\text{g}/100\text{ml}$, the U.S. action level. At the time of the study the RSA had one of the highest levels of lead in gasoline in the Western world, namely 0.836g/L . However since then levels have been reduced.

In the USA, the Environmental Protection Agency and the Agency for Toxic Substances and Disease Registry recognised in a policy statement, that lead, at low doses, is a serious threat to the central nervous

system of infants and children (59,63,). Of special significance to the present study is that both cross-sectional and retrospective studies have shown that children who have an increased level of lead perform less well than their peers, not only academically, but also in standardized intelligence tests (64,65,66,).

The conclusion reached from 4 prospective studies was also that an association existed between low level lead exposure and cognitive functioning (67,68,69,70,). In a study endeavouring to separate the effects of I. D. Anaemia (a common interfering variable in many studies) from those of lead overload, Wasserman et al (71) suggested that the brain was vulnerable to both.

As in many studies, which have endeavoured to measure the effect of a single factor or agent on cognitive functioning, the role of interfering variables has been extremely difficult to delineate and several authors of reviews on the topic of lead poisoning (71,72,) have pointed this out. However as so many studies have consistently found a degree of association between lead overload and impairment of neurological or cognitive development, this possibility must be seriously considered.

3. GESTATIONAL AND PERINATAL FACTORS WHICH MAY AFFECT COGNITION.

There is a large literature extant which indicates that there are factors occurring during gestation and in the perinatal period which result in sequelae which last a life time (73,74,75). A large number of these lead to impaired cognitive functioning. These may be divided into 1) factors which affect the foetus during gestational period and 2) factors which operate during the perinatal period.

3. 1. Factors in the Gestational period:

3. 1.1. Maternal malnutrition.

This has already been partially discussed above in the section on long term effects of malnutrition on the growing brain. The role that maternal malnutrition plays in intrauterine growth retardation (IUGR) remains questionable as there are many other factors which can lead to this sort of outcome. However factors associated with the risk of preterm delivery include low socio-economic status and low maternal weight which indirectly might imply maternal malnutrition(76).

3.1.2. Intrauterine growth retardation

Metcoff(77) stated that the three terms, small for gestational age(SGA), intra-uterine growth retardation (IUGR) and foetal malnutrition should be differentiated. IUGR is a catch all term which implies that, for whatever reason, the foetal growth potential is adversely affected.

SGA is weight for gestational age based on population norms with limits set at weight less than two standard deviations from the mean. It does not take into account the aetiology of the substandard size of the newborn. Foetal malnutrition affects the composition of the body and impairs brain development in animals and is independent of the birth weight. Its effect on brain development and cognitive function in humans is controversial. Hill found that C.N.S. sequelae occurred in foetally malnourished infants whether or not they were SGA. Infants who were SGA but not malnourished were not similarly affected(78).

Thus birthweight and gestational age alone are not sufficient to allow one to make an accurate assessment of the foetus' nutritional status and hence its possible risk for developmental delay. However there are many studies (73,79,80,81,) which have shown that very SGA babies are at risk for cognitive dysfunction and consequently birth weight remains a practical indicator of risk for future learning problems.

3.1.3. Maternal use of noxious substances during pregnancy.

3.1.3.1. Cigarette Smoking:

In 1974 it was shown that smoking of cigarettes during pregnancy resulted in the birth of babies who were growth retarded with the possibility of later developmental impediments(82).

3.1.3.2. Alcohol Ingestion:

Alcohol is freely available in our society and the incidence

of alcoholism is known to be high in the population group in which this study was carried out. Alcohol ingestion during pregnancy is the the leading known cause of mental retardation and teratogenesis in societies where it is available (83). The foetal alcohol syndrome was first described in France in 1968 (84) but only accorded significant attention after a paper published by Jones in 1973 (85). Included in its symptomatology are prenatal and postnatal growth deficiency, mental retardation and developmental delay with hyperactivity and attention deficit. It is quite likely that a large number of undiagnosed but less severely damaged children go unrecognised.

3.1.3.3. Use of Heroin, Methadone and Cocaine:

The use of heroin and methadone during pregnancy has been associated with intrauterine growth retardation, neonatal withdrawal symptoms as well subtle neurological abnormalities and attention deficit disorders (86). Cocaine ingestion has been implicated in cases of microcephaly, abnormal E.E.G., and cerebral infarction in the newborn (87). Its long-term affects are as yet unknown.

3.1.4. Genetic Abnormalities.

There are a large number of chromosomal abnormalities as well as other inherited conditions (83) including inborn errors of metabolism (88), which may result in mental retardation of varying degrees. A family history is the best method for eliciting this type of information.

3.1.5 Congenital Infections.

Specific maternal infections, especially in the first trimester of the pregnancy, may affect the foetus deleteriously resulting in dysmorphism or actual active foetal infection, both of which give rise to developmental delay(89,90,91,). In 1991, 5.5% of the 4,548 women delivered at Coronation Hospital, which is the hospital that serves the community in which this investigation took place, had a positive serological test for syphilis (92). The risk, therefore for the neonate, in this community, of having congenital syphilis is relatively great. Other congenital infections such as rubella, toxoplasmosis and that caused by cytomegalovirus are much less common. However with the increasing prevalence of HIV positivity amongst pregnant women in the RSA (93) the number of affected infants who are born has most certainly increased and it is well documented this infection gives rise to developmental delay (94)

3.2. Perinatal Factors.

3.2.1 Prematurity:

Prematurity with its accompanying complications of respiratory distress syndrome, hypoglycaemia, hyperbilirubinemia and intracranial haemorrhage is a well known cause of impaired cognitive function(73). It often leads to a prolonged stay in hospital, sometimes in the neonatal intensive care unit, immediately after birth. This may impair effective maternal-child bonding and lead to emotional problems which may impact on cognitive function.

3.2.2 Asphyxia and the Meconium Aspiration Syndrome:

This syndrome accounts for some 2% of neonatal deaths (6). It occurs more commonly in economically deprived communities where there is poor antenatal care or where patients present for the first time after they have gone into labour. Of the deliveries performed annually at Coronation Hospital, 10.2% were unbooked and 5.2% were born before arrival(92) with a consequently high rate of asphyxia and meconium aspiration. Survivors of this disease may have suffered prolonged periods of hypoxia which can result in brain damage with impaired function (95).

3.2.3. Perinatal Infections:

The most important of these are the bacterial neonatal meningitides, which include those due to group B beta haemolytic streptococcus and E.coli. These all have a considerable long term morbidity rate usually expressed as some form of cognitive impairment(96). Congenital syphilis may also present as meningitis during the perinatal period.

Of the non-bacterial perinatal infections which affect the central nervous system, that due to Herpes Simplex virus has both a high mortality and morbidity rate.

3.2.4. Neonatal Convulsions:

The prognosis for poor neurological outcome is related to the underlying cause of the seizures, the seizure type, time of onset of seizures and the duration of the convulsion(97). Neonates with seizures and an abnormal EEG have only a 7% chance of normal development whereas if the background activity is normal a good outcome is expected in 86% (98). What

is evident is that once a newborn develops seizures, a protracted hospital stay is likely as it may take some time before the etiology of the seizures is established and the patient is stabilised.

4. PSYCHOSOCIAL FACTORS

4. 1. Psychosocial Factors and Cognitive Development.

The case for investigating a number of important biological factors has already been made and it is now time to consider the evidence available regarding environmental characteristics which affect cognitive function or ability to learn. The latter would directly be congruent with the child's ability to successfully complete his/her first year at school.

4.1.1. Assessment of Cognitive Function

Cognitive function at present is best assessed by the use of psychometric tests (99). These purportedly measure the intellectual abilities of a person. The definition of intelligence as measured by these tests remains extremely inexact and for practical purposes as far as test users are concerned, "intelligence is what intelligence tests measure"(100). The norms for the outcomes of almost all psychometric tests, virtually since their inception, have been established using Westernised middle-class children.

However, Rafferty, writing in 1973, pointed out that, since the time when Alfred Binet and Theodore Simon developed their intelligence test in response to the French government's request to help with the problem of children failing at school, much has changed(101). Many of these changes pertain specifically to the present situation in South Africa. Thus ostensibly all (not only middle-class) children now go to school because this is a legal requirement. Large populations of children previously unschooled and

from different cultures have migrated into urban areas. The medium of education is often in a language the children do not understand. The expectations of achievement are applied nearly universally despite much rhetoric about individualization. Previously oppressed people now demand their equal rights and equal opportunity which not only changes the school situation for them but alters the whole social climate of going to school for everyone. All these factors must make the outcome of intelligence tests somewhat suspect.

4.1.2. Conclusions drawn from psychometric test scores

What is certain is that there is a good correlation between success in the education system of developed countries and the Intelligence Quotient (IQ) which is the result obtained from psychometric testing(102).

The primary activity of childhood is learning and Erikson has defined this phase of development as the time of "industry" (103). Walzer and Richmond state that society determines how this industry is translated into learning activity(104). In a technocratic society, which rightly or wrongly , is what most developing countries are striving to attain, the ability to succeed scholastically tends to be equated with the ability to succeed in life both materialistically and socially.

4.1.3. Constancy of psychometric test scores

Although it was initially thought that intelligence was innate and that it remained constant as measured by psychometric testing, this view

has not been supported by findings in several studies . Of importance in the context of the present investigation are the studies of Caldwell and Richmond (105,106) who showed a slow fall off in the developmental performance of children from low socio-economic circumstances. In addition Eisenberg showed that reading retardation was directly related to social class(107).

It has been found that infants who are physically normal appear to develop in a fairly rigid predetermined fashion regardless of their environmental milieu (108) . Bayley found that psychometric testing showed no decline in intellect attributable to social class before the age of 15 months (109). By the beginning of the second year of life, environmental factors including socio-economic status (SES), physical habitat, family structure and the child's interpersonal relationships begin to exert an influence on development and become significant predictors of cognitive function (9). Thus, at present, "there is uniform agreement that by 3 years of age there is a definite deficit in the level of intellectual functioning in children from impoverished and socially disorganised families"(104).

4.1.4. Environmental factors affecting psychometric test scores

The specific factors within the environment which affect cognitive development are difficult to elicit or quantify. SES, which is relatively easily measured, has most frequently been implicated as a causative factor of poor intellectual attainment. However there are many factors outside those involved in SES such as family structure, attitude to "scholastic success or failure", variety of experiences available, level of communication in the home

and other nurturing practices which must impinge on the cognitive development of the child. Thus SES alone, reveals little about the environmental attributes or socialization practices that directly influence cognitive development (110,111,112) and tends to ignore the impact of some of Bronffebrenner's nested structures(16) which must directly affect the child.

While the quality of the home is strongly related to SES, the latter should be viewed as being multifactorial and not as a unitary dimension. Whatever the SES, the range and quality of interactions within the family group (which must be influenced by the size of the family, presence or absence of father, birth order and household crowding) and that group's interaction with the community must to a lesser or greater extent be specific to that family. Therefore individuals within groups defined by their SES are most certainly not homogeneous.

Despite Gottfried's conclusion that it is an "empirical fact that the children from relatively higher SES families receive an intellectually more advantageous home environment"(113), there are children who succeed academically even though their family's SES is low and this must indicate that even in such circumstances there are homes that can provide a stimulating environment.

4.2. Measuring the quality of the Environment

A successful tool for measuring the quality of the environmental experience has been developed by Caldwell and Bradley in 1978 (114). This is "The Home Observation for Measurement of the Environment" (HOME) which has been shown to measure factors related to the home environment outside those of SES which correlate with early and late cognitive development especially after the first year of life (115,116).

Within HOME there are 6 subscales, parental responsiveness, acceptance of child, organisation of the environment, play materials, parental involvement and variety of stimulation. Stevens and Bakeman concluded that the HOME's predictive ability for cognitive functioning depends mostly on items which source the kinds of materials for learning that are provided in the home by the mother and her instrumental support for developmental advance (117).

The Home Screening Questionnaire (HSQ) which Coons et al developed from the HOME scale (118) has been shown to have a high degree of correlation with the parent test and is much easier to use (119). As it is purely a questionnaire, it however omits those items which depend on observing the mother and child in their home environment. In spite of this, for practical reasons it was decided to use the HSQ in the present study.

However as the HSQ was developed in the USA it was felt that a locally designed questionnaire used in conjunction with the HSQ might provide insights which the HSQ was not able to do. This questionnaire was designed with the aim of acquiring information that specifically pertained to

the questions being posed in this study and related particularly to the population group that was being investigated. It aimed at obtaining detail about family structure, language usage and medium of instruction, indicators of the family's attitude towards education such as sibling's school records, age at commencing school and parental expectations. SES was also investigated in terms of parental education, family possessions and crowding index.

Chapter 3

HYPOTHESIS AND OBJECTIVES OF STUDY.

HYPOTHESIS:

It is postulated that the excessively high failure rate in sub A children who attend schools run by the Department of Coloured Education, although probably largely due to a poor socio-economic environment, can be effectively decreased both by positive parental attitudes and intervention following identification of children at risk for school failure.

OBJECTIVES OF THE STUDY.

1) To validate the premise that the failure rate in Sub A in schools administered by the Department of Coloured Education and used in this study, was much higher than that found, at the same level, in schools belonging to the Transvaal Education Department.

2) To retrospectively attempt to identify in schools administered by the Department of Coloured Education, specific

characteristics of children in their first year of formal schooling, who are likely not to be promoted to the next class.

3) Should such characteristics be found, an attempt would be made to determine if they were of such a nature that they could be remedied by an early developmental assessment followed by appropriate therapy.

Chapter 4

THE CAPE COLOURED AND THE COLOURED POPULATION OF JOHANNESBURG.

The subject of racial discrimination in South Africa has always had a very high profile and consequently studies involving a specific race group have in the past been subject to prejudice and antagonism and their outcomes have been viewed with suspicion(120).

It thus does not appear to be inappropriate to spend some time describing both the origins and the social status of the race group in which the present study has been conducted. However, before focusing on the Coloured community of Johannesburg (to which this study was limited), an overview of the Coloured race in South Africa is essential in order to delineate a more understandable picture.

The Coloured People of South Africa:

Prof. Trevor Jenkins defines the evolution of a race as being due to mutation and recombination, selection, migration, hybridisation and genetic drift(120). With the exception of migration, all are impressed upon to

greater or lesser extent by social and cultural pressures. It is largely because of these pressures, many of which are still existant today(121), that the children of the Coloured people who live in the vicinity of Coronation Hospital formed a suitable study group for the investigation which we undertook.

The origin of the Coloured people was predicated on exotic white (European) people settling on the southern tip of the African continent in 1652. Marais stated that " the history of the Coloured People is the history of the contact of aboriginal Africans (and a few Orientals) with Europeans. Without this contact there would have been no Coloured folk"(122).

The new settlers (Europeans) rapidly came into contact with the two local or indigenous peoples living in the Cape(123). These together formed the Koisian people made up of the Hottentots (Koin-Koin) and the Bushman(San)(124). Within a short time an inevitable intermingling of racial genes occurred. The San however appeared to have played a much smaller role in this admixture than did the Koin-Koin(122). In 1658 a slave ship left about 300 boys and girls of Angolan and New Guinean extraction at the Cape(125) and their contribution to the gene pool of people of mixed race is proven by the presence of Haemoglobin C and S in both the Coloured and Caucasoid populations of the Cape(126). In fact "during the first 20 years of its existence no less than 75% of the children born at the Cape of slave mothers were half-breeds(126)."

Later in the 16th and 17th century the slave population was added to by people from Madagascar, Mozambique and the East. The latter came mainly from India, Ceylon and the Malay Archipelago(120) and

gave rise to what is now known as the the Cape Malay population who largely subscribe to the Moslem faith.

The exact contribution by various race groups to the gene pool of today's Coloured people has as yet to be ascertained . In addition, it is still a matter of dispute as to whether the Coloured people really form an homogenous group or whether there are various sub-populations of these people(120) . Both Gordon in 1965(128) and Botha in 1972(126) examining the Coloured population of the Western Cape, concluded that they could be divided into two groups, the Moslem Cape Malay and the Christian non Malay. These differed significantly from one another in their gene frequencies, with the Christian non-Malay group being a mixture of three base populations in the proportions of Southern African 46%, Western European 32% and Asian 22% whereas the corresponding figures for the Malay group were 25%, 32% and 42% respectively. Thus the Cape Malays had a much larger admixture of Asian blood than did their Christian non-Malay counterparts.

As defined by the Population Registration Act (Act 30 of 1950) a "Coloured" person is a person who is not a white person or a Bantu and does not form part of the Chinese, Indian or other Asiatic groups. Various subgroups of this population are distinguished in Section 5 (1) and (2), the Cape Coloured comprising the overwhelming majority with the Malay next in size(129). Whilst this definition has become irrelevant in the present South Africa, its effect of keeping people of a certain race group residing in specific areas and attending the same schools still persists. As an example, in 1980,

54% of the Coloured population lived in the Cape Peninsula, the majority living in designated coloured areas(128).

Whether Coloured people living in different geographical areas form distinct genetically different entities has remained an intriguing question. The Commission of Inquiry into the Cape Coloureds maintained that in the Eastern and Northern regions of South Africa, amongst "the lower class of Cape Coloured and the more or less detribalised Bantu living cheek by jowl with them e.g.in the 'locations' near towns and cities" casual sex outside that of marriage between the two groups resulted in a group of offspring who fell outside the Cape Coloured group and were simply called "Coloured"(121). (It is of interest to note that at least part of the population of the present study live in what was formerly known as the Western Native Township, a predominantly Bantu township where earlier conditions would have fulfilled those criteria described by the Commission).

However the findings of Jenkins, based on genetic markers, revealed that Coloured population of the Cape and Johannesburg were very similar with the exception of the surprising finding that the Cape Coloureds had a slightly larger admixture of Negro genetic strains. Whilst Jenkins qualifies these findings by saying that the samples were small and did not always satisfy statistical requirements(120), it would appear that for practical purposes the two groups are virtually identical and the perception that there was an increased admixture of Negro genes in the gene pool of the Transvaal Coloureds was probably wrong.

The Coloured Population of Johannesburg:

By 1896, ten years after Johannesburg was established, there were already 3,831 Malays and Coloured living there and they constituted 3.7% of the town's population(131). The 1991 Census indicated that the city, which by then had a population of 1,180,111, was home to 131,047 Coloured people who formed 11.1% of the total(132). The rapid growth of the size of the community, while partly attributable to the high birth rate was also due to the migration of Coloureds from other parts of South Africa who were lured by the better employment prospects and higher wages which existed in the commercial capital of the country(133).

The Coloured community of Johannesburg has some unique features. It is the largest of the inland communities and is second only to the Cape Coloureds of the Western Cape in size. It is isolated from the other two large Coloured population groups i.e. those of Port Elizabeth and Cape Town and is surrounded by significant concentrations of urban Blacks, Asians and Whites of Afrikaans, English and Jewish origin. Until fairly recently the Coloured community in the Cape was the largest of the local ethnic groups whereas in Johannesburg the community was smaller than all but the Asian group(134). These differences may have contributed to the Johannesburg Coloured community being less assertive than the Cape community.

Initially Coloureds lived around the centre of the city and as the city grew they tended to inhabit the older suburbs which were close to

1927 hardly impacted on the community as regards housing(133). However in 1936 the Johannesburg municipality decided to establish Coloured housing estates and the planning of Coronationville took place in that year. The first houses were completed in 1939. The planning and building of the Noordgesig estate followed close on its heels. Both these townships were built specifically to supply sub-economic dwellings for the coloured community. However housing for this group still remained hopelessly inadequate .

The melding of the Coloured people in Johannesburg into a unified group came about because of the Government policy of segregation as enunciated by the Group Areas Proclamation of 1956. Newclare which abutted on Coronationville, a mixed Coloured and Indian area was allocated only to Coloureds. Western Native Township, which was adjacent to Newclare and Coronationville and was home to a large Black population, was declared a Coloured area and was renamed Westbury. It was repopulated by Coloured people who had been moved from Albertville and the central city area which had both been declared white zones. The newer townships of Bosmont (adjacent to Newclare) and Riverlea which was also situated in a vicinity closeby, were built for Coloured people. All this resulted in the formation of a large consolidated area occupied exclusively (at least as far as the law was concerned) by Coloured people.

Of the 3 schools involved in the study, two were situated in the older areas of Coronationville and Newclare and the third was in the more recently established area of Westbury.

Coronationville as has already been stated was originally built as a subeconomic housing scheme. Because the houses were of good standard and families were selected on the basis that they would be likely to appreciate and maintain their improved situation, it was shown that in 1959 many families were earning more than the subeconomic income level. At this stage the City Council decided to sell the houses to the occupying tenants on terms which were within reach of many of them(135). Many of the occupants took advantage of this offer and this has resulted in a fairly stable and socially better class population than that found in either Newclare or Westbury.

Newclare, originated as a freehold area largely owned by Indians. Many coloured people rented rooms in the houses and conditions were often squalid(131). It was declared a coloured area in 1956. It remains a mixture of old delapidated houses often with rented out back quarters (tenanted by people who can find no other accommodation) and some newer houses. Multistoried blocks of council flats, both economic and sub-economic have also been built. Generally the families with school going children appear to be less well off than those in Coronationville.

The origins of Westbury have already been alluded to. In 1963, Proclamation 15 declared Western Township an economic housing scheme group area for ownership and occupation by coloureds (133). It is rather a mixed area economically with the newest parts being situated towards its northern boundary. Although it has a number of straight long streets, most of the houses are built around so called courts, which tend to produce a series of mini-neighbourhoods, each of which has its own character. Some are very

seedy and run down, whilst others, especially those in the newer parts have trees growing in the communal area and are clean and nicely looked after. At the northern end of Westbury there are several two storied apartment blocks mainly made up of one or two roomed flats. The division of this area into so many sub-neighbourhoods may partially explain the persistence of gangs and gang warfare with which the area is associated(136). These have a major influence on the life style of the children in the area and there is a high incidence of both substance abuse and violence.

Thus, although the areas in which the three schools used in this study are situated appear to range from purely subeconomic housing to those in which many people own their own properties, all three probably contain an admixture of most social classes of Coloured people. This can probably be attributed to the long standing acute shortage of affordable housing which at present shows little sign of being remedied in the near future.

CHAPTER 5

MATERIAL AND METHODS

1. STUDY DESIGN

The study population consisted of the children who failed Sub-A at the end of 1992 in schools under the Department of Coloured Education (C.E.D.) which were situated within a 5 km radius of the Coronation Hospital. This hospital lies in the heart of a coloured community which lives in the environs of Johannesburg.

The study was started at the beginning of 1993 when the school year commenced and was completed in September of the same year. The study children were repeating Sub-A and the control children had been promoted to Sub-B. Thus the design of the study was that of a retrospective case controlled study.

It was approved by the committee for Research on Human subjects of the University of the Witwatersrand (approval number R14/49 protocop number 08/11/92) and consent was obtained from their parents/guardians to weigh and measure the height of the children participating in the study.

Of the 7 schools which lay within the designated ambit, 4 were randomly chosen and their Sub-A failures for the specified year made up the study sample. It was ascertained that there were a total of 20 Sub A

classes in the 4 schools combined and that each class comprised 30-35 children. Thus the total number of children from whom the study and control sample were to be chosen was estimated to be between 600 and 700. If the failure rate, as derived from the literature was between 25-30%, then the study sample would be at least 150 (25% of 600).

For a control group, using the same 4 schools, it was decided to enrol those children who were placed in the top 5 of their Sub-A classes at the end of the same year (1992)[fig 1]. This would allow one to concentrate on the variables affecting the children and avoid confounding

FIG 1.

STUDY DESIGN

Study Population: All first year school failures in schools
of the C.E.D. within a 5 km radius of
Coronation Hospital (7 schools).

