The impact of family structure on schooling outcomes for children in South Africa

By

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ABSTRACT

This study investigates the impact of family structure on schooling outcomes for children aged 7 to 17 years in South Africa. There is limited recent national research focusing on examining factors affecting schooling outcomes for children beyond economic factors in South Africa. Most literature available is either based on selected provinces, communities and Demographic Surveillance Areas or studied schooling outcomes without delineating the effect of the family structures children live in. This study uses data on a sample of 225 538 children obtained from the Community Survey of 2007 (CS2007) which was conducted by Statistics South Africa. It identifies a taxonomy of family structures unique to South Africa in comparison to other parts of the world especially the developed world given the effects of long term migration and macro-social transformations such as HIV/AIDS, increase in urbanisation, decreasing marriage rates and increasing out-of-wedlock births all of which lead to more complex family structures being observed. The study uses quantitative techniques employing logistic and ordinary least squares regression models to analyse the odds of school enrolment for children and average highest grade completed for age. The results of the study show that family structure impacts on schooling outcomes for children significantly. The study thus arrives at the conclusion that, controlling for all other variables like age, sex, population group, province of residence, socioeconomic status and type of school, family structure has a significant impact on the schooling outcomes of children in South Africa.

Key words

Family structure, schooling outcomes, grade repetition, grade completion.

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DECLARATION

I declare that this dissertation is my own unaided work. All citations, references and borrowed ideas have been duly acknowledged. I confirm that an external editor was not used in the editing of this dissertation. It is being submitted for the degree of Masters in Population Studies in the College of Humanities, School of Built Environment and Development Studies, University of KwaZulu-Natal, Howard College, Durban, South Africa. None of the present work has been submitted previously for any degree or examination in any other University.

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Date

LIST OF ABBREVIATIONS

AHA	American Heart Association
AIDS	Acquired Immune Deficiency Syndrome
CS2007	Community Survey of 2007
EPCSA	Education Policy Consortium South Africa
EU	European Union
HIV	Human Immunodeficiency Virus
HSRC	Human Sciences Research Council
KZN	KwaZulu Natal
NIDS	National Income Dynamics Study
NMF	Nelson Mandela Foundation
OECD	Organisation for Economic Co-operation and Development
OLS	Ordinary Least Squares
MDGs	Millennium Development Goals
SA	South Africa
SAPS	South African Police Service
SES	Socioeconomic Status
SSA	Sub-Saharan Africa
UK	United Kingdom
UNESCO	United Nations Education, Scientific and Cultural Organisation
UNICEF	United Nations International Children's Emergency Fund
USA	United States of America

CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1: INTRODUCTION

1.1. Background to research

Lloyd and Blanc (1996) state that UNICEF in 1990, United Nations in 1994, and USAID in 1995 acknowledged and committed on the common view that education is an essential aspect of human development. This culminated on the incorporation of education as one of the 8 Millennium Development Goals (MDGs) in the 2000 United Nations Millennium Summit in New York, USA. Goal Number 2 of the MDGs aims to make education universal for boys and girls alike by 2015 (United Nations, 2012). It is reported that the majority of non-schooling children is found in sub-Saharan Africa and Southern Asia and one of the factors identified for this is inequality in societies (United Nations, 2012). Access to education can be an important aspect that reflects level of development in a country. At International population conferences, for example, International Conference on Population and Development in Cairo in 1994, and the 1995 World Summit for Social Development in Copenhagen, education was identified as a crucial factor in measuring development in developing countries (United Nations, 2012). However, these conferences were meant for policy formulation and not necessarily to determine the extent to which children's living arrangements impact on their schooling outcomes although there is academic literature on family structures which is largely based on studies conducted outside Africa.

Charles, Davies and Harris (2008:213) stated that social change, characterised by "de-domestication" of women, has been closely associated with changes in family structures with far reaching implications on child outcomes like educational attainment and health. In a related conclusion, it was observed that the well-being of children measured by different outcomes including educational attainment is "affected in important ways by the constellation of social relationships within which they live" (Townsend, Madhavan, Tollman, Garenne and Khan, 2002). In the past social change led to simplification of family systems; extended family households becoming less common while nuclear families becoming increasingly more common and were characterised by a more emphasis on investment in children's education and health needs (Goode, 1963). In several disciplines of the social sciences such as Population Studies, Economics and Psychology the subject of family structure and child development including educational attainment has received extensive theoretical and empirical investigation. Some of the theories developed include Becker's New Household Economics,

Ecological Systems, Vygotsky's Sociohistorical theory, Dynamic Systems theory, Economic Resource theory, Social Control and Economic Hardship theory among others (Bukatko and Daehler, 2011; Hill, Yeung and Duncan, 2001). The theories note the different living contexts within which children grow up particularly with regards to the presence and absence of parents.

The typology of family types that has been observed mostly in western countries such as the USA, Canada and UK comprise two-parent (intact biological) family, one-parent family and adopted family (Lansford *et al.*, 2001). The extended family system, still prevalent in modern South Africa, existed in the UK until the 1960s when women started entering the labour market (Charles *et al.*, 2008). Many studies have established the link between children's living arrangements and their schooling outcomes. Heiland and Liu (2006) compared children raised out of wedlock to those raised by married couples in USA and found the former to fare less on measures of well-being which included schooling outcomes. Related findings are reported in a recent publication by Fagan, Have, and Chen (2011) based on a US sample in which the socio-economic statuses of the families were controlled. According to Fagan *et al.* (2011) 85 per cent of adolescents from intact biological families complete high school compared to 67 per cent of students from single-parent families, 65.4 per cent from step-families and just 51.9 per cent of students who live with no parents. Moreover, children from non-intact families were found to be three times as likely to drop out of school as students from intact families.

Children's living arrangements and their impact on child outcomes have also been extensively studied in sub-Saharan Africa including South Africa. Bicego, Rutstein and Johnson (2003), in a study based on Demographic and Health Survey (DHS) data from seventeen sub-Saharan countries which include Zimbabwe, Kenya, Tanzania, Niger and Ghana, found higher levels of school dropout among children who have lost one or both parents. One of the reasons cited for to explain Bicego *et al.'s* (2003) finding was child mobility as orphaned children were found to frequently travel over long distances between households of relatives which disrupts children's schooling. Similar observations are reported in Ford and Hoosegood (2005) and Ainsworth and Semali (2003) in studies conducted in rural KZN and North Somalia respectively. Recent studies on changes in family systems in South Africa have noted the impact of HIV/AIDS and rising divorce rates. Cottrell, Merli and Nzimande (2007) state that HIV/AIDS, low marriage rates, delayed union formation and relatively high divorce rates in South Africa have resulted in different living arrangements for children with varying consequences on child development as many children are born and raised out of wedlock. A

previous study by Lloyd and Blanc (1996) based on a sample drawn in South Africa found that the presence of a female parent was associated with better schooling outcomes for children. Townsend *et al.* (2002) found similar findings in their study on children's living arrangements using data courtesy of the Agincourt Health and Population Programme in the Northern Province. Looking at changing family systems in South Africa using the 1991 census, 1996 census and 1998 South Africa Demographic Health Survey, Merli and Palloni (2004) highlighted that an increasing number of children were living with grandparents and extended family members in the wake of HIV/AIDS pandemic. Richter and Desmond (2008) confirmed this observation using data from national household surveys between 1995 and 2005, adding that child-headed households, despite being small in proportion, have rose markedly during the period especially considering the absolute numbers of children being orphaned. Orphanage, the condition of being deprived of parental care, especially the loss of the mother, almost tripled during the same period (Richter and Desmond, 2008). Most of the studies conducted in South African and sub-Saharan region were mostly either based on provinces or aimed at different objectives, this study will be based on a national sample and specifically focused on the impact of family structure (living arrangement) on children's schooling outcomes.

Family structure has been found to be an important factor in the schooling outcomes of children in most countries in the world including South Africa. The term 'family structure' is a social construct that can be genealogically or demographically conceptualized (Nam, 2005). It is used in this research in reference to its demographic meaning as captured in censuses, community or household surveys. The demographic meaning of family structure refers to the hierarchical social organization or arrangement that exists in a household and defines each member's position, functions and how they are related to other members living in the same residence as one family unit (Nam, 2005). Family structure can be used interchangeably with living arrangement or household because the three concepts carry similar meaning in demographic studies, and the latter two have been used in Cottrell *et al.* (2007) to refer to family structure. Living arrangements of children have been found to be linked to the level of income and socioeconomic status of households which affects the ability of a household to invest in children's education (Lansford, Ceballo, Abbey and Stewart, 2001). Using data from a Demographic Surveillance Area (DSA) in KwaZulu Natal (KZN) Case and Ardington (2006) found low enrolment rates and significantly fewer years of schooling completed among children without both of or one of their parents compared to those living with their parents. The level of income is generally lower in single-parent households than in two-parent

households and this subsequently impact on the level of expenditure on children's socio-economic needs such as education, health and shelter (Kibel, 2010; Lloyd and Desai, 1992). Studies investigating the importance of family structure in the United States of America and Canada found that children growing up in conventional two-parent households do better on measures of schooling outcomes compared to those in other family types (Gennetian, 2005; Lansford *et al.*, 2001).

1.2. Statement of the problem

South Africa's current social context of increasing divorce rates, low marriage rates and the history of migrant labour makes the study of the impact of family structure on children's well-being, which include educational attainment, an interesting subject for academic enquiry, state Holborn and Eddy (2011). The discovery of minerals like gold and platinum in areas surrounding Johannesburg coupled with the colonial political administrations' oppressive laws forced mostly African males to leave their families in search of paid employment in the mines resulting in growing prevalence of the absent father phenomenon. Despite improvements in the political environment that created the absent father since 1994 and the spread of capitalist values across the country, the family institution has not witnessed commensurate transformation anticipated in Goode's (1963) hypothesis. According to Cottrell *et al.* (2007) South Africa experienced profound socio-political and demographic changes in the 1990s that affected families' living arrangements. A major development was the emergence and spread of HIV/AIDS which only further complicated children's living arrangements while increasing the incidence of orphan-hood and widowhood (Cottrell *et al.*, 2007). According to Holborn and Eddy (2011:10), HIV/AIDS mortality and morbidity among young adults has "placed added burden on children" with negative implications on their educational careers especially in the context of rising unemployment. High unemployment means less income for the adult population left to care for children orphaned by HIV/AIDS mortality thus families will be unable to afford optimal investment in children's educational needs. Karim and Karim (2010) noted that HIV/AIDS has left in its wake a new form of family structure in South Africa, the child-headed household, as well as creating what has been called the skipped generation household.

Given the distinct context of South Africa due to factors highlighted in the preceding paragraph, this research departs from the western world's taxonomy of family structures and adopts one

that comprehensively captures the living arrangements prevalent in South Africa. The following taxonomy of family structures as identified by Cottrell *et al.* (2007:4) will therefore be adopted in examining the impact of family structure on children's schooling outcomes;

a. Nuclear structure, consisting of two parents and children (biological, adopted and stepchildren)
b. Incomplete nuclear structure, comprising of a single parent and his or her children;
c. Solitary structure: one person living alone;
d. Couple structure: consisting of two people living together as husband and wife or in a cohabiting relationship;
e. Extended structure (three generational households)
f. Skipped generation structure, consisting of grandparents and grandchildren;
g. Complex structure, which is any of the above with one or more non-related person; and
h. Other: a variety of household configurations that cannot be described by any of the above structures.

1.3. Purpose of the study

This study is designed to investigate the impact of family structure on the schooling outcomes of children aged 7 to 17 years in South Africa using the Community Survey of 2007. The study also seeks to add to the existing knowledge about children's living arrangements in South Africa inasmuch as there has not been literature on the subject based on recent national surveys. Previous related studies, for example, Cottrell *et al.* (2007); Amoateng, Heaton and Kalula-Gabiti (2007); Case and Ardington (2006); and Caldwell and Caldwell (1990) focused on selected provinces or research sites within provinces investigating different outcomes and not necessarily education. Although Fleisch, Shindler and Perry (2010) conducted a national study on children's schooling outcomes in South Africa, the focus was on identifying factors affecting enrolment and not the impact of family structure on schooling outcomes. Moreover, Fleisch *et al.*'s (2010) study did not identify the different family structures existing in South Africa thus could not delineate the effect on enrolment of living in different household types. This study will fill the gap in the existing literature regarding the impact of family structure on schooling outcomes using a nationally representative sample from the South African Community Survey of 2007. The study also seeks to enrich existing knowledge on schooling outcomes for children as well as family structures existing in modern South Africa.

The study has the following main objectives:

a) Determine the effect of family structure on the odds of school enrolment for children.
b) Investigate the effect of family structure on grade completion for children.

The following key questions will be asked:

a) What is the significance of family structure on the odds of school enrolment for children?
b) Does family structure affect grade completion by children?

1.4. Structure of dissertation

This dissertation consists of six chapters. The first chapter is the introduction which introduces the topic, outlines the contextual background as well as the problem statement of the study. It also highlights the rational and relevance of the study as has been demonstrated above. Chapter two contains a thorough review of literature on family structure, children's schooling outcomes, and previous findings on the effect of family structure on educational attainments of children. Chapter three discusses the research design and methodology of the study. It also describes the source of data, study sample as well as possible limitations of the methods used for data analysis. Chapter four presents the findings from data analysis on the odds of school enrolment for children. Chapter five presents findings from bivariate analysis and ordinary least squares regression on grade repetition, grade completion and average highest grade completed. Chapter six contains discussion of the main findings, recommendations and general conclusion on the study.

2.1. Introduction

In the international conferences of 1990, 1994 and 1995, UNICEF, UN and USAID respectively, emphasised the view that education is an essential aspect of human development (Lloyd and Blanc, 1996). According to UN (2012), goal number 2 of the Millennium Development Goals (MDGs) aims to make access to education universal for boys and girls alike by 2015. This goal, adopted in the year 2000 alongside seven others, is based on the acknowledgement that, besides itself being a measure of socioeconomic development in a country, education is an invaluable driver of human development (UN, 2012). To secure continued human development, children, who are the future custodians of this human advancement, must all be accorded equal access to education. However, access to education does not automatically translate to optimal educational attainment to every child. There are factors, besides economic, within children's social realms shaped by the family structures they live in which have been found to affect children's educational outcomes. It has been observed that child outcomes, including schooling and health, are "affected in important ways by the constellation of social relationships within which they live" (Townsend *et al.*, 2002:215). Family structure has been studied by many researchers in relation to its impact on the schooling outcomes of children. This chapter reviews past research and findings on the relationship between family structure and children's schooling outcomes. The literature to be reviewed first is that which was based on countries outside Africa. This will be followed by a review of research based on the sub-Saharan Africa, and finally literature based on the South African population. The South African literature to be reviewed includes changes in family structures in the country over time, and child outcomes in separate subsections, a format that will also be applied in subsection 2.2. A summary of the chapter will be provided at the end.

2.2. Research outside Africa

2.2.1. Types of family structures

The types of family structures existing at any point in time in a particular society are a result of contextual forces emanating from the cultural, religious and economic forms of production, knowledge and exchange systems prevailing in that society. In the pre-industrial era, families were generally large and often consisted of more than two generations per household given their agrarian-based subsistence production and communal lives theorised by French sociologist Ferdinand Tönnies in 1887 as gemeinschaft (Cahnman, 1973). The emergence and

growth of industry greatly altered the many aspects of the socio-economic organisation of the western world that favoured larger families. Goode (1983) identified socio-economic and demographic factors that changed the platform of family formation in Europe. The socio-economic factors included the separation of production from the domestic group, growth of non-familial education and dispersal of the kin while demographic factors comprised improvement in mortality, control of fertility and longer life spans which all, combined with rising prominence of individualism and an induced attitude towards small families, changed the platform for the formation of living arrangements (Goode, 1983). The developments in the socio-economic realms set family structures on a trajectory of continuous change which has culminated in the modern world's living arrangements characterised by low marriage rates, delayed marriages, high rate of marital divorce and high incidence of out of wedlock births.

Most studies based in USA, Europe, Australia and Canada have identified and classified family structures into four categories; two-parent (intact) family, single-parent family, stepfamily and others (Amato, 2007; Park, 2007; Lansford *et al.*, 2001). The four categories have been based on the traditional definition of the family which was first adopted for the 1940 census by US Census Bureau, defining a family as "a group of two people or more related by birth, marriage or adoption and residing together" (Tillman and Nam, 2008:368). Intact families make up what is referred to in literature as the nuclear family structure which used to be the dominant form of living arrangements before World War II. There are different forms of single-parent families, one headed by a female and another headed by a male as identified in Ginther and Pollak (2004); McLanahan and Sandefur (1994); Kiernan (1992). Stepfamilies comprise one biological parent of the children in the household and his or her spouse. According to Wattenberg (1986), adulthood to the baby boomers in USA coincided with socio-economic factors that resulted in the waning of the historical resistance to rearing children outside marriage hence the proliferation of the single-parent family structure beginning in the 1970s. Factors such as pursuit of higher education, professional careers, rising divorce rates and the tendency for man to choose spouses from younger cohorts for marriage which meant ever restricted chances of marriage for the female baby boomers in USA contributed to the growth of the single-parent family structure headed by a female (Wattenberg, 1986). Similar factors have been highlighted in recent studies on countries like Norway, Britain and Canada (Steele, Sigle-Rushton and Kravdal, 2009; Cheadle, Amato and King, 2010). In a study based on USA data, Wattenberg (1986) presented statistical evidence demonstrating the phenomenal rate of change in the patterns of living arrangements between 1970 and 1982. According to

Wattenberg (1986), single-parent families in USA headed by once married females with dependent children grew by 105 percent between 1970 and 1982, from 2.85 million to 5.86 million households. The same period also witnessed a 425 percent increase in the number of families headed by never-married women, and the number of children in two-parent families fell by 21 percent (Wattenberg, 1986). The prevalence of female-headed families, given that fathers have been found to be involved in their children's welfare for very short periods following divorce and hardly take custody of young children, has led some authors like Cheadle *et al.* (2010) to regard motherhood, defined as the kinship relationship between mother and child, as a very important aspect in studying how family structures impact on child outcomes such as schooling and health.

2.2.2. Child outcomes: educational and health

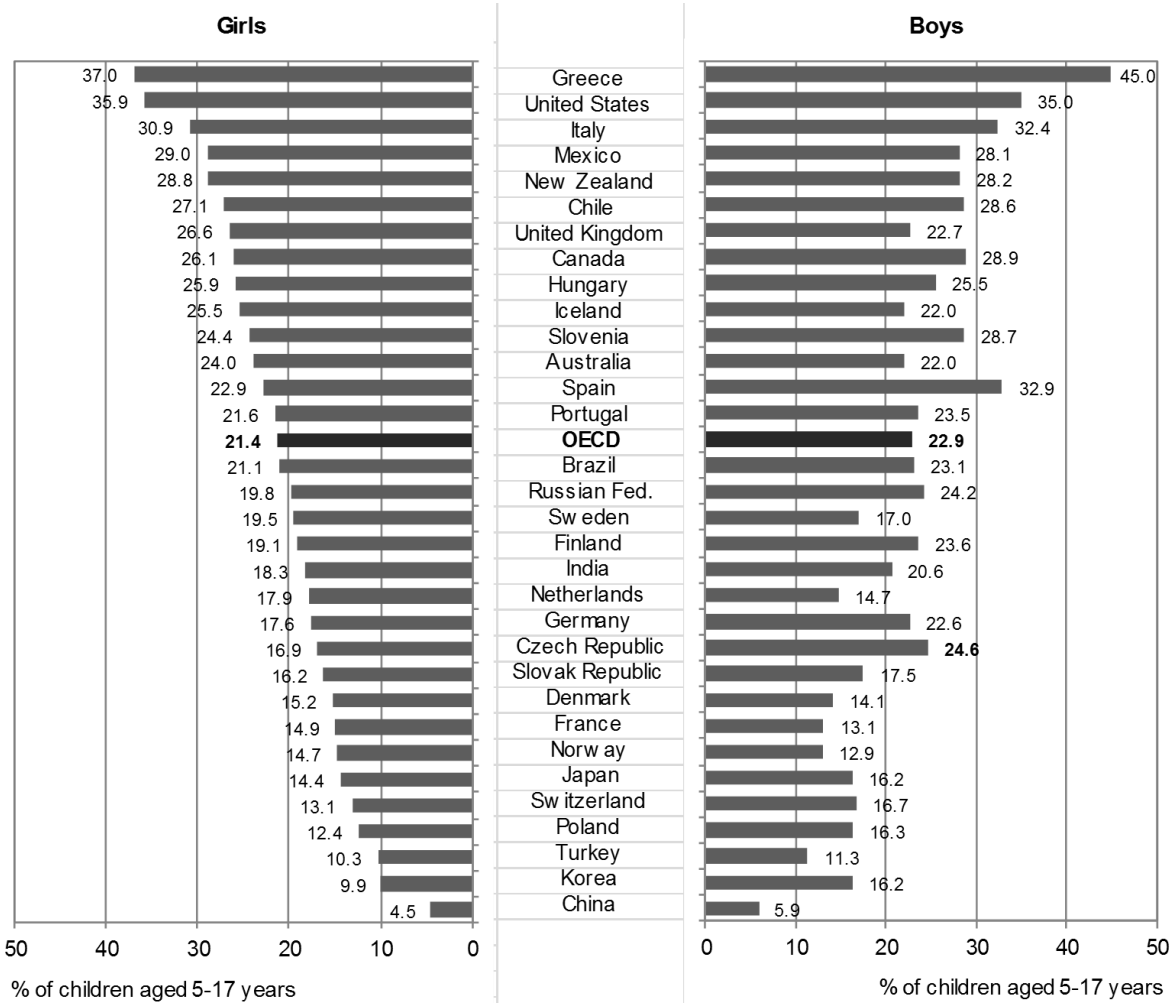
The standard of education delivery in the developed world has generally been high and some economically emerging countries have over recent years been in transition towards similar state. According to UNESCO (2012), countries in North America, European region and Asia, except Pakistan, Bangladesh and Thailand, had gross enrolment ratios of over 98 percent of all children in the year 2012. All the countries in the Central and Eastern Europe had by 2009 achieved gender parity between boys and girls for both primary and secondary education (UNESCO, 2012). This means that all children especially girls were not disadvantaged in terms of access to and enrolment for education, and in USA, for example, more girls were enrolled than boys in both primary and secondary education. According the UNICEF (2012a), gross enrolment ratios for the period 2007-2010 for primary school in USA was 99 percent for girls and 98 percent for boys. However, there has not been commensurate progress in completion of grades as in enrolment in the countries that have managed over 98 percent enrolment especially in USA, South and West Asia, Latin America and the Caribbean countries. The 2012 statistical publications by UNICEF reveal that between 15 to 20 percent of primary school going age children in USA, Russian Federation, Turkey, Saudi Arabia and Ukraine were out of school in 2009 mainly due to dropping out and expulsion. The situation was worse in Bolivia, Colombia, Mexico and Venezuela where up to 30 percent of children had dropped out of primary school while in India the proportion out of school exceeded 30 percent of children (UNICEF, 2012a). Furthermore, UNCEF (2012a) reported that notable proportions of children, especially when considered in absolute numbers, repeated at least one grade in Latin America and Caribbean (8.5 percent) and Arab States (6.9 percent) in the year 2009. Moreover, the education experience has greatly changed over recent times; physical education has significantly declined

since 2002, compounding health welfare of learners given the school environments comprising variety of cheap junk foods (American Heart Association (AHA), 2013). It was observed that only 7.9 percent of middle schools and 21 percent of high schools provided daily physical education in 2007 (AHA, 2013).

In terms of health-related outcomes, children from developed countries like USA, UK, Canada, Australia, Japan and the European Union region have access to shelter, sanitation and health facilities. However, the high level of affluence in the world into which these children are born presents a different kind of hazard referred to by AHA (2013) as an epidemic of excess characterised by 'empty calories' as opposed to the plight of shortage experienced in the Global South. Most of the food consumed by the children is high in saturated fat, trans fat, cholesterol, sodium, added sugars and calories, but low nutrients needed to be healthy and strong (AHA, 2013). According to OECD (2013), the 2011 updated statistics showed that one fifth of children aged between 5 and 17 years in the developed world were affected by overweight, and in countries like USA, Italy and Greece the proportion was found to be close to one in every three children whereas in China and Turkey the proportion overweight was less than 10 percent. The detailed statistical profile of overweight (including obese) children are shown in figure 2.1 below.

The American Heart Association (2013) states that excess body weight increases the chances of a child being obese, a condition that leads to high blood pressure, causes type 2 diabetes, elevates blood cholesterol levels and has negative psychological effects including low self-esteem and depression. According to Nihisier, Lee, Wechsler, McKenna, Odom, Reinold, Thompson, Grummer-Strawn (2007), obesity in the European region almost tripled in the period 1980-2004 from 7 percent to 19 percent among 6-11 year olds and 5 percent to 17 percent among the 12-19 year olds. Despite the data including 6, 18 and 19 year olds which are not part of this research, the statistics nonetheless help show the context of the health status of 7-17 year olds in the EU region.

Figure 2.1 Percentages of children overweight, including obese, in selected countries in the year 2011



Source: OECD (2013) Health at a glance, October 2011.

2.2.3. Childhood outcomes in relation to family structure

The impact of family structure on the schooling outcomes of children has been widely investigated outside the African continent. Most of the research has been based on data from USA and Western Europe, but a commendable amount of research has also been carried out in Australia, Canada, Asia and Latin America. Research in the western countries, especially the United States and Western Europe, has yielded findings indicating that children from two-parent families tend to have better schooling outcomes than those from single parent, stepfamily or other forms of family structures (Ermisch and Francesconi, 2007; Dronkers, 1994; McLanahan and Sandefur, 1994). International comparative studies such as those by Park (2007) and Pong, Dronkers and Hampden-Thompson (2005, 2003) found that staying in non-intact families in the liberal countries of the western world had negative impact on children's schooling outcomes compared to the social democracies of Iceland, Norway and

Asian states except for Japan. Welfare policies of the countries studied were found to play a significant role in influencing the impact of family structure on the schooling outcomes of children (Park, 2007; Pong *et al.*, 2005). In comparing the conditions of family life in Norway and USA, Steele *et al.* (2009) were able to test the impact of family structure on schooling outcomes for children in different socio-economic environments. Moreover, the prevalence of family structures other than two-parent households in Norway as depicted in Steele *et al.*'s (2009) study provides similarities with the current family structure profile of South Africa albeit due to different causes. Findings of the study showed worse schooling outcomes for USA children following family disruption compared to children from Norway where generous social protection has been argued to reduce the adverse effects of changing family structures. In both countries loss of father through divorce resulted in worse schooling outcomes than through death (Steele *et al.*, 2009). However, relatively higher marriages rates in Norway and USA compared to South Africa raise questions as to whether similar results can be observed in South Africa.

In a study by Park (2007), which comparatively scored reading ability between 15 year olds from intact families and those from single-parent families, it was found that students who stayed with single parents were not significantly disadvantaged once socio-economic backgrounds and demographic characteristics were controlled. This finding pertained to students from Hong Kong and Korea, while for Thailand single-parent family structures were associated with better reading performance compared to the two-parent family structures (Park, 2007). The study however, does not distinguish male-headed from female-headed families, despite known differences in educational attainments of children from these family structure configurations (Dronkers, 1994).

There has been cross sectional as well as longitudinal studies focused on the role played by family structure on schooling outcomes of children. Boyle, Georgiades, Racine and Mustard (2007) used longitudinal data from 1983 to 2001 to examine the relationship between family structure and educational attainments of children in Canada. This related with studies such as those conducted by Ermisch and Francesconi (2007); and Hill, Yeung and Duncan (2001) who tracked historical changes in the family structures of children over time and how these changes correlated with schooling outcomes. Cooksey (1997) studied young mothers' marital histories in USA in relation to children's cognitive development in terms of school performance in the early grades in primary. The study established that being born to non-married mothers was negatively associated with cognitive development (Cooksey, 1997). Using multilevel

regression, Boyle *et al.* (2001) found that differences in educational attainment between children which were attributed to between family differences were as high as 36.91 percent. Although the study did not exclusively focus on family structure and schooling outcomes, its use of multilevel regression model allowed for the specific relationship to be examined, observing that living in a female-headed household was associated with less years of schooling for both girls and boys (Boyle *et al.*, 2001). Studying changes in the marital status of the mother and focusing on different types of motherhood has been found to be important in explaining schooling outcomes of children given that there has been recorded world-wide decline in child-father co-residence (Brown, Karson and Saraswathi, 2002). This highly relates to the South African context where low marriage rates and relatively high teen fertility have meant that most children are living in the absence of their fathers. Moreover, motherhood, defined as the kinship relationship between the mother and her offspring, has increasingly become important because fathers have been found to be involved with their children in the period following divorce and not in the later years of their schooling (Cheadle, Amato and King, 2010).

There are studies that have looked at the absence of the father through migration in the same way as through divorce, separation or death, describing children's experience of such parental migration as akin to suffering from ambiguous loss which has negative impacts on psychological adjustment and schooling attainments (Falicov, 2007; Afifi and Keith, 2004). Parental migration in Mexico, especially international, was linked to 'below-age-appropriate' grade completion and a greater probability of dropping out of secondary school because of diminished involvement of the father (Creighton, Park and Truel, 2009; McKenzie and Rapoport, 2006). In other related studies, in was concluded that children of emigrants envision themselves emigrating in the future and therefore lack appreciation of future returns on additional years of schooling hence their lower schooling outcomes than children who did no experience parental migration (Wright, 2006; Chiquiar and Hanson, 2005; Kandel and Massey, 2002). In related findings, children of migrant fathers were more inclined to forgo attending school in favour of part time jobs in the hope of future migration (Nobles, 2011).

Buchmann and DiPrete (2006), in a study based in USA, compared college completion for boys and girls in relation to family background in terms of the presence and absence of the father in the home. The study found that the absence of the father negatively affected boys more than girls among the white students while the opposite was observed for black students (Buchmann and DiPrete, 2006). In other studies in the United States and Europe, the focus was to examine consequences of different types of motherhood and single-parenthood on children's

educational attainments (Ginther and Pollak, 2004; Kiernan, 1992, McLanahan and Sandefur, 1994). Some have looked at the causal factors of single parenthood, comparing single-parent families due to divorce or separation against single-parenthood due to death of the father (Biblarz and Gottainer, 2000; Borgers, Dronkers and Van Praag, 1996; Bosman and Louwes, 1988). Biblarz and Gottainer (2000) found that children in single-parent families due to death of the father had better schooling outcomes than those who were reared by single-mothers as a result of divorce or separation. Findings from related studies confirm the existence of a systematic relationship between family structure as the influencing variable and children's schooling outcomes as the dependent variable, although the role of selection was also noted in other studies (Boggess, 1998; Lang and Zagorsky, 2001). Investigating the role of selection using sibling-difference model, Björklund and Sundström (2005) found that children who grew up with both parents present did not enjoy any significant advantage over younger siblings who grew up after parental separation in terms of educational attainment.

There are studies that compared high school graduation between stepchildren in stepfather families with children who are biologically related to both parents, highlighting the importance of the child's relation to the household head, for example, Boggess (1998). In his study, Boggess (1998) observed that stepchildren were less likely to graduate than their counterparts who were biologically related to both parents. Similar observation was to be made by Anderson (2005) in South Africa in a study which will be reviewed in section 2.4. Using the National Educational Longitudinal Survey, Wojtkiewicz (2000) found that children staying in stable single-parent families were more likely to attend college than those from unstable single-parent or blended families. Biblarz and Raftery (1999), who controlled for the mother's occupation status, observed higher educational attainment for children reared by single biological mothers compared to those reared by a step parent or a single biological father. Case, Lin and McLanahan (2001) focused on the importance of ties between the child and the mother in the family, comparing schooling outcomes for children who lived with their birth mothers and those living with non-birth mothers. The study showed better schooling outcomes for children living with birth mothers compared to those living with non-birth mothers (Case *et al.*, 2001).

Pong, Dronkers and Hampden-Thompson (2003) investigated the gap in math and science performance of third and fourth graders living with a single-parent and those living with two parents from eleven countries including United States, New Zealand, Austria, Iceland and Ireland. Using multiple regression analysis, the study found the largest standard deviations in scores among US pupils followed by New Zealand (Pong *et al.*, 2003). There were no

significant differences in math and science performances for children in Austria, Iceland and Ireland where standard deviation in performance scores ranged between 0.01 and 0.03 for both subjects whereas for US and New Zealand the standard deviations ranged from 0.29 to 0.34 (Pong *et al.*, 2003). The standard deviations represented inequality in math and science achievements with pupils from two-parent families found to be better than those in single-parent families. However, the study by Pong *et al.* (2003) only considered two family structures and excludes other important family structure configurations such as investigated by Lansford *et al.* (2001); Haugaard (1998); Monserud and Elder (2011) and Kendig and Bianchi (2008). Lansford *et al.* (2001) considered adoptive, two-parent biological, single-mother, stepfather and stepmother family structures in the United States and observed better schooling for children in two-biological parent families than in other family structures. Other studies factored in the role of core residence with grandparents to compare schooling outcomes between children born to never married mothers with those born to once married mothers (Monserud and Elder, 2011; Kendig and Bianchi, 2008; DeLeire and Kalil, 2002; Aquilino, 1996). These studies are important with reference to South Africa which has a considerable proportion of never married mothers. The study by Monserud and Elder (2011) found that children born to never married mothers and were co-residing with their grandparents had better schooling outcomes than those born to once married mothers but also co-residing with grandparents. Co-residing with grandparents however, was also found to be associated with fewer years of schooling completed especially when co-residence occurred in late childhood (11-15 years old) (Hill, Yeung and Duncan, 2001). Better schooling outcomes associated with single-motherhood have been attributed to the strengths offered by single-parenthood in the absence of grandparents and in comparison to step-parents (Olson and Haynes, 1993; Richards and Schmiege, 1993).

One of the recent studies based in Canada examined family structure in relation to the demographic characteristics of the family (Boyle, Georgiades, Racine and Mustard, 2007). The study attributed 36.9 percent of the observed variation in schooling outcomes to family structure differences (Boyle *et al.*, 2007). However, the study failed to rank the schooling outcomes according to specific demographic characteristics of the families in the sample and therefore did not establish a clear causal relationship between family structure and schooling outcomes. In a comparable stud, Björklund, Ginther and Sundström (2007) established the causal relationship between family structure and schooling outcomes when they examined two samples of children from USA and Sweden. In both the 2004 and 2007 studies, Björklund *et al.* (2007) observed in the two samples that children from non-intact families had less

favourable schooling outcomes compared to those from intact families despite the two countries having very different family structure and public policy environments.

In another study, Björklund and Sundström (2005) investigated whether the commonly found negative relationship between changes in family structure and children's schooling outcomes was causal or it was mainly due to selection. The study's use of a sample of 100,000 Swedish full biological siblings born between 1948 and 1963 and sibling-difference estimations allowed for robust testing of established knowledge. Björklund and Sundström (2005) found evidence of the impact of selection besides that of family structure. The findings of Björklund and Sundström's (2005) related to those of previous studies which concluded that educational outcomes for children were also considerably a function of selection, for example, Ginther and Pollak (2004); Winkelmann (2003); Piketty (2003). These studies found that children who came from non-intact families due to parental separation or divorce were already at a disadvantage even before the experience of family disruption, concluding that factors that increased the risk of parental separation were also associated with lower educational attainments for children (Ginther and Pollak, 2004; Winkelmann, 2003; Piketty, 2003). Similar conclusions were made in investigations that focused more on the factors before family disruption such as mother's age at birth and family characteristics before divorce (Ermisch and Francesconi, 2001a; Fronstin, Greenberg and Robins, 2001, Jonsson and Gähler, 1997; McLanahan and Sandefur, 1994). These studies found that the effect on educational attainment of children attributed to family structure is greatly reduced once pre-family-disruption factors were considered (Ermisch and Francesconi, 2001a; Fronstin, Greenberg and Robins, 2001, Jonsson and Gähler, 1997; McLanahan and Sandefur, 1994). Inasmuch as family structure is important in predicting children's schooling outcomes, other factors in the family social realm are also worthy of consideration hence the need for current and future studies to be chary of these factors when investigating the impact of family structure on schooling outcomes of children in the different parts of the world.

Contrary to most findings, some studies, such as Park (2007) pointed out above, have observed unexpectedly positive effects of living in a single-parent family relative to living in a two-parent family and these include Smith, Brooks-Gunn and Klebanov (1997) and Cooksey (1997). Two-parent families do not always imply uniformly rewarding biological ties between the two parents and their children. Therefore, in order to determine the true nature of the composition of the families children live in, some studies have included an indicator variable capturing the marital status, presence of parents and their relation to child outcomes

(Gennetian, 2004; Peters and Mullis, 1997; Haveman and Wolf, 1994; Lazear and Michael, 1988). The study by Lazear and Michael (1998) used altruistic utility functions developed by Becker to examine empirical data on financial resources allocation within families and observed that households do not always spend uniformly on children's needs due factors like level of income, sex of household head and place of residence. While most studies found causal relationship between family structure and children's schooling outcomes, there are other studies that did not find conclusive evidence that the relationship is causal. For example, Francesconi, Jenkins and Siedler (2010) found no causal link between the family structure and schooling outcomes for children who grew up in former West Germany although the link was observed for children who grew up in former East Germany.

2.3. Sub Saharan Africa (SSA) excluding South Africa

Research in the Sub-Saharan region on the impact of family structure on children's schooling outcomes has largely been carried out in the context of poverty, child labour and recently HIV/AIDS-related mortality and morbidity. There has been little research focused exclusively on the impact of family structure on children's schooling outcomes investigating educational attainments relative to the family system they live in as has been done in the other parts of the world. This may be due to the fact that the cultural systems of the family are dominated by extended family, fostering and, amid poverty, child labour. Ainsworth and Filmer (2006) observed that due to HIV/AIDS there have been an increasing number of orphans in sub-Saharan Africa (SSA) resulting in an accumulation of personal tragedies and the fear that orphans will acquire less education. This section reviews literature on schooling outcomes of children in SSA and the types of family structures children live in.

Evans and Miguel (2007, 2004) looked at the impact of parental deaths on school participation using a panel dataset of 20,000 children from Busia district, Kenya where they compared schooling outcomes of maternal, paternal and double orphans. They found that maternal orphans had worse schooling outcomes than paternal orphans while double orphans had the worst outcomes (Evans and Miguel, 2007, 2004). Morbidity due to HIV/AIDS-related sickness was found to have a slight decrease in children's school participation (Evans and Miguel, 2004, 2007). By being based on longitudinal data, this made it possible to track changes in school participation for children from when parents were alive until after their death, a strength that cross sectional studies do not have. However, the study may have been limited in its generalisability due to it being based in one district only with distinct socio-economic and

cultural context. The findings of the study therefore were not consistent with those of Foster and Williamson (2000); Ntozi, 1997 and Foster, Shakespeare, Chinemana, Jackson, Marange, Gregson and Mashumba (1995) who noted the resilience of the extended family and community networks that were found to minimise the disadvantages of parental loss on educational outcomes.

Foster *et al.* (1995) observed in their Zimbabwean study that caregiving for children following parental death was also provided by maternal relatives which represented a departure from that traditional practice of paternal extended families only. Moreover, child outcomes, including educational, for orphans cared for in extended families were not affected by the death of the parents but, sibling headed households found to be on the increase had negative outcomes (Foster *et al.*. 1995). The emergence of the sibling headed households signified that the extended family was becoming overwhelmed by HIV/AIDS-related parental mortality (Foster *et al.*, 1995). Considering that there was, and still is, not any kind of social protection offered to the poor in Zimbabwe, sibling headed households which highlighted that the community coping mechanisms symbolised in the extended family were under stress may be considered inevitable. However, the country's state of primary and secondary education system which has become part of the culture of the people may be the contributory factor in the absence of significant unequal child outcomes in educational attainments between orphans and non-orphans. Such a context, plus relatively high marriage rates compared to South Africa's, raises questions as to whether similar child outcomes can be observed in the latter where there is social protection and its background of apartheid and colonisation.

There have been longitudinal studies that revealed worse educational outcomes for orphans compared to other children, for example, Ainsworth and Semali (2000) and Beegle, De Weerdt and Dercon (2007) in Tanzania, Evans and Miguel (2007) in Kenya, and Beegle, Filmer, Stokes and Tiererova (2010) whose study area included twenty one sub-Saharan countries. Beegle *et al.* (2010) observed that grandparents were more involved in looking after children than fathers following the death of the mother in countries like Zimbabwe, Malawi and Namibia. In the absence of social protection, grandparents face financial difficulties and as a result children living in households headed by grandparents have their schooling prospects badly affected (Niño-Zarazua, Barrientos, Hulme and Hickey, 2010; Grosh, Del Ninno, Tesliuc and Oerghi, 2008). In countries such as Tanzania, Namibia and Zimbabwe, there was an observed shift in caregiving from other relatives to grandparents while the opposite was observed in Kenya and Uganda (Monasch and Boerma, 2004). Due to HIV/AIDS, there has been a particular interest

in the child outcomes of orphans but, most studies investigating outcomes for orphans have done so with consideration of the family structures they joined following the death of parents. In a recent qualitative study on the extended family, Karimli, Ssewamala and Ismayilova (2012) examined child outcomes, including schooling, in Rakai district, Uganda in relation to the gender and type of relationship to the primary caregiver. Results showed that children from households headed by females reported that they received better support compared to those headed by males irrespective of type of relationship (Karimli *et al.*, 2012). While the study has the limitations of being based on one district Uganda hence its lack of validity for generalising to other parts of SSA, its findings are significant in that they echo observations made in other parts of the world praising female headed families such as Ginther and Pollak (2004); McLanahan and Sandefur (2004); Borgers (1996) and Kiernan (1992) reviewed in the previous section.

Foster and Williamson (2000) noted the importance of the extended family safety net, including its new form made up of maternal relatives, in promoting child outcomes following the death of parents in countries like Zimbabwe, Tanzania and Uganda. Their work, which reviewed findings on the state of orphans in sub-Saharan Africa, however, also found an increasing number of children in wage labour and removed from school among the families headed by migrant farmworkers following the death of household head (Foster and Williamson, 2000). Conceptualisation of family structures in sub-Saharan Africa was also found to be different from that observed in the other parts of the world; the adopted family structure identified in the US was found not to exist in its western sense in Africa due to fostering and the extended family system both of which may occur even when both parents are present (Foster and Williamson, 2000; Urassa, Boerma, Ng'weshemi, Isingo, Schapink and Kumongola, 1997). Fostering can be done specifically to enhance the child's schooling attainments and this has been cited as one of the main reasons together with extended families for why there no great schooling disadvantages for double orphans in Uganda (Ntozi, 1997; Ntozi and Mukiza-Gapere, 1995). In their 1995 study, Ntozi and Mukiza-Gapere used a qualitative methodology as was also done by Abebe and Aase (2007), reviewed later, which help understand the explanations behind certain patterns between family structure and children's schooling outcomes which may not be apparent in quantitative studies. Such qualitative studies provide in-depth understanding of the experiences of orphans provide a foundation on which, resources permitting, similar studies can be conducted in South Africa at a national level for both academic and policy purposes.

Bennell (2005) used nationally representative data sets collected from 1992 to 2003 to examine school repetition, attendance and absenteeism for children in Botswana, Malawi and Uganda. The results showed that children living without one or both parents had higher rates of absenteeism and grade repetition across all the study samples (Bennell, 2005). However, the study did not clearly identify the different family systems children included in the study were living in although this was due to particular focus on orphans. Orphan-hood due to HII/AIDS, and in some countries like Rwanda and Uganda, the effects of political conflicts like genocide in the context of poverty in sub-Saharan Africa have influenced some researchers to study the repercussions on family structures with an interest in child labour. Socio-economic stress among people was found to be one of the reasons why extended family members in some parts of Uganda were reluctant to take in additional orphaned children and adolescents even though they might be keen (Ssewamala and Ismayilova, 2009; Nyambedha, Wandibba and Aagaard-Hansen, 2003). In Northern Uganda, the social changes driven by urbanisation and the emergence of HIV/AIDS resulted in a shift from the customary patrilineal care for children without parents to matrilineal and grandparental care (Oleke, Bystand and Rekdal, 2005). Given that South Africa also experienced urbanisation and did this over long periods, it would be interesting to understand the prevalence of matrilineal and grandparental care as opposed customary patrilineal care.

In Ethiopia, Abebe and Aase (2007) distinguished in their study between the extended family structure; operationalizing one based on blood relationships, comprising uncles, aunts, grandparents and cousins, and another based on communal ties which they termed 'fictive kinship'. Fictive kinship included friends, teachers and neighbours (Abebe and Aase (2007). The study used reports by grade six and grade seven pupils as well as focus group discussions with those who had lost their parents to gain a deeper understanding of their life experiences in the family systems they had gone through as they were growing up (Abebe and Aase (2007). The results showed evidence of the customary patrilineal extended family being overwhelmed with children who have lost parents facing disadvantages of not having school fees, uniforms, books and pens for use in school (Abebe and Aase (2007). Such disadvantages underlay the educational penalty of not having both parents for most children observed in other parts of sub-Saharan Africa as well as the world over. Since the socio-economic context of Ethiopia is distantly different from that of South Africa, it is interesting to know if similar patterns in schooling outcomes for children in South Africa using the CS 2007 can also be observed. The distinct South African environment will enable to test the validity of Family Systems theory,

outlined in Chapter 3, which regards the optimal family as comprising mother, father and children.

There have been studies that have used family composition to imply also the number and gender of children as a defining component of family structure. Shapiro and Tambashe (2001) and Shapiro (1999) for example, operationalized family structure to include the number of children in the household, their different age groups, gender as well as their relation to the household head in studies carried out in Kinshasa, DRC. The number and gender of children in a family was found to be an important factor determining schooling outcomes for children proxied by investment decisions across the different family structures children were living in (Shapiro and Tambashe, 2001). Previous studies had also acknowledged that the impact of family structure on schooling outcomes in Kinshasa was proxied by socio-economic standard of living (Schultz, 1993; Parish and Willis, 1993). In the work by Glick and Sahn, 1999; Schultz, 1993; Parish and Willis, 1993 it was found that the presence of a father with education had more positive impact on schooling for girls than boys. The findings relate to those of Buchmann and Di Prete (2006) on a US study. However, the Kinshasa studies had an urban bias inasmuch as they did not include rural populations, something which this research seeks to do in South Africa. In a related study based on the populations in poor urban environments of West Africa, Glick and Sahn (1999) found the presence of children below five years of age in a family to be associated with less schooling attainments for girls while having no relationship with that of boys. The results showed that how the child related to the household, as a son or daughter, meant different roles to play in the family hence different effects on schooling outcomes. But this may be due to the relatively higher total fertility rates in the region compared to South Africa; therefore it can be asked if similar results can be observed in South Africa where fertility has generally been low.

2.4. South Africa

2.4.1 Family structure in South Africa; past and present

The conditions of domestic organisation in South Africa make for interesting investigation given the unique historical background of the country relative to other sub-Saharan countries. The discovery of diamonds in the turn of the 20th century in the present-day Johannesburg area was a distinguishing factor for the country notwithstanding the fact that other countries also went through differing periods under colonisation (Kanyenze, 2004). The arrival of European settlers in the 19th century marked the beginning of continuous reconfiguration of the family

structures of indigenous people (Russell, 2003; Ekeh, 1990; Caldwell and Caldwell, 1990). However, the influence was not only one way. Amoateng, Heaton and Kalule-Sabiti (2007) observed that the mutuality of influences between settlers and indigenous people had far reaching implications on household organisation for both groups of people as time passed. According to Russell (2003:10), the adaptive strategies of black people as time passed mainly occurred within the "agnatic idiom" while that for whites were largely within the "conjugal idiom" and both strategies proved equally resilient in providing a mechanism by which families coped with radical changes in domestic lives as the country went through the process of industrialisation and social change. Perhaps through the mutuality of influences, African family structures have been argued by some studies that they with time started to converge towards those of whites as the country industrialised, for example, Amoateng (1997); Steyn (1993); Nzimande (1987). This change has come to be known as the convergence thesis. The convergence thesis, critiqued in *section 2.4.3*, was conceived at the back of Goode's (1963) proposition that social change in the form of modernisation such as that prevailing in South Africa throughout the 20th century results in a simplification of family structures marked by a shift from the extended family household to nuclear families which have more emphasis on children's needs such as education and health. The original setting of Goode's (1963) conceptions which was Asia however, may render his conclusions somewhat problematic when applying to the South African context.

The main statement of Goode's (1963) thesis was an elaboration of the rural-urban model developed by German sociologist Toennies in 1940. According to Goode (1963) the processes of urbanisation and industrialisation result in a weakening of extended family structures, lead to decline in fertility, neolocal residence, emancipation of women and their greater participation in the labour force. The ultimate outcome is the overwhelming predominance of the conjugal (nuclear) family as the main structure in the domestic organisation of people's lives. Such an outcome was the object of Russell's (2002:3) commentary which carried that "kinship relations shrink largely, but not entirely, to the compass of a man's family of birth and family of marriage". Support for Goode's (1963) proposition in the context of South Africa can be found in the studies conducted by Pauw (1973), Marwick (1978) and, albeit confined to whites only, Beittel (1992). Pauw (1973) compared the family structures of the Duncan village residents in 1960 before they moved to Mdantsane. While in Duncan village, 58 percent of households were extended families but twelve years later the proportion of extended family structures had "significantly dropped" (Pauw, 1973:208). The predominance of the nuclear

family structure was clearer among the Nguni speaking people living in a township near Johannesburg where they were strongly influenced by modernisation as they almost entirely depended on wage labour for sustenance. This was revealed in Marwick's (1978) study which found that 48 percent of the households in the township were made up of nuclear families.

The observations by Marwick (1978) may have vindicated Goode's (1963) proposition but it can be pointed out that they were only applicable to the Nguni speaking community in the township near Johannesburg. Given the broader socio-political context prevailing in the country at the time, the system of residence identified by Marwick (1978) may not be considered representative of the wider changes in family structures in South Africa. Beittel's (1992) research presented a more authentic portrayal of family structure dynamics for the different population groups in the country. According to Beittel (1992), family structures for both poor and skilled whites had all been similar since the 1930s, comprising a conjugal unit with children and a black servant. Among blacks, particularly in the country sides, Beittel (1992) noted an increasing proportion of households headed by females and the rise of multigenerational family structures mainly due to male migration to urban centres for jobs. Currently labour migration involves both females and males and the extended family structure is very prevalent. It can be suggested that at national level South Africa has not experienced a linear path of transition in domestic organisation that culminates in a homogenous mass of families nucleated in small households largely dependent on wage labour for sustenance seeing wages are the foundation of nuclear family structures as can be deduced from the New Household Economics model.

Beittel (1992), besides revealing the differences in family structures between blacks and whites, his observations are insightful in that they help highlight the contradictions in social and domestic organisation among the blacks. While black South Africans residing in urban areas tended to stay in nuclear families, it was not the case in rural areas (Beittel, 1992). The findings echoed earlier observations made by Murray (1980) who drew mostly from the reports compiled by Monica Wilson regarding the black middle class' family systems. Far from resulting in nuclear families, modernisation-induced rural-urban migration resulted in a significant number of women bearing children but remain unmarried and many children growing up in grandparents-headed households (Murray, 1980). According to Wilson (1951) cited in Murray (1980:150) "prolonged absence of husbands and fathers inevitably impacted on conjugal breakdown and desertion (such as that observed in Mexico), led to instability in arrangements for rearing children and included deleterious emotional misery to children,

husbands and wives". These conditions were also contained in the report from Keiskammahoek Rural Survey conducted in Ciskei (Murray, 1980). The lack of uniformity in the family structures of different population groups and in different geographical locations highlights the naivety of the convergence thesis especially when considering labour control regulations, for example 1952-1986 Pass Laws, inflicted on the black populations for the most part of colonial and apartheid periods.

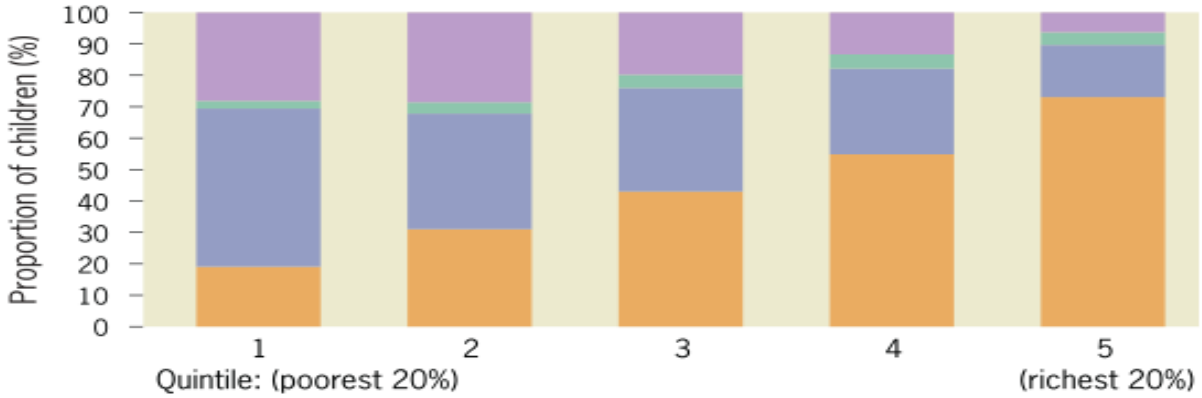
According to Spiegel (1994:11) the transition towards nuclear families has remained "a pipedream construct that has almost never been realised in the context of South Africa's black working population". Different factors can be identified for the continued predominance of the extended lineage-based consanquinal family system for both urban and rural populations. Factors such as forced migration for wage labour in the past followed by women entering the labour force as time passed which reduced the need for male partners to raise a family prevented the nuclear family structure from growing in prevalence relative to the pace of modernisation (Bozzoli and Nkotsoe, 1991). This was compounded by the fact that by the 1980s family building patterns in the country as captured in census and fertility surveys were already showing delayed marriages with mean ages at marriage of 28 years and 23 years for men and women respectively (Bozzoli and Nkotsoe, 1991). Moreover, recent investigations into marital trends report long standing low marriage rates among black South Africans notwithstanding continued relatively young average age at first birth among females (Preston-Whyte, 1993; Udjo, 2001). This means that delayed marriages coupled with low mean age at first birth for females imply that children were being born to single women. However, it should be noted that the western definition of being married as captured in past surveys and according to the laws of the time may have misclassified as cohabiting relationships marriage partnerships otherwise recognised in the African culture.

According to Preston-Whyte (1993), the younger generation have over time been increasingly living with their parents, siblings and children rather than relatives of marital ties. HIV/AIDS has compounded this in both urban and rural areas where the extended family system has remained the main safety net for most children. Heading into the new millennium the spectre of HIV/AIDS on family systems was exacerbated by the indifferent approach of the government on the provision of anti-retroviral (ARV) treatment such that unabated HIV/AIDS-related mortality resulted in a notable increase in child-headed families on top of cementing the predominance of the extended family structure. While HIV/AIDS can be cited as the underlying factor in the emergence of child-headed households, the same cannot be said of the

high prevalence of extended family structures. According to Russell (2002) African conceptions of family have throughout time largely remained within the agnatic idiom and not as assumed by proponents of the convergence thesis whose uncritical anticipation of 'nucleation' tends to brush aside the African reality of domestic organisation as a form of evolutionary dead end in the inevitable march to the 'universal' nuclear family. This is evident in that even the nuclear family structures of urban 'Europeanised' Africans were found to be a mere façade concealing an enduring subscription to the values of African family systems. Their children were "mostly being sent to live with grandparents, aunts, siblings or other members of the extended family" (Russell, 2002:7). This has remained the case until the current times as most children due to various reasons are staying with uncles, grandparents and aunts.

A recent investigation on the living arrangements of children by Meintjes *et al.* (2010) using data from Statistics South Africa (Statssa) revealed that the proportion of children living in a household with both parents present fell from 38 percent in 2002 to 33 percent in 2010. Due mainly to low marriage rates, divorce and mortality 39 percent of children were living with their mothers only while 3 percent were living with their fathers only (Meintjes *et al.*, 2010). An estimated 24 percent was found to be living in the absence of either of their parents and in most instances only one of the parents would be alive but living somewhere else. The current patterns of living arrangements for children at provincial level according to Hall, Lake, Woolard and Smith (2012) show that in the most urbanised provinces, for example Gauteng and Western Cape, there are higher proportions of children, 54 percent and 50 percent respectively, who live with both parents than the national average. This may partly be due to the impacts of modernisation on family structure postulated in Goode's (1963) model. This becomes more apparent when considering that most of the children living in nuclear families belong to the 40 percent richest quintiles as shown in the figure below.

Figure 2.2 Children's living arrangements in South Africa by income quintile, 2010



	1 (poorest 20%)	2	3	4	5 (richest 20%)
Both parents	19.1% 1,459,000	31.0% 1,545,000	43.0% 1,076,000	54.9% 1,087,000	73.1% 1,035,000
Mother only	50.3% 3,847,000	36.8% 1,833,000	33.0% 825,000	27.3% 542,000	16.6% 235,000
Father only	2.4% 186,000	3.6% 178,000	4.2% 105,000	4.5% 89,000	4.0% 57,000
Neither parent	28.1% 2,151,000	28.6% 1,425,000	19.8% 495,000	13.3% 264,000	6.3% 89,000

Source: Hall *et al.,* (2012) Children's Institute University of Cape Town.