Randomly Selected: 4 SCHOOLS

School A

School B

School C

School D

Study	Contrl	Study	Contrl	Study	Conrls	Study	Contrl
Fails	Top 5	Fails	Top 5	Study	Top 5	Fails	Top 5



variables resulting from differences pertaining at individual schools, as well as those stemming from the different education departments. As there were 20 Sub-A classes the controls should number approximately 100.

☐ variables resulting from differences pertaining at individual schools, as well as those stemming from the different education departments. As there were 20 Sub-A classes the controls should number approximately 100.

2. METHODS

The specific factors investigated in the two groups included:

- 1) Nutritional status
- 2) Serum lead levels
- 3) Visual status
- 4) Age at starting school
- 5) Gestational and perinatal factors which may affect cognition
- 6) Social background
- 7) Mental status (intelligence quotient or equivalent)

2.1. Nutritional Status:

The variables for nutritional status investigated were

- A) Weight for age
- B) Height for age
- C) Weight-height ratios
- D) Haemoglobin (Hb) levels
- E) Iron (Fe) status

2.1.1 Weight and Height Measurements

Arrangements were made with the schools so that a blanket consent was obtained to weigh and measure all children in Sub-A and Sub-B who formed part of the study or control group. A suitable day was chosen when the investigator accompanied by two final year medical students could visit the school and the children were available for having their weight and height measurements carried out.

The aim was to do both these measurements on a random sample (obtained by using random sample number tables) of both the control and study pupils which would include 70% of each group. Only those children who were available on the specific day that the school was visited were included in the sample. No attempt was made to revisit the school to obtain measurements on the children who had not been present at the initial visit. In addition, because of time constraints, not every child who was part of the sample, was measured.

Weighing was carried out by one of the medical students using an electronically triggered scale whilst the other student recorded the result.

Height measurements were carried out and recorded by the investigator using a microtoise height measure manufactured by Raven Equipment Ltd. London. This apparatus is easily portable and can be attached to any wall.

2.1.2. Blood Specimens for Haemoglobin, Serum Iron and transferrin

In order to obtain blood specimens for Hb estimation and red cell indices, iron studies and serum lead a further visit to the school was needed. Only children in both groups, whose parents had given permission for having blood samples taken from their offspring were enrolled for this part of the study. This meant that only pupils who formed part of the interview study (see below) were eligible for blood sampling as consent for this was obtained at the time of the home interview.

Haemoglobin and red cell indices were measured at the South African Institute of Medical Research laboratory at the J.G. Strijdom Hospital using an H1 technical analyser as per the manufacturer's instructions. Serum Fe was estimated as a coloured complex with ferrozine, using the Boehringer Mannheim kit and BM/ Hitachi System 717. Serum ferritin was measured from venous blood using the immunoturbimetric test kit from Boehringer Mannheim and the BM/ Hitachi System 717. Transferrin was estimated by the immunoturbimetric-Behring kit and the Behring nephelometer. These tests were carried out at the laboratories of the Iron and Red Cell Metabolism Unit of the Witwatersrand Medical School.

2.2. Lead Status:

2.2.1. Parameters for lead status

The parameters used to determine the lead status of the children were:

A) Serum lead

B) Zinc protoporphyrin

2.2.2. Collection of Samples

Blood for lead estimations was collected in lead free tubes. Serum lead was measured using a flameless atomic absorption spectrophotometer. Zinc protoporphyrin estimations were obtained using a Haematoflurometer. These measurements were done in the laboratories of the South African National Centre for Occupational Diseases.

2.3. Visual screening:

2.3.1. The testers

With the kind permission of Prof. J.J. Ferreira, the services of the optometry department of the Rand Afrikaans University (R.A.U.) were recruited to carry out visual screening on both the study and control subjects who had been enrolled in the study.

The team that carried out the testing comprised one of the lecturers in the R.A.U. optometry department assisted by 4 students. The testers were blinded as to which children were controls and which were pupils that had failed Sub-A.

2.3.2. The screening tests used were as follows:-

i) Tests of Visual Acuity for a) Near &

b) Distant vision

{The criterion used for abnormal near vision acuity was $< 1 \text{ M}$ and that for distant vision acuity was $< 20/20 (6/6)$ }

ii) The Cover Test- used to exclude strabismus

iii) Motility Tests (motilities and saccades) which test eye movement.

iv) Test for Convergence which tests for ability to do close work and the criterion for abnormality was $> 5 \text{ cm}$

v) Accommodation Flexibility Test : this is used to determine an ability to change focus rapidly from distant to close up objects and was judged to be abnormal if the speed attained was $< 8 \text{ cycles/min}$.

vi) Stereopsis: this tests the child's ability to visualise three dimensionality from a two dimensional drawing.

vii) Ophthalmoscopy i.e. the examination of the eye from the conjunctiva to the retina using an ophthalmoscope.

This battery of tests and methodology of carrying out the tests was based on the recommendations of the Orinda study, Vision screening for Elementary schools(135) and its validation by the New York State Ophthalmic Association(136).

2.4. Age at Starting School

The information was obtained from the admission registers at the 4 schools from which the study sample was drawn. The registers all recorded the date of birth of the child as well as when he/she was admitted to the school. The complete sample was used for purposes of analysis

2.5. Socio-ecological Setting

2.5.1. Administration of Questionnaire

The socio-ecological background was ascertained by means of two questionnaires which the investigator administered personally. Either parents or caregivers were interviewed at their homes or if this proved impossible, then over the telephone.

2.5.2. Sampling

Because of time constraints and limited manpower it was decided that the questionnaire would only be administered to a sample of between 50-60% of the study and control groups. Sampling was achieved using the cluster method. Both the study and control group of children were redivided into groups of three. The grouping was determined by the proximity of their addresses (as determined by the use of a map of the area which was obtained from the town planning department of Johannesburg) and the fact that it was impossible for the examiner to complete more than 3 questionnaires

at a time.

Those families that had telephones were seen only after an appointment had been made. Only 73 of the 125 homes where the questionnaire was administered had a telephone and in some of these the phone was out of commission as the last phone-bill had not been payed. Where there was no telephone the interviewer arrived at any time and hoped to find someone at home. If both parents were working an attempt was made to see them over a weekend. If two visits to a home proved fruitless, then that particular child was replaced by the next geographically closest subject of the same group who had not been included in the original subset.

2.5.3. Local Questionnaire

The first questionnaire, drawn up by the author, was constructed to cover both sociological and medical variables.

2.5.3.1 Sociological Variables

These were based on the interviewer's knowledge of the population, having worked with this community for several years. The areas dealt with included family size and composition as well as educational achievements, parental employment, preschool education of the propositus, assessment of the home, including the availability of reading material, and the crowding index. In addition questions relating to the family's attitude regarding education and their expectations for their children were also included.

2.5.4. Ante/Perinatal Section

A special section of the questionnaire was devoted

A special section of the questionnaire was devoted to details of the ante- and perinatal medical history of the child. These included the relevant antenatal behaviour pattern of the mother, duration of the pregnancy, the size (birth weight) of the infant, duration of hospital stay and possible problems which arose at or shortly after birth.

2.5.5. The H.S.Q. Questionnaire

The second questionnaire used was the " Home Screening Questionnaire" (H.S.Q.) which was developed in the USA by Coons et al (118). It was derived from the HOME questionnaire and was designed to screen for children from families of lower S.E.S. who were at risk of school failure. It aimed to investigate areas unrelated to S.E.S. which would foster learning in the child(114).

The areas covered in this questionnaire were:

- i) acceptance of the child
- ii) organisation of the environment
- iii) play materials
- iv) parental involvement
- v) variety of stimulation

2.5.5.1. Administration of the HSQ Questionnaire

Many of the questions overlapped with those in the questionnaire which was specially devised for the present study. Consequently a decision was made to administer both questionnaires at the

not undertaken as many of these coincided with those of the local questionnaire. However specific areas that were not covered by the local questionnaire were analysed on an individual basis.

2.6. Assessment of Developmental status using the Griffiths Developmental Scales.

Developmental status was measured using the Griffiths Scales of Mental Development(122,123,) of which the author is a trained and certified user. Each modality of the scales of mental development was tested by a different tester who was both a paediatrician and had successfully completed the training course for the Griffiths Developmental Testing. All testers were blinded as to whether the child they were testing had passed or failed to complete Sub A successfully.

3. School Teachers Questionnaire

A short questionnaire was developed to determine the attitude of school teachers to the high failure rate of children in their classes. This was self administered and took approximately 10 minutes to complete. The teachers who taught Sub-A and Sub-B at each of the schools were requested to complete the questionnaire. At each school, the relevant group of teachers met with the investigator in a suitable room and completed the questionnaire at the same time to prevent inter-teacher consultations.

4. STATISTICAL ANALYSIS

The findings of both the Home Screening questionnaire and the questionnaire devised specifically for this study were analysed using a programme of automatic interaction detection and the chi squared test (C.H.A.I.D) to establish significant differences at the level of $p=0.05$

Statistical differences between the control and study group's serum lead and haemoglobin levels and Iron Status was carried out using the chi squared test.

Nutritional status of the 2 groups was compared using the Programmes for Nutritional Anthropometry of Epi Info version 5. Both percentiles and Z score values were obtained and means with standard deviations were calculated. The Student's "t" test was used to test whether means differed from zero.

CHAPTER 6

RESULTS

1) VALIDATION OF EXCESSIVELY HIGH FAILURE RATES IN THE STUDY SAMPLE.

Before embarking on the study it was felt that it was essential to validate the premise of the excessive failure rate of coloured children in their first school year, at least, in the Sub-As of the 4 schools which formed the sample chosen for this study.

After getting permission from the Transvaal Education Department (TED), 42 primary government schools in the Johannesburg area were canvassed requesting both the number of children in Sub-A as well as those that had failed, for the year 1992. These schools at the time of the study enrolled virtually only white pupils most of whom came from middle or lower middle class homes.

Table 1

PERCENTAGE FAILURES IN TWO DIFFERENT EDUCATION DEPARTMENTS

EDUCATN DEPT	SCHOOL NUMBER	NUMBER OF PUPILS	NO. OF FAILURES	%AGE FAILURES
T.E.D	31	2864	205	7.15
C.E.D.	4	670	148	22.08

A response was received from 31 schools and a failure rate for these could be calculated. This rate was also available for the 4 sample schools.

From table 1 it can be seen that the failure rate in the T.E.D. schools was 7.15% whereas in the 4 schools which made up the sample the Sub-A failure rate was 22.08%, thus confirming the initial impression and so justifying continuing with the study in the sample population.

2) THE STUDY SAMPLE

In the 4 study schools combined a total of 670 children were in Sub-A in 1992, 242 in school A, 125 in school B, 172 in school C and 131 in school D. At the end of 1992, 50/242 (20.7%) were not promoted at school A, 23/125 (18.4%) at school B, 50/172 (29.1 %) at school C and 25/131 (19%) at school D. This gave an overall failure rate of 148/670 (22.1%) at the 4 schools with a range from 18.4 to 29.1 %. These 148 children formed the study group.

There were 20 Sub-A classes in the 4 schools combined and thus the control group was made up of 5 (the top 5 students in each class) x 20 which was 100 pupils. However, it was later found that 15 of the children, who were in the top 5 of their classes, had failed the previous year and were actually repeating Sub-A in 1992. This finding was not surprising when one realised that in two of the schools most of the failures were put together into the same class the following year. These 15 repeaters were excluded from the

control group and were added to the study group. As a result the study group was now made up of 163 children and the controls numbered only 85.

3) EVALUATION OF NUTRITIONAL STATUS

3.1. Weight and Height

Of the 163 children who had failed or were already repeating Sub-A (the study group), 111 (68%) had their weights and heights measured and their height and weight percentiles plotted. Seventy-six of the 85 (89%) children who had been promoted and never failed Sub-A (the control group) were similarly investigated. The latter group was made up of 42 (55.3%) girls and 34 (44.7%) boys whilst the study group comprised 66 (59.5%) males and 45 (40.5%) females reflecting the predominance of boys in the study group.

3.1.1. Weight For Age Ratios

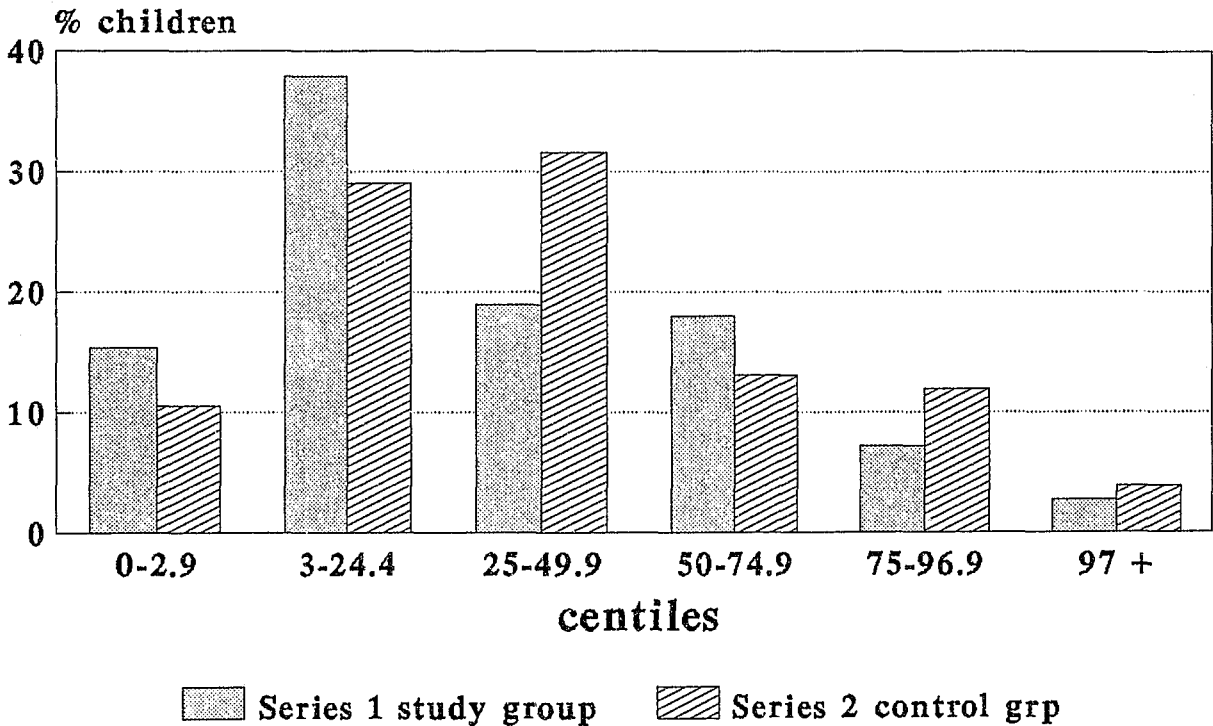
3.1.1.1. Weight/age Percentiles

The mean weight for age percentile for the study group was 32.2 with a range from 0.3 to 99.7. Corresponding figures for the controls were a mean of 37.9 (range 0.3 to 99.8). The median percentiles for the study and control children were 23.2 and 34.3 respectively. The 2 tailed student t test indicated that the two means came from the same population ($p = 0.236$).

From fig 2 it can be seen that in both the study and the control group the distribution curve of weight percentile was shifted to the left

Fig 2

WEIGHT \ AGE CENTILES STUDY AND CONTROLS



Study = 111 control = 76

with the majority (72.1%) of the study children and 71.5% of the controls falling at or below the 50th percentile. The percentage of children whose weight for age fell below the 25th percentile was 38 and 29 in the study and control groups respectively. In the study group 17 (15%) of the children's weights for age fell below the 3rd percentile as did 5 (6.6%) of the controls.

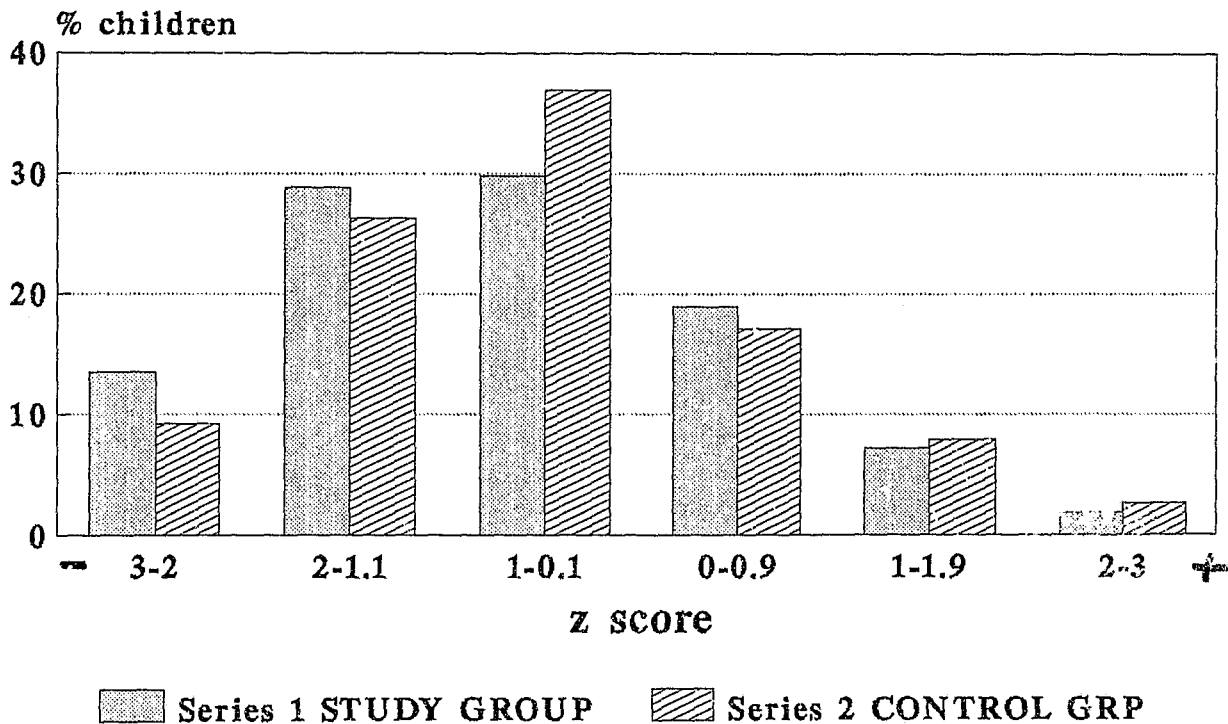
controls. None of the differences between the two groups were statistically significant. However there is a definite trend indicating that the study group's nutrition was somewhat poorer than that of the control group.

3.1.1.2. Weight\age Z scores

Looking at the weight\age Z scores (fig 3) it can be seen that

Fig 3

WEIGHT\AGE Z SCORES STUDY AND CONTROLS



study = 111 controls = 76

28% of children in both groups had a Z score of greater than 0 and the distribution curves for both study and control children had shifted to the left. The mean Z scores for the study and control groups were - 0.597 and -0.177 respectively. There was no statistically significant difference between the Z scores of both groups ($p = 0.147$)

3.1.1.3 Mean Weight/Age

Table 2

MEAN WEIGHT FOR AGE IN SPECIFIED AGE GROUPS

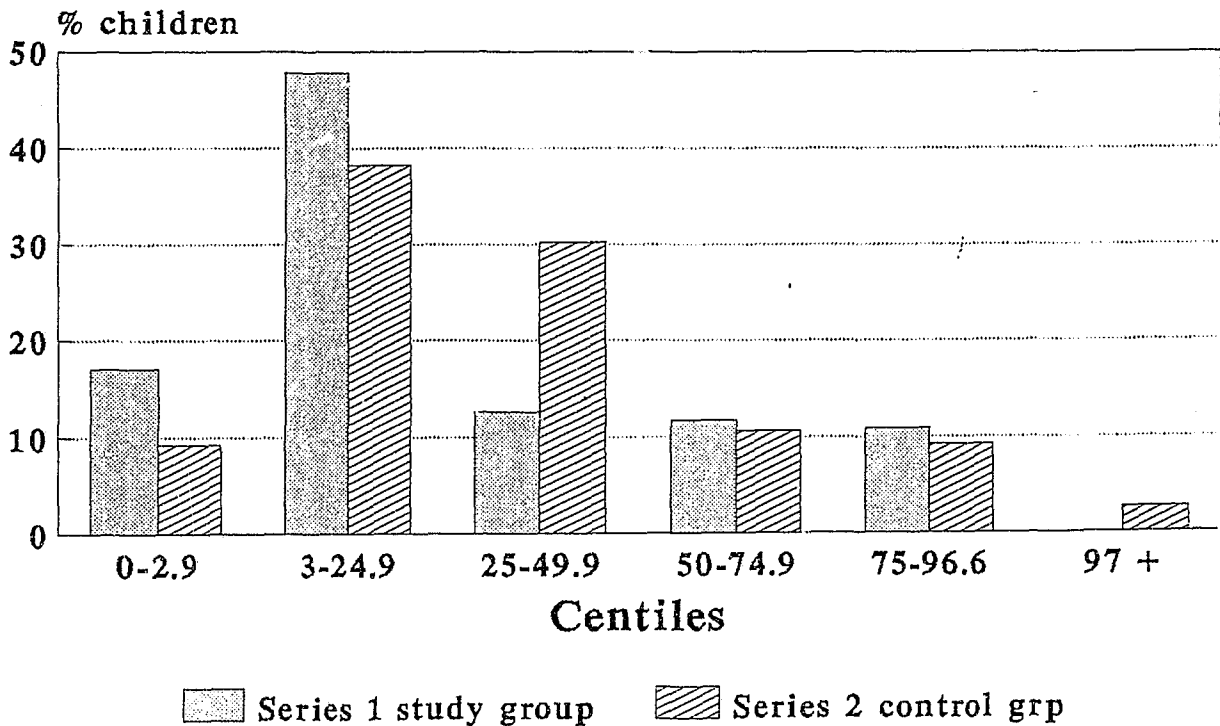
Group	Sex	Age(mnths)	No	Mean Weight	Std Dev	Median
Study	Male	>78<<90	43	21.4 Kg	3.46	21.5 Kg
Control	Male	>78<<90	17	22.0	3.36	22.0
Study	Female	>78<<90	29	21.0	3.80	21.0
Control	Female	>78<<90	20	24.2	5.35	22.5
Study	Male	>89<<102	17	22.32	3.17	22.0
Control	Male	>89<<102	14	22.4	2.15	22.5
Study	Female	>89<<102	12	23.1	4.08	23.5
Control	Female	>89<<102	18	20.9	3.02	21.3

Mean weight for age was calculated for study and control male and female 7 and 8 year olds using age at nearest birthday. The results as seen in table 2 show that the mean weights for boys in the study group whose age was nearest to their seventh and eighth birthday was 21.4 and 23.3 Kg respectively with ranges of 16 to 34.5 and 18 to 43 Kgs. The corresponding figures for the

control group were 22 and 22.4 Kgs with ranges of 17 to 28 and 18-15.5 Kg. The mean weight for female controls aged 8 years was lower than that of the study group. However the groups are small and the weight ranges wide so that no specific conclusions can be drawn from these findings. The mean weight for all the boys aged 7 years is 21.55 Kg (median 21.75) and for those aged 8 yrs is 23Kg (median 22.25) .

Fig 4

HEIGHT\AGE CENTILES STUDY AND CONTROL



STUDY = 111 CONTROL = 76

3.1.2 Height for Age Ratios

3.1.2.

1. Height\Age Centiles

The mean height for age centile for the study and control groups (Fig 4) were 26.7 (range 0.07 - 92.4) and 32.8 (range 0.03 - 99.5) respectively. The median height\age centile was 15.5 in the failure group and 26.6 in those who had passed. From fig 4 it can be seen that 64.9% of study and 47.4% control children's heights\ age were below the 25th centile and this difference was statistically significant ($p = 0.033$). A higher percentage of study children's height for age was below the 10th than that of the controls but this difference did not attain statistical significance.