Figure 2 shows that the proportion of children living with both parents is higher as one moves up the income quintiles, ranging from 19.1 percent in the poorest 20 percent to 73 percent in the richest 20 percent. This is comparable to a commensurate pattern of proportions of mother only and neither parent households that decline considerably as one moves up the income quintiles. It is however, interesting that the proportion of children living with father only is shown to be almost similar across all income quintiles, ranging from 2.4 percent in the poorest 20 percent to 4.5 percent of the forth quintile.

2.4.2 Child outcomes in South Africa

There have been various policy and academic research carried out in South Africa focusing on outcomes for children in South Africa at national, provincial and communal levels. Reporting on the health profile of children, UNICEF (2012) carries that thousands of children in South Africa below the age of 5 years die every year from mainly preventable causes followed by pneumonia and acute diarrhoea. According to UNICEF (2012b), the major problem affecting young children is malnutrition with about 25 percent (1 in every 4) of them stunted and many are deficient in minerals and vitamins essential for good health. The UNICEF figures however, reflect the average picture at a national level. While the constitution of the republic accords every child equal access to health and education, the worlds into which children are born are

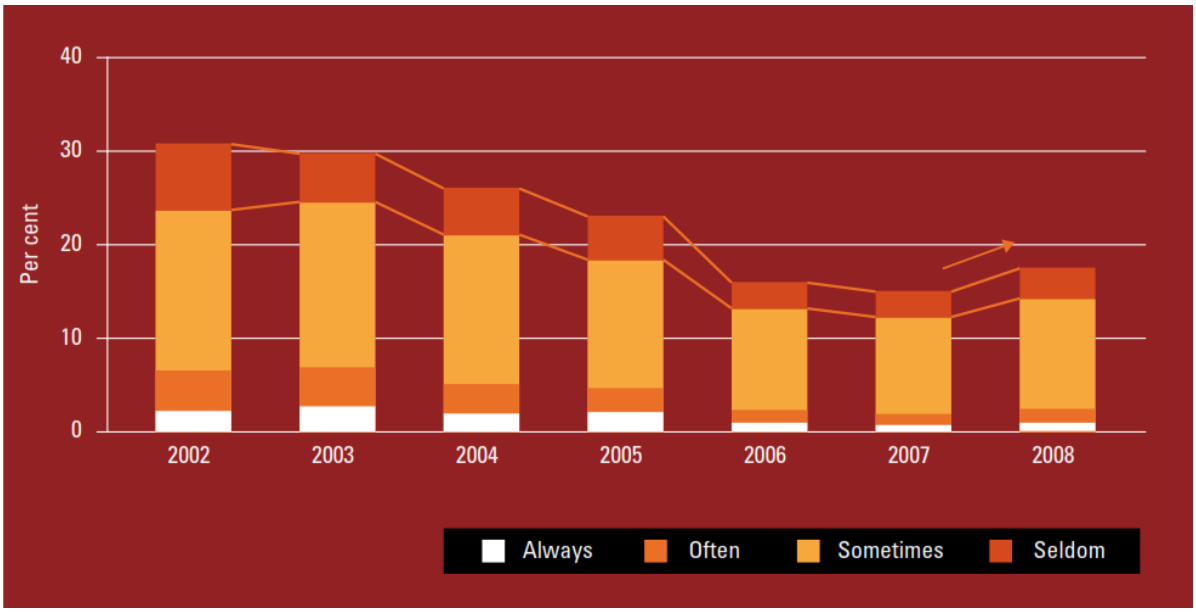
very unequal and this translate to differences in outcomes. There are children who grow up in rural areas, some in urban informal settlements, townships and others in urban areas with adequate access to all basic requirements. As noted in Meintjes *et al.'s* (2010) paper, children from former homelands such as KwaZulu Natal and Eastern Cape, particularly the rural areas and informal settlements, comparably have limited access to health services as well as education and economic opportunities. According to Hall *et al.* (2012), 97 percent of children from the richest 20 percent quintile, who mostly come from urban areas, have access to adequate water and health care while only 46 percent from the poorest 20 percent have access to the same services.

The quarterly bulletin of 2009 published by South Africa Reserve Bank cited in UNICEF (2009) pointed out that a Gross Domestic Product (GDP) of 281 billion US dollars and per capita of 5 740 US dollars qualified South Africa as a middle-income nation. However, income inequality meant that 68 percent of the children were living in poverty in 2009 despite high per capita income (UNICEF, 2009). According to UNICEF (2009), the 2005 national survey on food consumption revealed that 18.0 percent, 9.3 percent and 4.5 percent of children aged 1-9 years were stunted, underweight and wasted respectively, a profile not very different to that of 1995. This can have far reaching implications on educational outcomes of the children especially considering that at 9 years old a child is expected to have at least completed grade 2. Poverty has been identified as a major factor in these health outcomes for children. Its role is highlighted in recent research that looked at the impact of the global economic meltdown which saw South Africa entering into recession in May 2009 leading to the loss of almost one million jobs in 2009 alone (UNCEF, 2009). Loss of jobs by adult carers of children will affect the ability of families to sufficiently cater for the needs of children which include adequate nutrition, sufficient educational support in the form of school fees, uniforms and learning material.

According to Meintjes *et al.* (2010), orphans are the most vulnerable to poverty and face higher risks of abuse, exploitation, neglect and limited access to basic services. Violence against children, including sexual violence, abuse and neglect are a major concern in modern South Africa; 48 732 violent crimes against children were committed in 2008-2009 alone with 28 percent of all sexual offenses for the same period being against children (South Africa Police Service, 2010). According to Mabugu, van der Berg, Chitiga, Decaluwé, Maisonnave, Robichaud, Sherhperd, and von Fintel (2010), child poverty in South Africa has a racial dimension; Africans and Coloureds are the most affected in terms of absolute numbers,

proportions as well as according to measures of poverty depth (gap) and severity. Children in rural areas are reported to be the most affected, while there are no gender differences between boys and girls (Mabugu *et al.*, 2010). However, the Child Support Grant (CSG), a feature of social policy unique to South African in the context of government social support systems in Africa as a whole, has undoubtedly helped cushion the poor from receding into deeper poverty during the 2009 recession. According to Mabugu *et al.* (2010), the expansion of CSG to cover more poor households, besides the aforementioned positive impact in 2009 was hugely responsible for the declining trend in child poverty observed between 2002 and 2008. The declining trend is shown in figure 2.3 below.

Figure 2.3 Percentage of households that reported that children went hungry in the past year from 2002 to 2008, South Africa



Source: Mabugu *et al.* (2010) UNICEF South Africa and the Financial and Fiscal Commission of South Africa.

Figure 2.3 above shows that the percentage of households that reported that children went hungry declined overall from the year 2002 to 2007 before rising slightly in 2008. Throughout the 2002-2008 period, the largest percentage was for households reporting that children 'sometimes' went hungry followed by that for households which reported that children 'often' wen hungry. The two lowest percentages in figure 2.3 above were for households which reported that children 'often' and 'always' went hungry, and constituted not more than 2 percent of all households which reported poverty. The figure above does not provide insight into the profile of poverty by age, population group, rural-urban residence and province, variables which are important in understanding the poverty in a country. In the same study,

Mabugu *et al.* (2010) went on to provide a breakdown of the poverty profile of children in South Africa as shown in table 2.1 below.

Table 2.1. Poverty profile of children in South Africa, 2010

	Poverty Headcount Ratio (P_0)			Poverty Depth measure (P_1)	Poverty severity measure (P_2)
Age	**Rate %**	**Share %**	**Frequency**		
0-4	66.1	26.0	3 066 509	0.336	0.213
5-14	65.7	56.5	6 681 507	0.343	0.202
15-17	63.8	17.5	2 067 609	0.332	0.203
0-17 (all children)	65.5	100	11 822 544	0.328	0.205
Racial Group					
African	72.5	93.9	11 100 826	0.375	0.232
Coloured	41.3	5.3	623 412	0.167	0.092
Asian	24.2	0.7	76 137	0.093	0.052
White	2.0	0.2	18 081	0.012	0.008
Gender					
Girls	65.4	49.1	5 819 410	0.336	0.280
Boys	65.6	50.9	5 985 265	0.332	0.206
Urban/rural location					
Rural	82.8	63.3	5 819 410	0.336	0.204
Urban	48.6	36.7	5 985 265	0.332	0.206
Province					
Western Cape	37.9	5.0	587 580	0.153	0.085
Eastern Cape	77.9	20.1	2 378 696	0.415	0.258
Northern Cape	69.1	2.0	235 269	0.333	0.195
Free State	63.6	5.9	695 166	0.294	0.171
KwaZulu Natal	75.0	25.2	2 975 734	0.413	0.266
North West	66.2	8.1	962 355	0.345	0.216
Gauteng	41.3	9.6	1 138 511	0.186	0.110
Mpumalanga	66.4	7.2	846 494	0.322	0.187
Limpopo	78	16.9	2 002 739	0.400	0.242

Source: Mabugu *et al.* (2010) UNICEF South Africa and the Financial and Fiscal Commission of South Africa

Table 2.1 above confirms findings from other literature especially regarding the rural-urban and racial differences in poverty levels as well as provincial patterns. The Poverty Headcount Ratios (P_0) shown in the figure show that the most affected are children from rural areas. For example, while poverty rate in urban areas was 48.6 percent, that for rural areas for an almost

similar number of children was 82.8 percent. With respect to population groups, African children had the worst outcomes on poverty. Out of the total sample, African children comprised the largest number of those affected by poverty with a share of 93.9 percent compared to Coloureds (5.3 percent) and Indians and Whites who only had less than 1 percent each although this may be affected by relative sample sizes. The Poverty Depth Index (P_1), which measures how far below the poverty line one lies, show that African children (0.375) were the worst affected as well as Coloured children (0.167) compared to Indian (0.093) and White (0.012) children. Furthermore, the inequality among the poor, measured by Poverty Severity Index (P2), was highest among African children (0.232) compared to Coloured (0.092), Indian (0.052) and White (0.008) children.

The differences in the outcomes of poverty measures among the population groups depicted in table 2.1 above can be explained by socioeconomic status (SES). SES differences can also be argued to be the underlying factor in Mabugu *et al.*'s (2010) findings on child poverty by province. Mabugu *et al.* (2010) observed worst outcomes for children living in the less developed provinces and those with large proportions of rural populations. Table 2.1 shows that the least urbanised provinces namely Limpopo and Eastern Cape had respectively 16.9 percent and 20.1 percent share of the total children affected by poverty while KwaZulu Natal had 25.2 percent largely due to having a large proportion of rural population compared to other provinces. Poverty Depth Measure was largest for children living in Eastern Cape (0.415) followed by KwaZulu Natal (0.413), Limpopo (0.400), North West (0.345), Northern Cape (0.333) and Mpumalanga (0.322). This is compared to Gauteng (0.186) and Western Cape (0.153), provinces which by comparison to others have small proportions of rural populations.

The progress depicted in figure 2.3 above on the declining trend in child poverty at national level is not the only positive child outcome in post 1994 South Africa. According to UNICEF (2009), trends in school enrolment up to 2009 showed that South Africa was on course to achieving MDG number 2 especially regarding access to primary education. The Department of Education (2009), cited in UNICEF (2009), reported that gross enrolment for grades 1-7 was 98 percent in 2009 and 85 percent for grades 8-12. The country has managed to ensure equitable access to education for girls and boys evident in that gender parity index for primary and secondary in 2009 were reported to be 0.98 and 1.08 respectively (UNICEF, 2009). Qualitative studies however, revealed that the above statistics do not reveal the true dynamics of the experience of education especially to girls. In a report on education in South African rural communities by HSRC, NMF and EPCSA (2005), humiliation, bullying, sexual abuse and

violence by teachers and other students have been found to be major causes of school dropout mostly in rural areas. It is stated in the report that "…many learners drop out of school because of poor educational experiences and discouragement from their teachers" (HSRC *et al.,* 2005:61). Social Surveys Africa (2010); Lloyd and Mensch (2008) highlighted union formation as one of the main causes of school dropout especially for girls in South Africa having observed that pregnancy and child birth result in temporary withdrawal from school. Similar observations were also made by Grant and Hallman (2008) in a study based on a sample drawn from KwaZulu Natal province which used multinomial logit regression technique to analyse causes of school dropout.

Previous research on educational outcomes for children in South Africa observed disparities in enrolment rates, grade repetition and progression in school as well as school dropout by age, sex, population group, province and rural-urban residence. In a 2012 report on school repetition and dropout, UNESCO reported that repetition rates in South Africa for the 1999-2009 period remained around 7 percent for primary education, but declined from around 16 percent in 1999 to 12 percent in 2009 for secondary education. Moreover, UNESCO (2012) reported that children from rural areas and households with low socioeconomic status were most likely to repeat grades compared to those from urban areas and households with high socioeconomic status. There were related findings from studies by Louw, Bayat and Eigelaar-Meets (2012); Social Surveys Africa (2010); and Lam, Ardington and Leibbrandt (2007) which observed higher repetition rates in the less urbanised provinces such as Limpopo, Mpumalanga and Eastern Cape. Schooling outcomes have also been observed to differ by sex and population group in South Africa especially with regards to grade repetition (Branson, Lam and Zuze, 2012; Republic of South Africa, 2011, 2008). In a report on dropout and learner retention, Republic of South Africa (2011) stated that boys had higher repetition rates than girls. Branson *et al.,* (2012) found in their analysis of NIDS data that larger proportions of African children repeated school compared to Coloured, White and Indian/Asian children.

Access to quality education and school dropout are measures of schooling outcomes that have also been studied in South Africa in relation to population group. Louw *et al.* (2012) found that in Western Cape, 66 percent of children enrolled in poor schools were African despite Africans making only 30 percent of the province's population. This highlights the impact of population group on the access to quality education which can be argued to be mediated by SES differences. Consequently, African children become more likely to repeat grades as observed by Crouch (2005) using the 2003 General Household Survey. Different dropout rates have been

reported for primary and secondary school. Meny-Gibert (2012) used the Household Survey of 2007 to study schooling outcomes for children in South Africa and found that dropout rates at primary school level ranged from 0.5 percent to 2.7 percent while at secondary level 12-13 percent of children dropped out of school. The causes of school dropout were identified to be lack of finance, leaving school in search of paid work, lack of schools offering up to grade 12 in some areas, and union formation (Meny-Gibert, 2012; Gustafsson, 2011; Social Surveys Africa, 2010). Dropout rates have also been observed to differ by sex with boys more likely to drop out of school compared to girls because of drug abuse, bullying and lack of sufficient support structures at schools and at home (Townsend, Flisher, Chikobvu, Lombard and King, 2008). However, most studies identified causes of school dropout from data collected using quantitative questionnaires and may not accurately reflect the true context of school dropout. The socioeconomic life experiences of children which may be responsible for school dropout can be too complex to be summed up in few categories of probable reasons for leaving school which are provided in questionnaires. In-depth qualitative research may therefore provide insight into the reasons that lead children to decide on leaving school before completing grade 12.

2.4.3. Relationship between family structure and schooling outcomes

Critics of the 'convergence thesis' have advanced that the shift towards nuclear family structures was an artefact of deliberate urban planning during colonisation and particularly apartheid because Africans living outside the sphere of direct influence of the apartheid 'urban-industrial complex' had always been living in extended family structures (Russell, 2003, 2002, 1994; Spiegel, 1982, 1980a, 1980b; Murray, 1980). Inasmuch as the debate on the convergence thesis was founded on pre-1994 data, an examination of data from modern day South Africa where direct influence of politics on domestic organisation of living arrangements is optimally minimal enables credible testing of Goode's (1963) thesis. Literature from recent studies that looked at family structures, mostly referred to as living arrangements, and child outcomes in South Africa include Case and Ardington (2006); Hosegood, Floyd, Marston, Hill, McGrath, Isingo, Cramping and Zaba (2007); and Hosegood and Ford (2003). While these studies as well as others were mainly based on small geographical areas such as demographic surveillance areas in rural KZN and Eastern Cape, their findings provide important insights into the changing family structures particularly in the wake of the HIV/AIDS epidemic. Hosegood *et al.* (2007) investigated the impact of parental death on subsequent living arrangements for children using data from Hlabisa, a demographic surveillance area. The study did not find

evidence of growing child-headed households which highlighted the important role being played by the extended family in absorbing orphaned children (Hosegood *et al.*, 2007). The findings were consistent with Foster's (2002:1907) conclusion that "there is no such a thing as an orphan in Africa" because in the African cultures orphans are children who do not live in a household headed by an adult. Studying the impact of mothers' and fathers' deaths on children's schooling outcomes; Case and Ardington (2006) observed significant differences between the two parental death situations. Loss of the mother was found to be a stronger predictor of poor schooling outcomes for children than that of the father (Case and Ardington, 2006). Moreover, children who had been absorbed into extended families were found to be lagging behind those in the same household by an average of 0.12 years in school and were also less likely to be enrolled (Case and Ardington, 2006). While acknowledging the study's limited generalisability arising from the fact of it being based on small population in a rural KZN DSA relative to the country's its use of longitudinal data enhanced stronger comparative analysis of child outcomes as a result of changes in family structures by having the child as the same unit of analysis for the different family structures. There were comparable findings in a national study by Holborn and Eddy (2011) which attributed declining matric passes and reduced chances of continuous enrolment in school until matric to living in the absence of one or both parents.

Meanwhile, Case and Ardington's (2006) results are related to those of an earlier national study by Anderson (2005) whose investigative point of departure consisted of Hamilton's (1964) theory of inclusive fitness and a measure of relatedness between child and household head measured using Wright's (1922) coefficient of relatedness. Anderson (2005) used the October Household Survey (OHS) and Income and Expenditure Survey (IES) data for 1995 to examine the correlation between biological relatedness between children and household heads and the impact on child-oriented investment including for schooling. The study revealed that children biologically related to the household head received better investment than those who were not biologically related to the household head (Anderson, 2005). As pointed out in section 2.2, these findings drew similarities with those of Boggess (1998) for US children. However, it cannot be guaranteed that using CS 2007 will yield related results due to the time difference and attendant changes in social structures between 1998 and 2007.

Adult migration, a century old feature of social organisation in South Africa, has also been found to have consequences in family structures and children's schooling outcomes. Hosegood and Ford (2003) observed that most rural children have changed residence as a response to the

living arrangements that emerge due to adult migration, as well as parental death. The children who were affected by adult migration were also found to have experienced setbacks in their schooling (Hosegood and Ford, 2003). In the study sample of 10,490 households, Hosegood and Ford (2003) found that 18 percent of the households dissolved in a space of just one year, from 1 June 2000 to 1 June 2001 mainly due to HIV/AIDS mortality.

There are studies such as the one by Lu and Treiman (2011) that have looked at the impact of migration on family structure and schooling outcomes for children in a similar way Creighton *et al.* (2009) and McKenzie and Rapoport (2006) did in Mexico. However, Lu and Treiman (2011) conceptualised parental migration in South Africa as a distinct form of family disruption which has positive impacts on children's schooling outcomes, contrasting with that in the Mexican studies. The contrasting conceptualisation was due to the fact that parental migration in South Africa has largely been inter-provincial and mostly towards the Gauteng province as shown by CS 2007 data whereas that in Mexico was international (Statssa, 2008; Lu and Treiman, 2011; Kok, O'Donovan and Van Zyl, 2003). According to Lu and Treiman's (2011) study, parental migration, particularly that of the father, was correlated with improved schooling outcomes in terms of school attendance for black children while the opposite prevailed for white children. The findings for black children can be interpreted from the perspective of the theory of New Economics of Labour Migration which regards migration as a household's strategy for diversifying the sources of sustenance for a family (Stark and Bloom, 1985). Similar findings have also been reported in other countries other than South Africa which include Mexico, Ghana, Malaysia and Thailand (Adams, Richard, Cuecuecha and Page, 2008; Curran, Chung, Cadge & Varangrat, 2003; Hanson and Woodruff, 2003). However, deleterious impacts have been revealed in Mexico (McKenzie and Rapoport, 2006; López-Córdoba, 2005; Kandel and Kao, 2001; Taylor, 1987). The negative schooling outcomes observed by Lu and Treiman (2011) for white children in South Africa call for application of a more flexible contextual approach to understanding the family systems and how they impact on child outcomes..

2.5. Summary of the chapter

This chapter has reviewed existing literature on family structures, child outcomes and the relationship between family structure and child outcomes. The literature based on samples drawn largely from the developed world identified four types of family structures; nuclear, single-parent, step family and other. A large proportion of studies worldwide found better

schooling outcomes for children living in two-parent families compared to those living in other family types. Literature based on samples drawn from some countries in Asia, Iceland and Norway observed different results compared to those based largely on the western countries and Australia. Educational outcomes among children were observed to be similar for children living in nuclear structures and those living in other family types. The types of family structures existing in South Africa differ from those observed in mostly the developed countries in the sense that the nuclear type is not the majority type. However, existing literature on schooling outcomes for children in South Africa reports results comparable to those observed in other parts of the world. It has been reviewed that children living in nuclear families in South Africa have tended to do better in educational attainment compared to their counterparts living in other types of family structures.

CHAPTER 3: RESEARCH DESIGN AND METHODOLOGY

3.1. Introduction

This chapter discusses design and methodological approach explored to respond to each of the research questions raised. It provides a description of the data (CS2007) including the sampling procedures used by Statistics South Africa in carrying out the survey. This is done to provide a foundation for understanding the possible limitations of the study contained in the last section of the chapter. The chapter also provides a description of the study sample and variables that were investigated. Before carrying out the above, the chapter recaps the problem and purpose of the study as well as the key research questions.

3.2. Statement of the problem and purpose of the research

The research sought to investigate the impact of family structure on children's schooling outcomes in South Africa using the CS2007. The unique taxonomy of family structures in South Africa creates a chasm in modern literature on the interaction of schooling outcomes and family factors especially when comparing South Africa to the developed countries. Socio-economic and political events of South Africa's pre-1994 past created conditions for fluid living arrangements. While the transition to democracy changed the political and economic factors, the emergency of HIV/AIDS contributed to perpetuating the context for an already enduring fluid system of family structures in South Africa. This has raised academic curiosity on the impact on schooling outcomes of the types of family structures in modern South Africa. The purpose of this research was therefore to provide evidence based literature on South Africa on the interaction between different family structures and schooling outcomes for children.

3.2.1. Research questions

The research was guided by the following key questions;

i. What is the relationship between family type and school enrolment for children in South Africa?
ii. Does family structure affect grade repetition and grade completion by children in South Africa?

3.3. Research design

The research employed explanatory quantitative design using cross-sectional survey data to investigate family structure's impact on schooling outcomes of children in South Africa.

According to Maxwell and Mittapalli (2008), explanatory research aims to explain and not only to describe phenomena being studied. When using explanatory design, the researcher derives hypothesis from existing literature and employ statistical techniques in manipulating data to test the hypothesis (Maxwell & Mittapalli, 2008). This type of design has traditionally been used in quantitative research where the main focus is to analyse numeric data (Maxwell and Mittapalli, 2008).

Quantitative explanatory designs follow clearly defined steps when investigating a topic or phenomenon. The steps include, broadly, research design, sampling, measurement, analysis and conclusion. The explanatory quantitative researcher tests hypotheses derived from available theories or literature. This means that a review of available literature is done first to enable the researcher to develop the most suitable techniques for data analysis.

The choice to use quantitative explanatory design was made with due consideration of the topic of the study for two reasons. The first reason was that the topic's reference population is that of South Africa as a whole hence the need for a design that would allow, to a reasonable extent, for generalisation of findings. The second reason was based on that 'impact' as used in the topic imply more than mere correlation. There was need to have a study design that would make it possible to both determine and explain the extent of the impact in the form of association of family type on observed schooling outcomes. The two reasons, among other data-related reasons, were also crucial in the selection of the specific methods employed in data analysis. The methods are discussed in subsection 3.5 below.

3.4. Data

3.4.1. Community Survey 2007

The data used for this research was the 2007 Community Survey (CS2007). The Community Survey 2007 was a large scale national survey conducted by Statistics South Africa (Statssa) in the year 2007, hence its name, to provide demographic and socio-economic data at municipal level (Statssa, 2008). It was the largest survey ever to be carried out by the national statistical agency (Statssa, 2008). The survey was carried out following cabinet decision for Statistics South Africa to move from conducting five-year to ten-year census surveys which meant that Statssa was not to conduct a census in 2006 (Fleisch, Shindler and Perry, 2010). The deference of a census survey created an information gap and in order to fill it, CS2007 was carried out (Fleisch et al., 2010). The survey was carried out from the month of February to March in the year 2007.

The selection of households to participate in the survey was carried out using two-stage stratified random sampling (Statssa, 2008). According to Statssa (2008), each municipality was considered an explicit stratum. The first stage of the sampling process comprised selecting enumeration areas (EAs) in each municipality using systematic random sampling (Statssa, 2008). The second stage involved selection of households (or dwelling units) using listing methodology and this was determined by trained fieldworkers (Statssa, 2008). The selection of participating households ensured equitable representation of dwelling units located in all four settlement types found in South Africa; rural-informal (formerly tribal areas), rural-formal (commercial farms), urban informal and urban formal areas (Statssa, 2008). This was done to allow for fair chance of generalising observations from the survey.

3.4.2. Study Sample

The opening preamble of this chapter states that the research aimed to investigate the impact of family structure on schooling outcomes meaning that the focus was on children in households. While the total number of 7-17 year olds enumerated in CS2007 was 242 036, those who were staying in households were 225 538 and 16 498 were in institutions. The study sample considered was therefore 225 538 since the information on the living arrangements for persons in institutions were not collected by the CS2007. The decision to consider 7-17 year olds only was based on the Republic's constitutional provisions on the definition of a child in South Africa and the requirement for every citizen to have enrolled in at least Grade 1 in the year they turn 7 years of age (Fleisch et al., 2010). The constitution of South Africa requires all children to "attend school from the first day of the year in which such learner reaches the age of 7 years", (Republic of South Africa (1996) cited in Fleisch et al., 2010:8). Although it is commonplace to find 6 year olds enrolled in primary school in modern times and 18 year olds still in secondary school, it was prudent to use the legal basis provided by the constitution to set the maximum age limit. The study sample made up

The sample was evenly distributed across all the age groups. Its mean age, with a standard deviation of 3.15, was 12.16 years and was not very different from the median age of 12 years. There was negligible difference between the sexes in terms of age. The mean age for females was 12.15 years with a standard deviation of 3.14 while males had a mean age of 12.16 with a standard deviation of 3.16. However, breaking down the sample by population group revealed that Indian/Asian children constituted a slightly older sub-sample by a single year with a median age of 13 years compared to the sub-samples of African, Coloured and White children

which all had a median age of 12 years. Table 3.1 below present a detailed picture of the age distribution of the sample by population group.

Table 3.1 Age distribution of the study sample by population group

Population group	Observations	Mean	Standard deviation
African	189 112	12.13	3.15
Coloured	22 587	12.03	3.15
Indian/Asian	3 646	12.40	3.15
White	10 193	12.21	3.15

The sex ratio of the study sample was 1.008 depicting an almost equal number of male and female children, 50.02 per cent and 49.98 per cent respectively. The ratio is comparable to the recent sex ratio for children reported in the 2011 census results (Statssa, 2013). The sex composition of the study sample was therefore considered understandably representative of the children in South Africa in the year 2007. However, it should be noted that the differences in children and adult sex ratios have implications on the structure of families. The breakdown of the sample by sex was as shown in table 3.2 below.

Table 3.2 Sex ratio of the study sample

Sex	Frequency	Per cent
Male	112 806	50.02
Female	112 732	49.98
Total	**225 538**	**100.00**

The racial composition of the study sample was similar to that of South Africa as a whole. African children constituted the majority making up 83.85 per cent of the sample. Coloured children made up 10.01 per cent followed by white children who formed 4.52per cent of the total sample. The smallest proportion was made of Indian/Asian children, 1.62 per cent of the 7-17 year olds sampled in the CS2007. Table 3.3 below shows the details of total numbers and percentages of each population group in the study sample.

Table 3.3. Distribution of the study sample by population group

Population group	Frequency	Per cent
African	189 112	83.85
Coloured	22 587	10.01
Indian/Asian	3 646	1.62
White	10 193	4.52
Total	**225 538**	**100.00**

3.5. Variables

3.5.1. Dependent variable

The dependent variable for the study was schooling outcomes and was determined using two measures; enrolment status and highest level of education attained.

(a) Enrolment status

The first step in investigating schooling outcomes for children involves establishing if they are presently enrolled in school. Enrolment status was established using the following question;

Does *(the person)* **presently attend an educational institution?**

For a person to be considered attending an educational institution, one had to be involved in fulltime or part time studies whether in person, as a distance learner or involved in home schooling (Statssa, 2008). A lack of any of the different types of schooling meant that one was not attending an educational institution. The CS2007 gives data on school attendance as a dummy response.

(b) Grade completion

The second measure of schooling outcomes was based on a question regarding highest level of education an individual had completed at the time CS2007 was conducted. Statssa (2008) asked of each individual regardless of enrolment status;

What is the highest level of education that *(the person)* **has completed?**

Data on highest level of education ranged from no schooling to higher degree (masters and doctorate) and did not include qualifications for which a person was currently studying towards. This meant that, for example, the highest level of education completed by children doing grade 7 in the year 2007 was grade 6.

3.5.2. Independent variables

The main independent variable was family structure. Other explanatory factors that were included in data analysis were age, sex, population group, province, type of educational institution and socio-economic status (SES). Table 3.4 below shows summary statistics of the distribution of the study sample for each independent variable.

Table 3.4. Distribution of the study sample by variable type

Explanatory variable	Frequency	Percentage of total sample
Household variables		
Family structure		
Nuclear	58 977	26.15
Couple	100	0.04
Incomplete nuclear	36 761	16.30
Solitary	549	0.24
Extended	70 653	31.33
Skipped generation	23 113	10.25
Complex	4 095	1.82
Other	31 290	13.87
Total	**225 538**	**100.00**
Socio-economic status (SES)		
Low	64 564	28.63
Medium low	51 262	22.73
Medium high	44 925	19.92
High	62 503	27.71
Total	**223 254**	**98.99**
Biographic variables		
Sex		
Male	112 806	50.02
Female	112 732	49.98
Total	**225 538**	**100.00**
Population group		
African	189 112	83.85
Coloured	22 587	10.01
Indian/Asian	3 646	1.62
White	10 193	4.52
Total	**225 538**	**100.00**
Type of educational institution		
Public	202 661	89.86
Private	7 535	3.34
Total	**210 196**	**93.20**
Geographic variables		
Province		
Western Cape	19 680	8.73
Eastern Cape	40 480	17.95
Northern Cape	10 334	4.59
Free State	11 320	5.02
KwaZulu Natal	52 191	23.14
North West	14 195	6.29
Gauteng	33 263	14.75
Mpumalanga	16 891	7.49
Limpopo	27 174	12.05
Total	**225 538**	**100.00**

3.5.2.1. Family structure

Family structure is a categorical variable. It is a social construct that can be conceptualised genealogically and demographically, but was used in this research in terms of the latter. Family structure was operationalized using relationship to household head. Consequently, the term 'household' is used interchangeably in this research with 'family structure' although it is acknowledged that the two concepts may have different meanings in contexts different from this study's. When determining the types of family structures that individuals enumerated in CS2007 belonged to, responses to the following question were used;

What is *(the person)***'s relationship to the head or acting head of the household?**

There were eight different types of family structures that were identified, and were classified as solitary, couple, nuclear, incomplete nuclear, extended, skipped, complex and 'others'.

Solitary structure: A solitary household is one that has only one person living by him/herself.

Couple household: Couple household comprise two individuals, the household head and his or her spouse with no children or other person living with them.

Nuclear structure: Nuclear households have two parents (head and spouse) living with their biological children, stepchildren and adopted children. The inclusion of stepchildren and adopted children was done to suit the context of living arrangements in South Africa which is different from that of the western world.

Incomplete nuclear: The incomplete nuclear type is made up of a single parent living with her or his biological children. This type of family structure is also referred to as single-parent household and can be male-headed or female headed.

Extended structure: The extended family structure was identified as having a household head with a spouse living with biological children and at least one grandchild.

Skipped generation: The skipped family structure was defined as one comprising a household head with a spouse living with grandchildren. Any household that included an unrelated person was put under the complex structure classification.

The modal family structure observed from CS2007 was the extended type followed by nuclear structure which respectively accounted for 29.89 percent and 25.25 percent of the CS2007 sample excluding those living in institutions. Individuals living in family types classified as

'other' constituted 14.30 percent of CS2007 sample while incomplete nuclear structure accounted for 12.39 percent. The least prevalent type of family structure was the complex household which had 2.49 percent of the 949 100 individuals living in households. Excluding the forms of living arrangements classified under 'other', extended, nuclear and incomplete nuclear households were the main family types given that 67.53 percent of the applicable CS2007 sample was distributed among the three family types. The other family structures namely couple, solitary, skipped and complex contained 18.17 percent of the CS2007 population with the first three accounting for 4.37 percent, 4.65 percent and 6.66 percent respectively.

(a) Distribution of family structures for the study sample

The distribution of family structures for the study sample showed a similar pattern to that for the whole CS2007 sample. The extended household was still the modal family structure followed by nuclear and incomplete nuclear structures. However, the percentage shares of nuclear, incomplete nuclear, extended and skipped structures were higher for school going age children than for the CS2007 population while those of couple, solitary, complex and 'other' were lower. There was a total of 1243 children including the 549 living alone shown in table 3.4 above who were living without the presence of an adult, and although they constituted less than one per cent of the study sample, they are many in absolute numbers.

Table 3.4 shows that 31.33 percent of children were living in extended households while 25.15 percent, 16.30 percent and 10.25 percent were respectively living in nuclear, incomplete nuclear and skipped generation family structures. There were 50 couples among the study sample given that 100 children were in couple households while 549 were living alone. Couple and solitary structures were the least prevalent family types, accounting for 0.04 percent and 0.24 percent respectively of the 225 538 child population of school going age. There were 31 290 children constituting 13.87 percent of the study sample who were living in undefined family structures conveniently classified as 'other' in table above. The undefined family types accounted for more children than the combined total for couple, solitary, skipped generation and complex households which had a combined share of 12.25 percent of all children in the study.

(b) Distribution of family structures for study sample by population group

The distribution of family structures for the study sample showed that more than three quarters (76.09 percent) of White children lived in nuclear households whereas less than one quarter

(21.09 percent) of African children lived in nuclear households. The percentage shares of Coloured and Indian/Asian children in nuclear households were 39.70 percent and 64.84 percent respectively. While the nuclear structure had the highest prevalence for White, Coloured and Indian/Asian children, the extended structure, at 33.65 percent, was the most prevalent among African children. A largely similar pattern in the distribution of family structures was observed for Coloured and Indian/Asian population groups. As shown in table 3.5 below, both race groups had nuclear structure as most prevalent type followed in descending order by extended, 'other', incomplete nuclear, skipped, complex, couple and solitary.

Table 3.5 Distribution of family structures for the study sample by race, CS2007 South Africa

Key
Frequency
Column percentage

Family structure	African	Coloured	Indian/Asian	White	Total
Nuclear	39 891	8 966	2 364	7 756	**58 977**
	21.09	39.70	64.84	76.09	**26.15**
Couple	80	13	2	5	**100**
	0.04	0.06	0.05	0.05	**0.04**
Incomplete nuclear	33 252	2 279	259	971	**36 761**
	17.58	10.09	7.20	9.53	**16.30**
Solitary	534	10	0	5	**549**
	0.28	0.04	0.00	0.05	**0.24**
Extended	63 633	5 995	552	473	**70 653**
	33.65	26.54	15.14	4.64	**31.3**
Skipped generation	21 589	1 322	88	114	**23 113**
	11.42	5.85	2.41	1.12	**10.25**
Complex	2 640	994	86	375	**4 095**
	1.40	4.40	2.36	3.68	**1.82**
Other	27 493	3 008	295	494	**31 290**
	14.54	13.32	8.09	4.85	**13.87**
Total	**189 112**	**22 587**	**3 646**	**10 193**	**225 538**
	100.00	**100.00**	**100.00**	**100.00**	**100.00**

Table 3.5 above indicates that there was no Indian/Asian child lived alone compared to 10 Coloured children in solitary households, furthermore, the similarity in the pattern of distribution of family structures between Coloured and Indian/Asian race groups did not extend

to differences in the percentage shares of family types in the respective sub samples. For example, the extended structure accounted for 26.54 percent of Coloured children, but 15.14 percent of Indian/Asian children.

In table 3.5 above it is shown that there were distinct patterns in the distribution of family structures for African and White children. The incomplete nuclear structure had third highest percentage share (17.58 percent) among African children followed by 'other', and skipped, 14.54 percent and 11.52 percent respectively. Among White children, the incomplete structures had second highest percentage share of 9.53 percent followed by 'other' and extended with 4.85 percent and 4.64 percent respectively. The percentage of African children living in family structures classified as other was greater than the average for the total study sample which was 13.87 percent. The least prevalent family types among African children were couple, solitary and complex which respectively accounted for 0.04 percent, 0.28 percent and 1.40 percent of African children. Table 3.5 above shows that there were same number of White children in couple and solitary structures as both family types accounted for 0.05 percent of White children while the percentage share of the skipped generation household was 1.12 percent.

(c) Distribution of family structures for study sample by sex

There was a similar pattern in the distribution of family structures by sex for the study sample. All family structures had almost equal percentage shares in both sex groups, having a difference of less than one percent. For example, the nuclear structure accounted for 26.29 percent of males and 26.09 percent of females. The most prevalent family type for both sexes was the extended structure which accounted 31.20 percent of males and 31.45 percent of females. This was followed in descending order by nuclear structure, incomplete nuclear, 'other', and skipped generation. The couple and solitary structures had less than 0.5 percent prevalence in both sex groups. However, the couple structure was the least prevalence; there were 100 children living with a partner compared to 549 children living alone. Table 3.6 below shows detailed frequencies and percentage shares of all the family structures among males and females.

Table 3.6 Distribution of family structures for study sample by sex, CS2007 South Africa

Key
Frequency
Column percentage

Family structure	Male	Female	Total
Nuclear	29 653	29 324	**58 977**
	26.29	26.01	**26.15**
Couple	10	90	**100**
	0.01	0.08	**0.04**
Incomplete nuclear	18 626	18 135	**36 761**
	16.51	16.09	**16.30**
Solitary	393	156	**549**
	0.35	0.14	**0.24**
Extended	35 195	35 458	**70 653**
	31.20	31.45	**31.33**
Skipped	11 457	11 656	**23 113**
	10.16	10.34	**10.25**
Complex	2 040	2.055	**4.095**
	1.81	1.82	**1.82**
Other	15 432	15 858	**31 290**
	13.68	14.07	**13.87**
Total	**112 806**	**112 732**	**225 538**
	100.00	**100.00**	**100.00**

3.5.2.2. Age

Age can be defined as the length of time expressed in days, weeks, months or years that a person has lived since birth. This research operationalised age as the number of completed years at a child's last birthday using the CS2007 question '**What is** *(the person)***'s age in completed years?'** A child born in November 1997, for example, was 9 years old at the time of collecting data for CS2007.

3.5.2.3. Sex

Sex defines biological differences between males and females. It is a binary variable arbitrarily coded one for males and two for females in response to the question '**Is** (*the person*) **male or female?**' Statistics South Africa collected information on sex as part of biographic profile of

every individual enumerated in the CS2007. This study used sex as an explanatory variable to investigate differences in the odds of being enrolled and in highest grade completed between boys and girls that may be explained by sex. Males made up 50.02 percent of the study sample while females constituted 49.98 percent.

3.5.2.4. Population group

Defined based on physical characteristics distinct to a group of people, population group in South Africa is divided into four categories; African, Coloured, Indian/Asian and White. The CS2007 asked of every enumerated individual '**How would** (*the person*) **describe himself/herself in terms of population group?** The question was asked even when the population group of a person seemed obvious (Statssa, 2008). Population group was included in regression analysis to explain differences in educational outcomes that are due to population group and not family structure as well as the impact of family structure controlling for population group. Moreover, Mabugu *et al.* (2010) state that poverty levels in South Africa still have a racial dimension given enduring legacy of apartheid and are manifest in socioeconomic outcomes including education hence the need to control for population group.

3.5.2.5. Type of educational institution

The CS2007 collected information on the type of educational institution attended by individuals involved in studies. Type of educational institution refers to whether a person attended a public or private institution coded one and two respectively. The question '**Is the institution** (*the person*) **attends public (government) or independent (private)?**' when the type of educational institution was not known to the respondent, the response was coded three to indicate 'Do not know' and such cases were dropped for regression analysis. Of the 210 196 enrolled in school, 202 661 were in public schools while 7 535 were in private schools. The type of educational institution was included in data analysis given differences in quality of education between public and independent schools. Resource constraints in public schools may adversely affect progression in school thereby affecting highest grade completed relative to age hence the need to control for type of educational institution. Type of educational institution was included in OLS regression when analysing highest grade completed because the target sample was only children enrolled in school.

3.5.2.6. Province

South Africa has nine provinces which are Western Cape, Eastern Cape, Northern Cape, Free State, KwaZulu Natal, North West, Gauteng, Mpumalanga and Limpopo. The provinces have different levels of urbanisation, for example, Gauteng and Western Cape are more urbanised

than Limpopo and Eastern Cape. Children from more urbanised provinces have better access to education facilities and conducive environments for learning than children from less urbanised provinces (Meintjes *et al.*, 2010). Therefore, controlling for province enabled data analysis to isolate the impact of family structure that is not tainted by province-related factors.

3.5.2.7. Socioeconomic status (SES)

Holland, Breitbart and Jacobson (2009:47) defines socioeconomic status (SES) as a concept that describes "the placement of persons, families, households and census tract or other aggregates with respect to the capacity to create or consume goods that are valued in our society". In this study, SES was operationalised as a composite of household variables believed to define a household's investment capacity that reflects its social class in the context of CS2007. Households were classified into four categories of SES namely low, medium low, medium high and high. SES was computed using principal component analysis (PCA). The household variables used to determine SES are described in the section on PCA below. Data analysis included controlling for SES because wealth differences among households affect child outcomes (Hall *et al*., 2012).

(a) Principal Component Analysis

The importance of socioeconomic status (SES) has been acknowledged in many studies including those focusing on child outcomes. This is because the underlying SES is more reflective of a household's investment capacity and ability to impact on its members' individual outcomes than a household's reported income. There are different techniques for determining SES, but the method considered most suitable for this study was Principal Component Analysis (PCA). In this subsection, an overview of PCA is provided and how it was applied for purposes of this study.

According to Dunteman (1989:7), PCA "is a statistical technique that linearly transforms an original set of variables into a substantially smaller set of uncorrelated variables that represents most of the information in the original data set". The aim of PCA is to reduce the dimensionality of original data set while retaining its variation as much as possible (Dunteman, 1989; Jollife, 2002). The ability to transform a large number of variables into a smaller representative number easy to understand and work with is the reason why PCA was chosen. Although evidence of the technique's description and application is found in Pearson (1901) and Cauchy (1829), cited in Diacon and Effron (1983), it is asserted that "its modern instantiation was formalised by Hotelling (1933) who coined the term *principal component* (Abdi and Williams, 2010:2).

According to Nzimande (2007), the retention of the variation in the components is achieved through PCA's ability to assign weights to the original variables. Computation of PCA involves generating new variables called principal components (PCs) whereby the first component accounts for the largest possible variance in the original variables. This is followed by generating the second PC, third, fourth until the last PC in a 'hierarchical' fashion on the precept that each succeeding component accounts for maximal residual variance and is orthogonal to the one preceding it (Jollife, 2002; Filmer and Pritchett, 2001).

There are three steps that can be distinguished in PCA. The first step entails running PCA on a table of explanatory variables. The second step involves selecting components on which ordinary least squares is run. The third step is about computing parameters for the selected components of the model. Algebraically, the first principal component, denoted y_1, is a linear composite of all original variables (x_1, $x_2 \ldots$, x_k) and is computed as:

$$y_1 = a_{11}\, x_{1j} + a_{12}\, x_{2j} + \ldots. + a_{1k}\, x_k = \sum a_{1n}\, x_{ni} \qquad [3.1]$$

Where x_{1j} is variable i for household j and are linear coefficients (factor loadings) for component n and variable i. According to Filmer and Pritchett (2001), cited in Nzimande (2007), PCA extracts linear coefficients from n components and generate scoring factors which are weights applied to the variables normalised by their means and standard deviations. Similar algebras are employed for the other principal components, for example, the second component is computed as:

$$y_2 = a_{21}\, x_{1i} + a_{22}\, x_{2j} + \ldots. + a_{2k}\, x_k = \sum a_{2n}\, x_{ni} \qquad [3.2]$$

The variables used for PCA are type of dwelling, access to water, toilet facility, energy for cooking, refuse removal, and household goods which are fridge, television and internet access. Table 3.4 below shows factor scoring for PCA for the selected household variables.

Table 3.7. Factor scoring from PCA for selected household variables, CS2007 South Africa

Variable	Factor loadings (FL)	Factor scores (FS)	Mean	Standard deviation (SD)	SES Index (FS/SD)
Has brick dwelling	0.6532	0.17835	0.68824	0.46321	0.38503
Has piped water	0.5989	0.16352	0.84057	0.36608	0.44668
Has flush toilet	0.8016	0.21889	0.50358	0.49999	0.43779
Has electricity	0.7933	0.21661	0.60377	0.48911	0.44286
Has refuse removed by municipality	-0.7730	-0.21032	1.45730	0.49817	-0.42218
Has fridge	-0.7213	-0.19696	1.35475	0.47844	-0.41167
Has television	-0.6945	-0.18962	1.33521	0.47206	-0.40168
Has internet	-0.0958	-0.02616	1.99721	0.60911	-0.04295

(ai) Type of dwelling

CS2007 collected information on the type of main dwelling of every household according to the materials used to construct the dwelling such as bricks and traditional materials, and name of dwelling, for example, flat, workers' hostel and informal dwelling. Classification of dwelling type for PCA was done according to materials used to construct the main dwelling of a household. Dwelling types made of bricks or concrete were regarded as good while those made of other materials were classified as bad. House or brick structure on a separate stand or yard, flat in block of flats, town or semi-detached house (simplex, duplex or triplex), and room or flat-let not in backyard but on a shared property were classified as good. Dwelling types that were considered bad are traditional dwelling or hut structure made of traditional material, informal dwelling or shack in backyard, informal dwelling or shack not in backyard, for example squatter settlements, caravan or tent, workers' hostel and private ship or boat. CS2007 collected information on type of dwelling by asking '**Which of the following types describe the main dwelling unit that this household occupy?**' The variable was included in PCA because type of dwelling has been found to be an important predictor of socioeconomic status in South Africa (Michael, 2003).

(aii) Access to water

Information on access to water was collected using the question '**In which way does this household obtain water for domestic use?**' Access to water was classified into piped water and other for PCA. Piped water refers to water obtained from pipe inside the dwelling, outside the dwelling but in the yard, and from an access point outside the yard. Sources of water

classified as 'other' are dam or pool, borehole, spring, river or stream, water vendor, rain water tank and other sources. Water source was included because previous research, for example, Dungumaro (2007) observed a relationship between source of water and socioeconomic status, and Klasen (2000) found water source to be an important predictor of socioeconomic status.

(aiii) Toilet facility

Toilet facility was included in PCA whether a household had flushed toilet either connected to sewerage system or to a septic tank. Household without flushed toile had dry toilet facility, pit toilet with or without ventilation, chemical toilet, bucket system or none. Data on toilet facility was obtained using the question '**Which is the main type of toilet facility available for use in this household?**' The type of toilet used by a household has been found to be related to socioeconomic status, for example, Armstrong, Bongisa and Krige (2008) observed the relationship in a study of poverty in South Africa.

(aiv) Source of energy

CS2007 collected data on source of energy for cooking, heating and lighting as three separate variables. However, only source of energy for cooking was considered for PCA because cooking is the main purpose of energy consumption in most household. Moreover, Sugrue (2005) cited in Balmer (2007) found in a study of energy for sustainable development in South Africa that cooking energy is related to socioeconomic status stating that 25 percent of average poor households' expenditure is on energy for cooking compared to two percent for households with high socioeconomic status. Energy source was classified into electricity and 'other' for PCA with the latter representing gas, paraffin, wood, coal, animal dung, solar and other forms not specifically identified in CS2007. The question '**What type of energy or fuel does this household mainly use for cooking?**'

(av) Refuse removal

Refuse removal concerns how rubbish from a household is mainly disposed of. Each household was asked '**How is the refuse or rubbish from this household mainly disposed of?**' in the CS2007. Refuse removal was divided into either by local authority or 'other' for PCA. The 'other' forms of refuse removal represented communal refuse dump, no rubbish disposal, and other forms.

(avi) Household goods: fridge, television and internet facilities

CS2007 collected data about ownership of eight household goods three of which were included in PCA and are fridge, television and internet facilities. The survey asked '**Does the household own any of the following?**' Fridge and television were retained because of high factor loadings when PCA was initially run for all household variables. Internet facilities however, had low factor loading but was retained because internet access has important implications on schooling outcomes.

3.6. Methods

Data analysis was performed using SATA 11.2. Bivariate analysis was carried out first to created descriptive statistics about the distribution of family structures and to obtain the enrolment picture of children by sex, population group, province and rural-urban residence. Regression analysis, defined by Weisberg (2013) as the study of dependence, was then conducted to determine the statistical significance of differences in schooling outcomes among children. According to Sykes (1993), regression analysis is a statistical tool used to investigate relationships, which may be causal, among variables. In many quantitative research projects, regression analysis is a central tool used to investigate and understand functional relationships among variables of interest (Weisberg, 2013; Chatterjee and Hadi, 2006). The aim of conducting regression is to determine statistical significance, and in some instances, explain the nature of relationships among the variables of interest (Sykes, 1993). The use of regression analysis has attendant advantages over other methods, for example, bivariate *t*-tests or correlations because it allows for additional variables to be introduced in the model in order to establish if the relationship of interest is genuine or spurious (Gordon, 2012). Regression methods were therefore chosen for this study due to their associated advantages.

3.6.1. Regression models

The two models which were explored were chosen on the fact that the suitability of regression models is predicated on the measures of the dependent variable. The models are logistic and ordinary least squares (OLS). Logistic regression was used to analyse enrolment status, a dichotomous outcome variable while OLS was applied to highest grade completed.

3.6.1.1. Logistic regression model

Logistic regression, also called logit regression, was used on enrolment status across the different types of family structures. Logistic regression was conducted to assess school enrolment across family types. It was performed in the form of log of odds where the odds

were a function of probability of enrolment in relation to family type. The specific model was binary logistic model due to the fact that the dependent variable was coded 1 to denote enrolment in school and 0 to represent not enrolled. Letting X represent independent variables (family structure, sex, population group and province, the logistic model can be represented by;

$$log\frac{\pi_i}{1-\pi_i} = logO_i = \alpha + \beta_1(X_1) + \beta_2(X_2) + \beta_3(X_3) + \beta_4(X_4) \quad [3.3]$$

Where $1-\pi_i$ represent the conditional probability of being out of school; π_i is the conditional probability of being in school; and O_i is the conditional odds of being in school. In order for interpretation of logistic regression using odds, antilogs were applied to equation 3.3 to have the model as;

$$\frac{\pi}{1-\pi} = e^{\alpha+\beta} = e^{\alpha}\left(e^{\beta}\right)^{X} \quad [3.4]$$

Where the two constants multiplied by each other raised to the power x imply that an additional explanatory variable added on to the regression has a multiplicative effect on the odds of enrolment. Logistic regression was contacted using five models. The first model tested the impact of age and sex on the odds of being in school. The second model controlled for population group on top of age and sex. Family structure was added in the third model. The fourth model tested the variables included in the third model and socioeconomic status, and the final model included province.

3.6.1.2. Ordinary least squares (OLS) regression

A generalised linear modelling technique, ordinary least squares (OLS) regression is a useful model for analysing single response variables coded at interval scale (Moutinho and Hutcheson, 2011). The advantage of OLS model is that it can be applied with appropriately coded multiple categories of explanatory variables and this is why it was used in this research. OLS regression was employed to analyse the pattern in highest education completed by children across the different family structures. The form of the model as applied in the analysis is as follows;

$$Y = \alpha + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \ldots\beta_nX_n \quad [3.5]$$

Where Y is the dependent variable (highest education completed), α represents level of Y controlling for all explanatory variables, β is average change in Y in response to adding a specific explanatory variable, and $X_{1\ldots n}$ denote independent variables including the controlling

factors. The impact of the interaction of explanatory factors on the highest grade completed was examined using nested OLS models.

3.7. Limitations of the study

The limitations of the study largely draw from the fact that analysis was based on cross sectional survey data which was primarily collected for a purpose different from the objectives of this research. As a result the study was limited in the ability to comparatively measure schooling outcomes beyond enrolment status and grade completion. Critics can point out that, for example, completing tenth grade is not the same as passing tenth grade and therefore does not necessarily imply equal educational outcome for all who reported to have completed the grade. Furthermore, a measure of children's experience of education cannot be ascertained using CS2007 data because there was no relevant information collected for such a measure. Collection of qualitative data could have provided such information however, it would be difficult to do so for a nationally representative sample. The study could not account for individual differences among children that may be a result of selection. Children of educated parents may be more likely to be more intelligent than children from uneducated parents especially when the reason for differences in parents' levels of education were due to contrasting academic prowess. Moreover, there was no room to determine sibling differences in intelligence inasmuch as the study sample contained many children from same parents. The sampling unit of CS2007 also posed a limitation to the study. Statistics South Africa sampled at household level thus the composition of the study sample may not be entirely representative of the child population of South Africa hence the need for caution for generalising findings.

3.8. Summary

The purpose of this chapter was to present the research design and methodological approach that were explored when carrying out the study. The quantitative explanatory design used to analyse the cross sectional data was discussed. The chapter also described the CS2007 which was conducted by Statistics South Africa and is the source of data for this study. The characteristics of the study sample (N=225 538) were provided. The main variables of the study which were discussed are schooling outcomes (dependent) and family structure (independent). The specific methods of analysis employed were logistic and OLS regression and these were discussed in the chapter.

4.1. Introduction

The goal of this research was to investigate the impact of family structure on schooling outcomes for children aged 7 to 17 years in South Africa using the Community Survey of 2007. Achieving the goal involved identifying the types of family structures that prevail in South Africa, outlining how the study sample was distributed among the family types as well as by sex, population group, province and socioeconomic status as presented in chapter three. This chapter presents findings on the significance of age, sex, population group, family structure, province and socioeconomic status (SES) on the odds of being in school for children. Firstly, the chapter presents findings on school attendance from bivariate analysis and independent models from logistic regression. Secondly, results from nested models for the whole study sample are presented. Thirdly, findings from analysis comparing odds of attending school between children from female-headed and male-headed are describe. Fourthly, results from analysis comparing outcomes for female sample are presented and lastly, findings for the male sample. A summary of the chapter is then provided.

4.2. Bivariate analysis and independent logistic regression

Out of the 225 538 children studied, 93.31 percent were enrolled either in primary or secondary school while 6.70 percent were not enrolled. Table 4.1 below presents summary statistics on enrolment percentages for each type of independent variable and commensurate odds of being in school observed from independent logistic regression models. Row percentages in the table indicate the percentage of children in a category who were enrolled, for example, out of the 58 977 children living in nuclear structures, 94.18 percent were enrolled in school. Column percentages indicate each category's share of the total number of children enrolled, for example, 26.36 percent of the 210 457 children enrolled in school lived in nuclear family households.

Table 4.1. Summary of enrolment percentages and independent logistic models of odds of school enrolment for children of school going age, CS2007 South Africa

Explanatory variable	N	Row percentage	Column percentage	Odds of being in school
Household variables				
Family structure				
Nuclear	58 977	94.18	26.36	(omitted)
Couple	100	14.00	0.01	0.010**
Incomplete nuclear	36 761	94.61	16.53	1.084**
Solitary	549	81.06	0.21	0.262**
Extended	70 653	93.20	31.29	0.847**
Skipped generation	23 113	93.09	10.22	0.831**
Complex	4 095	88.96	1.73	0.498**
Other	31 290	91.60	13.65	0.674**
Total percentage			**100.00**	
Single-parent households				
Female-headed	33 296	94.89	90.67	(omitted)
Male-headed	3 547	91.63	9.33	0.589**
Total percentage			**100.00**	
Socio-economic status (SES)				
Low	64 564	92.43	28.64	(omitted)
Medium low	51 262	93.65	23.04	1.208**
Medium high	44 925	93.21	20.09	1.123**
High	62 503	94.13	28.23	1.313**
Total percentage			**100.00**	
Biographic variables				
Sex				
Male	112 806	93.30	50.01	(omitted)
Female	112 732	93.32	49.00	1.003
Total percentage			**100.00**	
Population group				
African	189 112	93.77	84.26	(omitted)
Coloured	22 587	89.10	9.56	0.543**
Indian/Asian	3 646	92.62	1.60	0.834**
White	10 193	94.47	4.58	1.135**
Total percentage			**100.00**	
Age				
All school-age children	225 538	93.31	100.00	0.848**
Total percentage			**100.00**	
Geographic variable				
Province				
Gauteng	33 263	93.25	14.74	(omitted)
Eastern Cape	40 480	92.87	17.86	0.944
Northern Cape	10 334	90.86	4.47	0.720**
Free State	11 320	95.06	5.11	1.393**
KwaZulu Natal	52 191	93.09	23.08	0.975
North West	14 195	92.45	6.24	0.886**
Western Cape	19 680	90.58	8.47	0.696**
Mpumalanga	16 891	95.36	7.65	1.488**
Limpopo	27 174	95.85	12.38	1.672**
Total percentage			**100.00**	

** Significant at p< 0.05 level

4.2.1. Enrolment by household variables

4.2.1.1. Family structure

Table 4.1 above shows enrolment rates for each family structure as well as the odds of being in school for children in other family types relative to those in nuclear households. The highest enrolment rates among family types were observed for incomplete nuclear structure (94.61 percent) and nuclear structure (94.18 percent). The nuclear and incomplete nuclear structures were also the only family types with enrolment rates higher than the average of 93.31 percent for the total study sample. There were three family structures with enrolment rate above 90 percent although below the total average for the sample. These were extended structure (93.20 percent), skipped generation (93.09 percent) and 'other' (91.60 percent). Enrolment rates for complex and solitary households were 88.96 percent and 81.06 percent respectively. The least enrolment percentage was observed for the couple structure which had 14 percent of the married children in school.