Height\Age Z scores

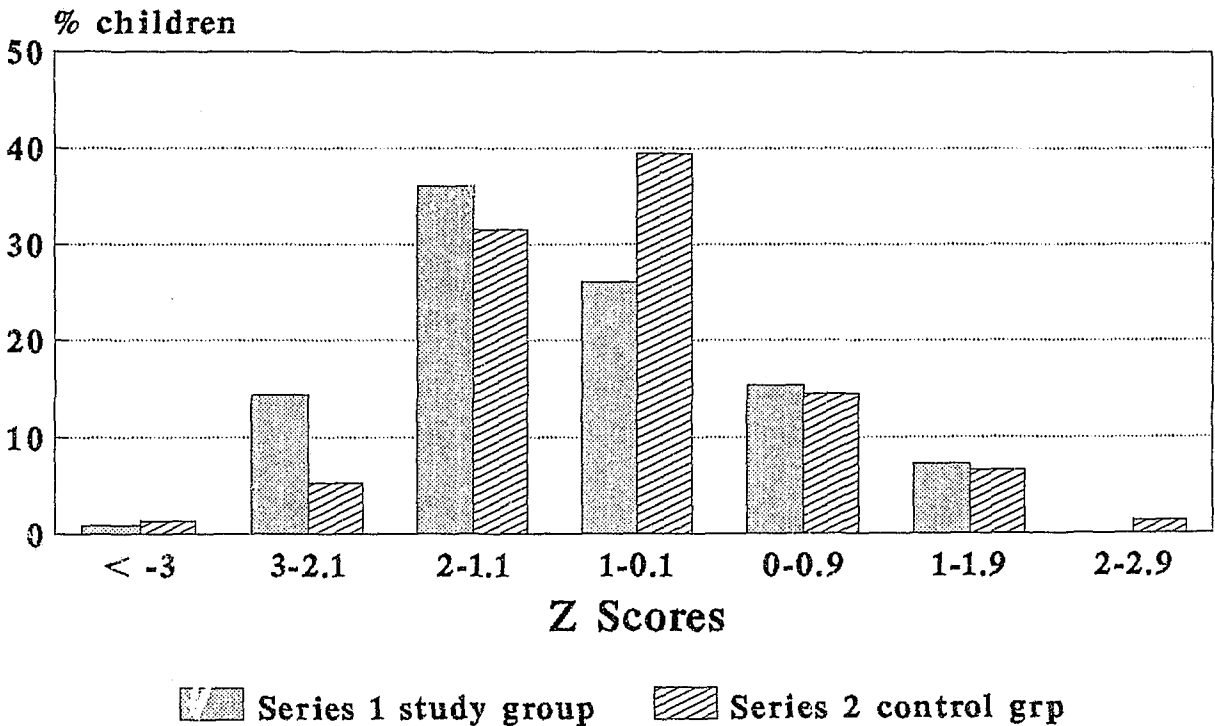
Although 15.3% (16/111) study compared to 6.6% (5/76) control children and 51.4% (57/111)study and 38.2% (29/76) study children had Z scores for height\age of less than -2 and -1 respectively (fig 5), this difference was not statistically significant ($P = 0.06$ and 0.076). It is noteworthy that in both the study and control groups 77% of children had Z scores of less than 0. The mean Z scores for height /age for study and control groups were not statistically significantly different ($p = 0.176$).

Of the 66 boys who failed Sub-A, 47 (71.2%) were below the 25th centile for height whereas this applied to only 53.3% (24) of the girls. This difference was statistically significant ($p = 0.05$). Comparing the HAZ

scores of boys and girls in the study group, a much higher percentage of boys (62.2%) had a Z score of < -1 than did girls (35.6%) and this difference was statistically significant ($p = 0.006$).

FIG 5

HEIGHT\AGE Z SCORES STUDY AND CONTROL



STUDY = 111 CONTROL = 76

3.1.2.3. Mean height/age

This was calculated in the same way as was mean weight for age and was carried out in the same age groups. The results as seen in table 3 show that with the exception of girls nearest their eighth birthday the mean height for all groups were lower for the study children than the controls. However none of these results attained statistical significance.

Table 3

MEAN HEIGHT FOR AGE IN SPECIFIED AGE GROUPS

Group	Sex	Age(mths)	No	Mean Height	Std Dev	Median
Study	Male	>78&<90	43	116.9	5.25	116.4
Control	Male	>78&<90	17	120.8	6.33	119.6
Study	Female	>78& <90	29	117.6	6.72	116.6
Control	Female	>78&<90	20	120.8	5.25	120.8
Study	Male	>89&<102	23	120.4	5.30	119.9
Control	Male	>89&<102	14	122.3	3.93	122.95
Study	Female	>89&<102	12	122.3	5.59	122.4
Control	Female	>89&<102	18	118.7	4.44	117.65

3.1.3 Weight/Height Ratios

3.1.3.1. Weight\Height Centiles

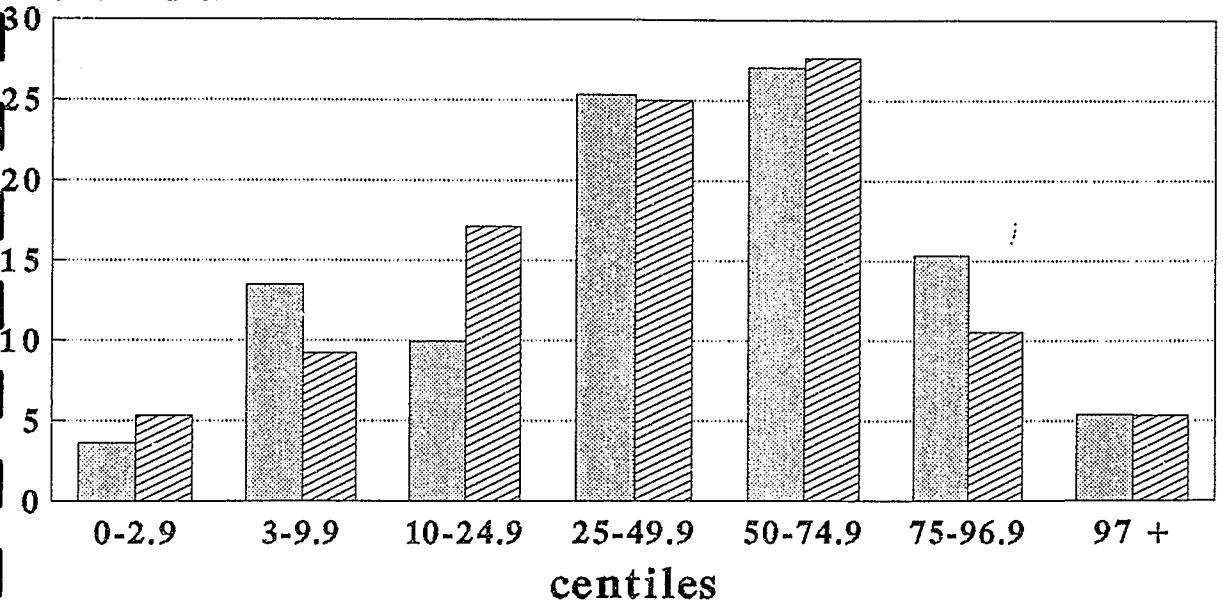
Centiles for weight height ratios (Fig 6) showed that 52.3% of controls were at or below the 50th centile as were 56.6% of study children. The distribution of Weight/height centiles appeared to suggest

that both the study and controls children's height for weight ratios were appropriate and the distribution of children in the various centile categories was essentially similar and normal.

Fig 6

WEIGHT \ HEIGHT CENTILE STUDY AND CONTROLS

% children



Series 1 study group



Series 2 control grp

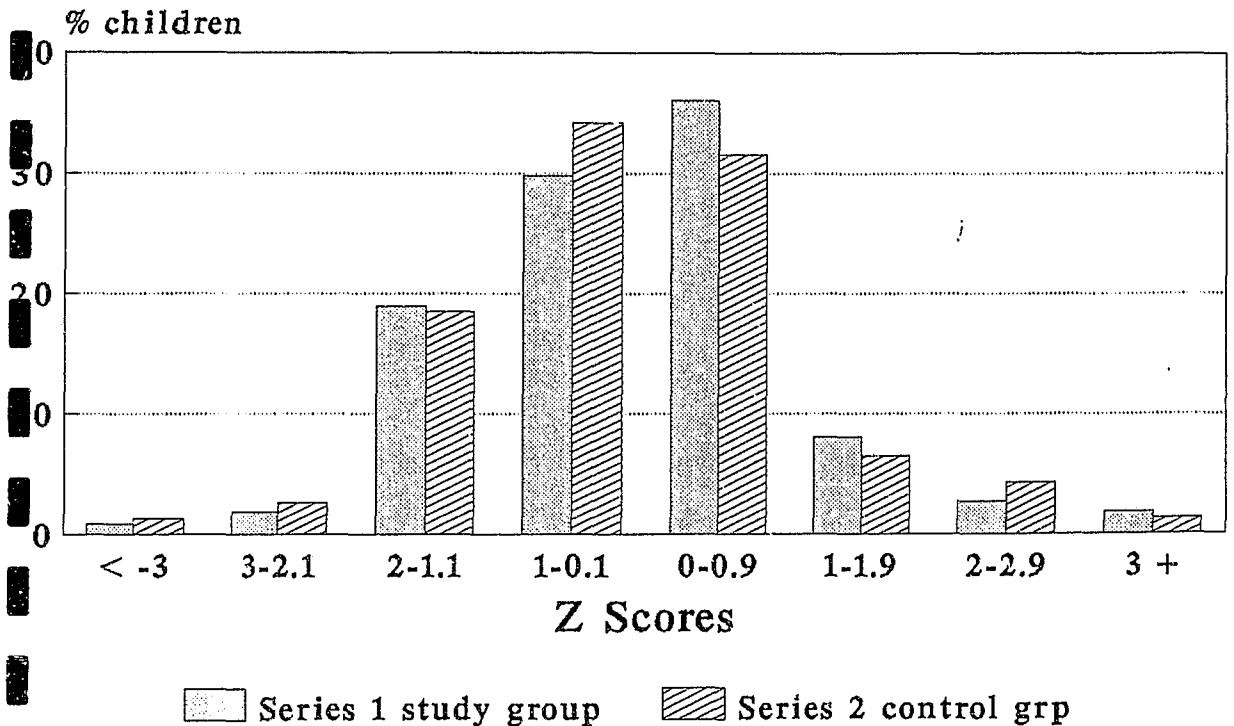
Study = 111 controls = 76

3.1.3.2. Weight \Height Z scores.

Fig. 7 shows that children in both the groups studied closely followed the normal distribution curve for weight\ height Z scores and neither excessively fat or thin children were more frequent in either group.

FIG 7

WEIGHT\HEIGHT Z SCORES STUDY AND CONTROLS



3.2. Body Iron Status

3.2.1. Haemoglobin Estimations

These were carried out on a total of 95 children, 56 of whom were in the study and 39 in the control group respectively. Numbers were limited by parental permission being withheld (this applied mainly to children in the control group) or, in a small number, the child became too upset when the needle and syringe was seen.

The mean Hb in the control group was 13.4 g/dl (range 11.4 to 15.5) and 12.8 g/dl (range 10.5 to 13.9) in the study group. The overall prevalence of anaemia, as defined by a Hb of less than 11.5 g/dl (2 SD below the mean for 5 -9 year olds (139), in the combined study and control groups was 5.3%. Of the children whose Hb was <11.5 g/dl, 4 (7.1%) were in the study group whereas 1 (2.6%) of the control group was similarly affected. The mean red cell volume was <77 fl in 6 (15.3%) of the controls and in 15 (26.8%) of the study group and this difference was not statistically significant ($p = 0.20$).

3.2.2. Serum Iron (Fe), iron-binding capacity, percentage saturation and serum ferritin levels.

All these were measured in only 67 children, 39 study subjects and 28 controls. Although samples were obtained from 93 children, due to a misunderstanding 26 specimens were put into unsuitable containers and estimations could not be carried out on them.

The mean Hb in these 39 study and 28 control children was 12.85 g/dl and 13.16 g/dl respectively. These means were very similar to those found in the larger groups of the 56 school failures and the 39 children who had been promoted and had their HBs done as part of a full blood count. Thus the sub-sample appeared to be representative of the larger sample as far as the HB levels were concerned.

Using 15 ug/dl [rather than the <10 ug/L recommended by Dallman(140)] as a cut off point, we found that 21 (31%) children had a low ferritin indicating deficient iron stores. Of these only 3 had Hbs of less than 11.5 g/dl. In the study group, 14 (36%) children had a low serum ferritin whereas 7 (25%) of the controls were similarly affected.

Table 4

SERUM FERRITIN LEVELS

Ferritin level (ug/L)	Study Subjects	Control Subjects	Total
< 10	4 (10.2 %)	3 (10.7%)	7 (16.4%)
10-14	10 (25.6%)	4 (14.3%)	14 (20.9%)
15 - 19	11 (28.2%)	12 (42.9%)	23 (34.3%)
20 - 29	5 (12.8%)	4 (14.3%)	9 (13.4%)
30 +	9 (23.0%)	5 (17.9%)	14 (20.9%)
Total	39	28	67

Transferrin saturations of 14% or less(128) were only found in 6 (9%) children, 4 in the study and 2 in the control group. Only 3 children (two of whom were in the study group) were considered to have iron

deficiency, i.e. a low ferritin and a low transferrin saturation. There was no statistically significant difference between the control and study groups as to Hb , PCV , serum ferritin and percentage transferrin saturation levels.

4 EVALUATION OF LEAD STATUS.

4.1 Serum Lead Estimations

Serum Pb measurements were carried out on samples from 86 children, 41 of whom belonged to the original group of controls. However 7 of these were found to have repeated Sub-A and were thus consequently analysed with the study group. This meant that there were serum Pb estimations available on 51 study and 35 control children.

The mean Pb serum levels in the study and control groups were 12.4 (range 7 to 20) and 11.7 (range 7 to 22) ug/ dl respectively. Levels of <25 ugms/100 ml are considered to be acceptable in children(63) and none of the measurements in children studied exceeded this figure. In the study group there were however 11/51 (21.6%) children with Pb levels > 15 ug/dl[the upper safe limit as defined by the Agency for Toxic Substances and Disease Registry(60)] whilst in the controls such levels were found in 5 of the 35 (14.2%) children. This difference was not statistically significant ($p = 0.026$)

4.2. Zinc Protoporphyrin (ZPP-B)

The mean ZPP-B was 2.26 ugmg/G of Hb in the study group and 1.97 in the controls . Although this difference is statistically significant it is of little relevance as it has no clinical significance . A level of less than 5 ugmg/ gm of Hb is considered to indicate that exposure to Pb was insignificant.

5) VISUAL SCREENING

5.1. Numbers Tested

A total number of 178 children were screened for visual problems. Of these 114 were study children and 64 were controls. Eleven of the children tested were initially regarded as controls but because they had failed Sub-A the previous year, they were designated study children. Thus 64/85 (75.3%) of the controls and 114/164 (69.9%) of the study group were tested.

At 3 of the 4 schools over 76% of the children who were to be tested underwent visual screening. At the 4th and the largest of the schools, the school principal was somewhat dubious of the whole study. In spite of the time taken to discuss its aims and objectives and the assurance that whatever the findings were, they would not reflect badly on his school, he remained uncooperative and consequently only 66% of the sample was made available for testing. Otherwise children who were not tested were either absent from school or on outings on the day the screening was done.

5.2. Outcome of Screening Test

5.2.1. Normal Outcomes

Of the 178 children tested 52 (29%) were found to be normal on all screening tests and did not require referral for further examination. No abnormalities were detected in 28.9% (19/64) and 29.7% (33/114) of the control and study groups respectively.

Table 5

OUTCOME OF VISUAL SCREENING IN STUDY AND CONTROL CHILDREN

Visual Screen. Test	No Of Study Children		No of Control Children	
	Failed	Passed	Failed	Passed
Vis. Acuity (Distance)	38 (33%)	76	21(32.8%)	43
Vis. Acuity (Near)	10 (8.8%)	104	6 (9.3%)	58
Cover Test	12 (10.5%)	102	9 (14.1%)	55
Motilities & Saccades	35 (30.7%)	79	21 (32.8 %)	43
Convergence	37 (32.4%)	77	22 (34.4%)	42
Accommodation	23 (20.1 %)	91	22 (34.4%)	42
Stereopsis	23 (20.1%)	91	11 (17.1%)	53
Ophthalmoscopy	6 (5.2%)	108	2 (3.1%)	62
Pupillary Reflex	6 (5.2%)	108	0	64
All Tests	0	33(28.9%)	0	19(29.7%)

5.2.2. Abnormal Outcomes

From table 5 it can be seen that suspected abnormalities of both convergence and visual acuity for distance were found in just over 30%

of both control and study subjects. Near visual acuity was suspect in 8.7% of study subjects and 9.4% of controls. Suspect accommodation flexibility was found in 34.3% of controls and in 20.2% of failing students ($p = 0.036$).

As regards the three modalities tested which depended on previous environmental stimulation, approximately 30% of both control and study subjects were found to have possible abnormalities of both convergence and motilities and saccades. Stereopsis was questionably abnormal in 20.2% and 17.1% of controls and subjects respectively.

Suspected abnormalities of three or more modalities tested per individual were found in 26/114 (22.8%) of study subjects and in 15/64 (23.4%) of controls.

6) AGE AT STARTING SCHOOL.

Of the total of 682 children in Sub-A in 1992, 147 (21.6%) were less than 6 years of age when they started school. Of these, 53 (36%) failed at the end of the year. The failure rate for the 535 children who started school at 6 years of age or older was 17.7% (95/535). This difference was statistically significant ($p = < 001$).

7) SOCIO/ENVIRONMENTAL INVESTIGATION.

7.1. Number Sampled

As stated previously, it was necessary to limit the number of interviews that could be conducted and to obtain a subset of the original sample, the cluster method of sampling was employed. There were 54 clusters of study and 28 clusters of control children. Half of these, selected randomly, formed the subset of the sample. Ultimately questionnaires were completed for 80/163 of the study population (these included 11 children who were repeating Sub-A in 1992) and 45/85 of the control population, i.e. approximately 50% of each group.

The sample size was large enough to detect a 10% difference between controls and study subjects

7.2. Study Specific Questionnaire:

7.2.1. Interviewees

The questionnaire was administered by the investigator personally. The interviewees were divided into categories as shown in table 3. Mothers made up 63.7% (51/80) and 68.9% (31/45) of the interviewees in the study and control groups respectively. Grandmothers made up the bulk of the remaining interviewees in both groups indicating their important role as care givers in this community. There were no statistically significant differences between the various categories of interviewees in the study and control groups.

Table 6

INTERVIEWEES BY STUDY AND CONTROL GROUPS

INTERVIEWEE	STUDY GROUP	CONTROL GROUP
Mother	51 (63.7%)	31 (68.9%)
Father	5 (6.3%)	3 (6.7%)
Grandmother	16 (16.0%)	6 (13.3%)
Aunt	3 (3.8 %)	2 (4.4%)
Other	5 (6.3%)	3 (6.75%)

7.2.2. Race

Of the 125 children on whom questionnaires had been completed the vast majority were of mixed race. In the study group 77/80(96%) were coloured and the remainder black Africans, whilst in the control group all 45 (100%) were coloured. The Africans lived in the same area as the rest of the children, their medium of instruction was Afrikaans and they spoke both Afrikaans and a Black indigenous language at home. Consequently it was decided to include them in the study with the coloured children.

7.2.3. Religion

In both groups households were of Christian denomination in 87% of cases and Muslim in the remainder. Generally the practice of religion was important in most households and regular attendance at church

or mosque was a feature of most families' lives.

7.2.4. Sex:

The study group was made up of 47 (58.8%) boys and 33 girls whilst the controls comprised 21 (46.6%) boys and 24 girls. Although there was a higher percentage of males in the study than in the control group, reflecting the higher number of boys failing Sub-A, this difference was not statistically significant ($p = 0.2$)

7.2.5. Age at Starting School:

The children's ages ranged from 5.34 years to 7.19 years with a mean of 5.84 yrs in the study group whilst in the control group the range was 5.34 to 8.51 years with a mean of 6.49 yrs . The difference for mean age between the two groups was statistically significant ($p = 0.04$).

Thirty of the 80 (37.5%) study subjects were less than 6 years of age when they enrolled and started schooling, as were 12/45 (26.7%) of the controls .Although there was a higher percentage of younger children in the study group, this difference was not statistically significant.

7.2.6. Home Language:

Afrikaans was the most common language spoken in the homes of both groups of children. In the study group the home language was Afrikaans in 57 (71.25%), English in 16 (20%), mixed English/Afrikaans in 4 (5%) and mixed Afrikaans/one of the South African Black languages in the

remaining 3 (3.75%) children. Corresponding values in the control group were 18 (40%) English speaking, 27 (60%) Afrikaans speaking while none spoke mixed English and Afrikaans or a South African Black language mixed with Afrikaans. The increased preponderance of English speakers in the control group was statistically significant ($p=0.015$).

7.2.7. Family Structure:

7.2.7.1. Parental Age

Table 7

STUDY AND CONTROL CHILDREN'S PARENT'S AGE

	STUDY	GROUP	CONTROL	GROUP
AGE (YRS)	Mother	Father	Mother	Father
20 - 24	5 (6.33%)	1 (1.3%)	0 (0.0%)	0 (0.0%)
25 - 29	26 (32.9%)	16 (20.0%)	17 (37.8%)	12 (26.7%)
30 - 34	21 (26.6%)	16 (20.0%)	15 (33.3%)	12 (26.7%)
35 - 39	9 (11.4%)	16 (20.0%)	5 (11.1%)	11 (24.4%)
40 - 44	13 (16.4%)	8 (10.0%)	4 (8.9%)	4 (8.9%)
45 - 49	2 (2.5%)	6 (7.5%)	1 (2.2%)	1 (2.2%)
50 +	2 (2.5%)	6 (7.5%)	1 (2.2%)	1 (2.2%)
unknown	2 (1.26%)	11 (13.8%)	2 (4.4%)	5 (11.1%)

7.2.7.1.1. Mother's Age

Maternal ages ranged from just over 20 years to just over 50 years in both the study and control groups. There were 5 mothers ,all whose children were in the study group,who were less than 25 years (Table 7). These

were all still teenagers when their children were born. This difference between the two groups did not reach statistical significance ($p = 0.03$).

7.2.7.1.2. Father's age:

This ranged from just below 25 to just above 54 years. The father's age was unknown in 11 (13.75%) of the study group and in 4 (9%) of the controls. Only one in each group was a teenage father (Table 7) . Twenty-five percent of the fathers of the study children were over 39 years compared to 13% of the control's fathers ($p = 0.025$).

7.2.7.2. Mothers Marital Status.

Table 4 shows that 33/80 (41.25%) study children had

Table 8

MOTHER'S MARITAL STATUS

MARITAL STATUS	STUDY GROUP	CONTROL GROUP
Unmarried	25 (31.25%)	10 (22.20%)
married	33 (41.25%)	30 * (66.67%)
separated	8 (10.00%)	2 (4.4 %)
Widowed	3 (3.75%)	0 (0.0 %)
Common law wife	3 (3.75%)	1 (2.22%)
Divorced	6 (7.50%)	2 (4.44%)
Unknown	2 (2.50%)	0 (0.00%)
Total	80	45

* $p = 0.006$

mothers who were married compared to 30/45 (66.7%) of the control

children's mothers. However 3 mothers of study children and 1 of the control children were in stable relationships and were considered to be married in common law. Whether or not one includes the common law marriages in the married group, the difference between the study and control group is statistically significant ($p = .006$ or 0.01 respectively) as regards this variable.

7.2.7.3. Mother living with her child.

In both the control and study groups 10% , i.e. 8/80 and 4/45 respectively, of the children did not reside together with their mothers. Thus the vast majority of children had their mothers living with them.

7.2.7.4. Father living at home:

The father was part of the nuclear family in 35 of the 80 (43.7%) of the study children and lived with the family. In the control sample the corresponding figure was 53.3% (24/45). This difference was not statistically significant. A small number of fathers were part of the family group but lived elsewhere, usually with their own mothers because of a problem of accommodation.

7.2.7.5. Number of Siblings:

In both the control and study group approximately 35% of the children were the first but not the only child of their parents. It can be seen from Table 9 that approximately 10% of children in both the study and the control groups were only children. In the study group 22 (27.5%) of the

children had 4 or more siblings whereas this applied to only 5 (11.9%) of the controls. This difference was statistically significant ($p=0.03$)

Table 9

**NUMBER OF SIBLINGS OF STUDY AND CONTROL
SUBJECTS.**

NO OF SIBLINGS	STUDY SUBJECTS	CONTRL SUBJECTS
0	8 (10%)	5 (11.1%)
1	19 (23.75%)	15 (33.4%)
2	19 (23.75%)	14 (31.1 %)
3	12 (15.0 %)	6 (13.3%)
4	8 (10.0 %)	3 (6.6 %)
5	5 (6.25 %)	1 (2.2 %)
6	6 (7.5 %)	1 (2.2 %)
> 6	3 (3.75%)	0 (0 %)

7.2.8. House-hold Size

Apart from homes in which only the nuclear family resided there were many children who lived in households where there were multiple families and/or with members of the extended family.

Households ranged in size from 2 to 21 and from 2 to 11 people in the study and control groups respectively. The mean household size was 7.94 in the study and 6.64 in the control group.

Of the study group 25 (31.25%) lived in households which contained 5 or fewer people whilst 19 (42.2% of the control group lived

in similar circumstances(Table 10). Households which contained 10 or more people were found in 26 (32%) of the study and in 9 (20%) of the control groups.

Table 10

HOUSE-HOLD SIZE

NO. OF PERSONS	STUDY GROUP	CONTROL GROUP
2 - 3	6 (7.5 %)	2 (4.4 %)
4	11 (13.75 %)	4 (8.8 %)
5	8 (10.0 %)	13 (28.9 %)
6	10 (12.5 %)	8 (17.8 %)
7	10 (12.5 %)	3 (6.7 %)
8 - 11	21 (26.25%)	15 (33.3 %)
12 - 15	11 (13.75%)	0 (0.00 %)
> 15	1 (1.25 %)	0 (0.00 %)

None of these differences were statistically significant but there was a trend for control children to live in households in which there were fewer people. No child who was successful in Sub-A, lived in a home with more than 11 occupants.

7.2.9. Factors reflecting Socio-economic status (S.E.S):

7.2.9.1. Employment status of father:

In the study group 40/80 (50%) of fathers were employed and helped to support the family whereas in the control group, the fathers who held jobs and were economically supportive numbered 36/45 (80

%). This difference was statistically significant ($p = 0.0001$). It was unknown if the fathers of 17 of the study and 3 of the control children were employed but, as they did not contribute to the finances of the household, for the purposes of this study they were equivalent to being unemployed.

7.2.9.2. Father's Occupation.

From table 11 it can be seen that in both the study and the control groups the fathers who were in the professions were rare (1/125). However only 12/80 (15%) fathers were white collar workers in the study group whilst in the control group this applied to 33% (15/45) if we included the single professional in this group. This difference is statistically significant ($p=0.016$).

Table 11

PARENTS OCCUPATION

	MATE	RNAL	PATE	RNAL
Occupation	Study	Control	Study	Control
Professional	3 (3.8%)	4 (8.9%)	0 (0.0%)	1 (2.2%)
White Collar	27 (33.8%)	19 (42.2%)	12 (26.7%)	14 (31.1%)
Qual.Trdsm	0 (0.0%)	0 (0.0%)	17 (21.3%)	11 (24.4%)
Blue Collar	22 (27.5%)	9 (20.0%)	30 (37.5%)	10 (22.2%)
Labourer	2 (2.5%)	4 (8.8%)	3 (3.75%)	1 (2.2%)
Housewife	22 (27.5%)	9 (20.0%)	0 (0.0%)	0 (0.0%)
Self Employ	1 (1.25%)	0 (0.0%)	2 (2.5%)	4 (8.9%)
Unknown	3 (3.8%)	0 (0.0%)	16 (20.0%)	4 (8.9%)
Total	80	45	80	45

7.2.9.3. Fathers' Education.

Educational attainments were available for 56 of the study and 40 of the control group fathers. In the remainder the interviewee (mostly mothers) did not know much about the father's education either because he had not been around for long enough or this was not the sort of thing that was discussed.

From table 12 it can be seen that 20 (50%) of the 40 fathers whose educational status was known had completed standard 9 or better whereas only 8 (14.5%) of the study group fathers had managed to do the same. This difference was statistically significant ($p = 0.0001$). The number of fathers whose educational achievements were unknown in the study group were statistically significantly higher than those found in the control group ($p=0.016$). Even if these fathers are excluded from the denominator the difference remains statistically significant.

7.2.9.4. Mothers' Employment

Forty-nine percent of mothers of children in the control group were unemployed(22/45) as were 61.3% (49/ 80) in the study group. The latter figure includes mothers whose whereabouts were unknown. This difference is not statistically significant ($p = 0.18$). All the unemployed mothers who were interviewed claimed that they were looking for work.

7.2.9.5. Mothers' occupation

There were more mothers who were employed as professionals, than fathers (table 8). In the study group 1 of the mothers was a trained nurse and another 2 were school teachers, one of whom had

graduated from Teachers Training College whilst the other had only completed high school and taught Sub-B. Of the 4 professional mothers in the control group, 1 was a primary school teacher, and 3 were in the nursing profession. (1 ward sister, 1 senior staff nurse and 1 nurse). Twenty-three mothers of controls (51%) were either professionals or white collar workers as were 30/80 (37.5%) study mothers.

7.2.9.6. Mother's Education.

From table 12 it can be seen that 26/80 (32.5%) of the mothers whose children had failed Sub-A had passed at least Std. 8 whereas in the mothers of the control group 27/45 (60%) had achieved a

Table 12

PARENTS EDUCATION

	MATE	RNAL	PATE	RNAL
LS* Passed	Study	Control	Study	Control
< 6	21 (26.25%)	4 (8.89%)	11 (13.75%)	1 (2.20%)
6 OR 7	25 (31.25%)	12 (26.67%)	17 (21.25%)	10 (22.22%)
8	19 (23.75%)	18 (40.00%)	19 (23.75%)	9 (20.00%)
9	2 (2.5 %)	1 (2.20%)	2 (2.50%)	7 (15.56%)
10+	5 (6.25%)	8 (17.78%)	7 (8.75%)	13 (28.89%)
UNKNOWN	8 (10 %)	2 (4.40%)	24 (30.00%)	5 (11.11%)

*LS = last standard

similar level at school. This difference was statistically significant ($p=0.003$) and remained so ($p=0.005$) even if we included the unknowns into the denominator.

7.2.9.7. End of year result as related to parents education and age at commencing school.

Table 13

PARENTAL EDUCATION AND AGE AT COMMENCING SCHOOL RELATED TO SUCCESSFUL OUTCOME

Variables Combined	Passed	Failed	Total
Father's Education >Std 8			
Mother's Education>Std 6	15 (37.5%)	2 * (3.6%)	17
Commenced school > 6.00 yrs of age			
With 2 or less of the above	25 (62.5%)	54 (96.3%)	54
Total	40	56	96

p = 0.000076

Combining the variables of parental education and age at starting formal schooling, it was found that if the mother had completed at least Std. 7 and the father Std. 9 or better and the child had started school at or after the age of 6 years then the pass rate for this group of children was significantly better than for children in whom these criteria were not fulfilled. Table 10 shows that of the 56 study and the 40 control children on whom information regarding all three of the variables was available, only 2 (3.57%) of the study children fulfilled the criteria set for all 3 variables whereas in the control group this applied to 15 (37.5%) of the children ($p = 0.0008$) Thus in the combined groups of control and study children there were only 17 children in whom findings were positive for all the above variables and of these only 2 were unsuccessful at the end of their first school year.

7.2.9.8. Scholastic performance of Siblings

The children of the study group had a total of 210 siblings of whom 127 (60.5%) attended or had attended school. The classes in which the school going portion of the 210 siblings of the study group were placed ranged from Sub-A to Std 10 (matric) and included 4 who were in special class i.e. a class for mildly retarded children (IQ between 50- 80). None of the 84 (48{57%} of whom attended or had attended school) siblings of the control group were or had been in special class and none were in Sub-A. These differences did not reach statistical significance.

Three of the study children had siblings in Sub-A and another 11 had siblings in Sub-B. As 8 of this group were only children there were 14/72 (19%) of study children who had a brother or sister in the same or only one class ahead of them. In the control group there were 4 children who had a sib that was only one year ahead at school. As 5 children in the control group were only children this meant that 10% (4/40) of these children were in this situation. This difference was not statistically significant.

7.2.9. Culture of Learning

7.2.9.1 School Progress patterns of Siblings.

The study children had 127 siblings who were still at school;

of these 46 had never failed, 48 had failed once and 34 had failed at least twice; no one had failed more than 4 times. Of the 48 siblings of the control group, who attended or had attended school, 14 had failed once and none had spent more than two year in the same class (Table 10). Differences between the two groups for the number of sibs who had repeated a class one or more times were statistically significant ($p < 0005$).

Table 14

SIBLINGS SCHOOL PERFORMANCE

STUDY

CONTROL

Xfld	Sib	Sib	Sib	Sib	Sib	Sib	Sib	Sib	Sib	Sib
No.	1	2	3	4	5	1	2	3	4	5
Never	13	16	8	7	2	19	9	4	1	1
1x	20	12	8	6	2	9	3	2	0	0
2x	11	4	6	2	0	0	0	0	0	0
3x	5	3	0	0	0	0	0	0	0	0
4x	1	0	1	0	0	0	0	0	0	0
TOTL	50	35	23	15	4	28	12	6	1	1

Of the 36 study children who had 2 or more school going siblings, 15 of the eldest pairs had failed at least once whereas this applied to 1 of the 12 eldest pairs of school going siblings of the control group. This difference was statistically significant ($p = 0.03739$ using the Fishers exact 2 tailed test).

7.2.9.2 Enrollment at Preschool or Nursery School

Enrollment at a nursery school for at least 6 months was

reported in 13/80 (16.25%) of the study children and in 10 /45 (22.2%) of the controls(Table 11). Preschool was attended by 19/80 (23%) of study children and by 20/45 (44.4%) of the controls, a difference which was statistically significant ($p = 0.02$ Yates corrected or 0.016 9 (M.H. corrected.). In addition the proportion of children in the control group who had attended preschool or nursery school or both (26/45) was statistically significantly higher than that of the control group. ($p = 0.045$ Yates, 0.02 M.H.). Only 4 of the controls and 2 of the study group had attended both pre-school and nursery school.

Table 15

ATTENDANCE OF NURSERY OR PRE- SCHOOL

Attended	Study No	Control No
Nursery school	13 (16.25 %)	10 (22.2%)
Preschool	19 (23.75 %)	20 (44.4%)*
Both Nursery & preschl.	(2)	(4)
Neither Nurs.or preschl.	48 (60%)	15 (33.4%)
Total	80	45

* $p = 0.02$

7.2.9.3. School Days Missed:

The number of school days during the year missed ranged from 0 to 80 in the study children and from 0 to 20 in the controls. From table 12 an absence of 7 days or less was recorded for 32(40%) of the children who failed and for 36 (80%) of those that were successful at the end

of the first school year. Thus many more of the study children than the control children were away from school for more than a week during the school year. This difference was statistically highly significant ($p = 0.0000177HS$). No control subject missed more than 20 days of school whereas 7 of the study children did. Using the Fisher's exact 2 tailed test this difference also proved to be significant ($p = 0.0486$).

Table 16

SCHOOL DAYS MISSED BY STUDY AND CONTROL CHILDREN

DAYS ABSENT	STUDY CHILDREN (NUMBER)	CONTROL CHILD- REN (NUMBER)
0 -7	32 (40%)	36 (80%)
8-14	33 (41.25%)	6 (13.4%)
15-21	7 (8.75%)	3 (6.6%)
22-40	7 (8.75%)	0
41+	1 (1.25%)	0

7.2.9.4. Reading Material in the Household:

7.2.9.4.1. Factors evaluated

This was evaluated by ascertaining if anyone in the household borrowed books from the public or school library, by the number of books in the home, if any newspaper was read by any household member on a regular basis and if anyone read magazines regularly. Although enquiries

were made as to the regular reading of comics by anyone in the household, the investigator became aware that comics have a very negative connotation in the community and often it was felt that this question was not always answered truthfully.

7.2.9.4.2. Use of Public Library

In the 80 homes of the study subjects there was someone who borrowed books from the library in 45 (56.2%) whilst the library was used by someone in 24/45 (53.3%) of the control households. Thus there was virtually no difference between control and study households as far as library utilisation was concerned.

7.2.9.4.3. Newspapers

Newspapers were read on a regular basis in 44% (20/45) of control and 23.7% (19/80) of the study households. This difference was found to be statistically significant ($p = 0.0169$).

7.2.9.4.4. Magazines

Regular reading of magazines was uncommon in both groups and took place in 5/80 (6.25%) of the study and in 11/45 (24.4%) of the control households ($p = 0.036$).

7.2.9.4.5. Books in Home:

Turning to books kept in the home, we see from Table 13 that in most a bible was present; in fact the sole book found in the house was a bible or Koran in 52(65% of the study and in 17(35%) of the control dwellings respectively ($p = 0.034$). In 6 (7.5%) of the study homes a

bible and upto 9 other books were found; in the control group the corresponding figure was 5 (10.9%). Homes in which there were more than

Table 17

BOOKS IN THE HOME

BOOKS Number/Type	STUDY HOMES		CONTROL HOMES	
	No	%	No	%
Bible/Koran only	52	65	17	38
< 10 incl. bible	6	7.5	5	11.1
> 10	17	21.2	21	46.6
no books	5	6.3	2	4.4

10 books per household were found more frequently in the control (21/45 or 46%) than in the study group (16/80 or 21.3%). This difference was statisically significant ($p=0.0018$).

7.2.9.5. Language Variables

7.2.9.5.1. Home Language

This has already been analysed and discussed in section 7.2.5. above.

7.2.9.5.2. Quality of Spoken Language in the Home:

This was roughly gauged by the interviewer and graded as

- 1) Unmixed and grammatical
- 2) Slightly mixed but ungrammatical
- 3) Very mixed and ungrammatical

Mixed languages referred to a mixture of either primarily Afrikaans diluted with English or English diluted with Afrikaans. The interviewer was not able to comment on the standard of black indigenous languages spoken but as these

Table 18

QUALITY OF SPOKEN HOME LANGUAGE

SPOKEN HOME LANGUAGE	STUDY GROUP		CONTROL GROUP	
	No	%	no	%
Unmixed & Grammat.	15	19.5	19	43.2*
Sltly Mixed & Ungram	60	77.9	23	52.3
very mixed & ungram.	2	1.3	2	4.5
TOTAL	77		44	

were spoken in only 4 of the homes of the children in this study (1 control and 3 study participants) there was no problem in excluding them from the analysis.

A better standard of spoken language was found in 19/44 (43.2 %) control homes and only in 15/77 (24.7%) study homes where the language spoken

was grammatical and not mixed with another language Table 18. This difference was statistically significant ($p = 0.005$). Surprisingly the home language was only very mixed in 2 each of the study and control homes.

7.2.9.5.3. Correlation of Home Language and Medium of Instruction:

Most of the children in the study and control samples were being educated in their home language. Of the English speaking children 2/16 study children and 2/17 controls attended Afrikaans medium schools; 7/57 study and 2/27 control Afrikaans children were being instructed in the English medium. Although the numbers were small it would appear that English was the preferred language of instruction in both those children who came from homes where a black language was spoken or where both English and Afrikaans had equal status (see Table 19).

TABLE 19

CORRELATION OF HOME LANGUAGE AND MEDIUM OF INSTRUCTION.

Home/school Language	Study Group (No)	Control group (No)
English/English	14 (17.5%)	16 (35.6%)
English/Afrikaans	2 (2.5%)	2 (4.4%)
Afrikaans/Afrikaans	50 (62.5%)	25 (55.6%)
Afrikaans/English	7 (8.8%)	2 (4.4%)
Afrikaans & Black/English	2 (2.5%)	0
Afrikaans&Black /Afrikaans	1 (1.3%)	0
English&Afrikaans/English	4 (5.0%)	0
Total	80	45

7.2.10. Parental Aspirations for the Child:

These were divided into 3 categories

- A) Obtaining a Junior School Leaving Certificate (Std 8 passed)
- B) Obtaining a Matriculation Certificate or equivalent
- C) Obtaining a Technicon or University Diploma or Degree

Of the parents questioned as to what they would regard as their expected attainments for their child scholastically, 27/72 (37.5%) and 33/ 43(76%) said they would expect their child to achieve a University or Technicon education($p= 0.0001$). Only 5 parents of children in the study group thought that a Standard 8 certificate was all they could expect for their progeny. It was apparent, whilst questioning the parents, that many had not given the matter a great deal of thought before the topic was raised by the interviewer.

7.2.11 .Quality of Housing:

7.2.11.1. Area andType of Home

Most of the children lived in Westbury, Newclare or Coronationville. Many lived in blocks of flats and these usually had the smallest living space as many of the apartments had only one bedroom. Newclare seemed to have the oldest and poorest dwellings. Coronationville, although not a new suburb, had a fairly middle class air about it. A fair proportion of the homes were owned by the occupants.

Westbury was rather heterogenous. Although some major roads run through it , it is divided into a large number of courts, each of which forms its

own mini-neighbourhood. Some of the courts and their surrounding houses were well kept and obvious additions had been made to the homes. The central court areas were devoid of litter and well kept and some had trees growing in them. Other courts were dirty, the houses obviously neglected, scruffy children played in the open space and the atmosphere of dire poverty was apparent.

A small number of children lived in so called 'white' suburbs but went to the schools included in the sample. This was because they had grandparents living in the area to whom they went when school was over and stayed until their parents fetched them on their way home from work. These children used their grandparents address at school which explains how they became included in the study.

Most of the children in both groups lived in 3 bedroomed houses but in many instances these were shared with an extended family. Of the 80 study children 46 (57.5%) lived in a three bedroomed dwelling as did 24 (53%) of the controls. In both the study and control groups about 16% of the children stayed in a single bed roomed flat.

7.2.11.2. Crowding Index of Habitation

A better indicator of living conditions would be the crowding index of the inhabitants of each dwelling. This was calculated by dividing the number of rooms in the dwelling by the number of people who resided in it.

In 39 (48.75%) instances the study children lived in homes with a crowding index of 3 or less whilst in the control group 28 (62%) lived in similar circumstances. This difference was not statistically significant ($p=0.06$); 27 (33%) of the study group resided in homes in which the crowding

index was between 3.1 and 4 as did 28.9% (13/45) of the control group. A crowding index of 4.1 or more was noted in the dwellings of 13 (16.25%) of the study and in 3 (6.7%) of the control scholars. Although there were no statistically significant differences between the study and control group children regarding crowding indices, the figures indicate that there was a trend for more of the study children to live in homes with a higher crowding index.

7.2.11.3. Nuclear Family Dwellings

In the study group 38 (47.5%) children lived with their nuclear family only, whereas 25 (54%) of the controls did the same.

7.2.12. Family Possessions as an Indicator of the Environment which may Influence Learning.

7.2.12.1. Household Furnishings:

Household furnishings were graded on an ascending scale of quality and then collated into 3 categories, very poor to poor, fair and good to excellent. Evaluations were not available for 7 of the study homes and for 2 of those of the controls as only homes that had been actually visited could be assessed.

Just over 50% (37/73) of the homes of study group pupils were rated as poor as against the 18.7% (9/44) of the control pupils homes ($p=0.002$). Home furnishings were rated as good to excellent in 14/44 (32.5%) and 10/73 (13.6%) in the control and study children's homes respectively.

TABLE 20

RATINGS OF HOME FURNISHINGS IN STUDY
AND CONTROL GROUPS

RATING	STUDY GROUP		CONTROL GROUP	
	No	%	No	%
POOR	37	50.8	9	18.7
FAIR	26	35.6	21	48.8
GOOD/EXCELLENT	10	13.6	14	32.5
NOT RATED	7		1	

This difference was also statistically significant ($p = 0.018$).

7.2.12.2. Television sets:

Television sets which were functional were found in all but 4 of the 45 residences of the control children (8.8%) and 16 of 80 homes (20%) study pupils (Table21). Eight of the 38 abodes which housed only the nuclear families of pupils who had failed were without television whilst this pertained to only 1 of the 25 similarly housed control families. (Fishers exact: a 2 tailed p value = 0.051 and just fails to reach statistical significance).

Where the families of successful students lived as an extended family 7/21 had 2 T.V. sets, 10 had only one and 5 had none at all. In the 42 multifamily homes of failing children, both the nuclear family and one

TABLE 21

TELEVISION SET IN THE HOME

HOUSEHOLD FAMILY TYPE	STUDY GROUP				CONTROL GROUP			
	No.	TV/Household			No	TV/Household		
		0	1	2		0	1	2
NUCLEAR	38	8	30	0	25	1	24	0
EXTENDED	42	8	29	5	20	3	10	7
TOTAL	80	16	59	5	45	4	34	9

other had a T.V.set in 5 (11.9%) instances and in 8 (19%) there were no sets at all.

7.2.12.3 Radios and Tapedecks in the Home:

Radios were less commonly found in homes than were television sets. Of the 80 homes of the study sample, only 59(73%) had a radio and ownership of the radio by the child's nuclear family occurred in 41 of the 59 (69.5%). Thus just about 50% (41/80) of the study childrens' nuclear family owned a radio.

Amongst the controls 35/45 (77.8%) had a radio in the house where they lived, a figure which is very similar to that found in the study population. The radio belonged to the nuclear family in 28 (80%) of these 35 control homes and consequently 62% (28/45) of the nuclear families of the controls owned a radio. None of the differences between controls and study groups as regards the variable of radio ownership was statistically significant.

Tapedecks were present in 47 (55%) of the homes of study children;

33 of these belonged to the nuclear family. As no home had 2 tape decks, 33/80 (41.25%) of the nuclear families in the study group had their own tape decks. As regards the control group, there were 34 (75.5%) homes with tape decks of which 26 belonged to the nuclear family. In 3 homes there were 2 tape decks, one of which belonged to the extended family; in 1 multifamily home the only tape deck belonged to the nuclear family. Thus a total of 26/45 (57.6% of nuclear families of controls owned their own tape deck. None of these differences were statistically significant ($p < 0.05$).

Table 22

RADIO, TAPEDECKS AND CD PLAYERS IN THE HOME

PRODUCT/ HOUSEHOLD	N	STUDY GROUP			CONTROL GROUP		
		N.F. no	X.F. no	Total	N.F. no	X.F. no	Total
		37	43	80	25	21	45
RADIO	0	8	13	21	4	6	10
"	1	29	28*	57	22	10**	32
	2	0	2	2	0	3	3
TAPEDECK	0	12	21	33	5	6	11
	1	24	23#		23	11##	34
	2	0	0		0	3	3
C.D. PLAYER	0	0	0		20	18	38
	1	0	0		5	2	7

N.F = Nuclear Family X.F. = extended or multiple family

* 10 owned by nuclear family ** 9 owned by nuclear family

9 owned by nuclear family ## 3 owned by nuclear family

7.2.12.4 COMPACT DISC PLAYERS(CDP)

CDP were found only in 7 of the control pupils homes. None of the immediate families of study children owned a CDP. This difference was statistically significant ($p = 0.0006$ { Fishers exact test }).