Given the low enrolment rate for the couple structure, married children were found to have the least chance of being enrolled in school compared to children from other family types relative to those from nuclear family households. From independent logistic regression model testing the odds of being in school for children in different family structures without controlling for other explanatory factors, it was found that children in couple families were 0.9899 times less likely to be in school than children in nuclear families. Results for other family structures were strongly significant in terms effect for not being in nuclear family structure ($p\ 0.0000 < \alpha\ 0.05$). Children from incomplete nuclear structures were found to be 0.0841 times more likely to be in school than children from nuclear family structures. This was however, not strongly significant ($p\ 0.005 < \alpha\ 0.05$). Besides those from couple households, children from solitary and complex structures were also observed to have less than half the chance of being in school than children in nuclear families. Children living alone were 0.7358 times less likely to be enrolled in school than children in nuclear structures while those in complex households were 0.5023 times less likely to be in school. The least penalty for not being in a nuclear family structure was observed for extended structure followed by skipped generation family type and the living arrangements categorised as 'other'. Compared to those in nuclear families, children in extended households were 0.1534 times less likely to be in school while those in skipped generation and 'other' were 0.1686 times and 0.3263 times less likely to be in school respectively.

4.2.1.2. Socioeconomic status (SES)

Enrolment rates among the four categories of SES shown in table 4.1 ranged from 92.43 percent for children in households with low SES to 94.13 percent for children in households with high SES. The enrolment rate for children in medium low SES households (93.65 percent) was slightly higher than that for children in children in households of medium high SES (93.21 percent). As a result, there were no significant differences in the chance of being in school for children in medium low and medium high SES households. However, the chance on being in school for both medium SES categories were significantly higher than for low SES category (p 0.000 < α 0.05). Relative to low SES category, children in medium low SES category were 0.1230 times more likely to be in school while those in medium high SES category were 0.2076 times more likely. Results for children in high SES households were strongly significant (p 0.000 < α 0.05). It was observed from logistic regression that children in high SES category were 0.3130 times more likely to be enrolled in school than their counterparts in low SES category. The overall results show that SES can significantly predict a child's chance on being in school without controlling for other explanatory variables.

4.2.2. Enrolment by biographic variables

4.2.2.1. Sex

Table 4.1 above shows almost equal enrolment rates for both males and females. Of the male sample, 93.30 percent were in school while 93.32 percent of the female sample were in school. Given the very slight difference in enrolment rates, the odds of being in school for female children were not significantly higher than those of male children (p 0.835 > α 0.05). It can therefore be concluded that sex did not affect the odds of being in school between boys and girls in the study sample.

4.2.2.2. Population group

Table 4.1 above shows that enrolment rates were different for the four population groups. The highest enrolment rate was observed for White children (94.47 percent) followed by African children (93.77 percent). Indian/Asian children had the third highest enrolment rate of 92.62 percent while the 89.10 percent for Coloured children was the least. While the enrolment rates for African and White children were higher than the 93.31 percent for the study sample as a whole, those for Coloured and Indian/Asian children were lower. The differences in enrolment rates were reflected in the odds of being in school for the children in the different population groups. Relative to African children, Coloured children were significantly less likely to be in school (p 0.000 < α 0.05). Coloured children were 0.4567 times less likely to be enrolled in

school than African children. While Indian/Asian children were also less likely (0.1650 times) to be in school than African children, results were not as strongly significant as for Coloured children (p 0.005 < α 0.05). Among the four population groups, Whites had the greatest chance of being enrolled in school. White children were 0.1347 times more likely to be in school than African children. However, just like for Indian/Asian children, results for White children were not as strongly significant as for Coloured children (p 0.004 < α 0.05).

4.2.2.3. Age

The odds of enrolment for age represent the odds of being in school for children as age increases. The odds of 0.848 reported in table 4.1 above mean that as children grow older, they become significantly less likely to be in school (p 0.000 < α 0.05). As age increases, the odds of being in school decrease by 15.20 percent.

4.2.3. Geographic variable

4.2.3.1. Province

The nine provinces of South Africa had different enrolment rates as shown in table 4.1 above. Enrolment rates ranged from a minimum of 90.58 percent for Western Cape to a maximum of 95.85 percent for Limpopo province. There were three provinces including Limpopo which had enrolment rates higher than the 93.31 percent of the study sample as a whole and were Free State (95.06 percent) and Mpumalanga (95.36 percent). Conversely, six provinces namely Western Cape (90.86 percent), Eastern Cape (92.87 percent), Northern Cape (90.58 percent), North West (92.43 percent), Gauteng (93.25 percent) and KwaZulu Natal (93.09 percent) had enrolment rates below 93.31 percent of the study sample as a whole.

The differences in the enrolment percentage rates among the provinces were reflected in the odds of being in school for children. Given enrolment rates higher than Gauteng's, it followed that the odds of being in school for children living in Free State (1.393), Mpumalanga (1.488) and Limpopo (1.672) were significantly higher than those for children residing in Gauteng. Conversely, for provinces with lower enrolment rates than Gauteng, the odds of being in school were significantly lower than when living in Gauteng. For example, children residing Northern Cape, North West and Western Cape were observed to be 28.0 percent, 11.3 percent and 30.4 percent more likely to be out of school than children living in Gauteng. Results for Eastern Cape and KwaZulu Natal showed that there were no significant differences in the odds of being enrolled for children residing in the two provinces compared to their counterparts in Gauteng. The independent model for province showed that it was more beneficial for children's

educational outcomes in terms of odds of enrolment to reside in Limpopo, Mpumalanga and Free State provinces than in other provinces.

4.3. Nested logistic models for the whole sample

Table 4.3 below presents findings from the three logistic models that were explored to examine the impact of family structure on children's odds of enrolment. Nested logistic models on school enrolment yielded largely statistically significant results. The aim for exploring nested models was to examine changes in the effect of family structure on children's enrolment odds as more explanatory variables were controlled. The interpretation of the findings of Model I is linked to the results observed in the independent models presented in table 4.1 in order to establish the changes in the odds of enrolment when SES was controlled. Similar method of interpretation is adopted for reporting results of biographical and geographical variables for Model II and Model III respectively.

Table 4.2. Nested logistic models on the odds of enrolment for school-age children in South Africa, CS2007

Explanatory variable	Model I (N= 225 538)		Model II (N=225 538)		Model III (N=225 538)		Model IV (N=225 538)		Model V (N=223 254)	
	OR	**SE**	**OR**	**SE**	**OR**	**SE**	**OR**	**SE**	**OR**	**SE**
Age	0.848**	0.002	0.847**	0.002	0.850**	0.002	0.847**	0.003	0.846**	0.003
Sex (male)										
Female	1.003	0.017	1.004	0.017	1.012	0.017	1.007	0.017	1.006	0.017
Population group (African)										
Coloured			0.529**	0.013	0.520**	0.012	0.587**	0.011	0.487**	0.016
Indian/Asian			0.867**	0.056	0.797**	0.052	0.878**	0.041	0.607**	0.042
White			1.156**	0.051	1.033	0.048	1.088	0.029	0.848**	0.001
Family type (Nuclear)										
Couple					0.017**	0.005	0.017**	0.005	0.018**	0.005
Incomplete nuclear					1.053	0.032	1.035	0.031	1.079**	0.032
Solitary					0.409**	0.046	0.382**	0.042	0.427**	0.049
Extended					0.800**	0.019	0.801**	0.020	0.820**	0.020
Skipped generation					0.785**	0.026	0.776**	0.026	0.819**	0.027
Complex					0.543**	0.029	0.562**	0.030	0.573**	0.032
Other					0.678**	0.019	0.686**	0.019	0.696**	0.020
Province (Gauteng)										
Eastern Cape							0.991	0.030	1.338**	0.044
Northern Cape							0.947	0.042	1.098**	0.050
Free State							1.440**	0.071	1.601**	0.080
KwaZulu Natal							0.988	0.028	1.293**	0.040
North West							0.908**	0.036	1.069	0.043
Western Cape							0.959	0.037	1.021	0.041
Mpumalanga							1.498**	0.065	1.838**	0.083
Limpopo							1.699**	0.065	2.206**	0.089
SES (Low)										
Medium low									1.229**	0.031
Medium high									1.418**	0.038
High									2.032**	0.058
Log likelihood	**-53613.156**		**-53273.222**		**-52916.484**		**-52680.084**		**-51642.835**	

** Significant at p<0.05; OR = Odds Ratio; SE = Standard Error; Omitted categories are in parenthesis

4.3.1. Model I: Age and sex

Model I estimated the odds of school enrolment controlling for age and sex of the child. As shown in table 4.2, the odds of being enrolled in school significantly decreased as age increased implying that children were more likely to be out of school at older ages. The odds of 0.848 shown in the table above mean that as age increased, the odds of being enrolled in school decreased by 15.2 percent. Results for sex were insignificant, there were no differences in the odds of school enrolment between male and female children (p 0.856 > α 0.05). Unlike in the past when male children had an advantage over females with regards to schooling opportunities, the progress that has been made towards achieving universal access to education between the sexes in South Africa is the reason why both sexes were found to have similar odds of school observed in Model I.

4.3.2. Model II: Age, sex and population group

Model II estimated the children's odds of school enrolment controlling for age, sex, and population group. The results reported in table 4.2 above for Model II show no differences in the odds of school enrolment for boys and girls as was the case in Model I (p 0.834 > α 0.05). Controlling for population group however, resulted in a slight, although negligible, decrease in the odds of school enrolment by 0.12 percent from 0.848 in Model I to 0.847 in Model II. The impact of age on the odds of being enrolled in school however, remained significant. Children were more likely to be out of school as they grew older with the odds of being enrolled decreasing by a significant 15.3 percent as age increased

There were significant results at the 0.05 level observed for all three categories of population groups relative to Africans. Coloured and Indian/Asian children were significantly less likely to be in school compared to African children while White children were significantly more likely to be in school. The observed odds of school enrolment for Coloured children (0.529) mean that Coloured children were 0.471 times less likely to be enrolled than African children. Compared to African children, Indian/Asian children were 0.133 times less likely to be enrolled given 0.867 odds of enrolment shown in table 4.1. Although both population groups show significant negative effect for not being African, Coloured children (p 0.000 < α 0.05) were the worst affected compared to Indian/Asian children (p 0.028 < α 0.05). However, results for Indian/Asian children are inconsistent with existing literature, for example, Crouch (2005), who observed consistently higher age-specific enrolment ratios for Indian/Asian children than African children. The observed odds may have been influenced by the small sample size of Indian/Asian children which was not representative of Indian/Asian child population as

suggested by Gustafsson (2012) on related research. Findings for White children showed significant advantage over African children with regards to odds of school enrolment. White children were 0.156 times more likely to be enrolled in school compared African children controlling for age and sex. Model II found the population group variable to be an important predictor of enrolment opportunities for children in South Africa. However, unlike in the past when African children had the least odds of school enrolment due to political causes, as of 2007 African children had significantly higher probability of enrolling for school than Coloured and Indian/Asian children.

The inclusion of population group in the regression equation made Model II fit significantly better than Model I, the log likelihood increased to -53273.222 from -53613.156 in Model I. The likelihood ratio test comparing Model I to Model II yielded a significant statistic. This highlights the importance of population group as an explanatory factor of children's odds of school enrolment

4.3.3. Model III: Age, sex, population group and family type

The computation of children's odds of school enrolment in Model III controlled for age, sex, population group and family structure. Controlling for family structure resulted in changes in the odds that had been observed in Modell II for the population groups as well as in the log likelihood for the estimated model. Model III shows better ability to account for the estimated of odds of school enrolment given that the observed log likelihood (-52916.484) was significantly greater than the log likelihood for Model II (-53273.222). This means that Model III has better fit than Model II because it contains more variables that are relevant to explaining children's odds of school enrolment.

The odds of school enrolment for Coloured children and Indian/Asian population groups were lower in Model III than in Model II because of the addition of family structure as a predictor variable. Coloured children were 0.480 times less likely be enrolled in school compared to African children the odds of school enrolment for Indian/Asian children were 0.203 times less than those for African children. The odds of school enrolment for White children (1.033) also decreased when family structure was controlled. This resulted in an insignificant over African children such that it can be sated than African children were as likely to be enrolled in school as their White counterparts controlling for age and family structure ($p\ 0.488 > \alpha\ 0.05$). This can be explained by the fact that a greater White children were living in nuclear structures which are associated with better schooling outcomes unlike African children, thus once family

structure was controlled so that children from similar structures were compared, the advantage White children had over their African counterparts was diminished.

There was also a change observed for age in the form of a slight increase in the odds of children being enrolled in school at older ages, but children remained significantly less likely to be enrolled as age increased (p 0.000 < α 0.05). Furthermore, sex continued to be an unimportant variable for predicting children's odds of being in school because the observed odds showed no significant differences between male and female's odds of being in school (p 0.484 > α 0.05).

Results for family structures in Model III did not contrast with those of the independent model reported in table 4.1 except for the incomplete nuclear structure. Contrary to the findings from the independent model reported in table 4.1, children living in single-parent households were not significantly more likely to be in school than those living with both parents (p 0.085 > α 0.05). The odds of school enrolment observed for children living in incomplete nuclear households were 0.053 times higher than for those living in nuclear structures, an insignificant an insignificant advantage. There were significant results for children living in the other family types.

Model III found that it was less beneficial for children to live in couple, solitary, extended, skipped generation, complex and 'other' family structures compared to nuclear and incomplete nuclear structures. The worst affected were the 100 children living in couple structures whose odds of being enrolled in school were almost non-existent. A couple structure was defined as a family configuration where a child was living with a partner to whom one was married or engaged in a cohabiting relationship. Each couple structure was made up of two members, one female and one male. Children in couple households were 0.983 times less likely to be enrolled in school compared to children living with two parents. In other words children living with a spouse had only 1.7 percent of the odds of school enrolment of children living in nuclear households. The negative effect for not living in a nuclear household was also strongly significant for children living alone. Children in solitary households were 0.581 times less likely to attend school than their counterparts living in nuclear structures. This means that when living alone, the odds of school enrolment were less than 50 percent of those living with both parents in a nuclear family. Children living alone had the second least probability of being enrolled in school among the eight family types analysed.

Among the family structures besides couple and solitary, children living in extended families (0.800) had the least negative effect for not staying in nuclear structures followed by those living in skipped generation (0.785), 'other' (0.678) and complex (0.543) structures. Given the observed odds, children living in extended and skipped generation families were 0.200 and 0.215 times less likely to be enrolled in school compared to their counterparts living in nuclear structures. Children living in in 'other' family types were 0.322 times less likely to be enrolled in school compared to those living in nuclear structures. The negative effect for living in a complex structure compared to a nuclear structure was a loss of 0.457 odds of school enrolment. The odds of being enrolled in school for children living in skipped generation households were 0.785 and those for children in extended structures were 0.800 as reported in table 4.3 above.

4.3.4. Model IV: Age, sex, population group, family type and province

Model IV in table 4.2 shows results from the estimation of children's odds of school enrolment when differences in age, sex, population group, family structure and province of residence were controlled. Sex was again an insignificant factor as both male and female children had comparable odds of being enrolled in school (p 0.574 > α 0.05). The results for age (0.847) were the same as those observed in Model II, implying a significant decrease in the odds of school enrolment as age increased (p 0.000 < α 0.05). The odds of enrolment observed for population groups were higher in Model IV than in Model III, but Coloured and Indian/Asian children remained significantly less likely to be enrolled in school than African children while White did not have a significant advantage over African children. Coloured children were 0.413 times less likely to be in school than African children while Indian/Asian children were 0.112 times less likely. The odds of 1.088 observed for White children did not imply significantly higher odds of school enrolment than African children at 0.05 level.

Model IV found similar odds of school enrolment for children living in couple structures as those in Model III. Children living in couple structures remained 0.983 times less likely to be enrolled in school than children living in nuclear households even when differences in province of residence were accounted for. This mean that province of residence did not have any impact on married children's odds of school enrolment. Model IV, like Model III found no significant differences in the odds of school enrolment between children living in nuclear households and those living in single-parent households (p 0.250 > α 0.05). The odds of school enrolment observed for children living in solitary structures (0.382) and skipped generation (0.776) were slightly lower than those observed in Model III for the respective family types, representing

greater negative effect of not living in a nuclear family. The observed odds imply that controlling for age, population group and province, children living in solitary and skipped generation structures were less likely to be enrolled in school by respectively 0.618 times and 0.224 times compared to those living in nuclear structures. There were slight increases in the odds of school enrolment for children living in extended, complex and 'other' family types when province of residence was introduced in the regression equation, but were not enough to render insignificant the disadvantage of not living in nuclear structures. Children living in extended, complex and 'other' family types were respectively 0.199 times 0.438 times and 0.314 times less likely to be enrolled in school compared to those living in nuclear households. It was therefore observed in Model IV that children benefited more by living in nuclear and incomplete nuclear households in the form of higher odds of school enrolment than in any other family type as was also the case in Model III.

The results observed for provinces in Model IV show that residing in Free State (1.440), Mpumalanga (1.498) and Limpopo (1.699) was more beneficial to children in terms of higher odds of school enrolment compared to living in Gauteng. The odds of being enrolled in school when residing in Free State, Mpumalanga and Limpopo were respectively 44.0 percent, 49.8 percent and 69.9 percent higher than when living in Gauteng. Conversely, living in the North West province significantly limited children's odds of school enrolment by 9.2 percent compared to living in Gauteng. Despite having odds of school enrolment in the negative direction, children living in Eastern Cape (0.991), Northern Cape (0.947), KwaZulu Natal (0.988) and Western Cape (0.959) were not significantly less likely to be enrolled in school compare to those living in Gauteng.

4.3.5. Model V: Age, sex, population group, family type, province and SES

In the fifth model SES was introduced in the regression equation and odds of school enrolment were observed for each independent variable. Age remained an important factor determining children's odds of school enrolment, the observed odds of 0.846 indicated significantly less probability of being enrolled at older ages ($p\ 0.000 < \alpha\ 0.05$). As children's age increased, the odds of being enrolled in school decreased by 15.4 percent. As was also the case in the preceding four models, there were no significant differences in the odds of school enrolment between girls and boys even after SES was controlled. This means that sex was not an important factor in children's odds school enrolment. The introduction of SES however, impacted notably on the differences in the odds of being enrolled in school between African children and their counterparts in each of the other population groups.

Model V indicates that Coloured, Indian/Asian and White children were all significantly less likely to be enrolled in school than African children when SES was controlled. The odds of school enrolment for Coloured children (0.487) were less than half those of African children meaning that Coloureds were over 50 percent more likely to not be enrolled in school compared to their African counterparts. The odds observed for Indian/Asian (0.607) and White (0.848) children imply that these children were respectively 39.3 percent and 15.2 percent less likely to be in school compared African children when age, sex, province and SES were controlled. The low school enrolment odds observed in Model V for the three population groups were due to relatively low SES for African children compared to those in other population groups particularly Whites. The majority of White children lived in nuclear households with high SES compared to Africans. The benefit of living in high SES families was therefore diminished when SES was controlled thereby resulting in significantly lower odds of school enrolment for White children compared to their African counterparts in Model V.

Results on family structures in Model V reveal significant differences in the odds of school enrolment between children living in nuclear structures and those in each of the other family types. Unlike in Model IV, children living in single-parent households (1.075) were significantly more likely to be in school that those from nuclear structures due to higher odds induced by the introduction of SES in the regression ($p\ 0.013 < \alpha\ 0.05$). There were also higher odds of school enrolment for other family structures in Model V than in Model IV. However, living in couple, solitary, extended, skipped generation, complex and 'other' family types was still associated with significantly lower odds of school enrolment than living in nuclear structure. Children staying in extended households (0.820) were the least affected by not living in a nuclear structure followed by those in skipped generation (0.819), 'other' (0.696) and complex structures (0.573). The odds of being enrolled in school for children living in extended, skipped generation, 'other' and complex structures were respectively 18.0 percent, 18.2 percent, 30.4 percent and 42.7 percent less than those of children living in nuclear households. The biggest disadvantage for not living in a nuclear structures was observed for married children and those living alone who were respectively 98.2 percent and 57.3 percent less likely to be enrolled in school compared to African children.

The introduction of SES in the regression equation notable effect on the odds of school enrolment for provinces such that while only Free State, Mpumalanga and Limpopo had positive odds in Model IV, all provinces recorded positive odds in Model V. However, five provinces namely Limpopo (2.206), Mpumalanga (1.838), Eastern Cape (1.338) and Free State

(1.602) had results showing statistically strong significance (p 0.000 < α 0.05). The odds of school enrolment for children residing in the aforementioned provinces were significantly greater than those of children living in Gauteng. While results for children living in Northern Cape (1.098) also indicated notable advantage, they were marginally significant (p 0.043 < α 0.05). There were no significant differences in the odds of school enrolment between children living in North West (1.021) and those staying in Gauteng when SES was controlled (p 0.609 > α 0.05). Model V also found insignificant results for children residing in Western Cape (1.069) compared to those living in Gauteng (p 0.089 > α 0.05). The results on provinces which showed that children were mostly better off not living in Gauteng mean that the benefit Gauteng residents had in Model IV was due to the province's higher SES compared to others. Gauteng province is highly urbanised compared to others hence less rural population, higher employment levels and incomes which positively impact on school enrolment odds. The benefit of living in a rich province was therefore lost when SES was controlled hence higher odds of enrolment for children living in other provinces compared to those residing in Gauteng.

Table 4.2 above shows incremental benefit on the odds of being enrolled in school as SES increased. Children living in high SES families had the biggest advantage over those staying in low SES households. The odds school enrolment for children living in households in the high SES category (2.032) were more than double those of children living in households with low SES. The positive effect of living in a medium high SES household was a likelihood of being enrolled in school higher than that for children living in low SES families by 0.418 times. Children from families in the medium low SES category also had a significant advantage over children in the low SES category. Given their odds of school of school enrolment (1.229), children living in medium low SES families were 0.229 times more likely to be in school compared to those living in low SES families. Model V results thus show that SES is an important factor determining the odds of school enrolment for children in South Africa.

The log likelihoods for Model IV and Model V reported in table 4.2 above continue the increasing trend observed in the first three models, indicating that with each additional variable being added in the regression equation, improvements were made towards explaining the nature of children's odds of school enrolment. The log likelihood for Model IV is significantly greater than that for Model III and in turn significantly less than the log likelihood for Model V. Overall, the estimated nested models reported in table 4.2 above show a positive shift towards convergence as the log likelihoods successively increased with each additional explanatory variable in the regression equation.

4.4. Female-headed versus male-headed households

Nested models for comparing the odds of school enrolment between children from male-headed incomplete nuclear households and those from female-headed incomplete nuclear households were estimated to examine differences in the odds of being enrolled in school between the two groups of children. Existing literature observes better schooling outcomes for children living female-headed single-parent families than those living in male-headed single-parent families (Kibel, 2010; Case and Ardington, 2006; Lloyd and Desai, 1992). It was therefore considered justified to investigate the differences in the odds of school enrolment between children living with mothers only and those living with fathers only. This section presents findings from five nested models that were explored to examine the impact of living with a single father compared to living with a single mother. Table 4.3 below presents findings from the analysis.

Table 4.3. Nested logistic models showing odds of school enrolment for children living in incomplete nuclear structures

Independent variables	Model I (N=36 843)		Model II (N=36 843)		Model III (N=36 843)		Model IV (N=36 843)		Model V (N=36 513)	
	OR	***SE***	***OR***	**SE**	**OR**	**SE**	**OR**	**SE**	**OR**	**SE**
Age	0.838**	0.007	0.840**	0.007	0.840**	0.043	0.840**	0.007	0.838**	0.007
Sex (female)										
Male	0.924	0.043	0.927	0.043	0.937	0.044	0.936	0.044	0.945	0.043
Population group (African)										
Coloured			0.457**	0.033	0.458**	0.034	0.498**	0.046	0.424**	0.041
Indian/Asian			0.573**	0.123	0.585**	0.125	0.682	0.147	0.486**	0.107
White			1.199	0.185	1.258	0.194	1.375**	0.215	1.042	0.168
Type of incomplete structure (female-headed)										
Male-headed					0.641**	0.043	0.659**	0.044	0.650**	0.044
Province (Gauteng)										
Eastern Cape							1.102	0.085	1.424**	0.120
Northern Cape							1.291	0.187	1.473**	0.219
Free State							1.828**	0.251	2.013**	0.280
KwaZulu Natal							1.035	0.077	1.290**	0.103
North West							1.003	0.109	1.144	0.128
Western Cape							1.053	0.111	1.088	0.117
Mpumalanga							1.584**	0.173	1.899**	0.215
Limpopo							1.863**	0.174	2.342**	0.230
SES (Low)										
Medium low									1.139**	0.074
Medium high									1.424**	0.104
High									1.861**	0.146
Log likelihood	**-7511.8320**		**-7448.9176**		**-7438.3451**		**-7393.1924**		**-7282.0449**	

*** Significant at p<0.05 level; OR = Odds Ratio; SE = Standard Error; Omitted categories are in parenthesis*

4.4.1. Model I: Age and sex

As shown in table 4.3 above, Model I examined school enrolment odds for children living in single-parent households controlling for age and sex only. The odds of being enrolled in school for children living in single-parent households significantly decreased as age increased. Given the observed odds (0.838), children living in households headed by a single parent were 0.162 times less likely to be enrolled in school as they grew older. As was also found for the whole study sample, sex was not an important factor affecting odds of school enrolment for children living with a single parent as the observed result for male children (0.924) did not represent a significant disadvantage compared to females.

4.4.2. Model II: Age, sex and population group

Model II estimated odds of school enrolment for children residing in incomplete nuclear families controlling for age, sex and population group. The odds of being in school for age slightly increased to 0.840 in Model II from 0.838 in Model I when population group was introduced in the equation. However, there was still a strongly significant negative effect on the odds of being in school as age increased ($p\ 0.000 < \alpha\ 0.05$). There were no significant differences in the odds of being enrolled in school between boys and girls living with single parents given the observed result of 0.927 for boys in Model II which were not significantly less than 1 ($p\ 0.105 > \alpha\ 0.05$). The insignificance of the disadvantage for boys is consistent with the findings in a study by Anderson *et al*. (2001) based on a sample drawn from South Africa which reports that no differences in school enrolment between boys and girls, but acknowledges that boys are more likely to enrol late for grade 1 and to be suspended from school.

With regards to population group, Coloured (0.457) and Indian/Asian (0.573) children were significantly less likely to be in school than their African counterparts. The negative effect of not being African was 54.3 percent and 42.7 percent reduction in the odds of school enrolment for Coloured and Indian/Asian children living in single-parent structures respectively. The odds of enrolment observed for White children were 1.199, but were not insignificantly above 1 ($p\ 0.238 > \alpha\ 0.05$). This means that the odds of being enrolled in school were not significantly different between White children staying in incomplete nuclear households and their African counterparts from similar household structure. The inclusion of the population group variable impacted on the log likelihood of the Model II compared to the preceding model. Model II (-7448.9176) shows better fit than Model I (-7511.8320) implying that controlling for population

group differences improved the ability of the model to account for the observed odds of school enrolment for children living in incomplete nuclear structures.