7.2.12.5 REFRIGERATOR IN THE HOME:

Refrigerators were found in 61/80 (76.3%) and 37/45 (82.2%) of study and control homes respectively. The child's nuclear family owned its own 'fridge in 35(45%) of the study and in 29 (64%) of the control subjects ($p = 0.026$). Six (13.3%) of the control and 5 (6.3%) of the study children lived in households which had more than 1 refrigerator . Refrigeration facilities were not available in 9 of the single family and 10 of the multiple family homes of study subjects and in 4 each of the single family and multiple family homes of the controls. None of these differences are statistically significant.

7.2.12.6 TELEPHONE PRESENT IN THE HOME:

A telephone was present in the homes of 45 study and 29 control children. Thus approximately 60 percent of homes in both groups were ostensibly contactable by telephone but this did not always apply as in a number of homes no service was available as the telephone bill had not been

paid. There was no difference between the 2 groups.

7.2.12.7. MOTOR CAR OWNERSHIP

A motorcar was owned by the parents of 12 (15%) of the children who had failed but a car was present in the households of another 3, thus giving a total of 18.75% failure homes with automobiles.

Of the parents of the control pupils, 13 (28.9%) owned a motor vehicle and in a further 2 control households someone other than the parents owned a car. Consequently a vehicle was present in one third (33%) of the homes of control pupils. This difference between the 2 groups appeared to show a trend which was just short of being statistically significant ($p = 0.07$).

7.2.13. STABILITY OF CAREGIVER

In the study group 54 (67.5%) children had had only one caregiver (usually the mother) and in the control group the corresponding figure was 21 (46.7%). A change of care-giver on 2 or fewer occasions was reported in 19 (23.75%) study subjects and in 21(44%) of controls ($p = 0.01$). Only 5 (6.25%) study and 2 (4.4%) control children had had more than 4 different care givers. This difference was unremarkable.

7.2.14. DOMESTIC HELP IN THE HOME:

A domestic helper was employed in 12.5% (10/80) of the study and in 35.6% (16/45) of the control children's homes, a difference which was statistically significant ($p = 0.003$).

7.2.15. STABILITY OF RESIDENCE:

Of the children who had failed, 34/80 (42.5%) had lived in the same premises since birth and the same applied to 16/46 (34.8%) of the controls. There was a slight preponderance of 2 or more changes of abode in the control compared to the study children but this was not statistically significant.

7.2.16. CHILDREN'S BREAKFASTS AND LUNCHES:

It was extremely difficult to be certain that the answers to the questions relating to the children eating breakfast before going to school or taking lunch to school with them were answered truthfully. Most parents seemed to realise that negative answers to these questions reflected poorly on themselves.

7.2.17. THE CHILD AND HOME CHORES:

Home chores were allocated to 22 of the 45(48.9%) control and to 27 of the 80 (33.75%) study children. Although a higher percentage of control than study children were expected to help with housework, this difference was not statistically significant. The chores described were never very strenuous or time consuming. Some examples are sweeping the yard, making the beds and cleaning the lavatory.

7.2.18. ALCOHOL PROBLEM IN THE HOME

Direct questioning revealed that at least one person imbibed alcohol excessively in 29% (23/80) of the homes of study children whereas the corresponding figure for control children was 15.5% (7/45). This difference did not reach statistical significance ($p=0.1$) although excessive alcohol intake did occur more frequently in the study children's homes.

7.2.19 FACTORS RELATING TO PREGNANCY AND THE PERINATAL PERIOD:

7.2.19.1. Antenatal Clinic Attendance:

All but 2 of the study and 1 of the control group's mothers attended antenatal clinic prior to the birth of the relevant baby. However this

Table 23

ANTENATAL CLINIC ATTENDANCE.

NUMBER OF ANTENATAL VISITS	MOTHER'S OF STUDY SUBJECTS	MOTHER'S OF CON -TROL SUBJECT
0	2	1
1-2	1	1
3-4	5	2
> 5	69	40
Unknown	3	1

information was not available in 3 of the controls and 1 of the study patients.

Over 80% of mothers in both groups attended ANC at least 5 times and only 1 mother in each group attended 2 or less times(Table).

7.2.19.2. Blood Taken at ANC

Blood was taken to exclude the diagnosis of syphilis in 68 of the study and 38 of the control mothers during the pregnancy involving the propositus. Only 3 of the control and 1 of the study patients' mothers were adamant that no blood had been taken during this period. In 9 instances, involving the mothers of children who had failed, it was unknown if blood had been taken. This applied also to 4 mothers of controls. (Table). None of these differences between the two groups reached levels of statistical significance.

Table 24

BLOOD TEST AND TREATMENT FOR SYPHILIS DURING PREGNANCY

	BLOOD TAKEN				INJECTION GIVEN			
	Y*	N*	U*	Ttl*	Y	N	U	Ttl
subject	68	1	11	80	8	58	14	80
control	38	3	4	45	2	40	3	45

* Y= yes, N = No, U= Unknown and Ttl = Total

TABLE 25

ALCOHOL INGESTION DURING PREGNANCY

Alcohol Ingestion	Study Mothers	Control Mothers
Never	56 (70%)	37 (82%)
Occasionally	12 (15%)	6 (13%)
Frequently	8 (10%)	2 (4%)
Daily	4 (5%)	0
Total	80	45

The majority of mothers of both the control and study children claimed that they had not imbibed any alcohol during the relevant pregnancy (Table 21). However 15% (12) of the study mothers claimed that they had taken alcohol on a regular basis whilst they were pregnant whereas this applied to only 4.% (2) of the control mothers. This difference was not statistically significant ($p = 0.07$) but certainly tended to indicate a trend that there was a higher intake of alcohol amongst study mothers than among control mothers.

7.2.19.4. Maternal Smoking During Pregnancy:

From table 26 it can be seen that 60% and 47.5% of the mothers of control and study children respectively did not smoke during the pregnancy with the propositus. Ten or more cigarettes a day were smoked by only 2 of the control,s mothers but by 12 of the study children's mothers. This difference did not reach statistical significance ($p = 0.07$) but there appeared to be a trend for mothers of study children to smoke more than those of controls.

Table 26

MATERNAL SMOKING PATTERNS DURING PREGNANCY

No. Cigarettes Smoked	Study Mothers	Control Mothers
0	38 (47.5%)	27 (60%)
1 - 5	11 (13.8%)	7 (8.8%)
6 - 10	16 (20%)	8 (17.8%)
>10	12 (15%)	2 (4.4%)
Unknown	3 (3.8%)	1 (2.2%)
Total	80	45

7.2.19.5 .Place of Delivery:

In both the control and study group over 84% of children were born in a Hospital in Johannesburg. Birth in a Johannesburg Municipal Clinic took place in 4(5%) of the study and 4 (8.9%) of the control group respectively. None of the children were born at home.

7.2.19.6. Mode of Delivery of the Infant:

Table 27 shows that, as expected, the vast majority of children were born by normal vertex delivery(81.25% of study and 73.3% of control children). Birth by caesarean section was reported for 12 (15%) of the study children and for 8 (17.8%) of controls.

TABLE 27

MODE OF DELIVERY

Delivery Type	Study Children	Control Children
Normal Vertex	65 (81.25%)	33 (73.3%)
Breech	0	1 (2.2%)
Forceps	0	1 (2.2%)
Caesarean Section	12 (15%)	8 (17.8%)
Unknown	3 (3.85%)	2 (4.4%)
Total	80	80

7.2.19.7. Birth Weight:

In 38 (47.5%) of study and 14 (31.1%) control groups, the interviewees did not remember or know the birth weight of the child. The road to health card was also not available to obtain this information. Usually it was said to be at the school or locked away. Of those in whom the birth weight was known only 5 (6.25%) study (one of whom weighed < 1000g) and 1 (2.2%) control weighed < 2000g.

7.2.19.8. Expected time of Delivery:

Only 7 (8.75%) mothers or other interviewees in the study and 3 (6.6%) in the control groups stated that the birth had occurred earlier than expected. With the exception of 1 study and 2 control children, who were reported to have been born after their due date, the remainder had all been delivered at the expected time.

7.2.19.9. Parents Perception of Baby's Size at Birth:

Table 28

PARENTS PERCEPTION OF BABY'S SIZE

Size Perception	Study Children	Control Children
Very Small	16 (20%)	11 (24.4%)
Average	34 (42.5%)	19 (42.2 %)
Big	25 (31.25%)	13 (28.9%)
Unknown	5 (6.25%)	2 (4.4%)
Total	80	80

When asked whether the size of their baby was appropriate at birth, 16 (20%) of study and 11 (24.4%) of interviewees thought that the infant was very small. Babies were considered to be of average size by 34 (42.5%) study and 19 (42.2%) of control respondents respectively. In 5 of the study and 2 of the controls this information was not available (Table 28).

7.2.19.10. Jaundice and Phototherapy:

Of the study and control children respectively, 15 (19%) and 9 (20%) were reported to have had neonatal jaundice. This information was unknown in 7 (8.25%) who had failed and 2 (4.4%) controls. A history of phototherapy in the newborn period was volunteered in 12 (15%) of study and 7 (17.5%) of control children respectively. Only 4 study children and 1 control child were reported to have had phototherapy for 3 days or longer.

7.2.19.11. Need for assisted ventilation in the neonatal period.

None of the children in this study required assisted ventilation and only 3 study children were reported to have been kept in incubators.

7.2.19.11. Duration of Hospital stay at Birth:

From table 29 it can be seen that over 55% of both the study and control groups spent 3 or less days in hospital after birth. Another approximately 25% spent between 4 and 8 days in hospital (these were mostly the babies born by caesarean section). Only 3 babies of whom 2 were controls, remained in hospital for more than 21 days post delivery.

Table 29

HOSPITAL STAY POST-DELIVERY

Number of days	Study Group	Control Group
0 - 3	47	26
4 - 8	17	13
9 - 20	7	4
21+	2	1
unknown	7	1
Total	80	45

7.2.20. Admissions to Hospital after the Newborn period:

Many children participating in this study had a history of at least one hospital admission, with 31.25%(25/80) and 37.7%(17/45) of study and control children respectively having had a hospital stay prior to starting school. Six of the study group had 2 or more admissions whereas this applied to 2 of the controls.

In both groups the commonest conditions requiring hospitalisation were minor surgical procedures including tonsillectomy and dental extractions. Motor vehicle accidents necessitating hospital admission occurred in 2 study children and 1 control. No child had been hospitalised because of epilepsy but 2 children who had failed and 1 that had passed sub-A, were admitted for what was diagnosed as pyrexial convulsions. One child in each group had suffered from gastro-enteritis and had been admitted. Interestingly 6 of the study patients had been hospitalised for respiratory problems whereas this applied to none of the controls but this difference just failed to be statistically significant ($p=0.06$).

8. HOME SCREENING QUESTIONNAIRE RESULTS.

8.1. Total Score

Scoring of the 125 H.S.Qs, which were completed, revealed that in only 6 cases was the score 41 or greater. Thus only 4.8% (6/125) of all

Table 30

HSQ SCORES IN STUDY AND CONTROL GROUPS

HSQ SCORE	STUDY NUMBER	CONTROL NUMBER
< 10	1 (1.25%)	0
10 - 20	18 (22.50%)	3 (6.7%)
21 - 25	21 (26.25%)	4 (8.9 %)
26 - 30	23 (28.75 %)	10 (22.2%)
31 - 35	16 (20.00 %)	13 (28.9%)
36 - 40	1 (1.25%)	9 (20.0 %) }*
41+	0	6 (13.3%) }
Total	80	45

children interviewed, using the H.S.Q. as a standard, would not be at risk of school failure (Table 30). These 6 children all belonged to the control group of which they formed 13% (6/45).

A score of 36 or greater was achieved by 15 of the control and by one of the study children, a difference which achieved statistical significance ($p = 0.00001$). If 30 was used as the cut off figure then 17 (28.8%) of study and 28 (62.2%) of the control children had scores above this level. This difference between the two groups was statistically significant ($p = 0.0001$).

8.2. Factorial analysis.

8.2.1. Parental Involvement:

8.2.1.1. Stories read to child:

The answers to this question were categorised from hardly ever, at least once a week, at least 3 times per week to at least 5 times per week.

Table 31

READINGS PER WEEK FOR STUDY AND CONTROL CHILDREN

Times read to weekly	Study Children	Control Children
Hardly Ever	34 (42.5%)	14 (31.1%)
At least 1 x per week	24 (30.0%)	12 (26.7%)
At least 3 x per week	11 (13.8%)	9 (20.0%)
At least 5 x per week	10 (12.8%)	9 (20.0%)
Missing Data	1 (1.5%)	1 (2.2%)
Total	80	45

Although there were no differences of statistical significance between the two groups, it is noteworthy that 42% of study and 31% of control children hardly ever had anyone read to them at home. In 12.8% of the study and 20% of the control homes the children were read to almost daily (Table 31).

8.2.1.2. Helping the Child with Basic Concepts

8.2.1.2.1. Naming Colours

Enquiries as to whether the child was taught to recognise and name colours, elicited a positive reply from the parents of 68 (85%) study and 38 (84.4%) control children.

8.2.1.2.2. Teaching Shape Recognition

Children in the study group were taught to recognise and name shapes such as circles, triangles, squares and diamonds in 39 (48.75%) families (Table 32), whereas 32 (71.1%) of the control children were similarly instructed. This difference was statistically significant ($p = 0.01$).

Table 32

TEACHING BASIC CONCEPTS AT HOME

Taught Shapes				Taught Alphabet		Taught Reading	
Group	Number	%		Number	%	Number	%
Study	39	48.75		53	66.25	7	8.75
Control	32	71.1*		44	97.8#	20	44.44**

* $p = 0.01$

$p = 0.00125$

** $p = 0.000095$

8.2.1.3. Teaching the alphabet and/or reading

Table 27 also shows that the the percentage of children whose families attempted to teach them their alphabet and to read was significantly higher in the control than in the study group.

8.2.1.4. Teaching the child songs and nursery rhymes.

Whilst 42 (93.3%) of controls were taught jingles, songs or nursery rhymes, the same held good for only 57 (65%) of the study children. This difference reached statistical significance ($p = 0.007$).

8.2.1.5. Home tuition of a combination of basic concepts.

Children in the study group were instructed in a combination of basic concepts comprising shape recognition and naming,

learning the alphabet as well as to read and to recite or sing songs or nursery rhymes in 6 (7.5%) families. In the control group this applied to 16 (35.5%) children, a statistically significant difference($p = 0.0008$). However if the learning of colour recognition and naming was added to the combination the difference between the 2 groups was no longer of consequence.

8.2.2. Availability of specific toys to the child.

The maximum score possible on the HSQ Toy checklist is 14. Table 33 shows that 36 children in both the study and control groups

Table 33

TOYCHECK LIST SCORES IN STUDY AND CONTROL CHILDREN

Toycheck List Score	Study children (No)		Control Children (No)	
< 3	8	10.0%	1	2.2%
4 - 6	21	26.25%	4	8.8%
7 - 8	15	18.75%	4	8.8%
9 +	36	45 %	36	80.0%*
Total	80		45	

* $p = 0.0051$

received a score of 9 or more, i.e. 45% and 80% in each group respectively. This difference is statistically significant ($p = 0.0049$). Only 1 child in the control group scored 3 or less whereas a score in the same range was found in 8 study children.

8.2.3,. Accompanying Mother to Grocery Store

There were no significant differences between the study and

Table 34

TIMES TAKEN TO GROCERY STORE

Frequency	Study Children	Control Children
Hardly Ever	12 (15%)	3 (6.6%)
1 x / month	23 (28.75%)	13 (28.8%)
2 x / month	11 (13.75%)	9 (20.0%)
1 x / week	32 (40.0%)	20 (44.4%)
Total	80	45

control groups as to how often they accompanied their mothers on a shopping expedition (Table 34). Of the controls, 44.4% (20/45) went along at least once per week, and 7% hardly ever went along at all. Corresponding figures for the study group were 40% (32/80) and 15%(12/80).

8.2.4. Discipline and the Child

8.2.4.1. Spankings per Week:

In the greater majority of cases the parents of both the controls and study subjects claimed that their child had not received any corporal punishment in the week prior to the administration of the questionnaire. Only 1 child had been subjected to 4 spankings and another 3 had been spanked 3 times in the same time period. All 4 of these children were part of the study group. No difference, between the number of spankings received in study and control children, reached statistical significance (Table 35).

Table 35

TABLE 35

NUMBER OF WEEKLY SPANKINGS IN
STUDY AND CONTROL CHILDREN

Number. of Spankings Weekly	Study Children		Control Children	
	Number	Percent	Number	Percent
0	54	67.5	33	73.3
1	19	23.75	10	22.2
2	2	2.5	1	2.2
3	3	3.75	0	0
4	1	1.25	0	0
Unknown	1	1.25	1	2.2
Total	80	100	45	100

8.2.5.2. Response to Child Hitting the Parent.

In reply to the question "What would you do if your child got angry and hit you?", in both the study and control groups, 50% of parents maintained that they would spank the child and about 10% said they would hit the child back to show how painful it was. Of the remainder, 29% of control and 19% of study parents said they would talk to their children. Parental responses were virtually identical in both groups .

8.2.5.3. Feeding prior to meal-times

Should a child get hungry about 30 minutes before dinner was due to be served, 23.75% (19/80) and 28.9%(13/45) of study and control group parents, respectively, would supply a snack. The whole meal would be

parents. Only about one third of parents in both groups would expect their child to wait until the meal was due to be served.

8.2.5.4. Cleaning up after making a mess

When asked what they would do if the child spilt milk on the floor, 78% of parents of both groups said that they would insist that the child should wipe it up. Only 2 parents (both from the study group) said they would spank the child. Of the remainder, 15% of study and 20% of controls replied that they would get someone else to wipe up the mess. Attitudes in both groups were very similar.

8.2.6.. Time Spent With Father or Father Figure.

This was measured by two variables, viz number of meals eaten with father or surrogate over a given time period and how often the child spent working or playing time with his/her male parent or equivalent.

8.2.6.1. Meals in the Company of Father

Table 36 shows that that 57 (71.25%) of study subjects ate one meal daily with their father whereas this applied to 39 (86.7%) of the controls. This difference was statistically significant ($p = 0.04$).

A male figure was completely absent at mealtimes in the homes of 21% of the study and 9% of the controls respectively. Very few children (four from the study and two from the control group) had a father/father figure that visited intermittently and took a meal with the family.

Table 36

MEALS EATEN WITH FATHER OR FATHER FIGURE

Frequency of meals eaten together	Study Children		Control Children	
	Number	Percent	Number	Percent
Never	17	21.25	4	8.8
1x/ month	1	1.25	0	0
1x/ week	0	0	0	0
2x/ week	1	1.25	1	2.2
3 - 4x/week	2	2.5	1	2.2
Daily	57	71.25*	39	86.7*
Unknown	2	2.5	0	0
Total	80		45	

* $p = 0.04$

8.2.6.2.. Playing or working with father

The number of occasions that a child spent playing or working with his/her father/father figure ranged from never to at least 4 times per week.

Of the study children, 21 (26.25%) never played or spent time with an adult male; 15 (18.75%) did so 1 -4 times per month and 41 (51.25%) were engaged with their fathers at least 2-4 times per week. In the control group 35 (77.8%) of children spent time with their fathers 2 or more times per week whilst only 3 (6.6%) never interacted with a male parent or equivalent.(Table 37). These differences were statistically significant ($p < 0.008$).

Table 37

TIME SPENT PLAYING WITH FATHER/FATHER-FIGURE

Number of Times	No. Study Children	No. Control Children
Never	21 (26.25%)	3 (6.6%)
1 x / month	6 (7.5 %)	3 (6.6%)
1 x / week	9 (11.25%)	4 (8.88%)
2 x / week	11 (13.75%) }#	10 (22.2 %) }#
4+ x / week	30 (37.5 %)*}	25 (55.5 %)*}
Unknown	3 (3.75%)	0 (0.0%)
Total	80	45

* p = 0.0078

p = 0.0037

The results of the small number of remaining variables on the HOME questionnaire were not analysed as the relevant information had already been obtained from the initial questionnaire designed for this study.

9. ANALYSIS OF TEACHERS' QUESTIONNAIRE

9.1. Number of Questionnaires Completed

All 50 involved teachers were requested to meet the investigator on a specified day immediately after school ended. At each school a different day was chosen. Only 31 of the 50 teachers arrived for these meetings and attempted to fill in the questionnaire. In one case only one question was answered and the form returned was largely blank. This was excluded from the analysis.

9.2. Teachers' Demographics

9.2.1 Educational Level of Teachers.

Of the 30 teachers, 18 (60%)had matriculated or had some form of matriculation exemption certificate; 11 had only passed standard 8 and 1 had completed standard 9.

All but 2 of the teachers had a certain amount of special training after leaving school; 10 (33%) had 3 years at a teachers training college, 17 (57%) were trained for 2 years and 1 had only done a 1 year course. The shorter their teaching experience the better trained the teachers were.

9.2.2. Sex and Age of Teachers

All the Sub-A and Sub-B teachers were female and many of them were elderly. Although the teachers' ages were not ascertained directly, the years of experience they had, acted as an indirect indicator of their age. Of the 30, 10 (33.3%) had been teaching for 25 years or more and another 8 had taught for between 16 and 25 years. Only 9 (30%) had less than

10 years teaching experience. It appeared that most of these women had taught the same class all through their teaching careers.

9.3. Reasons for Failing

The questionnaire offered the teachers 7 possible contributory causes of school failure in the first grade (Table 38) and they were asked to prioritise them in order of importance.

Table 38

PRIME REASON CITED BY SCHOOLTEACHERS FOR SCHOOL FAILURE

PRIME REASON GIVEN	No. Of Teachers	Percentage
Too young at school entry	9	30
Poor intellect	6	20
Mixed language spoken	5	16.7
Class too big	3	10
Alcohol abuse at home	3	10
Single parent family	2	6.7
Economic deprivation	2	6.7
Total	30	100

From the table it can be seen that 30% of teachers thought that the major reason for excessively large numbers of children failing the first grade was that many were too young to start formal schooling . Another 20% thought that the excessive failure rate was mainly due to low intellectual ability. The third most

common prime reason given was one of mixed languages, either the children spoke a mixed English/Afrikaans at home or they were being educated in a language other than their home language.

If the 7 possible contributory reasons for failing were weighted according to the position to which they had been prioritised by each of the teachers, it was found that although starting school too early remained the top of the list, excessively large classes and alcoholism in the home featured as a close second and third (Table 39). Thus whilst the latter two were not often regarded as the prime reason for the child doing badly, they were seen as important contributing factors where poor school performance was concerned.

Table 39

**REASONS FOR FAILING WEIGHTED ACCORDING
TO PRIORITISATION**

REASON FOR FAILURE	WEIGHTED SCORE POSSIBLE 200	ORDER OF IMPORTANCE
Too young for school	153	1
Class too big	121	2
Home alcohol abuse	119	3
Poor intellect	111	4
Mixed languages	111	4
Economic deprivatn.	87	5
Single parent family	83	6

9.4. Time taken to Decide whether a Pupil was likely to Fail

Almost half (46.7%) of the teachers thought that they could determine whether or not a child would cope successfully in that class by the end of 3 months. The remaining 16 thought that 6 months were needed to make such a decision.

9.5. Teacher-Parent interaction

9.5.1 Informing Parents

Virtually all the teachers felt that the parents should be contacted as soon as they perceived that the child was unlikely to be promoted at the end of the school year.

9.5.2. What parents needed to be told

The question as to what they should tell the parents was left open ended. No teacher made more than 3 suggestions as to what the parents should do; there was a total of 52 advice items put forward.

The answers fell roughly into seven categories of which far and away the most common pertained to increased parent/child involvement. This included helping the child with his/her homework, being encouraging and loving the child. This category contained 30 (58%) of the 52 advice items. Closely allied to this and the next most common piece of advice to parents was that they should cooperate with the school teacher and that help at home should tie in with what was going on at school. This was suggested on 10 occasions and comprised 19% of the 52 advice items.