4.4.3. Model III: Age, sex, population group and type of incomplete structure

Model III estimated odds of school enrolment for children living in incomplete nuclear families controlling for age, sex, population group and sex of household head. The odds of being in school for children living in male-headed households were 0.641 and indicated significant disadvantage compared to children living in female-headed incomplete structures (p 0.000 < α 0.05). The implication of the odds is that children living with single fathers only were 35.9 percent less likely to be enrolled in school compared to their counterparts living in households headed by lone mothers. The result for children living with fathers only relate to findings from previous studies based on samples drawn from South Africa by Lloyd and Blanc (1996) and Townsend *et al*. (2002) although the latter's study was based on Northern province only.

The effect of increase in age on the odds of school enrolment in Model III was the same as that observed in Model II. This means that even as population group differences and sex of the household head were controlled, the odds of school enrolment children living in single-parent households decreased by 16.0 percent as age increased. Model III found no significant differences in the odds of school enrolment between male and female children as was also the case in the preceding two models.

Results for population groups in Model III show that Coloured children had the least odds of being enrolled in school compared to African children. The odds of being in school for Coloured children, at 0.458, were less than half those of African children living in similar family structures and indicated significant disadvantage (p 0.000 < α 0.05). Coloured children were 54.2 percent less likely to be enrolled in school compared to African children. Indian/Asian children were also significantly affected negatively by living in single-parent households compared to African children. The odds of being enrolled in school for Indian/Asian children (0.585) were less than those of African children by 41.5 percent and represented significant disadvantage (p 0.012 < α 0.05). The odds observed for White children were 1.258 meaning that White children were 25.8 percent more likely to be in school than African children. However, the 25.8 percent advantage was not significant (p 0.137 > α 0.05). This was because of the relatively small sample of children living in single-parent households; using small samples increases the possibility of differences occurring out of chance.

The odds of school enrolment for children living in male-headed incomplete nuclear families were 0.641 and showed significant disadvantage compared to children living in female-headed households (p 0.000 < α 0.05). This finding is consistent with existing literature based in South Africa, most of sub-Saharan Africa and the western world (Karimli, 2012; McLanahan and Sandefur, 2004; Borgers 1996; Kiernan, 1992). The importance of the sex of household head on the odds of school enrolment can also be derived from the log likelihood of Model III (-7438.3451) compared to that of Model II (-7448.9176). The log ratio (LR) test which was conducted to test the difference between the two models showed that the log likelihood for Model II was significantly greater than that for Model II (*Pro > Chi2 = 0.000*).

4.4.4. Model IV: Age, sex, population group, type of incomplete structure and province

Model IV presented in table 4.3 above controlled for age, sex, population group, and province of residence to estimate children's odds of school enrolment when living in a male-headed household compared to a female-headed household. It was observed that children living with their fathers only were significantly less likely to be enrolled in school than those living with their mothers only. The odds of school enrolment for children in male-headed households were 0.659, implying a loss of 34.1 percent of the odds enjoyed by children in female-headed incomplete nuclear structures. It can therefore be concluded that children benefited more in terms improved odds of being school when living in female-headed households compared to staying in male-headed households.

The introduction of province in Model IV did not affect the odds observed for age in Model III and Model II which remained at 0.840 hence the significant loss of odds of school enrolment as age increased p 0.000 < α 0.05). There were higher odds school enrolment for Indian/Asian children Model IV than in Model III such that the negative effect in terms of limited odds of attending school for not being African was statistically insignificant when province was controlled (p 0.077 > α 0.05). There was a slight increase in the odds of being in school for Coloured children, from 0.458 in Model III to 0.498 in Model IV, although the significance of negative effect of not being African remained the same as in Model III (p 0.000 < α 0.05).

As was also the case in Model III, the odds of being enrolled in school for children living with fathers only when province of residence was controlled were significantly less than those for children living with mothers only. The negative effect for living in a male-headed incomplete nuclear structure was a loss of 0.361 odds of school enrolment compared to living in a female headed incomplete nuclear structure.

Results for provinces in Model IV show significantly higher odds of school enrolment for children living in Free State (1.828), Mpumalanga (1.584) and Limpopo (1.863) than those living in Gauteng (p 0.000 < α 0.05). There were positive odds of school enrolment for children living in Eastern Cape (1.012), Western Cape (1.291), Northern Cape (1.035), KwaZulu Natal (1.003) and North West (1.053), but did not imply significant advantage children living in Gauteng. It can be concluded from Model IV that living in Mpumalanga, Limpopo and Free State was more beneficial to children staying in single-parent households in the form of higher odds of school enrolment compared to residing in the other provinces. Despite only three significant results, province of residence impacted significantly on the overall fit of the Model IV as the observed log likelihood (-7393.1924) was significantly greater than the log likelihood for Model III.

4.4.5. Model V: Age, sex, population group, type of incomplete structure, province and SES

Model V introduced SES variable to observe the effect of controlling for living standards on children's odds of being in enrolled in school. The results presented in table 4.3 above show that age remained an important predictor of children's odds of school enrolment. The significance of age was not affected by the introduction of SES in Model V, odds of school enrolment decreased to 0.838. As the age of children living in incomplete nuclear structures increased, the odds of being in school decreased by 16.2 percent. As was also the case in the preceding four models, sex was not an important factor affecting enrolment odds in Model V. The odds of female children (1.062) enrolling in school were not significantly greater than those of male children (p 0.202 > α 0.05).

Findings on population groups show that Coloured and Indian/Asian children were significantly disadvantaged in terms of odds of being in school compared African children. Compared to their African counterparts, Coloured children living in incomplete nuclear structure had the least odds of being in school followed by Indian/Asian children. The odds of being enrolled in school for Coloured children were 0.576 times less compared to African children, a disadvantage observed to be strongly significant (p 0.000 < α 0.05). There was also statistically strong negative effect for not being African observed for Indian/Asian children whose odds of being in school were less than African children's by 51.4 per cent (p 0.001 < α 0.05). The results for Indian/Asian children however, may have been affected by the sample size if Indian/Asian children as they contradict findings in Gustafsson (2012) and Crouch

(2005) who have found better schooling outcomes for Indian/Asian children than African children. The introduction of SES affected the difference in odds of enrolment between White and African children living in incomplete nuclear structures. Although the odds of school enrolment for White children were 1.042, they were not significantly greater than 1 (p 0.798 > α 0.05). This means that for children staying in lone-parent households, Africans were as likely to be in school as Whites. The results in Model V therefore show that African and White children in single-parent households were better off in terms higher odds of being in school than their Coloured and Indian/Asian counterparts staying in the same type of family structure.

Living in a male-headed incomplete nuclear structure was found to pose statistically significant disadvantage to children in the form of limited odds of school enrolment. The observed odds for children from male-headed households were 0.650, meaning that odds of being enrolled in school when staying in such a household structure were 0.350 times less than when living in a female-headed household. Results showed strong statistical significance at 0.05 level (p 0.000 < α 0.05). It was therefore more beneficial for children to stay in female-headed households than male-headed structures.

The results for provinces presented in table 4.3 for Model V show that there were higher odds of being enrolled in school for children living in poorer provinces compared to Gauteng. Of all the provinces, only Western Cape (1.088) and North West (1.144) recorded odds above one which were not statistically significant, indicating children residing in the two provinces had similar probabilities of being enrolled in school as those in Gauteng. The introduction of SES in the regression resulted in significantly higher odds of being in school for children residing in Eastern Cape (1.424), Northern Cape (1.473) and KwaZulu Natal (1.290) compared to those living in Gauteng. This showed the importance of SES on school enrolment for children in single-parent households because the three provinces recorded insignificant results in Model IV. As for Limpopo (2.342), Mpumalanga (1.899) and Free State (2.013) provinces, controlling for SES resulted in even higher odds of being enrolled in school for children resident in the provinces with those of children in Limpopo and Free State exceeding double the odds of their counterparts living in Gauteng. The results help to how that children living in Gauteng benefited from staying in a richer province with higher employment rates compared provinces. Controlling for SES removed the advantage of living in a richer province thereby diminishing the odds of school enrolment for children residing in Gauteng.

Model V in table 4.3 above shows significant incremental benefit regarding odds of being enrolled in school as SES increases. All three SES categories, medium low (1.139), medium high (1.424) and high (1.861), recorded higher odds of school enrolment indicating that children in households belonging outside low SES category were significantly more likely to be enrolled in school than their counterparts in poor families. Expressed in percentages, the odds of school enrolment were 13.9 percent higher for children in medium low SES households compared to those in low SES families, increasing to 42.4 percent and 86.1 percent as one moved up to medium high and high SES households respectively. The overall conclusion for Model V is that age, population group, sex of household head, province and SES were important factors determining the odds of school enrolment for children in single-parent families. Furthermore, by including all six variables, Model V shows the highest fit evident in the largest log likelihood (-7282.0449) compared to the four preceding models.

4.5. Logistic regression results for the female sample

Given that there were no differences observed between the sexes as reported in the two preceding sets of results, unisex analyses were contacted to observe differences among children in each sex group. Analysis was contacted for the female sample to examine differences in the odds of school enrolment within the female sample, and the same was done for the male sample. Five models were estimated for each sex group. This section presents findings for the female sample the statistical results of which are presented in table 4.4 below.

Table 4.4. Nested logistic models showing odds of school enrolment for girls

Variables	Model I (N=112 732)		Model II (N=112 732)		Model III (N=112 732)		Model IV (N=112 732)		Mode V (N=111 568)	
	OR	**SE**	**OR**	**SE**	**OR**	**SE**	**OR**	**SE**	**OR**	**SE**
Age	0.828**	0.003	0.827**	0.003	0.832**	0.004	0.831**	0.004	0.827**	0.004
Population group (African)										
Coloured			0.568**	0.019	0.557**	0.019	0.596**	0.028	0.495**	0.024
Indian/Asian			0.824**	0.074	0.750**	0.069	0.829**	0.077	0.579**	0.056
White			1.246**	0.081	1.104	0.075	1.138	0.078	0.901	0.065
Family structure (Nuclear)										
Couple					0.018**	0.006	0.019**	0.005	0.021**	0.006
Incomplete nuclear					1.092**	0.047	1.078	0.047	1.124**	0.049
Solitary					0.298**	0.081	0.377**	0.077	0.393**	0.081
Extended					0.792**	0.027	0.798**	0.028	0.818**	0.029
Skipped generation					0.727**	0.033	0.720**	0.033	0.764**	0.035
Complex					0.546**	0.042	0.565**	0.044	0.572**	0.045
Other					0.677**	0.027	0.684**	0.027	0.695**	0.028
Province (Gauteng)										
Eastern Cape							0.990	0.043	1.337**	0.063
Northern Cape							0.980	0.064	1.133	0.076
Free State							1.471**	0.104	1.623**	0.115
KwaZulu Natal							0.945	0.039	1.240**	0.055
North West							0.865**	0.048	1.015	0.058
Western Cape							0.998	0.056	1.068	0.061
Mpumalanga							1.395**	0.083	1.716**	0.107
Limpopo							1.531**	0.081	1.993**	0.112
SES (Low)										
Medium low									1.224**	0.043
Medium high									1.454**	0.056
High									2.009**	0.081
Log likelihood	**-26537.133**		**-26401.223**		**-26160.460**		**-26061.776**		**-25543.935**	

** Significant at p<0.05; OR = Odds Ratio; SE = Standard Error; Omitted categories are in parenthesis

4.5.1. Model I: Age

The first model estimated the odds of school enrolment as age increased and found that female children were significantly less likely to be enrolled in school at older ages ($p\ 0.000 < \alpha\ 0.05$). Given the observed odds of 0.828, it means that the odds of being in school for girls decreased by 17.2 percent as age increased. It was therefore concluded that, without controlling for other factors, age was a significant predictor of odds of school enrolment for female children.

4.5.2. Model II: Age and population group

The second model estimated girls' odds of being enrolled in school controlling for age and population group. The introduction of the population group variable in the regression resulted in a slight decrease in the observed odds for age, from 0.828 in Model I to 0.827 in Model II. This odds of being enrolled in school for female children decreased to 82.7 percent as age increased, a significant loss of 17.3 percent of odds of school enrolment. Results for population groups as reported in table 4.4 show that the odds of being in school for Coloured girls (0.568) were significantly less than 1 ($p\ 0.000 < \alpha\ 0.05$). This means that compared to their African counterparts, Coloured girls were 43.2 percent less likely to be in school. Indian/Asian girls (0.824) were also found to have significant disadvantage relative to African girls, but not to the same extent as Coloured girls ($p\ 0.032 < \alpha\ 0.05$). The odds of school enrolment for Indian/Asian girls were 17.6 percent less than those for African girls. The highest odds of being in school were observed for White girls whose odds were 1.246, and represented a significant advantage over their African counterparts ($p\ 0.001 < \alpha\ 0.05$). The observed odds mean that White girls were more likely to be enrolled in school than their African counterparts by 24.6 percent. Overall, Model II results show that without controlling for other variables, age and population group were important predictors of girls' odds of school enrolment.

4.5.3. Model III: Age, population group and family structure

The third model introduced family structure in the logistic regression equation thus controlling for three levels of independent variables. The odds for age increased to 0.832 in Model III with the introduction of family structure. Nevertheless, female children were still significantly less likely to be enrolled in school as age increased ($p\ 0.000 < \alpha\ 0.05$). The odds of school enrolment fell by 14.8 percent as age increased. While the odds for age increased though negligibly, the opposite was the case for population groups. The disadvantage for not being African was greater in Model III than in Model II for Coloured (0.557) and Indian/Asian (0.750) girls when family structure was controlled. Coloured girls and their Indian/Asian counterparts were respectively 44.3 percent and 25.0 percent less likely to be in school than African girls. The

decrease in the odds for White girls to 1.104 with the control of family structure resulted no significant differences between White and African girls' odds of attending school (p 0.144 < α 0.05). A change in the direction of the odds for White girls in Modell III highlight that White girls' advantage over African girls came from living in more conducive family structures. When White girls were compared to African girls living in similar family structures, the odds of school enrolment were not significantly different.

Model III results for family structure show that girls living in nuclear and incomplete nuclear structures had higher odds of being in school than those living in any other household type. There were however, significant differences between girls living in nuclear structures and those living in single-parent families. Female children living in incomplete structures were 0.092 times more likely to be enrolled in school than those living in nuclear structures although the advantage was marginally significant (p 0.043 < α 0.05). Living in a family structure other than nuclear of incomplete nuclear structure was associated with lower odds of school enrolment for children. The worst affected were girls in couple households. With 0.019 odds of being enrolled in school, married girls were 0.981 times less likely to be enrolled in school compared to unmarried girls living in nuclear structures. The huge gap in the odds of school enrolment may be due to socio-cultural expectations on married teenagers as wives which hinder girls from enrolling in school. This was observed by Lloyd and Mensch (2008) who found union formation or cohabitation to be the main cause of girls from sub-Saharan African not being enrolled in school. Given that 90 of the 100 married children in the study sample were girls, their partners were older men who would be opposed to have their wives enrolled in school. Living alone also posed significant disadvantage as girls in solitary structures were 0.602 times likely to attend school compared to their counterparts in nuclear households. The odds of school enrolment for girls living in couple and solitary households may however, have been affected by very small sample sizes. For example, comparing mean odds of school enrolment for 90 married girls with that for 22 294 girls living with both parents may not produce accurate results.

The odds of school enrolment when living in a complex household structure as shown in table 4.4 above were 0.546 meaning that children in such structures were 0.454 times less likely to be enrolled in school compared to those living in nuclear households. The odds observed for girls in extended, skipped generation and 'other' households were 0.792, 0.727 and 0.677 respectively. Out of all the family types for which odds less than one were observed, children from extended structures had the least disadvantage followed by those living in skipped

generation and 'other' households. However, girls living in these household structures were also significantly less likely to be in school than those living in nuclear structures (p 0.000 < α 0.05). Given the observed odds, children staying in extended, skipped generation and 'other' family structures were respectively 20.8 percent, 27.3 percent and 32.3 percent less likely to be enrolled in school than those living in a nuclear structure. The negative effect on the odds of school enrolment for children not living in nuclear structures may have resulted from relative family sizes. Given that nuclear households tend to be smaller hence more resources available to be directed towards children's education, the larger sizes of extended, complex and 'other' family configurations may have affected the ability of the households to afford sending their children to school. Furthermore, skipped generation households experience financial difficulties which constrain grandparents' ability to afford their grandchildren's educational needs which often result in children ending up not enrolling in school as was observed in Holborn and Eddy, 2011.

4.5.4. Model IV: Age, population group, family structure and province

The fourth model presented in table 4.4 above controlled for age, population group, family structure and province. There was no notable change in the odds of school enrolment for age besides the slight decrease to 0.831 from the 0.832 observed in Model IV. The overall significance of age on girls' odds of school enrolment was closely related to that observed without controlling for province. The introduction of province resulted in slightly higher odds of school enrolment for children from the different population groups in Model IV than in Model II, the odds for Coloured and Indian/Asian girls remained in the negative direction while those for Whites were in the positive direction. The odds of school enrolment for Coloured (0.495) and Indian/Asian (0.579) girls remained significantly less than those for African children (p 0.000 < α 0.05). The odds of being enrolled in school for Coloured and Indian/Asian girls were respectively 49.5 percent and 57.9 percent of those for African girls.

The odds of school enrolment observed for family structures in Model IV differed from those in Model III. There were decreases in the odds of school enrolment for children living in incomplete nuclear and skipped generation households with the introduction of province in the regression equation. Unlike in Model III, children from incomplete nuclear families (1.078) were not significantly more likely to be enrolled in school than those staying in nuclear structures (p 0.084 > α 0.05). The odds of school enrolment for children in skipped generation households (0.720) remained in the negative direction of the odds for African girls. The odds of school enrolment for children living in skipped generation households were 72 percent of

those for girls living with both parents and indicated significant disadvantage (p 0.000 < α 0.05). Despite slight increases in the odds of school enrolment for girls in couple (0.019), solitary (0.377), extended (0.798), complex (0.505) and 'other' (0.684), they remained significantly less than those of girls living in nuclear structure. Married girls' odds of being in school, at 1.9 percent of those of girls in two-parent households, still indicated almost non-existent probability of being enrolled in school compared to girls living in nuclear households. Living alone was associated with less than half of the odds of school enrolment for girls staying with both parents. As was also the case in Model III, girls from extended households (20.2 percent) had the least disadvantage of not living in a nuclear family followed by those living in skipped generation (28.0 percent), 'other' (31.6 percent) and complex (43.5 percent) although all were significantly disadvantaged.

The results for provinces in table 4.4 show that only girls living in Free State (1.471), Mpumalanga (1.395) and Limpopo (1.531) were significantly more likely to be enrolled in school compared to those living in Gauteng. The observed odds indicate that the biggest advantage was for girls living in Limpopo followed by Free State and Mpumalanga as their odds of school enrolment were respectively 53.1 percent, 47.1 percent and 39.5 percent higher than those for girls residing in Gauteng. Of the five provinces with odds less than one in Model IV, only North West (0.866) showed significant disadvantage for girls residing in the province compared to those living in Gauteng (p 0.009 < α 0.05). Girls residing in North West were 0.135 times less likely to be in school than those staying in Gauteng when age, population group and family structure were controlled. Despite having odds of school enrolment below 1, girls living in Eastern Cape (0.990), Northern Cape (0.980), KwaZulu Natal (0.945) and Western Cape (0.998) were not significantly less likely to attend school than their counterparts living in Gauteng (p > 0.05). Without controlling for SES, it might be expected that girls residing in Gauteng should have significantly higher odds of school enrolment than their fellow counterparts living in other province. However, the results reveal the opposite which show the negative effect of living in a highly urbanised province where the general cost of living is high on the odds of school enrolment for children living in single-parent families. Past studies have documented resource constrains on incomplete nuclear families which adversely affect schooling outcomes, for example Park (2007) and Pong *et al.* (2005, 2003). Therefore, resource constrains coupled with high cost of living in Gauteng increases the negative effect on the odds of school enrolment for girls living in incomplete nuclear structures and diminishes the

advantage of living in a rich province hence the lack of significantly higher likelihood of school enrolment for Gauteng residents compared to those from other provinces.

4.5.5. Model V: Age, population group, family structure, province and SES

The fifth model introduced SES in the regression equation to observe the odds of school enrolment for girls when all the relevant independent variables were controlled. Table 4.3 shows that the odds of being in school were jointly lowest in Model V and Model II at 0.827 although odds of school enrolment decreased significantly as age increased in all models. Model V shows odds less than one for all population groups. However, only the odds for Coloured (0.495) and Indian/Asian (0.579) girls were significantly less than one, indicating significant disadvantage compared to African girls. The odds of Coloured and Indian/Asian girls being in school were less than those of African girls by 0.505 and 0.421 times respectively. There was no significant disadvantage regarding school enrolment for White girls (0.901) compared to their African counterparts (p 0.148 > α 0.05).

The odds of being in school for all family structures increased when SES was controlled. The increase resulted in significant advantage being observed for children living in incomplete nuclear structures (1.124) over their counterparts staying in nuclear families (p 0.008 < α 0.05). This means that when controlling for SES, province, population group and age, it was more likely for female children in single-parent households to attend school than those staying in nuclear structures. However, girls from the other family types remained significantly less likely to be enrolled than girls residing in nuclear structures (p 0.000 < α 0.05). Married girls and those living alone had the least likelihood of attending school. The odds of being enrolled for girls living in extended structures were 81.8 percent of those staying in nuclear families, a statistically significant disadvantage (p 0.000 < α 0.05). As for girls from skipped generation, complex and 'other' family types, the odds of being in school were respectively 76.4 percent, 69.5 percent and 57.2 percent of the odds of their counterparts from nuclear structures. Results for family structures show that, controlling for age, population group, province and SES, it was more beneficial for girls in terms of higher enrolment odds to stay in nuclear or incomplete nuclear households and particularly female-headed for the latter as was found in 4.2.3.

Table 4.4 above shows that all provinces recorded odds greater than one in Model V. However, five provinces namely Eastern Cape (1.337), Free State (1.623), KwaZulu Natal (1.240), Mpumalanga (1.716) and Limpopo (1.993) which indicated significantly higher odds of school enrolment for girls staying in the provinces compared to their counterparts residing in Gauteng.

The results mean that the odds of being enrolled in school was 33.7 percent higher for girls residing in Eastern Cape than those living in Gauteng while for residents of Free State, KwaZulu Natal, Mpumalanga and Limpopo they were 62.3 percent, 24.0 percent, 71.6 percent and 99.3 percent higher respectively. The odds of school enrolment for girls living in Northern Cape (1.113), North West (1.105) and Western Cape (1.068) were not significantly higher than those of girls residing in Gauteng. It can therefore be concluded from the findings on provinces that controlling for age, population group, family structure and SES, girls were significantly better off in terms of higher odds of school enrolment living in Eastern Cape, Free State, KwaZulu Natal, Mpumalanga and Limpopo than staying in Gauteng.

Model V presented in table 4.4 shows incremental increase in the odds of school enrolment for girls as SES increases. The higher the SES of the household a female child belonged to, the higher were her odds of being enrolled in school. The odds of being enrolled in school for girls living in medium low SES households (1.244) were 24.4 percent higher than for girls from low SES households when age, population group, family structure and province were controlled. Living in medium high SES households (1.454) was associated with 45.4 percent higher odds of being enrolled in school than living in low SES households. The results on SES show that with 2.009 odds of being in school, girls living in high SES families were at least two times more likely to be in school than their counterparts from low SES households. There was also significant advantage for girls from medium low SES families over those from low SES families. The findings on SES reveal that SES was an important predictor of odds of school enrolment for girls in South Africa.

An overall assessment of the models presented in table 4.4 above using LR tests showed that there were significant improvements in maximising with each additional explanatory variable as analysis progressed from Model I to Model V. For example, as Model I was nested in Model II, the log likelihood significantly increased from -26537.133 to -26401.233. Comparable increases occurred for the subsequent models such that the largest likelihood was observed for Model V. The log likelihoods thus help showing that each variable added in the regression equation was important in explaining the variance in the odds of school enrolment among girls aged 7 to 17 years in South Africa using the Community Survey of 2007.

4.6. Logistic regression models for the male sample

Table 4.5 below presents findings for five for the male sample, showing the odds of being enrolled in school and the standard errors of the estimated odds.

Table 4.5. Nested logistic models showing odds of school enrolment for boys

Independent variable	Mode I (N=112 806)		Model II (N=112 806)		Model III (N=112 806)		Model IV (N=112 806)		Model V (N=111 686)	
	OR	***SE***	***OR***	**SE**	**OR**	**SE**	**OR**	**SE**	**OR**	**SE**
Age	0.867**	0.003	0.865**	0.003	0.868**	0.004	0.867**	0.004	0.864**	0.004
Population group (African)										
Coloured			0.494**	0.016	0.487**	0.016	0.581**	0.026	0.481**	0.023
Indian/Asian			0.914	0.084	0.846	0.079	0.927	0.088	0.637**	0.062
White			1.078	0.066	0.971	0.062	1.045	0.067	0.803**	0.054
Family structure (Nuclear)										
Couple					0.009**	0.010	0.008**	0.009	0.009**	0.010
Incomplete nuclear					1.018	0.042	0.994	0.041	1.036	0.044
Solitary					0.399**	0.053	0.378**	0.049	0.422**	0.058
Extended					0.808**	0.028	0.804**	0.028	0.822**	0.028
Skipped generation					0.857**	0.040	0.846**	0.040	0.887**	0.043
Complex					0.537**	0.040	0.556**	0.042	0.572**	0.044
Other					0.679**	0.027	0.687**	0.027	0.696**	0.028
Province (Gauteng)										
Eastern Cape							0.991	0.042	1.336**	0.061
Northern Cape							0.919	0.057	1.067	0.068
Free State							1.413**	0.097	1.581**	0.111
KwaZulu Natal							1.033	0.042	1.348**	0.059
North West							0.952	0.053	1.125**	0.065
Western Cape							0.923	0.050	0.977	0.054
Mpumalanga							1.619**	0.101	1.976**	0.128
Limpopo							1.902**	0.106	2.464**	0.144
SES (Low)										
Medium low									1.232**	0.044
Medium high									1.381**	0.052
High									2.050**	0.083
Log likelihood	**-27045.868**		**-26836.27**		**-26717.085**		**-26569.451**		**-26049.207**	

*** Significant at p<0.05; OR = Odds Ratio; SE = Standard Error; Omitted categories are in parenthesis*

4.6.1. Model I: Age

Model I presented in table 4.5 shows estimates of male children's odds of being enrolled in school as age increased. It is shown that the odds of being enrolled in school for age were 0.867 and represented significantly low probability of school enrolment for boys as age increased (p 0.000 < α 0.05). The observed result shows that age was an important factor affecting the odds of boys being enrolled in school at older ages. Mode I in table 4.5 shows slightly higher odds of school enrolment than does the equivalent model for girls (0.828) presented in table 4.4. This might be due to that the probability of dropping out of school is higher for girls than for boys. Grant and Hallman (2008) observed in a study based on a sample drawn from KwaZulu Natal that girls were more sensitive to factors affecting one's odds of enrolling in school, for example, absence of female parent and financial difficulties.

4.6.2. Model II: Age and population group

Model II estimated the odds of school enrolment for boys controlling for age and population group. The introduction of population group variable resulted in a slight decrease to 0.865 of the odds of school enrolment as age increased, from 0.867 observed in Model I. The odds for age observed in Model II mean that controlling for population group, male children lost a significant 13.5 percent of their odds of being enrolled in school as age increased (p 0.000 < α 0.05).

Findings for population groups in Model II presented in table 4.5 above reveal that Coloured boys were significantly less likely to be enrolled in school than their African counterparts (p 0.000 < α 0.05). The odds observed for Coloured boys were 0.494, meaning that they were 0.506 times less likely to be in school than African boys. Results for Indian/Asian and White boys were insignificant. The odds of being in school for Indian/Asian boys were 0.914 and were not significantly less than 1 to indicate notable negative effect of not being African (p 0.333 > α 0.05). Despite having odds greater than 1, White boys (1.078) were not significantly more likely to be in school than their African counterparts (p 0.220 > α 0.05). Model II for boys show less disparities among the population groups than the equivalent model for girls presented in table 4.4. For the female sample, all population groups had odds of attending school that were significantly different from Africans', with the highest odds of being in school observed for Whites followed by Africans, Indians/Asians and Coloureds. Conversely, only Coloureds had odds of school enrolment that were significantly different from those of Africans for the male sample.

4.6.3. Model III: Age, population group and family structure

Model III introduced family structure in the regression equation. As reflected in the odds presented in table 4.5 above, controlling for family structure affected the odds observed for age and population groups, but without changing the overall significance of the two levels of independent variables as observed in the preceding model. The odds of boys being enrolled in school as age increased were slightly higher in Model III (0.868) than in Model II, a 0.003 improvement. However, boys were still significantly less likely to be enrolled in school as age increased ($p\ 0.000 < \alpha\ 0.05$).