Interestingly, in spite of my contact with the schools and the fact that the services of an assessment clinic were easily available, only 4

teachers thought that this would be an appropriate course for the parents to pursue (7.7% of items of advice suggested).

The other items of advice proffered were encourage reading and use of the public library (7.7%), buying educational toys (5.8%) and extra homework and tuition (1.9%). Although 2 of the schools had a social worker, no teacher suggested that a home visit might be useful.

10. SCHOOL READINESS TESTS

Only one of the 4 schools had a school readiness test carried out on some of the new school applicants, But regardless of the outcome the children were admitted anyway and the teachers were not always informed of the result.

None of the schools had a resident psychologist. The teachers who replied in the affirmative to this question were referring to the Coloured Education Department's team of itinerant educational psychologists. Thus the local hospital provided the most easily available source of such services. This appeared to be something of which most of the teachers were not cogniscent .

11. GRIFFITHS SCALES FOR MENTAL DEVELOPMENT :

11.1. Number Assessed

In total 45 children were fully assessed using the Griffiths scales for mental development. Of the 45, 30 were study children and 15 were controls. All tests were carried out by a tester who was a certified Griffiths user and who was blinded as to whether or not the child had failed Sub-A. In addition all parents, whose children had failed and had Griffiths tests done, were encouraged to bring their child to The Coronation Hospital Assessment Clinic so that the a complete assessment, including Speech and Occupational Therapy and if considered appropriate, a psychological profile, could be carried out. Fourteen children's parents availed themselves of this service.

11.2. Outcome of Griffiths Testing:

The mean of the Griffiths Quotients (GQ) obtained on the 30 study children tested was 90.2 with an S.D. =10.27 (median = 85) and a range of 45.5 to 105. In the 15 controls the mean GQ was 97.2 with an S.D. = 7.1 (median = 97) and a range from 86 to 107. Although the difference of the means for the 2 groups was statistically significant ($p = 0.01$) there was considerable overlap in the ranges of the two groups. Of the 30 failures, 8 (26.7%) had a GQ greater than 90 whereas this applied to 11/15 (73.3%) of the controls, a difference which was statistically significant ($p = 0.003$). Four

of the study and none of the controls had GQs of 80 or less.

Turning to the subscores of the individual modalities tested, it can be seen from table 40 that the means for the motor subscore in both the groups was fairly similar(insignificant statistically) and close to 100 which is

Table 40

MEAN SUBSCORE OF EACH MODALITY TESTED

Modality Tested	Mean Score Study group	Mean Score Control Group
Motor	101	104
Personal/Social	87	96
Speech & Hearing	87	96*
Motor Coordination	85	101*
Performance	79	84
Practical Reasoning	88	99*
Total Score	87	96

* Statistically significant

the mean for the general population. The mean scores for the modality of Speech and Hearing as well as that of Practical Reasoning were lower in the study than the control group and these differences were statistically significant. The same applied to the modality of motor coordination. Both groups fared badly in the modality of performance with the study group achieving the poorer mean outcome (score of 79) but this difference was not significant.

Of the study patients 12/30(40%) scored 80 or less i.e. at or below the 3rd centile for the modality of speech compared to 1/15 (6.7%) of the controls. This difference was statistically significant ($p= 0.02$)

11.3. Results of Full Assessment at Coronation Developmental Clinic:

All 15 children from the study group who presented themselves for a full assessment at the Coronation Hospital Assessment Clinic were found to have definite problems which required specific therapy from either a speech therapist, an occupational therapist or a clinical psychologist. In addition a few children required to be removed from mainstream education and be suitably placed in either a training centre or a special education class.

The mean G.Q. for 14 children of this group was 88.6 with a range of 79 to 107 and this was very similar to the mean G.Q. for all 30 of the

Table 41

**DISTRIBUTION OF GRIFFITHS QUOTIENTS AMONG
15 FULLY ASSESSED CHILDREN**

Griffiths Quotient	No. Of Children	Percentage
< 75	1	6.70
75 - 79	1	6.70
80 - 84	2	13.3
85 - 89	4	26.7
90 - 99	4	26.7
>100	3	20.0

study children tested. The 15th child was excluded from the calculation of the mean as she was moderately mentally retarded with a GQ of 46 and should never have been admitted to main stream education. Of the remaining 14 children 7 had G.Q.s of < 90 and 1 of these score was < 80. One child who scored 85 did poorly in testing by both the speech therapist and occupational

therapist. She was retested by the clinical psychologist using the Senior South African Individual Score (SSAIS) and the score for this test was 73 .

The above child was moved to a special education class as was one other. Another child (G.Q. 46) who should never have been in mainstream education was placed at a training centre. In addition to her low intellect, this little girl exhibited abnormal behaviour in that she was excessively affectionate, kissing and cuddling strangers indiscriminately.

Significant emotional problems were found in 4 children. Of these one was depressed and at interview it became apparent the child's family was totally disinterested. The family member that brought the child for assessment had done so only because she thought there might be some financial gain, such as a grant, if the child was seen at the hospital; another was excessively dependent on his father and was not coping with separation. The latter responded well to behaviour modification. One little girl appeared to be suffering from abuse and the whole family was brought in for therapy. In the home of another girl the family dynamics were chaotic with an alcoholic father and siblings who constantly threatened the propositus. The latter family, as expected, came for therapy irregularly and the child continued to do poorly at school.

Visual perceptual problems were diagnosed as the major cause of school failure in 5 children whose G.Q.s ranged from 87- 109. In one of these they were of such severity that they led to the child being dyslexic. This child required intensive therapy from both an occupational therapist and a remedial

teacher. Three of the children had major difficulties with directionality and displayed an excessive amount of reversals in their writing of both numbers and letters. One of these also had problems with bilateral integration. Treatment by an occupational therapist was recommended for all three.

Disabilities relating to language were found to be the major impediment to learning in 2 children and both had G.Q.s above 90. One had difficulties with auditory processing which led to reading and writing problems whilst the other had difficulties with both receptive and expressive speech the functional level being about 2 years behind the chronological age. This, of course impinged negatively on all forms of learning. Both these children were offered therapy at the hospital's speech and hearing clinic.

The 2 children who had GQs in the range of 80-84 had scored within the the low normal range for all modalities tested and required help across the board.

DISCUSSION:

There seems little doubt that, both from official sources and from the figures obtained in the present study, there is an excessively high failure rate among children attending schools administered by the Coloured Education Department. In this study it was shown that the failure rate was 300% higher amongst pupils in Sub-A attending a random sample of 4 CED schools in the Coronationville area of Western Johannesburg than amongst pupils attending 31 TED schools. In the latter the vast majority of pupils are whites from lower-middle and middle class families whereas in the former most children are of mixed race and come from a working class background.

The failure rate in 3 of the 4 sample schools was fairly similar with a range of from 18.4 - 22.1%. However the failure rate in the 4th school was considerably higher (29.1%) but this difference just failed to reach statistical significance ($p = 0.06$). There was no apparent reason for this difference as the school served a similar community to the others, classes were approximately the same size and the teachers were similarly qualified.

The choice of the control group comprising the most successful students in the same school system allowed for the negating of interfering variables such as size of class, quality of teacher and teaching, physical status of the school and access to school equipment, all of which have been shown to affect the potential for learning in a school system. Simultaneously it provided the opportunity to attempt to uncover positive factors which help to ensure success in the same school system.

The finding that a number of control children had actually failed the previous year and were repeating Sub- A, whilst initially surprising, was easily explained when the organisation of classes at the schools became apparent i.e. placing all repeaters in the same class. The inclusion of these children into the study group was felt to be justified as no major changes had occurred in the year preceding the commencement of the study which might influence the areas under investigation.

Anthropometry revealed that both the study and control groups tended to be both lighter and shorter than the reference populations used to develop growth reference curves by the National Centre for Health Statistics and the CDC using data from the Fels Research Institute and US Health Examination Surveys[Epiinfo, Version 5, Users Guide(141)].

Although none of the differences between the study and control groups as regards weight for age reached statistical significance, there was a definite trend indicating that the study group's nutrition as expressed by this ratio i.e. weight/age was somewhat poorer than that of the control group. It is of interest to note that whereas in this study there were 13.3 % children below the 3rd centile for weight for age, in 1983, 23.3% of black children in a lower primary school were similarly underweight /age(5). This might perhaps indicate that the community being investigated was economically somewhat better off than the black Sowetan one.

Similar conclusions were reached from the height /age measurements, the only difference being that the number of study children who were below the 25th centile for height was statistically significantly higher than their control

counterparts . However in both the study and control group the distribution curve for height\age was shifted to the left compared to normal standards but the trend was for the study group to be more severely affected and to suffer from a greater degree of stunting.

Interestingly a much higher proportion of boys than girls were below the 25th centile and had a Z score of < -1 for height\age. As none of the girls were pubertal and thus could not have started their secondary growth spurt (142), this was difficult to explain.

The completely normal distribution of weight\height ratios has been found in many other third world situations (143) and suggests that prolonged suboptimal nutrition affects height and weight potentials equally. It is however difficult to rule out that one is dealing with a genetically predetermined growth pattern for a specific population.

The trends shown in this study that stunting and suboptimal weight for age are more common amongst children who are required to repeat the first year of formal schooling than those who are promoted cannot be taken to mean that poor nutrition impairs cognitive function. Firstly, the trend in this study did not achieve statistical significance and secondly, the number of children in both the study and control groups who had overt malnutrition or were below the 3rd centile for any of the anthropometric parameters investigated was extremely small. In addition, if one extrapolates from the questionnaires that were administered to a subgroup of these children, then virtually none of them had been hospitalised for any form of malnutrition. Thus in the present study only the effects of chronic suboptimal nutrition,

rather than that of severe acute malnutrition, can be assessed. It also remains impossible to discount the role of innumerable interfering variables.

Thus as with so many studies examining the relationship between nutrition and cognitive function, the outcome is inconclusive. The study fails to support Pollitt's statement that "poor nutritional status among school children has significant adverse effects on school progress"(144), and our findings are more in keeping with those of Wagstaff et al which indicated that the general range of anthropometric findings did not clearly correlate with classroom achievement(5). The study by Booysen et al (145) which showed that malnourished Indian children did poorly in their first year at school, had major problems with reading and failed to show evidence of catch up unfortunately did not have any controls and the possibility of other variables playing a role in the children's predicament cannot be excluded. Nevertheless the weight of the evidence in the literature seems to suggest that malnourished children suffer some loss of intellectual function and score less well on psychometric testing than do their well nourished counterparts (29,146,147,148). Perhaps the most appropriate conclusion to be drawn from the anthropometry data, as stated by Wachs, is that chronic malnutrition may be a necessary but insufficient influence for explaining variability in cognitive performance (119)

Anaemia as defined by a Haemoglobin of 2 or more SD below the mean for the 6 -12 year age group was relatively uncommon (5.3%) but still considerably higher than that found in a group of healthy American children of approximately the same age group (150). However its prevalence in the control and study group was fairly similar. Actual Fe deficiency however, was a much more common finding and although more frequent in the study group, this difference did not reach statistical significance.

Obviously from this study one cannot determine the effects of undocumented prolonged iron deficiency, which might have occurred in the first year or two of life, when iron deficiency has its highest prevalence. Whether iron deficiency or iron deficiency anaemia at the age of 6 years are indicators of an earlier deprivational state is unknown. What this study shows is that iron deficiency with or without anemia did not seem to play a role as a causal factor for excessive school failure in the first year of schooling in the children studied.

Although none of the children in this study had a blood lead level which exceeded the acceptable non-toxic level of 25 ug/dl which is countenanced by the laboratory of the South African Centre for Occupational Disease, it is important to realise that the toxic level for blood lead has been revised downwards in recent years.

Both the overall mean blood level and the mean blood lead levels

of each group in this study were considerably lower than the levels found by von Schirnding in 1990 in a very similar group of inner city mixed race children living in Cape Town(62). She found that 13% of her subjects had blood lead levels $> 25\mu\text{g}/\text{dl}$. In a similar but earlier study(1986) Deveau et al found blood lead levels exceeding $30\mu\text{g}/\text{dl}$ in 4.4% of the children.(151) whereas no child in the present study had a level of greater than $22\mu\text{g}/\text{dl}$. Whether this reflects the decrease in the level of lead in gasoline since the earlier studies is a moot point.

The Agency for Toxic Substances and Disease Registry in the USA defined the threshold for neurobehavioural toxicity as $10-15\mu\text{g}/\text{dl}$ (60). In the present study almost 19% of children's (11 in the study and 5 in the control groups) blood lead levels exceeded this figure. However there was no statistically significant difference between the numbers of children with these levels in the 2 groups studied . Consequently one is unable to implicate lead toxicity as a cause of poorer school function in the group that had failed Sub-A. Albeit, there does seem to be a trend to indicate that the group of unsuccessful school achievers had both a higher mean blood level and an increased number of children with levels above the considered toxic level.

The visual screening tests employed in this study comprised those that only tested physical and physiological functions or phases of seeing. No attempts were made to test the components of the psychological phase of vision

such as ability to perceive likenesses and differences in form, position in space, size and space relationships, visual memory and memory for visual sequencing etc. Thus, what was tested, was the physical quality of the childrens' vision and their ability to accommodate for both close and distant objects.

From the tests carried out the findings indicated that visual problems have no major role in determining the outcome at the end of the first year or formal schooling. There were no real differences between the outcome of visual screening in the study and control groups.

However what was shown and considered to be of major importance was that in both groups of children the prevalence of abnormalities relating to eye use for close work was in the region of 30%, a much higher figure than that obtained in a comparable group of caucasian children of higher socio-economic status. This finding indicates that these children will experience difficulty in acquiring reading and writing skills. As these are learned skills and obtained by practice, programmes should be instituted to educate parents to encourage their children to employ their skills for doing close visual tasks from an early age. Phillips found in a study of socially disadvantaged children that both his focus and control group contained significantly more cases of visual impairment than those found in the normal population(152). More than 90% of those with visual impairment were not wearing spectacles. This strongly supports the view that visual screening in older age groups is of the utmost importance.

The high failure rate in children who started school before reaching the age of six years when compared to their slightly older contemporaries is a very significant finding. Unfortunately at the present time attendance at creche or preschool facilities, which are not part of the free school system, are beyond the means of many families. Consequently parents are extremely keen for their children to attend school as early as possible as this gives the mothers an increased chance of returning to work. However as many of these children have attended neither creche nor preschool and, as observed previously, most of the schools in the coloured education system do not use school readiness tests, it would appear that a large number of immature, understimulated, non-school ready children gain admission to school. It is thus not surprising that a high percentage of these fail to succeed in their first year of schooling. In view of such failures it would seem logical to suggest to the education authorities that a year of preschool education be supplied without cost to all children. In this way one could ensure that by the time the children are ready to start Sub-A they have acquired the basic concepts which will make them school ready.

Among the children who formed the sample for the study specific and HOME questionnaires, the mean age at starting school was statistically significantly lower than that of the controls, which supported the view that school enrollment at too early an age could lead to school failure. However, in the same group, disappointingly, the number of children starting school prior to the age of six years did not differ significantly in the control and study subjects but only showed a trend for the failure group to comprise a higher

percentage of children under six years. However as this sub-sample was much smaller than the overall 4 school sample, the result could be disregarded and it is probably indicative of a type 2 error. This occurred in spite of the fact that the number of children sampled for the socio/environmental investigation was statistically considered adequate to demonstrate a difference of 10%

That the interviewees who answered the two questionnaires were largely the mothers of the children indicated both, that that investigator aimed to interview mothers and that generally the mother was the caregiver of the child. However 10% of mothers in both study and control group did not live with their children and these children were mainly cared for by their grandmothers. While this did not seem to affect the outcome of the first year of schooling it does suggest that there was a fair amount of family disorganisation in the community being investigated.

Less than 5%(3 children) in the study group were African and not Coloured. In view of the fact that they lived in, socialised with, spoke the same language and attended the same schools as the community that was being studied there seemed to be no reason to exclude them from the study.

The religious denomination of family appeared to play no role in the child's school performance. Religious practices appeared to be of major importance in most homes. Many families attended church or mosque regularly and in many of the Christian homes bible readings and hymn singing as well as

church meetings were regular activities during the week. Moslem children attended religious school every afternoon but this did not seem to improve their schoolwork or affect it adversely. The importance of religion and religious institutions amongst the coloured community has also been identified by Strong in a study carried out in Riverlea(153).

The finding that almost 60% of the study group were boys is not unexpected as the sample reflected the findings in the total study population. It is well documented that learning problems and behavioural disorders are between 3 to 10 times more common in males than in females(104). This applies especially to reading problems and attention deficit disorders.(154,155)

However, while Jantz and Sclara(156), Solomon et al(157) and Wasserman et al(158) showed that Black girls were perceived or shown to fare better in school than were Black boys, this was not really borne out by our study as the control group, i.e. the children who had done best in their first year of schooling, contained only a slight preponderance (54%) of girls.

Interestingly only 4 interviewees admitted to their home language being a mixture of both Afrikaans and English and the majority claimed that either the one or the other was spoken in their homes. The experience in the Coronation Hospital Developmental Clinic, outpatients and wards suggests that mixing of

the two languages indiscriminately is much more frequent than has been recorded in this study(159). One can only speculate as to why English was the reported home language in a statistically significantly higher proportion of the control than study group. Possible explanations are that English speakers are financially better off or more socially aware and more ambitious for their children. Certainly English is perceived by many to be the most important and useful language in the present political climate of this country.

Although very few of the variables in the questionnaires which reflected the family structure showed significant differences between the two groups there was a trend which seemed to suggest that the family structures were more stable and less stressed in the control children's homes.

The variables which reached differences of statistical significance and had a negative connotation for the family structure were: the study group had a higher proportion of fathers of 40 years or older, had 4 or more siblings, and had a higher percentage of unmarried mothers. The first two indicate that the study group came from larger families than the controls whilst the third suggests that the homes were less stable. Eysenck and Cookson(160) found a negative relationship between family size and score on Aptitude tests for School Beginners as did Owen(161) who was working with a coloured population in the R.S.A. This would support our finding that children who came from larger families were less likely to succeed at the school entry level than those who came from smaller families. Family instability is one of the features identified

which leads to increased stress in the home environment with consequent poor school performance by children from such households(162).

Variables whose differences failed to reach statistical significance but nevertheless showed trends which had a negative connotation for the study group were the increased number of teenage mothers at the time of birth,(4) the higher percentage of fathers that did not live at home, and the number of households which comprised 11 or more people. A study by Fraser(163) showed that children who scored poorly in assessment tests often came from large families living in overcrowded circumstances whilst Gordon(4) noted that among black children from homes where the parents had never married or where the child lived with the extended family and the mother only, there was an increased chance of not succeeding in the first few years of schooling.

Although the population of children of both the study and control groups ostensibly lived in the same area and attended the same schools, their socio-economic circumstances were not identical. As mentioned earlier parts of Westbury has houses that are relatively new or have been upgraded and the courts around which they are built are much better cared for. The occupants of these houses appear to be better adjusted and more dependable than those living in the more rundown section of the township. The Coronationville community is known to be more stable than that of Newclare and Westbury as many people own their own homes. In addition a small number of children who gave local addresses did not actually live in the area but had grandparents

who did and their families found it more convenient for them to attend the local school.

In the control group a significantly higher proportion of fathers were better educated, were employed and held white collar jobs than in the study group. All these indicated that socio-economic circumstances were better among the control than in the study children. Maternal education was also significantly better in the control group. However the number of working mothers was not significantly different in the groups studied. It was extremely difficult to be ascertain whether unemployed mothers really wanted or needed to work or preferred to remain housewives.

In the light of the fact that numerous studies exist which have shown that children from families with low SES do less well at school than do those from homes of high SES(112,113,,164,165), the above findings should not be surprising. However the difference bewteen the SES of the two groups of children studied was not profound. It would thus appear that even slight adjustments of socio-economic circumstances may be of importance in determining scholastic success . Gottfried claims that it is an empirical fact that the children from relatively higher SES families receive an intellectually more advantageous home environment(113). However it must be remembered that SES is only one of many contributing factors impacting on intellectual development and consequent academic success.

The finding that children who had a father who had passed at least standard 9 and a mother who had passed standard 7 or better and who were fully six years of age when they started school had an excellent chance of

succeeding in their first year of school is of major significance. It highlights the fact that children should not start school before they have attained a certain level of maturity even if they come from homes where parents are better educated. As school readiness tests are not feasible at present then chronological age is all that we have to guide us. Starting school at too early an age certainly results in a high failure rate. This is costly for the education department both financially and because it potentially may engender the mindset of failure for all future schooling. It would seem much more rational to provide all primary schools with a free and compulsory preschool class.

Of the variables that together as a group reflected the culture of learning in the households of the study and control children, all showed evidence of being statistically significantly more favourable in the control group of children who had done well in their first school year.

School failure seemed to be more entrenched amongst siblings of children who had failed sub-A than those who were successful. Once a pattern of school failure was established in a family it would appear that it became the expected norm. Parents thought that their children were doing well at school if they had only failed one class. In the Report of the Plowden Committee "Children and the Primary School" a significant finding was that variations in parental attitudes can account for more of the variations in children's school achievement than either the variations in home circumstances or variations in schools(166). The impression one gained when conducting the

interviews with parents or caregivers for this study was that many of them had no real concept of the standard against which scholastic success could be measured.

It is generally well accepted that a child's learning experiences during the years before school provide an essential foundation for all later learning (167). Jean Piaget(168) theorised that the child who is deprived of appropriate environmental stimuli will lack sufficient experiences for adequate development of mental progress necessary for acquiring intellectual skills and abilities.

Although there was no difference between the two groups of children as to nursery school attendance, preschool attendance alone or combined preschool and nursery school attendance positively affected the outcome at the end of the first year of school. Nursery schools vary markedly in the quality of care that they provide. Some act only a caregivers whilst others have good informal educational programmes. Obviously, the benefits as well as the cost of attending the latter are much greater. Unfortunately it was impossible to assess the type of nursery school the child attended and this may account for the failure of nursery school attendance being shown to make an impact on school performance.

On the other hand preschool classes are fairly standardised and so it was possible to demonstrate that they have a favourable effect on the results at the end of the first year of formal schooling. The effect of preschool and both preschool and nurseryschool on school performance in this study supports Deutch's statement(169) that "children who have pre-school or kindergarten

experiences are more likely to cope with the demands of the school than are children who have not had this experience". Of course attending preschool does not guarantee that one will do well in the school years that lie ahead. Gordon found that 38% of the pregrade pupils failed at least once in the first three years of schooling (4). In the present study it must be noted that 24% of first year failures had attended preschool.

It is interesting to note that, of the total number of children involved in the questionnaire portion of the study, just over 50% had no access to early education facilities. This is less than the 1991 figure quoted for white children (68%) and remarkably smaller than the figure quoted for Black (Coloured, African and Indian) children (94%)(151). The figure for the study group alone i.e. the group that failed their first school year was 60%. It seems unlikely that such a radical change in preschooling could have taken place in the few years between 1991 and the time that the present study was being carried out. Whether the 1991 estimations were incorrect or whether this study is dealing with a particularly fortunate segment of the population(which seems most unlikely) is a matter for conjecture. What is abundantly clear is that is unwise to generate statistics for combined race groups when conditions pertaining to each of them were and as yet remain strikingly different.

Chetty cites a study by Sexton which showed that children from poor homes are handicapped directly by high rates of sickness and poor

attendance(170). Truancy, that is school absence without a plausible reason with or without parental knowledge, is also considered to be a major contributing cause. There appears to be a considerable interplay between physical and emotional illness which leads to excessive school absence(171).

The U.S. National Health Interview Survey (156) showed that on average school days missed per school year by American children aged 5 to 17 years was 5 days. The highest rate(5.8 days)was found among families with the lowest income. Among the coloured children we investigated over 60% of study children were away from school for 8 or more days compared with 13.4% of controls. It comes as no surprise that the absence rate amongst the school failures was considerably higher than that of the controls. In fact 10% of study children missed more than 21 schooldays during the year which was being investigated.

However it is much more difficult to determine why school absence occurs. According to Klerman(171) for most families school absence is a trivial problem. However parents' physical and emotional problems may contribute to absence(172) and this sort of situation could be aggravated in dysfunctional families(173).

The overall impression gained from visiting the homes and interviewing parents was that reading as a means of gathering information or just for pleasure was not of any great consequence in the community. In many homes where some books were present they were infrequently used and in a number of homes which sported a set of Encyclopaedias these were in pristine condition

and were obviously only used on very special occasions.

The most ubiquitous and most used book in the community was, without doubt, the Bible or its Muslim equivalent, the Koran. Bible readings were frequent occurrences in many homes and nearly all the Muslim children attended Madrassah (religious school). Indeed only 6% of study children's and 4% of controls' parents did not own a holy book.

The presence of 10 or more books in a household was significantly more common amongst the children who were at the top of their class than in those who were required to repeat the year. Both Naiker(174) and Chetty(170) consider reading experience in the home to be of importance in determining scholastic success and an assessment of the number of books in the home are perhaps an indirect way of measuring this. Thus our findings appear to support the conclusions of their studies.

Although the use of the public library was very similar in both our control and study groups, this may not have accurately reflected the reading experience in the home as the proportion of children in both the study and control groups who were either only children or the eldest child of the family was similar (45%) in both the groups we studied. Often these children in Sub-A were not considered to be library ready and as the parents themselves did not tend to use the facility , the library was only used if there was an older sibling. As such families(i.e. those where older siblings were present) only made up 55% of both groups the result of this was that the size of the sample and control group was too small for effectual comparison purposes.

From our findings it would appear that the fact that a newspaper was regularly read in the home was a better indicator of literate values and had a greater influence on school outcome.

The predominance of English speakers in the control group is difficult to explain. Although a higher percentage of English speaking than Afrikaans speaking fathers had passed at least Std 9 this difference was not statistically significant. It is just possible that English speaking coloured families had a better self image and consequently were more positive about their children's abilities and potential as in the political climate of the time and indeed at present there are distinct advantages to being English speaking in the Gauteng Province of South Africa.

Regardless of what language was spoken in the home, standard language usage, as opposed to ungrammatical combinations of Afrikaans or English peppered with a multitude of English or Afrikaans words i.e. grammatically correct and not mixed with any other language, was significantly more frequently associated with success in the first year of schooling.

The coloured people have developed a patois of their own. This, although being extremely expressive and picturesque so that it has been used to write significant works by poets such as Adam Smal, does not accord well with standard Afrikaans. The results have been that children have difficulties at school and that such children score poorly in the verbal sections

of I.Q. assessments(175).

In addition studies looking at Afro-American children have concluded that this group uses language in a pattern quite distinctive from that of middleclass whites and Shade(176) speculated that traditional schools in the USA are not sensitive to the learning and communication styles familiar to and used by the majority of African-American children. This is an aspect which as far as I am aware has not been investigated in the coloured community.

The vast majority of the children in this study were being educated in their home language. Where the home language was mixed or an indigenous African language there was a propensity for the children to be educated in English. This reflects the growing perception that English speakers will have an advantage in the job marketplace. However, as no effort is made to determine the child's preferred language as regards both fluency and comprehension, the new scholar may encounter considerable difficulties which may lead to school failure.

Parental expectations as regards a university or technicon education for their child were significantly higher among the control compared to the study group. This finding accords well with those in the literature. Morkowitz and Ginsberg(177) found that American Japanese students' scholastic success was partly attributable to parental emphasis on respect for education and expectation of achievement. Fraser(163), in a study in Aberdeen found that consistent parental encouragement was most important

in providing the incentive for scholastic achievement. Havinghurst(178) considers parental interest to be a more important factor in academic achievement than is the standard of the home.

Most parents in both groups thought that their child should be able to achieve a standard ten certificate. This seems quite unrealistic when one takes into account the pass rates in Standard 10 in the community in which this investigation was carried out.(163). Although this could not be documented, it was quite evident to the interviewer that a large number of parents had not given the matter any thought at all previously.

Almost 50% of the children in this study lived in dwellings occupied only by their nuclear family. This figure applied to both the study and control groups and was just over 27% greater than Richter(112) found in a study carried out on black urban families, which may suggest that the coloured community is economically somewhat better off than the black. The alternative explanation, that there is a much bigger backlog of housing for Blacks than Coloureds(179), is probably more tenable especially in view of the major urban drift of black rural people that has occurred in the last decade.

Although there was tendency for the control group to live in less crowded circumstances, the crowding indices for the two groups studied, were not significantly different. Liddell et al(180) suggest that thresholds for crowding are thought to exist, beyond which additional levels of crowding have little further effect (as has been found in the present study) so that

consequently the variables influence can no longer be measured.

Of the family possessions evaluated, a rated overall impression of the household furnishings correlated best with the outcome at the end of the first year of schooling. The impression was not only created by the quality and condition of the furnishings but also by the organisation and tidiness of the dwelling. Thus while socio-economic factors are reflected in this variable it also has some connotations of how the family values itself and the appearances it seeks to create. This finding tends to reinforce the value of a home visit by a social worker or teacher.

Although functioning television sets were fairly ubiquitous, their absence in the homes of nuclear families whose children had failed compared to controls was just short of reaching statistical significance. It is interesting to note that television sets were found in 50% of the the homes of black urban children studied by Richter at al(112) whereas in this study they were present in 84% . However considerably fewer coloured families owned radios(73%) than the 91% black families reported in the above study. Neither the possession of a radio or a tape deck had any impact on outcome at the end of the first year of schooling.

All 7 children who came from families that owned compact disc players formed part of the control group. Although the difference between the two groups was significant the number is so small that the interpretation of this finding is impossible. It largely suggests that some of the control group were

more affluent than the majority of the study group.

Of the other family possessions targeted, no significant differences existed between the study and control group families as to ownership of a refrigerator, motor car or telephone. However there was a definite trend indicating that a higher percentage of control families had these amenities. Of interest was the number of unpaid telephone bills and cut off services.

Comparing controls to study children, a significantly larger proportion came from homes where a domestic help was employed. This was related to the fact that more mothers of control children worked and probably that financial circumstances were better in such homes.

The overall perspective of family possessions and the fact that a home help was employed would seem to indicate that the control children's families were financially better off than those forming the study group. This is not surprising as many studies exist which have shown the importance of socio-economic status as a determining factor in academic success.(110, 113, 181)

The control children were more likely to have had more than 1 caregiver than the study children. This was largely due to the fact that more control childrens' mothers held down jobs and so employed a caregiver to take care of their children. Only 7 children had had more than 4 caregivers and both groups were affected similarly. Approximately 40% of the children in this study had always lived in the same house and the permanence of living quarters did not differ significantly in the two groups of children. Thus,

although Gordon(4) showed that instability in the home affected school outcome, we were unable to come to any definite conclusions. At an individual level we can quote two children who were caught up in a battle between parents in the one instance and between mother and grandmother in the other, who both fared badly at school.

The results of the antenatal and perinatal events investigated in this study showed very little difference between the two groups on which we focused. Apart from a trend indicating that the study children's mothers were more likely to smoke and imbibe alcohol during the pertinent pregnancy no other variable was significant. It would seem that the sample size in this study was too small to show up the effects of well substantiated causes of learning problems such as prematurity, breech delivery and multiple pregnancies. This of course does not detract from the importance of obtaining a full antenatal and perinatal history in all children with learning problems.

A history of illnesses requiring hospital admission did not reveal any differences between the two groups. None of the children had suffered an obvious insult to the brain postnatally and the incidence of pyrexial convulsions was noncontributory.

The HSQ was developed in order to have a simple screening instrument whereby children at risk of developmental delays due to negative environmental influences could be easily identified and offered some form of intervention(120). The questionnaire was meant to be filled in by the parent of

the child and when it was standardised, children with illiterate parents were excluded from the test sample. In addition two forms of the HSQ were developed, one for under threes and another for three to five year olds. The test was not standardised for children who had reached their sixth birthday.

The test was meant to be used only on children of poor SES and the racial mix that it was standardised on for the older age group included only 8% of American black children. However Richter et al found that the test appeared to be appropriate for South African black township children who were less than 3 years(112). As far as I am aware there are no studies extant which use the test in the older age group in this country or elsewhere in the developing world. However as the test is less reliable in the younger age group(121) but was nevertheless used successfully, it should also be applicable to older children in the same circumstances.

In our study all the children were over the age of six years but after looking at the questionnaire it seemed that all the questions still remained relevant and apart from the fact that the children had started formal schooling, no other age-related changes would have occurred in their lives.

As previously stated the questionnaire was completed by the researcher who visited the home and talked to the parent as it was felt, rightly or wrongly, that most parents or childminders would be unable to complete the form on their own.

The cut off score (<40) under which children were considered to be at risk was only exceeded by 6 of the 125 (4.8%) children whose parents had been interviewed in this study. The corresponding figure given in the HSQ

instructions is 34%(122) . Thus in,our hands, using the standardised criteria, the test would fail as a screening test for school failure as virtually every child would be considered to be at risk which of course may in fact be true given their home circumstances.

However if an HSQ score of 30 was used as a cut of point then a significantly larger number of controls(62%) as compared to study children (29%) would not need any further intervention. The test would thus have a sensitivity of 78.75% and a specificity of 62.2% and thus would be a reasonable screening tool.

Looking at individual variables considered in the HSQ which ostensibly did not reflect SES but were linked to the nurturance of the home environment and had not been included in the questionnaire devised by the author, it would seem that many of these appeared to have some role in students coping with their first school year.

Compared with study children a significantly larger number of control parents had made an effort to teach their children shape naming, songs or nursery rhymes, the alphabet and reading. In addition, significantly more control children spent time with their fathers or other male figure than did those of the study group. Teaching children to name colours prior to their going to school seemed to be generally ubiquitous and did not correlate with school results. There were also no differences between the two groups as regards feeding children prior to mealtimes, spankings for maintaining discipline or being taken to shops. However the HSQ questionnaire did not address the difference between going to the local corner store and visiting a

hypermarket. This may be of some importance as it seemed as though better off families used the hypermarket in preference to the local more expensive and much more limited corner shop.

Reading to children did not appear to be part of the culture of this community and the number of children read to was not significantly different in either group. More than two thirds of all the children were read to only once or less per week and these readings were often limited to portions of the bible or koran. Many parents seemed quite suprised at the question pertaining to reading and reacted as though such a thought had never crossed their minds. This substantiates Brown's statement that "the parent's attitude to reading stories to their children at bedtime is culturally determined and so is the presence of books in the home"(182)

The objectives of the teachers' questionnaire was to try indirectly to establish the quality of teaching the pupils received, the insight the teachers had of their pupils problems and the means they used to solve them.

It is well established that teachers in the former nonwhite education departments were underqualified and that the least qualified teachers were allocated to teaching at the most junior level(1). Thus the finding that 40% of the teachers who completed the questionnaire did not have a Matriculation exemption or equivalent came as no surprise. However, all but 2/30 had had at least 1 year of special training for teaching school entrants.

All the teachers were female and many were elderly with a great

deal of experience having taught either Sub A/B all through their teaching careers. However one can surmise that they were unlikely to be open to more modern methods of pedagogy and would have benefited from more inservice training. The younger teachers were better trained as the minimum criteria for acceptable teacher training had been raised over the years. However these teachers made up just less than a third of the sample.

Of the possible 7 causes of school failure which they were asked to rank it is noteworthy that the one most commonly chosen as the prime cause was "too young at school entry". This has been shown in the present study to be an important contributory factor to school failure and is probably the one that it is most easy to do something about.

Teachers when asked if they thought any major cause for school failure had been omitted from the list they were given, or if they wanted to add any other possibilities answered in the negative.

Weighting the responses for the prime cause of school failure still left "too young for school" as the most commonly perceived cause. Suprisingly it was followed by "class was too big." Classes ranged in size from 30 to 35, which although not ideal, is far smaller than the classes found in schools for black African children. Unfortunately it is highly unlikely that classes will become smaller in the foreseeable future as the government policy of achieving equity in education for all sections of the population is obviously going to be regulated by budgetary limitations.

Abuse of alcohol in the home was seen as the third most important reason for children doing badly at school. This is partly supported

by our finding that 30% of school failures reported excessive alcohol intake by at least one member of the household whereas the corresponding figure for controls was 15%. That single parent family was considered to be relatively unimportant as a reason for school failure reflects how close to the norm this type of situation is in the Coloured community. Our study bears this out as in only about 35% of families of both study and control children were both parents living at home.

All teachers felt that they could determine which of their pupils would not cope within the first half of the school year and almost all felt that the child's parents should be contacted and the problem discussed.

What the teachers envisaged as a plan of action was left as an open ended question. This ensured that their replies would not be biased by the investigator's perceptions.

In spite of the fact that most teachers knew that the study was closely associated with the Developmental Assessment Clinic at Coronation Hospital, the strategy most of them put forward was that the parent should get more involved with the child's homework and schooling in general and that there should be more cooperation between parents and the teacher. A mere 13% (4 teachers) thought that a consultation at the assessment clinic would be a good idea.

In view of the fact that so many of the referrals to the clinic are of children who have a long record of failure and it is often too late for successful therapy, the response from the teachers, while most disappointing, accurately reflected the perception of the staff of the

developmental assessment clinic that many teachers in the Coloured Education Department were not aware of even the limited facilities that were available or the need to get help as soon as possible. These findings underline the great need for teacher education regarding learning problems and how to manage them.

The means and the medians of the Griffiths quotient for both the study and control groups fell below the test median of 100 indicating the probable effect of low SES and relative understimulation. However the study group's scores were significantly lower than that of the controls. Nevertheless there was a considerable overlap of GQ scores in the two groups, thus GQ scores alone did not help to establish all the children at risk of failing.

Although the 15 of the 30 study children who had had a Griffiths test and presented for a full assessment were not randomly chosen, the fact that 13 of them had specific problems must be of some significance. Even the other two children who were globally affected would have benefited from some form of intervention.

Accepting that only those children whose problem was most evident to their parents, came to the clinic for an assessment and assuming the other 15 who stayed away, had no specific problems, it would seem to be justified that all children who fail Sub A for the first time should have their developmental status fully evaluated as they appeared to have at least a 50% chance of having a remedial problem. Although time consuming and labour intensive, if this form of testing can help the child get over any

specific hurdle or ensure correct placement the effort would be well worthwhile. In fact in a country where trained personnel are in short supply, purely as a value judgement, it would seem that the children with borderline normal GQs probably affected by lack of stimulation should have priority for any form of therapy that is available.

CHAPTER 8

SUMMARY AND CONCLUSIONS

This study confirms the perception that an unacceptably high number of children attending schools which fell under the aegis of the Department of Coloured Education failed to cope successfully academically in their first year at school.

In an attempt to elucidate the cause of this and perhaps endeavour to be able to predict the individual child's likelihood of failure, the most successful children in the same class acted as controls for a study group of children who had failed to be promoted at the end of their first school year.

Based on findings in the previous literature to which school failure had been attributed, variables which fell into 2 main categories, namely nutritional status and socio- environmental factors, were examined.

Whilst anthropometry revealed that in both groups of children centiles for height and weight were shifted to the left, intergroup differences failed to reach statistical significance with the exception of the finding that more study children were below the 25th centile for height for age. However there was a consistent trend for study children as a group to be smaller and lighter than their controls. Thus this study, as so many others, fails to clarify the relationship, if any, between mild malnutrition and cognitive ability. One can only perforce agree with Wachs(149) and conclude that chronic

malnutrition may be a necessary but insufficient influence for explaining variability in cognitive performance.

From the biochemical measurements carried out in this study, it would seem that Fe deficiency rather than actual Fe deficiency anaemia is of greater relevance in the population investigated. Whilst it was not shown to have been related to cognitive function, the use of prophylactic Fe supplementation might be an option to be considered.

Lead blood levels in this investigation proved to be considerably lower than that found in previous South African studies and were generally below those considered to be associated with neuro-physiological deficits.

Whilst gestational and peri-natal factors are well established causes of poor cognition, the number of children participating in this study was perhaps too small to obtain meaningful results for these variables. In addition as many children have severe sequelae from genetic abnormalities, congenital infections and perinatal misadventure, many of these are never admitted to main-stream schools.

Our results confirmed that poor SES adversely affected the scholastic success of the children. However this remains a variable which will not be impacted on in the foreseeable future and therefore the teasing out of specific factors involved in Broffenbrenners nested structures paradigm may offer a better approach to improving the situation.

Of prime importance is that this study showed that commencement of formal schooling at too young an age, particularly in understimulated children, is a major factor resulting in school failure in the first year at

of school failure as exemplified by the high failure rate found in siblings then chances of a poor outcome were considerably increased. Enrollment at pre-school or at pre-school and creche prior to commencing school was shown to increase the chances of school success as did evidence of home stimulation such as teaching of songs and drawing and naming of shapes by parents or siblings. These findings suggest that attendance at pre-school should become a prerequisite for all children and should form part of the compulsory school curriculum with no extra costs to the parents. This would also serve to prevent children from starting Sub A before the age of 6 years and in turn succeed in reducing the abysmally high failure rate of these children.

As used by us, the HSQ appears to be an effective screening tool for finding children at risk for school failure. Unfortunately it seems unlikely that parents would be able to complete the questionnaire by themselves. Perhaps they could attempt to complete as much of the form as possible and then any their queries or problems could be addressed by a trained supervisor. In this manner the HSQ might be a useful and practical tool for spotting the "at risk for school failure" child.

Whilst teachers in this community seemed to be adequately trained and are aware of the major causes of school failure, they do not seem to consider the option of an early examination by the local learning assessment clinic as a useful approach to the child who is likely to fail. They appeared to think that involving parents and asking them to work harder with the child are the best means at their disposal for helping the child. This attitude is reflected by the large number of children who only arrive for an assessment after having

failed a class 3 or 4 times or alternatively having been pushed to the next higher class because they are too old to keep back and their new teacher finds that they are unable to read, write or do any calculations. By this stage the children are too old for therapy and the situation is not retrievable.

Of the children in this study who had a full developmental evaluation by the complete assessment team, the number in whom problems were found that could be improved by occupational and/or speech therapy or required remedial teaching was considerable. The therapy they received proved of great value.

While the study design did not allow for the possibility of arriving at a definite conclusion as regards the effectiveness of spotting the "child at risk of failing" using the HSQ, followed by a developmental assessment combined with appropriate therapy and so avoiding school failure, the relevant findings strongly suggest that this might be the case. If these measures were carried out on children who, according to their teacher, had not made satisfactory progress at the end of the pre-school year, the numbers involved might be reduced to manageable proportions. Should such an approach not be possible, then the initial step to avoid school failure at the first hurdle should be to ensure that no child commences school before the age of 7 years. This, hopefully, would be followed by instituting a compulsory year of pre-school education. Together these two measures would be both successful and cost-effective.

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NAME OF SCHOOL

DATE ☐ 1984

HOME TELEPHONE

CONTROL ☐

INFORMED CONSENT FORM FOR YOUR CHILDS PARTICIPATION
IN A STUDY TO DETERMINE WHY SO MANY SO CALLED
COLOURED CHILDREN FAIL SUB A.

You as a parent must be fully aware of the importance of education in the lives of your children. Without education children will not be able to take their rightful place in the "New South Africa".

Many more coloured children fail Sub A than do their white counterparts. We would like to know the reason for this and try and find out if there is something that can be done about the situation. That is why we are doing this study.

We are thus asking your permission to allow your child to take part in the study. What will this involve?

- 1) We will need the parents cooperation to help us fill out a questionnaire about the number of children in the family, the type of housing, the family structure etc. Also we will want to know about the birth of the child and his/her medical history. This should not take more than 50 minutes. This will be done in your home at a time convenient to you.
- 2) The child will then have a complete physical examination and his scholastic abilities will be assessed. This will be done at Coronation Hospital and will take about 1 hour.
- 3) We will have to take 10 ml of blood from the child to see if we can trace any physical problems that may lead to poor school performance or might help to maintain good school performance.
PLEASE NOTE THAT BOTH SUCCESSFUL PUPILS AS WELL AS THOSE WHO HAVE NOT DONE WELL WILL BE ENROLLED IN THE STUDY

- 4) If we feel that the child requires and will benefit from other tests after the examination we would ask your permission to carry these out.

If the above is agreeable to you, please fill out the short form below.

I.....being the parent or legal guardian of.....agree to allow him/her to participate in the above study and understand that blood will be taken from the child on one occasion only. I also understand that I may withdraw my child from the study whenever I wish to.

____ day ____ month ____ year
Date

Signature of parent or guardian

IF NO HOME TELEPHONE:
THEN ANY CONTACT PHONE NO:

NAME:..... DATE OF BIRTH:.....

ADDRESS:..... PRESENT AGE:.....

DATE OF INTERVIEW:.....

RACE GROUP: W ☐ C ☐ I ☐ B ☐

RELIGION: CHRISTIAN ☐ MOSLEM ☐ OTHER ☐

INTERVIEWERS NAME:.....

RELATIONSHIP OF INTERVIEWEE TO PROPOSITUS:.....

HOME LANGUAGE: ENGLISH ☐ AFRIKAANS ☐ OTHER ☐

SCHOOL MEDIUM: ENGLISH ☐ AFRIKAANS ☐

HOUSEHOLD MEMBERS:..

IMMEDIATE FAMILY: Father ☐ Y ☐ N

Mother ☐ Y ☐ N

Step-father ☐ Y ☐ N

Grandmother ☐ Y ☐ N

Grandfather ☐ Y ☐ N

Mother's boy friend ☐ Y ☐ N

Father's girl friend ☐ Y ☐ N

SIBLINGS (SEX & AGE): 1. ☐ M ☐ F years.

2. ☐ M ☐ F years.

3. ☐ M ☐ F years.

4. ☐ M ☐ F years.

5. ☐ M ☐ F years.

6. ☐ M ☐ F years.

OTHER ADULTS: MALE (NO):..... FEMALE (NO):

OTHER CHILDREN (UNDER 18 YRS OLD): MALE (NO):..... FEMALE (NO):

PARENTS:

FATHER MOTHER

AGE IN YEARS

--	--

LAST STANDARD PASSED AT SCHOOL

--	--

MARITAL STATUS

--	--

EMPLOYED (YES/NO)

--	--

TYPE OF WORK

AFTER SCHOOL CARE GIVER IF PARENTS WORK:

SIBLINGS SCHOOLING (IN ORDER BY AGE)

SIBLING	PRESENT STANDARD		NO OF TIMES FAILED	
SIBLING 1	PRESENT STANDARD		NO OF TIMES FAILED	
SIBLING 2	PRESENT STANDARD		NO OF TIMES FAILED	
SIBLING 3	PRESENT STANDARD		NO OF TIMES FAILED	
SIBLING 4	PRESENT STANDARD		NO OF TIMES FAILED	
SIBLING 5	PRESENT STANDARD		NO OF TIMES FAILED	
SIBLING 6	PRESENT STANDARD		NO OF TIMES FAILED	

PROPOSITUS SCHOOLING:

ATTENDED NURSERY SCHOOL FOR 6 MONTHS OR MORE

Y	N
---	---

ATTENDED PRESCHOOL

Y	N
---	---

NO OF TIMES FAILED SUB A

1	2	3
---	---	---

SCHOOL REPORT AVAILABLE

Y

N

REASON FOR FAILURE AS DEDUCED FROM SCHOOL REPORT

POOR MATHEMATICAL ABILITY

Y

N

POOR ENGLISH

Y

N

POOR AFRIKAANS

Y

N

BEHAVIOURAL IMMATUREITY

Y

N

ALL OF THE ABOVE

Y

N

ILLNESS: STATE NUMBER OF DAYS ABSENT

DOES THE CHILD HAVE BREAKFAST BEFORE SCHOOL

NEVER

SOMETIMES

ALWAYS

IF YES, WHAT DOES THE CHILD EAT

DOES THE CHILD TAKE LUNCH TO SCHOOL

NEVER

SOMETIMES

ALWAYS

DOES THE PROPOSITUS HAVE TO DO ANY HOUSEHOLD CHORES
BEFORE OR AFTER SCHOOL

Y

N

IF YES, SPECIFY

NUMBER OF BEDROOMS IN HOUSE/FLAT

DOES NUCLEAR FAMILY OWN

1) MOTOR CAR

Y

N

2) T.V.