When family structure was controlled, all population groups, Coloured (0.487), Indian/Asian (0.846) and White (0.971), recorded odds of school enrolment less than one. Nonetheless, only Coloured boys were significantly less likely to be in school ($p\ 0.000 < \alpha\ 0.05$). The odds of school enrolment for Coloured boys were 0.513 less than those of African boys. Although Indian/Asian boys were 0.154 times less likely to be enrolled in school than their African counterparts, they were not significantly disadvantaged ($p\ 0.075 > \alpha\ 0.05$). As for White boys, odds of being enrolled in school were almost the same as those for African boys being slightly less by 2.9 percent ($p\ 0.640 > \alpha\ 0.05$). The results for Indian/Asian and White boys were however, most likely affected by small sample sizes especially considering that the odds for age (0.868) indicated significant loss of odds of school enrolment for the whole boys sample, but the odds of 0.846 for Indian/Asian boys only were not significantly less than 1.

Model III results on family structures show significantly less odds of school enrolment for boys who were not staying in nuclear households except for those living in incomplete nuclear structures. With odds 1.018, boys living in incomplete nuclear households were as likely to be in school as their counterparts living in nuclear households. With regards to other family structures, the worst outcome for not living in a nuclear household was observed for married boys (0.009) whose odds of school enrolment were close to zero. However, the result for boys from couple structures should be treated with caution given that there were only 10 married boys, a sample too small to be compared to that of boys living in nuclear structures. There was also a big gap in the odds of school enrolment between boys living alone staying with both parents. The observed odds for boys living in solitary households were 0.399. This means that the odds of attending school for boys living alone were less than half those of boys living in two-parent households. Living alone poses financial difficulties to children, and given the need to obtain food for daily sustenance, dropping out of school becomes inevitable. Unless the male

child lives alone specifically for schooling, it is difficult for boys to afford enrolling in school hence the very low odds of school enrolment.

The least negative effect of not living in nuclear structures was observed for boys living in skipped generation households followed be those staying in extended, 'other' and complex although all were significantly disadvantaged. Compared to their counterparts living in nuclear structures, boys staying in skipped generation, extended, 'other' and complex structures were less likely to be enrolled in school by 14.3 percent, 19.2 percent, 32.1 percent and 46.3 percent respectively. The results can be explained by differences in the composition of the four family types and relative incomes. Skipped generation households were on average smaller than extended, complex and 'other' households, and given that the old age pension grant is relatively higher than the other grants providing income to the unemployed, grandparents can be more likely to afford the costs of sending their grandchildren to school compared to the household heads of extended, 'other' and complex households.

4.6.4. Model IV: Age, population group, family structure and province

The fourth model introduced the province variable into the regression equation and the findings are presented in table 4.5 above. The odds of school enrolment for boys as age increased still decreased significantly at the 0.05 level. Given 0.867 odds of school enrolment observed for age, male children were 0.133 times less likely to be enrolled in school as they grew older. The odds of school enrolment observed for age in Model IV the same as those in Model I implying that the effect of age on school enrolment for boys was not affected by a combination of province, family structure and population group.

The introduction of an additional control variable, province, in Model IV resulted in increases in the odds for all population groups albeit without affecting the overall conclusion on each population group observed in Model III. There was a change in the direction of the odds of being enrolled in school for White boys relative to African boys, from negative to positive. The odds of school enrolment for White boys (1.045) in Model IV indicated a positive advantage over African boys, but was not statistically significant (p 0.491 > α 0.05). Conversely, the odds for Indian/Asian boys (0.927) remained in the negative direction of those for Africans despite an increase after controlling for province. Nonetheless, India/Asian boys were not significantly less likely to be enrolled in school than their African counterparts (p 0.423 > α 0.05). The only significant result among the population groups was observed for Coloured boys whose odds of school enrolment were 0.581 and were significantly less than those for African boys (p 0.000

< α 0.05). Compared to African boys, the negative effect of being Coloured was a loss of 41.9 percent of odds of being enrolled in school. As was also the case in Model III, Model IV presented in table 4.5 shows less disparities among the population groups than the equivalent model for the female sample shown in table 4.4.

Model IV results on family structures show that all family types were associated with odds of school enrolment which were in the negative direction of those for nuclear structure. However, the odds of school enrolment for boys from incomplete nuclear households (0.991) were not significantly less than those for boys from nuclear families (p 0.881 > α 0.05). As was also the case in Model III, married boys (0.008) did not have notable odds of being enrolled in school, having only 0.8 percent of the odds which their counterparts living with both parents had. This result can be attributed to two factors, the small sample size of married boys and the demands from socioeconomic expectations placed on teenage husbands. The sample of 10 boys living in couple structures was too small to be compared to a sample of 29 611 boys living in nuclear structures. Teenage husbands experience resource constrains including financial which hinder them from enrolling in school, but instead drop out of school to look for sources of income although there is no literature to support this given that boy rarely get married during teenage-hood.

The odds of school enrolment for boys living alone decreased when province was controlled, from 0.399 in Model III to 0.362 in Model IV. This means that controlling for age, population group and province, boys living in solitary structures had 63.2 percent less odds of being enrolled in school compared to those living in nuclear structures. By not living in a nuclear household, boys from skipped generation structures (0.846) were a significant 15.4 percent short of odds of school enrolment compared to those living in nuclear households. As for boys living in extended (0.804), 'other' (0.687) and complex structures (0.556), their odds of school enrolment were respectively 19.7 percent, 31.3 percent and 44.4 percent less than those for boys staying in nuclear families. Given the results in Model IV, it was more beneficial for male children in terms of odds of school enrolment to live in nuclear households or incomplete nuclear structure, especially female-headed as revealed in section 4.2.2, than in any other family structure.

Results for provinces show that boys living in Free State (1.413), Mpumalanga (1.619) and Limpopo (1.902) were significantly more likely to be enrolled in school than those residing in Gauteng (p 0.000 < α 0.05). Compared to their counterparts living in Gauteng, the odds of

school enrolment for boys living in Free State, Mpumalanga and Limpopo were respectively 41.3 percent, 61.9 percent and 90.2 percent higher. Despite having positive odds of school enrolment, boys living in KwaZulu Natal (1.033) were not significantly more likely to be in school than those living in Gauteng ($p\ 0.428 > \alpha\ 0.05$). The odds of school enrolment observed for boys living in Eastern Cape (0.991), Northern Cape (0.919), Western Cape (0.922) and North West (0.952), despite being on the negative side, did not imply significant disadvantage compared to boys residing in Gauteng. The results for provinces show that it was more beneficial for male children to live in Free State, Mpumalanga and Limpopo than in Gauteng or Eastern Cape, Northern Cape, Western Cape and North West.

There a similar positive trend in the log likelihoods of successive models for the boys sample with that observed for the girls sample. LR tests yielded significant results showing notable increases in the log likelihoods between successive models implying a positive shift towards convergence. This means that with each additional variable, significant improvements were made in the ability of models to account for the variance observed in the odds of school enrolment among boys.

4.6.5. Model V: Age, population group, family structure, province and SES

Model V added SES on the control variables examined in Model IV and the resultant odds of school enrolment for each level of independent variables are presented in table 4.5 above. The odds of school enrolment for age (0.864) were lowest in Model V compared to those observed in the preceding four models. Controlling for age, population group, family structure, province and SES, the odds of school enrolment for boys decreased by 13.6 percent as age increased. There are different factors that have been cited as responsible for boys not enrolling in school and include lack of support structures in poor households, expulsion from school due to ill behaviour such as drug abuse, and to a less extent bullying which leads to avoidance of school and eventually influence the decision to drop out (Townsend, Flisher, Chikobvu, Lombard & King, 2008).

The introduction of SES in the regression equation had notable effects on the odds of school enrolment observed for population groups. Model V found that Coloured (0.481), Indian/Asian (0.637) and White (0.803) boys were all significantly less likely to be enrolled in school compared to African boys. The negative effect of not being African was largest for Coloured boys whose odds of being enrolled in school were less than those for African boys by 0.519 times. The second largest disadvantage for not being African was observed for Indian/Asian

boys who were 0.363 times less likely to be enrolled in school compared to African boys. White boys were the least affected by not being African although they were also significantly disadvantaged. Compared to African boys, the odds of school enrolment for White boys were less than those of African boys by 0.197 times. The results in Model V show that the odds of school enrolment for White and Indian/Asian boys were largely due to higher SES compared African boys. Controlling for SES diminished the benefit of living in richer families, thus if living in households with similar SES as those for African boys, White and Indian/Asian boys would be significantly less likely to be enrolled in school.

Model V results on family structures show higher odds of school enrolment for each family type than in Model IV although without affecting the significance of not living in a nuclear structure. The odds of school enrolment for boys living in incomplete nuclear households were 1.036, but did not imply significant advantage over boys living in nuclear structures (p 0.401 > α 0.05). As was also the case in Model IV, the worst affected boys by not living in a nuclear household were the married followed by those living alone. Given the odds of school enrolment equal to 0.009, boys living in couple households had only 0.9 percent of the odds male children living with both parents had. Despite an increase in the odds of school enrolment when SES was controlled, boys living in solitary structures (0.422) still had less than half the odds of school enrolment that their counterparts living in nuclear families had. There were also significant disadvantages for boys living in complex (0.572) and 'other' (0.696) households. The negative effect for not living in nuclear households was a significant loss of odds of school enrolment equal to 42.8 percent and 30.4 percent for boys staying in complex and 'other' family structures respectively. The least affected boys by not staying in a nuclear structure when SES was controlled were living in skipped generation households followed by those from extended structures. Compared to living in a nuclear family, staying in a skipped generation household resulted in a significant loss of enrolment odds equal to 11.3 percent given the 0.887 odds of attending school (p 0.013 < α 0.05). As for male children from extended households, the odds of attending school were 0.822 hence the odds of being in school less than those living in nuclear structures by 17.8 percent. The results in Model V presented in table 4.5 thus show that male children were better off in terms good school enrolment possibilities staying in nuclear and incomplete nuclear, especially female-headed, structure than in any other type of household.

Model V shows that the odds of school enrolment for boys living in all the provinces except Western Cape were on the positive direction of the odds for boys living in Gauteng. There were

insignificant results for Northern Cape and Western Cape, boys residing in the two provinces were as likely to be in school as those living in Gauteng. The most benefit for not residing in Gauteng was observed for boys living in Limpopo (2.464) whose odds of school enrolment were more than two times those of boys staying in Gauteng. The second biggest benefit for not being a Gauteng resident was observed for boys living in Mpumalanga (1.976) followed by those residing in Free State (1.581). Male children living in Mpumalanga and Free State were respectively 0.976 and 0.581 times more likely to be enrolled in school than their counterparts residing in Gauteng. There were also significantly higher odds of being enrolled in school for boys living in KwaZulu Natal (1.348), Eastern Cape (1.336) and North West (1.125) compared to Gauteng residents. Compared their counterparts living in Gauteng, boys living in KwaZulu Natal, Eastern Cape and North West were more likely to be enrolled in school by 0.348, 0.336 and 0.125 times respectively. The advantage for boys from Limpopo, Mpumalanga, Free State, KwaZulu Natal and Eastern Cape was strongly significant at 0.05 ($p\ 0.000 < \alpha\ 0.05$) while that for North West residents was marginally significant ($p\ 0.042 < \alpha\ 0.05$). The results on provinces in Model V show that the odds of school enrolment for boys living in Gauteng were higher in Model IV where SES was not controlled. Boys living in Gauteng benefited from being in a rich province with high employment rates and a population with relatively higher SES compared to other provinces. Controlling for SES removed the benefit arising from living in a wealthy province thereby leaving boys living in Gauteng with relatively lower odds of school enrolment compared to their counterparts residing in other provinces.

Model V results for SES categories show incremental benefits in the form of higher odds of school enrolment as standard of living improved. Boys living in medium low and medium high SES families were significantly more likely to be enrolled in school than their counterparts from low SES families by 0.232 and 0.381 times respectively. As for boys living in households with high SES (2.050), the odds of school enrolment were more than two times higher than for those living in low SES households. The results on SES variable thus show that school enrolment for boys was sensitive to households' relative wealth, and that there was a positive relationship between the odds of being in school and SES. Overall, it can be concluded from Model V findings that the odds of school enrolment for male children in South Africa were affected significantly by age, population group, family structure, province of residence and SES variables.

4.7. Summary of the chapter

This chapter has presented findings from logistic regression analysis in five subsections. The first set of nested models covering the whole study sample, as did all the other four, presented that age was an important factor affecting children's odds of being in school given that growing older was observed to be associated with less school enrolment probabilities. Sex was observed to be an insignificant factor in the odds of being in school. Other independent variables such as population group, family structure, province, sex of household head and SES have been found to be important factors in children's odds of being in school. White and African children were generally more likely to be in school than Indian/Asian and Coloured children. With respect to family structure, children benefited more by living in nuclear and incomplete nuclear households than other family types with couple and solitary arrangements being the worst household setups for children's odds of school enrolment. The best incomplete nuclear household configuration for children's school enrolment odds was female-headed. There were generally higher odds of attending school for children from poorer provinces especially Limpopo and Mpumalanga, as well as Free State, compared to other provinces. With regards to SES, the more wealth a household had, the higher the odds of school enrolment for children.

CHAPTER 5 RESULTS: GRADE REPETITION, GRADE COMPLETION AND HIGHEST GRADE COMPLETED

5.1. Introduction

This research aimed to investigate the impact of family structure on schooling outcomes measured by school enrolment and highest grade completed for children in South Africa using the Community Survey of 2007. The preceding chapter has presented results on the first measure in the form of odds of school enrolment for all children aged 7 to 17 years old and were staying in households. This chapter presents results on the second measure in the form of grade repetition, grade completion, and average highest grade completed. Firstly, the chapter presents results from bivariate analysis in the form of tabulated findings on grade repetition. Secondly, graphical presentation of the relationship between grade completion and the percentages of children enrolled in the right grade for age. Two scatter plots with fitted regression lines are presented, one for the whole sample and the other by population group. Thirdly, results from estimated nested OLS models on average highest grade completed are presented. Lastly, a summary of the chapter is provided.

5.2. Bivariate analysis: grade repetition

The Community Survey of 2007 does not have a measure of grade repetition and this was implied by calculating age and grade completed for each child using SA norms. For example, 9 year olds are expected to have completed grade 2 thus any child whose highest grade completed at age 9 years was less than grade 2 was considered a repeater. Table 5.1 below shows the percentages of children who were repeaters in 2007 for each category of sex, population group, family structure, province, type of school and socioeconomic status (SES). Some children included under repeaters may not have repeated any grade, but enrolled for grade 1 aged 8 years or older. These children were categorised as repeaters because both grade repetition and late enrolment lead to the same outcome of children falling behind their peers in grade completion in school. Moreover, the Community Survey of 2007 does not provide data which makes for the distinction between late enrolment and grade repetition to be made. The same can be stated for children who are categorised as never repeated a grade. Other children may have enrolled for grade 1 a year early and repeated once, but were considered non-repeaters because they would not have fallen behind their peers of the same age cohort in grade

completion. The percentages of repeaters presented in table 5.1 below thus represent children who were at least 1 year older than the right age for the grade they were enrolled in.

Table 5.1. Percentages of repeaters among children enrolled in school

Variable	N	% grade repeaters in each category	% grade repeaters by category
Total sample	205 196	9.36	100.00
Sex			
Male	102 507	10.84	57.86
Female	102 689	7.88	42.14
Total			**100.00**
Population group			
African	173 068	10.25	92.35
Coloured	19 545	5.59	5.69
Indian/Asian	3 275	2.66	0.45
White	9 308	3.12	1.51
Total			**100.00**
Family structure			
Nuclear	53 998	7.01	19.71
Couple	14	14.29	0.01
Incomplete nuclear	34 090	9.96	17.68
Solitary	430	32.56	0.73
Extended	64 169	9.81	32.77
Skipped generation	21 041	10.75	11.77
Complex	3 511	7.60	1.39
Other	27 943	10.95	15.94
Total			**100.00**
Province			
Gauteng	30 183	6.88	10.81
Eastern Cape	36 585	11.16	21.25
Northern Cape	9 140	8.14	3.87
Free State	10 540	10.63	5.83
KwaZulu Natal	47 402	9.40	23.20
North West	12 797	10.16	6.77
Western Cape	17 221	6.29	5.64
Mpumalanga	15 745	10.60	8.69
Limpopo	25 583	10.46	13.93
Total			**100.00**
Type of educational institution			
Public school	197 742	9.54	98.35
Private school	7 218	4.39	1.65
Total			**100.00**
Socioeconomic status (SES)			
Low	58 042	11.72	35.83
Medium low	47 025	10.89	26.97
Medium high	40 879	8.78	18.91
High	57 238	6.07	18.30
Total			**100.00**

5.2.1. Total sample

Table 5.1 above shows that 9.36 percent of the 205 196 children enrolled in school in the year 2007 could be classified as repeaters. Repeaters can be defined as children who enrol in the same grade for two or more consecutive years (Republic of South Africa, 2011). In this study, repeaters were operationalised as children enrolled in the same grade, but at least a year older, as children who were in the right grade for their age. The percentage of repeaters means that out of the 205 196 children enrolled in school, 19 207 were at least 1 year older than the right age for the grade they were enrolled in. The percentage of repeaters reported in table 5.1 above is related to the findings published in the 2011 Report on Dropout and Learner Retention Strategy by the Department of Basic Education (Republic of South Africa, 2011). The report used 2009 data and estimated that the average repetition rate among learners in South Africa ranged from 9 percent in primary schools to 13 percent in secondary schools (Republic of South Africa, 2011). Causes of grade repetition have been identified as a combination of in-school and out-of-school factors. In-school factors include lack of resources such as lack of textbooks, improper classrooms, and inadequately trained teachers. These factors increase the risk of grade failure and attendant grade repetition (Republic of South Africa, 2008). Out-of-school factors have been linked to problems associated with household environment, delinquent behaviour especially among boys and pregnancy among girls (Meny-Gibert, 2012; Social Surveys Africa, 2010; Republic of South Africa, 2008).

5.2.2. Grade repetition by sex

Repetition results by sex show that a greater percentage of boys fall behind in grade completion compared to females. As shown in table 5.1 above 10.84 percent of boys enrolled in school in the year 2007 were repeaters compared to 7.88 percent of girls. Given that there were as many girls as boys in the sample, the column percentages for male and female repeaters are not affected much by relative sample sizes. Therefore, it can be stated that boys (57.86 percent) make up the majority number of repeaters thus were more likely to repeat compared to girls (42.14 percent). The results on grade repetition by sex are consistent with findings reported in existing literature, for example, Louw *et al.* (2012); UNESCO (2012); Republic of South Africa (2011) and Republic of South Africa (2008) which report that a greater proportion of boys repeat grades than girls. The reasons for differing repetition rates between boys and girls can be twofold, one related directly to boys and the other related to girls. According to Louw *et al.* (2012), pressures among boys to join deviant 'gangs' whose underlying ethos of anti-intellectual and anti-social behaviour lead to grade failure hence greater risk of grade repetition. Furthermore, the many household responsibilities girls assume at young ages influence early

maturity and fosters a sense of goal directedness and resilience, two attributes which are crucial in grade success thereby reducing the risk of grade repetition compared to boys (Louw *et al.*, 2012).

5.2.3. Grade repetition by population group

Table 5.1 shows that the African population group had the largest proportion of children who were repeaters compared to the other population groups. Out of the 173 068 African children enrolled in school in for the year 2007, 10.25 percent were repeaters. This is compared to 5.59 percent of 19 545 Coloured children, 3.12 percent of 9 308 White children and 2.66 percent of 3 275 Indian/Asian children. However, because of a relatively small sample size, the percentage of repeaters for the Indian/Asian children may not be compared to other population groups especially Africans in a manner that warrants conclusions that can be supported by sufficient statistical power as will be highlighted in the results from regression analysis. Nonetheless, there were similar observations as those reported in table 5.1 above in studies based on samples drawn from Eastern Cape and urban South Africa by Louw *et al.* (2012) and Lam *et al.* (2007) respectively. The reasons for higher percentages of repeaters among African children have been linked to socioeconomic and historical factors, for example, the inability of poor schools to overcome the disadvantages inherited from the apartheid schooling system (van der Berg, 2008). Social Surveys Africa (2010) found that the probability of grade failure and repetition is higher among African children because of a large proportion of African households in the low SES category compared to other population groups. Moreover, Africans are the majority population group residing in rural areas and poorer provinces. As a result, a large proportion of African children were enrolled in schools with less resources where grade completion is slowest hence the greater percentage of repeaters for the African population group compared to others. Conversely, Coloured, Indian/Asian and White populations are mostly located in urban areas and in the more developed provinces where better schools coupled with living conditions at home conducive to learning increase chances of grade success and faster completion through grades for children.

5.2.4. Grade repetition by family structure

Grade repetition results by family structure presented in table 5.1 above show that the least percentage of repeaters was among children living in nuclear structures (7.01 percent) followed by those living in complex structures (7.60 percent). The percentage of repeaters was highest among children living in solitary structures (32.56 percent) and couple structures (14 percent). However, because of too small sample sizes of children living in the two family types relative

to other family structures, the results for couple and solitary structures, and to some extent complex structure (7.60 percent), may not warrant in-depth comparative analysis especially when the reference group is the 53 998 children living in nuclear structures. However, the observed percentages of repeaters help indicate school completion among married children, those living alone and those staying in complex households. The percentages of repeaters among children staying in incomplete nuclear households (9.96 percent), extended (9.81 percent), skipped generation (10.75 percent) and 'other' (10.95 percent) households can be compared to that for children living in nuclear structures because of large sample sizes. The results in table 5.1 above thus imply that a greater proportion of children living in nuclear families progress through grades faster compared to children living in any other family structure. There were related findings in a study by Fleisch *et al.* (2010) which observed that higher percentages of repeaters were among children who were not living with both parents.

5.2.5. Grade repetition by province

Table 5.1 above shows that percentages of repeaters were lower among children residing in the more urbanised provinces. There were only four provinces with less than 10 percent of children who were repeaters and these were Gauteng (6.88 percent), Northern Cape (8.14 percent), KwaZulu Natal (9.40 percent) and Western Cape (6.29 percent). The majority of less urbanised provinces had numbers of the repeaters exceeding 10 percent of the total number of children residing in the provinces. Eastern Cape (11.16 percent), Free State (10.63 percent), North West (10.16 percent), Mpumalanga (10.60 percent) and Limpopo (10.46 percent) were the provinces where more than 10 percent of the children were repeaters. Differences in levels of urbanisation among the provinces have been identified in literature as the underlying factor in the observed percentages of repeaters (Social Surveys Africa, 2010). This is because urban schools generally have better resources than rural schools hence more urbanised provinces tend to afford children better access to quality education which result to low risk of grade failure and grade repetition. For example, Social Surveys Africa (2010) found that over 70 percent of Limpopo population lives in traditional settlements where schools lack the capacity to facilitate grade success and optimal grade completion hence relatively high percentage of repeaters compared to Gauteng. As a result children living in Limpopo are most likely to be enrolled "in school beyond the compulsory school going age" Social Surveys Africa, 2010:4).

The row percentages of repeaters described in the preceding paragraph and presented in table 5.1 above do not reflect the relative sizes in absolute numbers of repeaters by province. This is rather reflected by the column percentages which help indicate the province of residence of

repeaters in absolute numbers without implying relative risk of grade repetition posed by living in a province. For example, there were 47 402 children living in KwaZulu Natal 9.86 percent of whom were repeaters, but 23.20 percent of the 12 207 repeaters for the whole study sample were from KwaZulu Natal. This contrasts with Free State where 10.63 percent of the 10 540 children were repeaters, but only 5.83 percent of the 12 207 repeaters were from Free State. Therefore, partly because of large numbers of children living in the provinces, the majority of repeaters were living in KwaZulu Natal (23.20 percent), Eastern Cape (21.25 percent) and Limpopo (13.93 percent). This is compared to Gauteng, Northern Cape, Free State, North West, Western Cape and Mpumalanga with each accounting for 10.81 percent, 5.83 percent, 6.77 percent, 5.64 percent and 8.69 percent of the 12 207 repeaters respectively. There were however, more repeaters living in Limpopo (13.93 percent) than in Gauteng (10.81 percent) despite the former having 25 583 children compared to the latter's 30 183 children, which may be an effect of Gauteng having more conducive learning environment than Limpopo due to different levels of urbanisation.

5.2.6. Grade repetition by type of school

Table 5.1 above shows that the majority of children were enrolled in public schools which are run by the government while private schools are operate independently from government and are better resourced. There were 197 742 children enrolled in public schools compared to 7 218 who were attending private schools. Consequently, 98.35 percent of the total number of repeaters were enrolled in public schools while 1.65 percent were attending private schools. Among the children enrolled in public schools, 9.54 percent were repeaters while for those enrolled in private schools 4.39 percent were repeaters. The reasons for a higher percentage of repeaters among children in public schools compared to those in private schools include the learning conditions in public schools and socioeconomic status of the households where the children were living. Most public schools especially those located in poor areas have limited capacity to deliver quality education which reduces risk of grade failure hence grade repetition (Republic of South Africa, 2008). Furthermore, the majority of children enrolled in public schools come from poor households where living conditions adversely impact children's school performance starting in the first grade thereby increasing the risk of grade failure and subsequently grade repetition (Heckman, 2006; Lee & Burkam, 2002).

5.2.7. Grade repetition by socioeconomic status (SES)

Table 5.1 above shows that the percentages of repeaters decreased as socioeconomic status increased. Among the 58 042 children living in households with low SES, 11.72 percent were

repeaters while for the 47 025 staying in households with medium low SES, 10.89 percent were repeaters. This contrasted with 8.78 percent of 40 879 children living in households with medium high SES and 6.07 percent of 57 238 children living in households with high SES who were repeaters. The importance of SES can be seen in the column percentages for medium low and high SES categories. Out of the total number of repeaters, 26.97 percent were living in households with medium low SES while 18.30 percent were living in households with high SES. This is despite that there were more children in the high SES category than medium low SES category. The higher percentages of repeaters among children from the low and medium low SES categories can be explained by the fact that factors responsible for grade failure and repetition are concentrated among children from poor households. As was observed in Lee and Burkam's (2002) study, living in poor households is associated with socioeconomic problems such as poor nutrition, health issues, lack of resources and insufficient educational support which cumulatively increase risk of grade repetition as age increases hence relatively higher percentages of repeaters in the two lower categories of SES. Conversely, the majority of children living in households with medium high and high SES have access to better nutrition, better quality schools and sufficient educational support from home which increase the probability of grade success thereby reducing risk of grade repetition. Consequently, grade repetition was less in the two upper categories of SES compared to the two lower categories.

5.3. Grade completion

Grade completion measures how fast children pass through grades until they finish matric. Children who never repeat a grade are said to have normal grade completion while those who repeat have slow grade completion. This section presents results on grade completion for the whole sample of children who were enrolled in school for the year 2007 and differentials by population group.

5.3.1. Grade completion for all children

Figure 5.1 below shows the relationship between age and grade completed for children enumerated in the Community Survey of 2007 (CS2007) who were enrolled in school in South Africa.