Y

N

3) RADIO

Y

N

4) TAPE DECK

Y

N

5) C.D. PLAYER

Y

N

6) A REFRIGERATOR

Y

N

DOES HOUSEHOLD HAVE

1) TELEPHONE

Y

N

2) MOTOR CAR

Y

N

3) A T.V.

Y

N

4) A RADIO

Y

N

5) A TAPE DECK

Y

N

6) A REFRIGERATOR

Y

N

DO YOU OWN ANY BOOKS WHICH ARE KEPT IN THE HOME

Y

N

IF YES, IS IT ONLY THE BIBLE?

Y

N

BIBLE PLUS SCHOOL BOOKS

Y

N

IF NO, DO YOU HAVE 10 OR MORE BOOKS?

Y

N

DOES ANYONE IN THE HOUSEHOLD BORROW BOOKS FROM THE LIBRARY

Y

N

DOES ANYONE IN THE HOUSEHOLD GET A DAILY NEWSPAPER

Y

N

DOES ANYONE READ PICTURE MAGAZINES REGULARLY

Y

N

DOES ANYONE READ COMICS REGULARLY

Y

N

PERINATAL HISTORY:

DID MOTHER ATTEND ANTE-NATAL CLINIC DURING PREGNANCY?

Y

N

IF YES, FOR HOW MANY TIMES?

1

2

3

4

5

or more

WAS MOTHER'S BLOOD TAKEN AT A.N.C.?

Y

N

DID MOTHER RECEIVE INJECTIONS DURING PREGNANCY?

Y

N

IF YES, HOW MANY?

1

2

3

4

or more

DID MOTHER TAKE ANY MEDICINES DURING PREGNANCY?

Y

N

IF YES, WHAT MEDICINES? (1)

(2)

(3)

DID THE MOTHER SMOKE DURING PREGNANCY?

Y

N

IF YES, HOW MANY DAILY? LESS THAN 5

5-10

MORE THAN 10

DID MOTHER TAKE ANY ALCOHOL DURING PREGNANCY?

Y

N

IF YES, HOW OFTEN? OCCASIONALLY

OFTEN

DAILY

WAS THE BABY BORN AT THE RIGHT TIME

TOO EARLY

TOO LATE

WAS IT A NORMAL BIRTH?

☐ Y☐ N

BREECH DELIVERY

☐ Y☐ N

FORCEPS DELIVERY

☐ Y☐ N

CAESARIAN SECTION

☐ Y☐ N

BIRTH WEIGHT (IF KNOWN) gms

WAS THE BABY

VERY SMALL

☐

AVERAGE

☐

BIG

☐

WAS THE BABY JAUNDICED (YELLOW)

☐ Y☐ N

DID THE BABY HAVE BLUE LIGHT . .

☐ Y☐ N

FOR HOW MANY DAYS?

☐

WAS THE BABY IN AN INCUBATOR?

☐ Y☐ N

FOR HOW MANY DAYS?

☐

WAS THE BABY VENTILATED IN I.C.U.?

☐ Y☐ N

FOR HOW MANY DAYS?

☐

HOW LONG DID YOUR
BABY STAY IN HOSPITAL
AFTER BIRTH (DAYS

☐ DAYS

POST NATAL HISTORY:

HAS THE CHILD EVER BEEN HOSPITALISED?

Y

N

IF YES, HOW MANY TIMES?

1

2

3

4

5

WHAT WAS THE DIAGNOSIS/PROBLEM ON EACH OCCASSION?

- (1).....
- (2).....
- (3).....
- (4).....
- (5).....

SOME FURNISHINGS (RATE OUT OF 10.)

- EXCELLENT = 9-10.
- GOOD = 7-8
- DECADE = 5-6.
- POOR = 3-5
- POOR = 0-2

RATING

Child's Name _____ Birthdate _____ Age _____
Parent's Name _____ Phone No. _____
Address _____ Date _____

HOME SCREENING QUESTIONNAIRE
Ages 3-6 Years

Please answer all of the following questions about how your child's time is spent and some of the activities of your family. On some questions, you may want to check more than one blank.

1. a) Do you get any magazines in the mail? YES NO
b) If yes, what kind?
_____ home and family magazines
_____ news magazines
_____ children's magazines
_____ other

2. Does your child have a toy box or other special place where he/she keeps his/her toys? YES NO

3. How many children's books does your family own?

_____ 0 to 2
_____ 3 to 9
_____ 10 or more

4. How many books do you have besides children's books?

_____ 0 to 9
_____ 10 to 20
_____ more than 20

Where do you keep them?

_____ in boxes (packed)
_____ on a bookcase
_____ other (explain _____)

5. How often does someone take your child into a grocery store?

_____ hardly ever; I prefer to go alone
_____ at least once a month
_____ at least twice a month
_____ at least once a week

6. About how many times in the past week did you have to spank your child? _____

7. Do you have a T.V.? YES NO
About how many hours is the T.V. on each day? _____

FOR
OFFICE
USE
ONLY

8. How often does someone get a chance to read stories to your child?

_____ hardly ever
_____ at least once a week
_____ at least 3 times a week
_____ at least 5 times a week

9. Do you ever sing to your child when he/she is nearby? YES NO

10. Does your child put away his/her toy by himself/herself most of the time? YES NO

11. Is your child allowed to walk or ride his tricycle by himself/herself to the house of a friend or relative? YES NO

12. What do you do with your child's art work?

_____ let him/her keep it
_____ put it away
_____ hang it somewhere in the house
_____ throw it away shortly after looking at it

13. In the space below write what you might say if your child said, "Look at that big truck".

14. What do you usually do when a friend visiting you in your home and your child has nothing to do?

_____ suggest something for him/her to do
_____ offer him/her a toy
_____ give him/her a cookie or something to eat
_____ put him/her to bed for a nap
_____ play with him/her

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15. How often does your child eat a meal at the table with both mother and father (or other adult male)?
- ☐ never
- ☐ at least once a month
- ☐ at least once a week
- ☐ at least twice a week
- ☐ at least 3 or 4 times a week
- ☐ at least once a day

16. How often does your child spend time playing or "working" with his/her father (or other adult male)?
- ☐ at least 4 times a week
- ☐ at least twice a week
- ☐ at least once a week
- ☐ at least once a month
- ☐ never

17. How often does someone get a chance to take your child out of the house for an outing (shopping, park, zoo, restaurant museum, car trip, library, etc.)?
- ☐ at least 6 times a year
- ☐ at least once a month
- ☐ at least twice a month
- ☐ at least once a week

18. Check the things which you (or other adult or older child) are helping or have helped your child to learn:
- a. ☐ colors (like naming colors of things)
- b. ☐ alphabet
- c. ☐ numbers
- d. ☐ understanding of time (like morning-afternoon and now-later)
- e. ☐ shapes (like drawing circles or squares)
- f. ☐ reading new words or writing his/her name

19. Has your child learned any songs, prayers, or nursery rhymes?
- YES NO

If yes, where did he learn them?

- ☐ at day care or preschool
- ☐ from a sister or brother
- ☐ at church or Sunday School
- ☐ from mother or father
- ☐ from television

20. It is 30 minutes before dinner and your child is hungry. Most of the time you would:
- ☐ give him/her a snack
- ☐ have him/her wait for dinner

21. Which items do you sometimes let your child choose for himself herself?

- ☐ part of what to have for breakfast or lunch
- ☐ favorite foods in the grocery store (fruit, cereal, cookies, etc.)
- ☐ the clothes he wants to put on
- ☐ none of the above

22. What would you do if your child got angry and hit you?
- ☐ hit him/her to show him/her it hurts
- ☐ send him/her to his/her room
- ☐ spank him/her
- ☐ talk to him/her
- ☐ ignore it

23. Do you have any pets? YES NO

24. Do you have any plants in your house? YES NO

25. Which of the following best describes your neighborhood:
- ☐ it is not as clean as I would like it
- ☐ the houses are not well cared for
- ☐ it is well cared for
- ☐ it is well cared for and attractive

26. How many bedrooms does your house have? _____
- How many people are living in your house? _____

27. Do you occasionally try new recipes that you find in the newspaper or in magazines?
- YES NO

28. Is anyone in the family presently taking a class in school at the college level? YES NO

29. Who buys the groceries for the family?

- | Sometimes | Often |
|--------------------------|--------------------------------------|
| ☐ | ☐ Mother |
| ☐ | ☐ Father |
| ☐ | ☐ Grandparent |
| ☐ | ☐ Older child |
| ☐ | ☐ Other |

Go on to next page

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30. Most of the decisions about how the family income is to be spent are made by
- ☐ Mother
 - ☐ Father
 - ☐ Grandparent
 - ☐ Friend

31. How often do you and your child get a chance to play together (like pretend games, dolls, house, cars and trucks, or table games)?
- ☐ hardly ever; too young
 - ☐ at least once a week
 - ☐ at least 3-4 times a week
 - ☐ everyday

32. Do you have any friends or relatives with children about the same age as your child? YES NO

33. When your child asks if he/she can do something you think he/she is too young to do, would you be more likely to say
- ☐ no, I don't want you to
 - ☐ no
 - ☐ not now.
 - ☐ No. You're too young now but when you're older you'll be able to do it.

34. What would happen if your child spilled his/her milk?
- ☐ he/she would be spanked
 - ☐ he/she would have to clean it up
 - ☐ someone else would clean it up
 - ☐ he/she would be sent to his/her room

Please complete the checklist on the next page

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See the HSQ Reference Manual for scoring instructions.

Questions Subtotal _____

Toy Checklist Subtotal _____

TOTAL HSQ SCORE _____

HSQ Results _____

Scorer's Name _____

We are interested in finding out what kinds of toys children have in their homes. The items listed below are for children of different ages.

PLEASE CHECK ANY OF THE FOLLOWING THAT YOU HAVE IN YOUR HOME AND THAT YOUR CHILD IS ALLOWED TO PLAY WITH. DO NOT CHECK THE ONES THAT YOU DO NOT HAVE NOW OR ONES THAT ARE BROKEN.

DO NOT EXPECT A CHILD TO HAVE ALL OF THESE ITEMS.

- | | |
|---|--|
| 1. ☐ dolls with clothes or paper dolls | 25. ☐ shape ball or box |
| 2. ☐ stuffed animals, animal toys or animal books | 26. ☐ crib gym |
| 3. ☐ dress-up clothes or costumes | 27. ☐ jumpseat or door swing |
| 4. ☐ tricycle, bicycle or scooter | 28. ☐ squeeze toys |
| 5. ☐ stroller or walker | 29. ☐ rattles |
| 6. ☐ wagon | 30. ☐ T.V. |
| 7. ☐ Big Wheel or child-size car | 31. ☐ Busy Box |
| 8. ☐ pull or push toy | 32. ☐ gun |
| 9. ☐ mobile | 33. ☐ clay or play dough |
| 10. ☐ child-size furniture | 34. ☐ real or toy musical instruments |
| 11. ☐ high chair | 35. ☐ sand box |
| 12. ☐ playpen | 36. ☐ homemade building toys |
| 13. ☐ puzzles - at least three | 37. ☐ blocks |
| 14. ☐ alphabet toy, alphabet game or alphabet book | 38. ☐ Tinker Toys, Lego or Lincoln Logs |
| 15. ☐ number toy, number game or number book | 39. ☐ record player |
| 16. ☐ coloring book | 40. ☐ children's records |
| 17. ☐ dot-to-dot or color-by-number book | 41. ☐ chalkboard |
| 18. ☐ scissors | 42. ☐ swings |
| 19. ☐ pegboard | 43. ☐ jungle gym |
| 20. ☐ toy telephone | 44. ☐ car, truck or train |
| 21. ☐ plastic snap-together beads | 45. ☐ measuring cups |
| 22. ☐ musica. or music box | 46. ☐ pots and pans |
| 23. ☐ children's books | 47. ☐ toy dishes |
| 24. ☐ ball | 48. ☐ doll carriage |
| | 49. ☐ plastic tools and workbench |
| | 50. ☐ crayons, paints or pencils |

ADDENDUM TO QUESTIONNAIRE

PLACE OF BIRTH OF STUDY CHILD.....

WHEN CHILD IS 16 YEARS OLD DO YOU EXPECT HIM/HER TO
LEAVE SCHOOL AND GO TO WORK

YES..... NO.....

IF NO DO, YOU EXPECT YOUR CHILD TO PASS 1) STD. 8
2) MATRIC
3) GO TO UNIVERSITY OR TECHNICON
3) OTHER

YES..... NO.....
YES..... NO.....
YES..... NO.....
YES..... NO.....

HOW MANY CHANGES OF ADDRESS HAS THE CHILD HAD

0..... 1-2..... >4.....

HOW MANY CHANGES OF CARE GIVER SINCE BIRTH

0..... 1-2..... >4.....

HAS THE MOTHER EVER BEEN MARRIED

1) TO THE CHILDS FATHER
2) TO ANYONE ELSE

YES..... NO.....
YES..... NO.....
YES..... NO.....

HAVE THE CHILDS PARENTS BEEN DIVORCED

DOES THE MOTHER SEE THE CHILDS FATHER
REGULARLY (IF NOT MARRIED)

YES..... NO.....

DOES THE MOTHER HAVE A STEADY BOY FRIEND
AT PRESENT

YES..... NO.....

INTERVIEWERS ASSESSMENT:

DOES THE INTERVIEWEE SPEAK HER HOME LANGUAGE

UNMIXED AND GRAMMATICALLY

YES..... NO.....

UNMIXED BUT UNGRAMMATICALLY

YES..... NO.....

SLIGHTLY MIXED WITH ANOTHER LANGUAGE.

YES..... NO.....

VERY MIXED WITH ANOTHER LANGUAGE

YES..... NO.....

DOES THE FAMILY EMPLOY A DOMESTIC

YES..... NO.....

ANYONE WITH AN ALCOHOL PROBLEM.
IN THE HOUSEHOLD.

YES..... NO.....

IF YES. WHO?

IS IT IMPORTANT IF A CHILD FAILS
SUB A.

YES..... NO.....
DONT KNOW.....

WHAT DOES THIS TELL YOU ABOUT THE CHILD?

DO YOU THINK THAT THINGS WILL BE
BETTER AND YOUR CHILD WILL HAVE
MORE OPPORTUNITIES IN THE NEW S. AFRICA.
THAN YOU HAD

YES..... NO.....
DONT KNOW.....

Child's Name _____ Birthdate _____ Age _____

Parent's Name _____ Phone No. _____

Address _____ Date _____

HOME SCREENING QUESTIONNAIRE
Ages 3-6 Years

Please answer all of the following questions about how your child's time is spent and some of the activities of your family. On some questions, you may want to check more than one blank.

FOR
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_____ other
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3. How many children's books does your family own?
_____ 0 to 2
_____ 3 to 9
_____ 10 or more
4. How many books do you have besides children's books?
_____ 0 to 9
_____ 10 to 20
_____ more than 20
Adult Only
Where do you keep them?
_____ in boxes (packed)
_____ on a bookcase
_____ other (explain _____)
_____)
5. How often does someone take your child into a grocery store?
_____ hardly ever; I prefer to go alone
_____ at least once a month
_____ at least twice a month
_____ at least once a week
6. About how many times in the past week did you have to spank your child? _____
7. Do you have a T.V.? YES NO
About how many hours is the T.V. on each day? _____

FOR
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USE
ONLY

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_____ suggest something for him/her to do
_____ offer him/her a toy
_____ give him/her a cookie or something to eat
_____ put him/her to bed for a nap
_____ play with him/her

FOR
ICE
USE
ONLY

15. How often does your child eat a meal at the table with both mother and father (or other adult male)?
- _____ never
- _____ at least once a month
- _____ at least once a week
- _____ at least twice a week
- _____ at least 3 or 4 times a week
- _____ at least once a day

16. How often does your child spend time playing or "working" with his/her father (or other adult male)?
- _____ at least 4 times a week
- _____ at least twice a week
- _____ at least once a week
- _____ at least once a month
- _____ never

17. How often does someone get a chance to take your child out of the house for an outing (shopping, park, zoo, restaurant museum, car trip, library, etc.)?
- _____ at least 6 times a year
- _____ at least once a month
- _____ at least twice a month
- _____ at least once a week

18. Check the things which you (or other adult or older child) are helping or have helped your child to learn:

- a. _____ colors (like naming colors of things)
- b. _____ alphabet
- c. _____ numbers
- d. _____ understanding of time (like morning-afternoon and now-later)
- e. _____ shapes (like drawing circles or squares)
- f. _____ reading new words or writing his/her name

19. Has your child learned any songs, prayers, or nursery rhymes?
- YES NO

If yes, where did he learn them?

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- _____ from a sister or brother
- _____ at church or Sunday School
- _____ from mother or father
- _____ from television

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- _____ give him/her a snack
- _____ have him/her wait for dinner

FOR
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USE
ONLY

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- _____ part of what to have for breakfast or lunch
- _____ favorite foods in the grocery store (fruit, cereal, cookies, etc.)
- _____ the clothes he wants to put on
- _____ none of the above
22. What would you do if your child got angry and hit you?
- _____ hit him/her to show him/her it hurts
- _____ send him/her to his/her room
- _____ spank him/her
- _____ talk to him/her
- _____ ignore it

23. Do you have any pets? YES NO

24. Do you have any plants in your house? YES NO

25. Which of the following best describes your neighborhood:
- _____ it is not as clean as I would like it
- _____ the houses are not well cared for
- _____ it is well cared for
- _____ it is well cared for and attractive

26. How many bedrooms does your house have? _____
- How many people are living in your house? _____

27. Do you occasionally try new recipes that you find in the newspaper or in magazines?
- YES NO

28. Is anyone in the family presently taking a class in school at the college level? YES NO

29. Who buys the groceries for the family?

Sometimes	Often
_____	_____ Mother
_____	_____ Father
_____	_____ Grandparent
_____	_____ Older child
_____	_____ Other

FOR
OFFICE
USE
ONLY

FOR
OFFICE
USE
ONLY

30. Most of the decisions about how the family income is to be spent are made by

☐ Mother
☐ Father
☐ Grandparent
☐ Friend

34. What would happen if your child spilled his/her milk?

☐ he/she would be spanked
☐ he/she would have to clean it up
☐ someone else would clean it up
☐ he/she would be sent to his/her room

31. How often do you and your child get a chance to play together (like pretend games, dolls, house, cars and trucks, or table games)?

☐ hardly ever; too young
☐ at least once a week
☐ at least 3-4 times a week
☐ everyday

Please complete the checklist on the next page.

32. Do you have any friends or relatives with children about the same age as your child? YES NO

33. When your child asks if he/she can do something you think he/she is too young to do, would you be more likely to say

☐ no, I don't want you to
☐ no
☐ not now
☐ No. You're too young now but when you're older you'll be able to do it.

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See the HSQ Reference Manual for scoring instructions.

Questions Subtotal _____

Toy Checklist Subtotal _____

TOTAL HSQ SCORE _____

HSQ Results _____

Scorer's Name _____

We are interested in finding out what kinds of toys children have in their homes. The items listed below are for children of different ages.

PLEASE CHECK ANY OF THE FOLLOWING THAT YOU HAVE IN YOUR HOME AND THAT YOUR CHILD IS ALLOWED TO PLAY WITH. DO NOT CHECK THE ONES THAT YOU DO NOT HAVE NOW OR ONES THAT ARE BROKEN.

WE DO NOT EXPECT A CHILD TO HAVE ALL OF THESE ITEMS.

- | | |
|--|---|
| 1. ___ dolls with clothes or paper dolls | 25. ___ shape ball or box |
| 2. ___ stuffed animals, animal toys or animal books | 26. ___ crib gym |
| 3. ___ dress-up clothes or costumes | 27. ___ jumpseat or door swing |
| 4. ___ tricycle, bicycle or scooter | 28. ___ squeeze toys |
| 5. ___ stroller or walker | 29. ___ rattles |
| 6. ___ wagon | 30. ___ T.V. |
| 7. ___ Big Wheel or child-size car | 31. ___ Busy Box |
| 8. ___ pull or push toy | 32. ___ gun |
| 9. ___ mobile | 33. ___ clay or play dough |
| 10. ___ child-size furniture | 34. ___ real or toy musical instruments |
| 11. ___ high chair | 35. ___ sand box |
| 12. ___ playpen | 36. ___ homemade building toys |
| 13. ___ puzzles - at least three | 37. ___ blocks |
| 14. ___ alphabet toy, alphabet game or alphabet book | 38. ___ Tinker Toys, Lego or Lincoln Logs |
| 15. ___ number toy, number game or number book | 39. ___ record player |
| 16. ___ coloring book | 40. ___ children's records |
| 17. ___ dot-to-dot or color-by-number book | 41. ___ chalkboard |
| 18. ___ scissors | 42. ___ swings |
| 19. ___ pegboard | 43. ___ jungle gym |
| 20. ___ toy telephone | 44. ___ car, truck or train |
| 21. ___ plastic snap-together beads | 45. ___ measuring cups |
| 22. ___ musica. or music box | 46. ___ pots and pans |
| 23. ___ children's books | 47. ___ toy dishes |
| 24. ___ ball | 48. ___ doll carriage |
| | 49. ___ plastic tools and workbench |
| | 50. ___ crayons, paints or pencils |

IF YES, IS IT ONLY THE BIBLE?

Y

N

BIBLE PLUS SCHOOL BOOKS

Y

N

IF NO, DO YOU HAVE 10 OR MORE BOOKS?

Y

N

DOES ANYONE IN THE HOUSEHOLD BORROW BOOKS FROM THE LIBRARY

Y

N

DOES ANYONE IN THE HOUSEHOLD GET A DAILY NEWSPAPER

Y

N

DOES ANYONE READ PICTURE MAGAZINES REGULARLY

Y

N

DOES ANYONE READ COMICS REGULARLY

Y

N

PERINATAL HISTORY:

DID MOTHER ATTEND ANTE-NATAL CLINIC DURING PREGNANCY?

☐ Y☐ N

IF YES, FOR HOW MANY TIMES?

☐ 1☐ 2☐ 3☐ 4☐ 5

or more

WAS MOTHER'S BLOOD TAKEN AT A.N.C.?

☐ Y☐ N

DID MOTHER RECEIVE INJECTIONS DURING PREGNANCY?

☐ Y☐ N

IF YES, HOW MANY?

☐ 1☐ 2☐ 3☐ 4

or more

DID MOTHER TAKE ANY MEDICINES DURING PREGNANCY?

☐ Y☐ N

IF YES, WHAT MEDICINES? (1)

(2)

(3)

DID THE MOTHER SMOKE DURING PREGNANCY?

☐ Y☐ N

IF YES, HOW MANY DAILY? LESS THAN 5

☐

5-10

☐

MORE THAN 10

☐

DID MOTHER TAKE ANY ALCOHOL DURING PREGNANCY?

☐ Y☐ N

IF YES, HOW OFTEN? OCCASIONALLY

☐

OFTEN

☐

DAILY

☐

FOR HOW MANY DAYS?

HOW LONG DID YOUR BABY STAY IN HOSPITAL AFTER BIRTH?

DAYS

POST NATAL HISTORY:

HAS THE CHILD EVER BEEN HOSPITALISED?

☐ Y

☐ N

IF YES, HOW MANY TIMES?

☐ 1

☐ 2

☐ 3

☐ 4

☐ 5

WHAT WAS THE DIAGNOSIS/PROBLEM ON EACH OCCASSION?

(1).....

(2).....

(3).....

(4).....

(5).....

Author Rosen E U

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