Figure 5.1. Relationship between age and grade completed for children enrolled in school

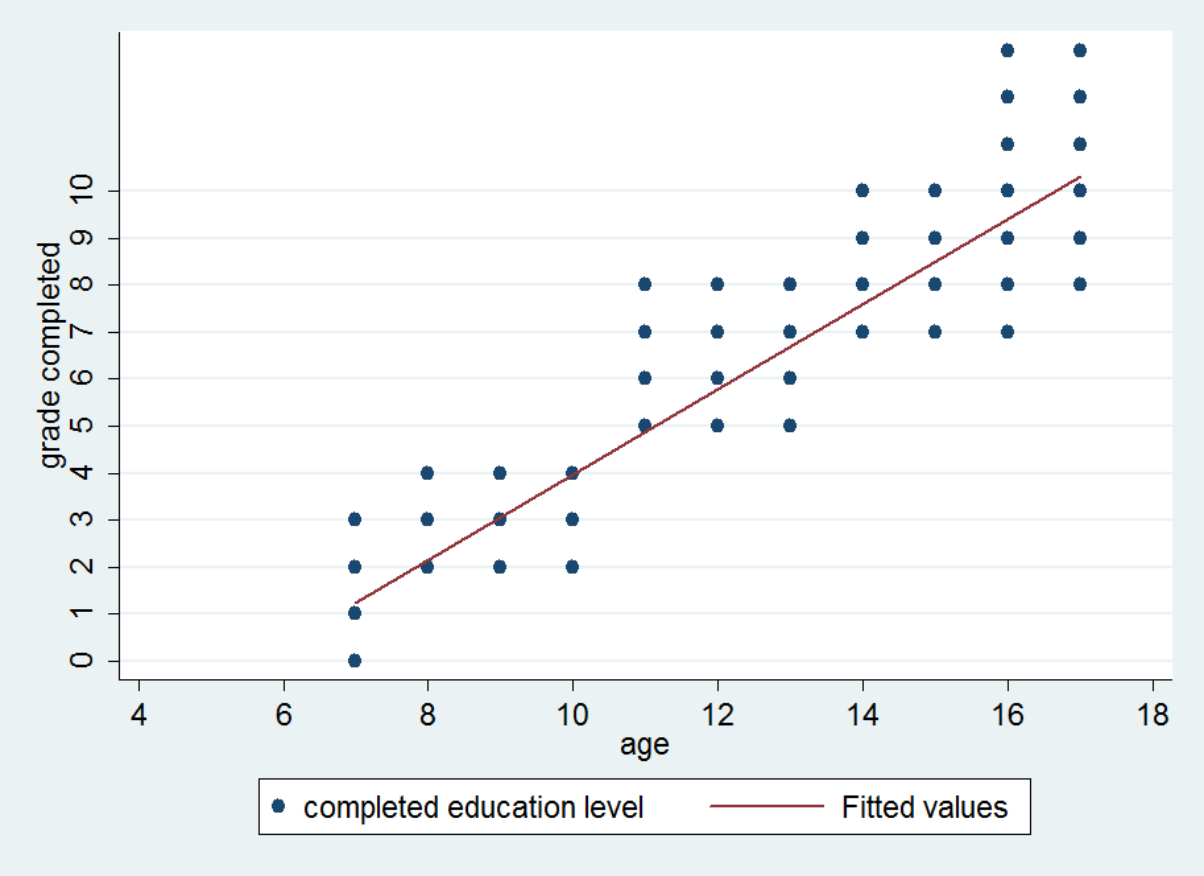


Figure 5.1 above shows that there was a positive linear relationship between age and grade completed, as age increased grade completed also increased. The figure includes a fitted line which represents expected average grade completion as age increased. The proportion of children falling behind in grade completion as age increased was greater in senior grades. This is reflected in the dots below the fitted line. As can be observed in figure 5.1 above, there are more dots below the fitted line at older ages and senior grades compared to younger ages and juniour grades. This means that as grade completed increased, the proportion of children enrolled in the right grade for age decreased. This is clearly shown in figure 5.2 below which complements figure 5.1 in presenting the strength of the relationship between grade completed and age for children enumerated in CS2007 and were enrolled in school.

Figure 5.2. Percentages of children enrolled in the right grade as age increased

Figure 5.2 above shows that the percentage of children enrolled in the right grade for age decreased as age increased. The figure shows that there were no repeaters aged 8 years and 9 years. An increasing number of children were falling behind particularly in the senior grades starting with grade 7. The correlation equation (y=-3.1053x + 121.86) shows a negative relationship between age and enrolment in the right grade, but the observed r-squared (R^2=0.7365) is positive. The r-squared value is positive because it is reflecting the general positive relationship between age and grade completed. The r-squared value reflects the strength of the relationship depicted in the scatter plot in figure 5.1 above, and means that the relationship was relatively strong since the fit explains 73.65 percent of the variation. The picture of enrolment in the right grade presented in figure 5.2 is consistent with previous observations in studies by Statistics South Africa cited in Republic of South Africa (2011) and UNESCO, 2012) which observed higher repetition rates among older children and in senior grades. One of the reasons for higher repetition rates at older ages (hence in senior grades) was identified to be the pressure on schools to boost pass rates which make schools to force children to repeat grades (Republic of South Africa, 2011). Furthermore, some children might fail to secure places for grade 8 due to poor grade 7 results and are forced to enrol for a further year

in primary. The same can also be stated for children expecting to enrol for grade 12, but are forced to repeat grade 11 because schools will be aiming to boost matric pass rates.

5.3.2. Grade completion by population group

Figure 5.1 and figure 5.2 do not provide insight into the differences in grade completion among population groups. Given the different repetition rates presented in table 5.1 above, there is need to examine differences in age-specific repetition rates among the four population group categories. Because incorporated in grade level is the age of a child, figure 5.3 below can be seen as reflecting age-specific repetition rates for children although the focus is on percentages of children enrolled in the right grade for age.

Figure 5.3. Percentages of children enrolled in the right grade for age by population group

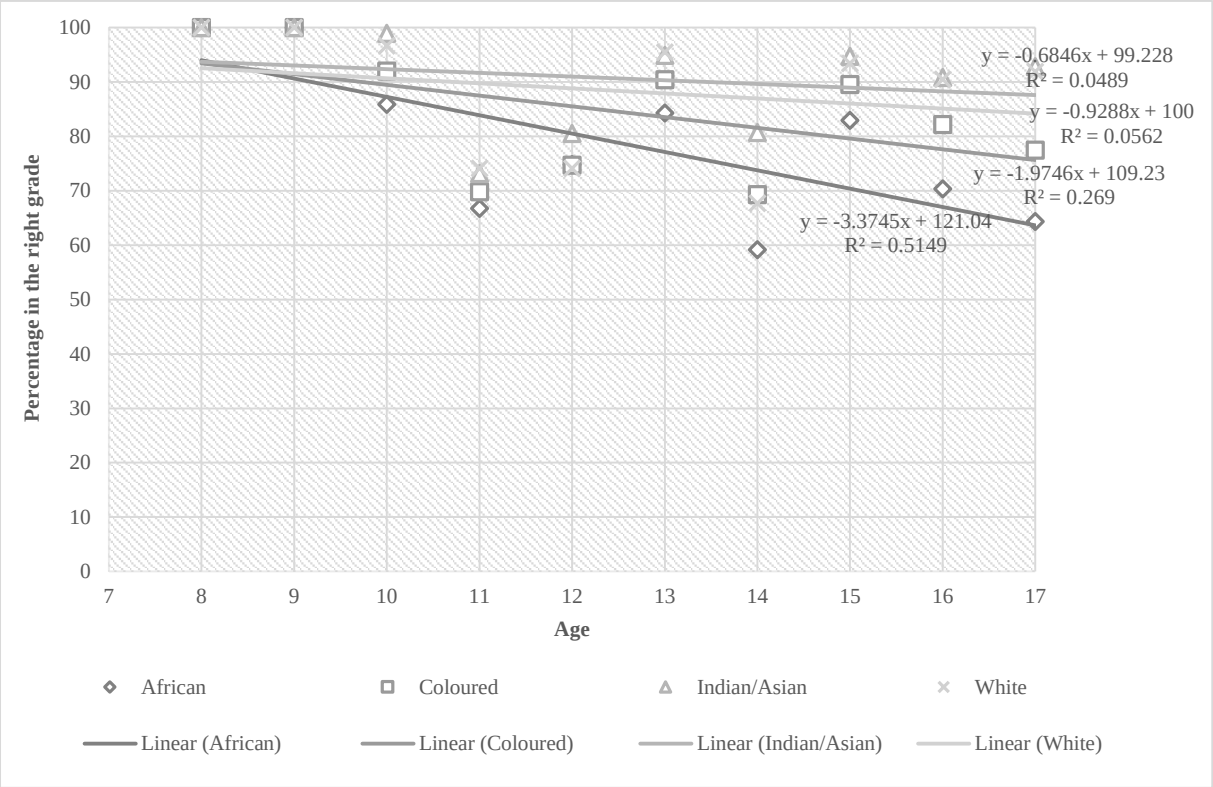


Figure 5.3 above shows differences in percentages of children enrolled in the right grade as age increased by population group. The displayed trend lines show that the average highest percentages of children enrolled in the right grade as age increased were for Indian/Asian children followed by White, Coloured and African children. As age increased, the lowest decrease in the percentage of children enrolled the right grade was observed for Indian/Asian children (β = -0.6846) and was slightly less than that for White children (β = -0.9288). The largest decrease in the percentage of children enrolled in the right grade as age increased was observed for African children (β = -3.3745) while that for Coloured children (β = -1.9746) was

second largest. However, the observed r-squared values compare differently among the population groups, the r-squared value for Indian/Asian ($R^2 = 0.0489$) children was the lowest. The largest r-squared value was observed for African ($R^2=0.5148$) children followed by Coloured ($R^2=0.269$) and White ($R^2=0.0562$). The differences in the r-squared values can be explained by relative sample sizes among the population groups. For example, the r-squared value for Indian/Asian children is affected by the very small sample size of children of the population group compared to that of Africans. This partly explains the r-squared value observed in figure 5.2 which can be argued to be largely affected by the large sample size of African children in the study sample. However, figure 5.3 provides useful insight regarding the average percentages of children in each population group expected to reach 17 years of age without repeating a grade. Specific differences on grade completion by population group and other important independent variables are presented in the following subsection which explores five nested models on average highest grade completed.

5.4. Regression results on grade completed

Table 5.2 below presents results from nested models from OLS regression on average grade completed for children enrolled in school. Results on highest grade completed can be used to estimate the rate of school completion among children.

Table 5.2. Nested models on average highest grade completed for children

Independent variable	Model I (N=190 964)		Model II (N=190 964)		Model III (N=190 664)		Model IV (N=190 737)		Model V (N=188 892)	
	Coef	**SE**	**Coef**	**SE**	**Coef**	**SE**	**Coef**	**SE**	**Coef**	**SE**
Age	0.910**	0.001	0.910**	0.001	0.910**	0.001	0.910**	0.001	0.910**	0.001
Sex (female)										
Male	-0.129**	0.004	0.129**	0.004	0.129**	0.004	0.129**	0.004	0.127**	0.004
Population group (African)										
Coloured	0.140**	0.006	0.130**	0.007	0.144**	0.008	0.142**	0.008	0.086**	0.008
Indian/Asian	0.463**	0.015	0.440**	0.016	0.404**	0.015	0.389**	0.015	0.280**	0.016
White	0.226**	0.009	0.196**	0.010	0.175**	0.010	0.153**	0.010	0.084**	0.010
Family structure (nuclear)										
Couple			-0.119	0.232	-0.134	0.229	-0.135	0.230	-0.099	0.238
Incomplete nuclear			-0.034**	0.006	-0.024**	0.006	-0.023**	0.006	-0.007	0.006
Solitary			-0.236**	0.042	-0.205**	0.041	-0.200**	0.041	-0.163**	0.041
Extended			-0.051**	0.005	-0.041**	0.005	-0.038**	0.005	-0.028**	0.005
Skipped generation			-0.065**	0.007	-0.045**	0.007	-0.042**	0.007	-0.023**	0.007
Complex			-0.027	0.016	-0.023	0.015	-0.027	0.015	-0.039**	0.015
Other			-0.057**	0.007	-0.048**	0.006	-0.047**	0.006	-0.044**	0.006
Province (Gauteng)										
Eastern Cape					-0.146**	0.007	-0.139**	0.007	-0.036**	0.007
Northern Cape					-0.145**	0.011	-0.136**	0.012	-0.096**	0.011
Free State					-0.161**	0.010	-0.154**	0.010	-0.130**	0.010
KwaZulu Natal					-0.069**	0.006	-0.061**	0.006	-0.027**	0.007
North West					-0.115**	0.009	-0.108**	0.009	-0.061**	0.009
Western Cape					-0.104**	0.009	-0.094**	0.009	-0.079**	0.009
Mpumalanga					-0.135**	0.008	-0.128**	0.008	-0.064**	0.009
Limpopo					-0.136**	0.007	-0.128**	0.007	-0.043**	0.008
Type of school (public)										
Private							0.147**	0.011	0.114**	0.010
SES (low)										
Medium low									0.076**	0.006
Medium high									0.150**	0.006
High									0.233**	0.006

Reference group in parenthesis; ** Significant at p<0.05; Coef = Coefficient; SE = Standard Error

5.4.1. Model I: Age, sex, and population group

Model I examined coefficients on average highest grade completed controlling for age, sex and population group. Age was included in the regression equation as a control variable. Age controls for the fact that as age increases, grade completed should also increase. Furthermore, age also helps to control for grade repetition. As shown in table 5.2 above, the coefficient for observed for age was 0.910 implying that a one unit increase in age was associated with an average of 91.0 percent increase in highest grade completed. The relationship between highest grade completed and age was significant ($p\ 0.000 < \alpha\ 0.05$). However, the increase in highest grade completed was slower than that of age. This was because of the presence of repeaters who pulled down the average increase in highest grade completed as age increased.

Table 5.2 above shows a negative coefficient (-0.129) for male children. The negative coefficient means that for every predicted highest grade completed by girls, the highest grade completed for boys was on average 12.9 percentage points lower. In other words, boys completed on average 87.1 percent of every level of grade completed by girls. The result can therefore be interpreted as implying that boys had slower grade progression than girls, an assertion that was also found to be true in a report on educational outcomes in South Africa using 2009 data (Republic of South Africa, 2011). Because of a greater proportion of boys who were repeating compared to girls as shown in table 5.1 above, grade progression for boys was consequently slower than that of girls.

Model I results for population groups presented in table 5.2 above show that for every predicted level of highest grade completed for African children, the average highest grades completed by Coloured, Indian/Asian and White children were significantly higher ($p\ 0.000 < \alpha\ 0.05$). The highest grade completed by Indian/Asian (0.463) children was on average 46.3 percent higher for every predicted grade level for African children, the largest gap in educational attainment measured in highest grade completed among the population groups using Africans as the reference group. The second largest gap involved White (0.226) children whose highest grade completed for every predicted grade completed for African children was on average 22.6 percent higher. The coefficient for Coloured (0.141) children imply that for very predicted unit of grade completed for African children, the highest grade completed by Coloured children was on average 14.1 percent higher. Based on Model I results, it can be stated that Indian/Asian children had on average the fastest grade completion followed by White children and Coloured children. The coefficients on the average highest grade completed for the population groups are consistent with findings in Branson *et al.,*'s (2012) paper which observed highest repetition

rates among African children followed by Coloured, White and Indian children using NIDS Wave 1 data. Higher the repetition rates among children of a particular population group are associated with average grade completion rate for that population group which is slower than those of other population groups.

5.4.2. Model II: Age, sex, population group and family structure

Model II introduced family structure into the regression equation. There were no changes in the observed coefficients for age and males. A one unit increase in age remained associated with 0.910 increase in the average level of grade completed. The gap between girls and boys remained the same with the highest grade completed by boys for every predicted grade completed for girls lower on average by 12.9 percent.

The coefficients for population groups remained positive and represented significantly higher average highest grades completed by Coloured, Indian/Asian and White children for every predicted highest grade level completed for African children (p 0.000 < α 0.05). The coefficients for Coloured, Indian/Asian and White children however, decreased when family structure was controlled. The results for Model II presented in table 5.2 above show that for every predicted highest grade completed for African children, Indian/Asian (0.440) children completed on average the highest grade followed by White (0.196) and Coloured (0.131) children. This means that for a predicted unit of grade level completed for African children, the highest grade completed by Indian/Asian children was on average 44.0 percent higher while that of White children was 19.6 percent higher. As for Coloured children, the highest grade completed for every predicted unit of grade level completed for African children was on average 13.1 higher.

Model II results for family structures presented in table 5.2 above show that children living in family types besides couple and complex families completed on average significantly lower grades for every predicted grade level completed by those living in nuclear structures. The coefficient for children living in couple structures was -0.120 and was the lowest coefficient compared to those of children living in other family structures, but was insignificant (p 0.604 > α 0.05). The gap in highest grade completed between children living in couple structures and those staying in nuclear families was insignificant because of the too small sample size of children living in couple households. The same can also be stated regarding the insignificant result for children living in complex households (-0.023; p 0.119 > α 0.05) despite having almost similar coefficient with that for children living in incomplete nuclear households

(-0.024) which was significant. The significant result for children living in incomplete nuclear was because when comparing large samples, the probability of between sample differences occurring out of chance is diminished and the observed differences reflect actual differences between the two samples. The highest grade completed by children living in incomplete nuclear households for every predicted grade completed for children living in nuclear structures was significantly less ($p\ 0.000 < \alpha\ 0.05$). For every predicted grade completed for children living in nuclear families, the highest grade completed by children living in incomplete structures was on average less by 3.4 percent. The result thus implies delayed grade completion for children living in incomplete structures compared to their counterparts living in nuclear structures and is consistent with findings in studies by Holborn and Eddy (2011); Case and Anderson (2006), Pong *et al*. (2005,); and Ermisch and Francesconi (2001).

The smallest coefficient of average highest grade completed for every predicted level of grade completed for children living in nuclear structures was observed for children living in solitary structures (-0.236). The coefficient means that children living alone completed only 76.4 percent of every predicted grade completed for children living in nuclear structures. Living alone during childhood is associated with many factors which adversely affect grade completion. Absence of parental support and shortage of food are some of the factors which can cause children living alone to be absent from school regularly and consequently lag behind their peers living in nuclear structures in grade completion.

The average highest grades completed for children living in extended (-0.051), skipped generation (-0.065) and 'other' (-0.057) family structures were respectively 94.9 percent, 93.5 percent and 94.3 percent of every predicted grade completed for children living in nuclear structures holding all other factors constant. As in the case of children living in incomplete structures, the results are consistent with findings in existing literature. For example, Hosegood *et al.* (2007); and Case and Ardington (2006) observed that children living in other family structures were lagging behind those living in nuclear households in grade completion. Using samples drawn from North America and Western Europe, Pong *et al.* (2005); and Ermisch and Francesconi (2001) found that children living in two-parent intact families performed better and progressed through grades faster than those living in single-parent and other family types. Model II thus shows that holding all other factors constant, living in nuclear structures was associated with significantly faster grade completion compare to living in any other family type.

5.4.3. Model III: Age, sex, population group, family structure and province

Model III added a fifth variable, province, into the regression equation. There were no changes in the coefficients of highest grade completed for age and males which remained 0.910 and -0.129 respectively. This means that like family structure in Model II, province of residence did not affect the extent of change in highest grade completed in relation to age, as well as the average gap in highest grade completed between boys and girls.

The coefficients of highest grade completed for Coloured (0.144), Indian/Asian (0.404) and White (0.175) children remained positive after province of residence was controlled. The coefficients for Indian/Asian and White children were however, lower in Model III than those observed in Model II for the respective population groups while that for Coloured children was higher. This means that compared to every predicted level of grade completed for African children, the average highest grade completed by Indian/Asian and White children decreased in Model III while that of Coloured children increased. Holding all other factors constant, the average highest grade completed by Coloured children for every predicted highest grade completed for African children was higher by 14.4 percent. As for Indian/Asian and White children, the highest grade completed compared to Africans were on average higher by 40.4 percent and 17.5 percent respectively. The results for population groups reflect differences in grade completion which are affected by repetition rates, the lower the repetition rate, the higher the average level of grade completed.

Model III observed negative coefficients for all provinces compared to Gauteng as shown in table 5.2 above. For every predicted highest grade completed for children living in Gauteng, those living in other provinces completed highest grades which were on average significantly lower ($p\ 0.000 < \alpha\ 0.05$). Using Gauteng as the reference province, the largest gap in highest grade completed involved children living in Free State (-0.161) followed by those living in Eastern Cape (-0.147) and Northern Cape (-0.145). Given the coefficients, it follows that children living in Free State, Eastern Cape and Northern Cape completed on average 83.9 percent, 85.3 percent and 85.5 percent of every predicted highest grade completed for children living in Gauteng respectively. Children living in Mpumalanga (-0.135) and Limpopo (-0.136) completed on average 86.4 percent and 86.4 percent of every predicted highest grade completed for children living in Gauteng holding all other factors constant. The least negative effect for not living in Gauteng in terms of average highest grade completed was observed for children living in KwaZulu Natal (-0.069) who completed on average 93.1 percent of every predicted highest grade completed for Gauteng residents.

The negative effect of living in North West (-0.115) and Western Cape (-0.102) was completion of grades equivalent on average to 88.5 percent and 89.2 percent of every predicted grade completed for children living in Gauteng respectively. Model III results on provinces reveal the importance of living in a rich province on grade completion. The majority of Gauteng population is urbanised thus the greater proportion of children have access to better schools and resources which promote grade success and faster grade completion. Conversely, the other provinces have significant proportions of their populations residing in rural areas. As a result, many children attend rural schools most of which are poorly equipped to enable optimal grade completion and avoid grade repetition. Because large proportions of children enrolled in rural schools repeat grades, this pulls down the average highest grade completed for a given cohort and ultimately that of the province hence the negative coefficients for all the provinces presented in Model III as shown in table 5.2.

5.4.4. Model IV: Age, sex, population group, family structure, province and type of school

Model IV added type of school to the variables controlled in the regression equation. There were no changes in the coefficients of highest grade completed for age and males which remained 0.910 and -0.129 respectively. This means that type of school was not important in how highest grade completed related with age and sex. The coefficients of highest grade completed for Coloured (0.142), Indian/Asian (0.389) and White (0.153) children were slightly lower in Model IV than in Model III because of the type of school variable introduced in Model IV. The largest decrease occurred for White children followed by that for Indian/Asian children. This can be explained by the fact that, compared to African children, greater proportions of White and Indian/Asian children attend private schools which have low repetition rates hence faster grade completion. Controlling for type of school thus removed the benefit obtained from attending private schools for White and Indian/Asian children although without significantly affecting the gap in highest grade completed between Africans and each of the two population groups. For every predicted highest grade completed by African Children, Indian/Asian and White children completed a grade higher on average by 38.9 percent and 15.3 percent respectively, representing significant gaps ($p\ 0.000 < \alpha\ 0.05$). Coloured children also completed on average a significantly higher grade for every predicted grade completed for African children, and the gap was equivalent to 14.2 percent in favour of Coloureds ($p\ 0.000 < \alpha\ 0.05$).

The coefficients for family structures in Model IV remained negative after type of school was controlled as shown in table 5.2 above. Holding all other factors constant, average highest grades completed for children living in family structures besides couple and complex types were significantly less for every predicted highest grade completed for children living in nuclear structures. The results for children living in couple (-0.136; p 0.554 > α 0.05) and complex structures (-0.027; p 0.064 > α 0.05) were insignificant because of too small sample sizes relative to the sample size of children living in nuclear structures. This is reflected in the result for children living in incomplete nuclear structures with a coefficient of -0.023 which was greater than the coefficients for children living in couple and complex structures, but was significant (p 0.000 < α 0.05). The average grade level completed by children living in incomplete nuclear structures was 97.7 percent of every predicted grade completed for children living in nuclear structures. Case and Ardington (2006) made similar observation in a study based on sample drawn from South Africa, stating that children living in single parent families had slower progress in school than those living in two-parent households.

Table 5.2 shows that Model IV coefficients on average highest grade completed for children living in extended, skipped generation and 'other' family types relative to children living nuclear structures were respectively -0.038, -0.042 and -0.047, and reflected significantly slower grade completion compared to children living in nuclear structures (p 0.000 < α 0.05). The coefficients mean that, holding all other factors constant, children living in extended, skipped generation and 'other' family structures completed on average 96.2 percent, 95.8 percent and 95.3 percent of every predicted highest grade completed for children living in nuclear structures respectively.

Model IV results on average levels of grade completed by province show significant disadvantage in grade completion for children living outside Gauteng. Ranking the average highest grade completed for every predicted grade completed for children living in Gauteng, children living in KwaZulu Natal (-0.061) were highest followed by those living in Western Cape (-0.094), North West (-0.108), Mpumalanga (-0.128) and Limpopo (-0.128). The observed coefficients mean that for every predicted grade completed for children living in Gauteng, children living in KwaZulu Natal completed on average 93.9 percent while those living in Western Cape and North West completed on average 90.6 percent and 89.2 percent respectively. As for children living in Mpumalanga and Limpopo, the average highest grade completed was 83.2 percent of every predicted grade for children living in Gauteng. The least average highest grades completed for every predicted grade completed for children living in

Gauteng were observed for children living in Free State (-0.154), Eastern Cape (-0.139) and Northern Cape (-0.136). The observed coefficients imply that children living Free State, Eastern Cape and Northern Cape completed on average 84.6 percent, 86.1 percent and 86.4 percent of every predicted grade completed for children living in Gauteng respectively. The differences in the average levels of highest grade completed for children among the provinces can be explained by differences in levels of socioeconomic development at provincial level. More urbanised provinces are associated with higher average highest grades completed and faster grade completion compared to less urbanised provinces. This is evident in the results which show that grade completion was fastest in Gauteng followed by KwaZulu Natal and Western Cape, provinces which are more urbanised compared to other provinces such as Eastern Cape and Northern Cape.

Model IV shows positive coefficient on average highest grade completed for children enrolled in private schools (0.147) which depicts a significant advantage ($p\ 0.000 < \alpha\ 0.05$). The observed coefficient for children enrolled in private schools implies that for every predicted grade completed for children enrolled in public schools, the average highest grade completed by children enrolled in private schools was 14.7 percent higher. The difference can be attributed to lower repetition rates among children enrolled in private schools compared to children in public schools. Unlike public schools, private schools are almost exclusively for children from households with high SES, have more educational resources and low teacher-student ratio, conditions that enable better chances of grade success and optimal grade completion. Consequently, average highest grade completed would be higher for children enrolled in private schools compared to that of children in public schools.

5.4.5. Model V: Age, sex, population group, family structure, province, type of school and SES

Model V introduced socioeconomic status (SES) in the regression equation which resulted in notable changes to observed coefficients in Model V compared to Model IV. As shown in table 5.2 above, the coefficient for age remained the same as in Model V at 0.910, but that for males increased slightly to -0.127 from -0.129 in Model IV. The increase in the coefficient for males was however, not sufficient to significantly affect the gap in the average highest grade completed between boys and girls. Holding all other factors constant, the average highest grade completed by boys was a significant 12.7 percent lower for every predicted grade for girls ($p\ 0.000 < \alpha\ 0.05$).

The coefficients observed for Coloured (0.086), Indian/Asian (0.280) and White (0.084) children in Model V were noticeably lower than in Model IV although the significant advantage over African children on grade completion remained. The decrease in the coefficients for population groups was because a greater proportion of Coloured, Indian/Asian and White children live in households with medium high to high SES thus have access to quality education, better schools and educational resources compared to African children. Controlling for SES removes the differences in highest grade completed that are due to SES differences hence the noticeable decrease in coefficients after SES was controlled. It can be observed that the coefficient for White children in Model V is smaller than that for Coloured children, but the opposite was the case in Model IV which also help reveal the effect of SES on average grade completion among children from different population groups. The results for population groups in Model V presented in table 5.2 above mean that for every predicted level of grade completed for African children, Indian/Asian children completed on average the highest grade followed by Coloured then White children. The highest grade completed by Indian/Asian children for every predicted grade level for African children was higher by an average of 28.0 percent. As for Coloured and White children, the average highest grades completed for every predicted grade for African children were 8.6 percent and 8.4 percent higher respectively. The results on population groups thus imply that of all the population groups, grade completion was on average slowest among African children.

The introduction of SES in the regression equation resulted in increases in the coefficients observed for all family structures except complex type. The result for children living in couple structures (-0.099) remained insignificant ($p\ 0.076 > \alpha\ 0.05$). The increase in the coefficient for children living in incomplete nuclear structures to -0.007 from -0.136 in Model IV led to insignificant results ($p\ 0.235 > \alpha\ 0.05$). This shows that children living in nuclear structures have the advantage of living in households with higher SES compared to children living in incomplete structures. Controlling for SES thus diminished the benefit accrued from living in wealthier households for children living in nuclear structures hence the insignificant difference in the average highest grade completed between children in nuclear households and those in incomplete nuclear households. The benefit of higher SES was highlighted in McLanahan and Sandefur (2004) in a study comparing children from two-parent intact families to those from single-parent families which found better schooling outcomes for children living with both parents present.

The result for children living in complex structures (-0.039) became significant with the introduction of SES in the regression equation (p 0.008 < α 0.05). Given that the coefficient is the lowest for complex structure across all models, it means that for small samples, the gap in the average highest grade completed had to be fairly large in order for the difference to be recognised as significant. Children living in complex households completed on average 94.1 percent of every predicted grade completed for children living in nuclear structures. The coefficients for children living in solitary (-0.163), extended (-0.028), skipped generation (-0.023) and 'other' (-0.045) family structures also represented significantly lower average highest grades completed compared to children living in nuclear structures (p 0.000 < α 0.05). For every predicted grade completed for children living in nuclear structures, the average highest grades completed by children living in solitary, extended, skipped generation and 'other' family types were lower by 16.3 percent, 2.8 percent, 2.3 percent and 4.5 percent respectively.

The results described in the preceding paragraph help show that children living in nuclear structures do not only have SES-related advantage over their counterparts living in other family types. While the increase in the coefficients reflect the gap that was due to SES, the significant results can be considered to reflect the effect of factors not captured in the observable household characteristics such as SES and family structure as well as others controlled in this analysis. For example, children living in nuclear structures experience less stressful home environments, have more emotional attention from parents and are less likely to assume the burden of household chores compared to those living in incomplete nuclear families where parents do not have enough time to give optimal emotional attention to their children. As children grow, these differences become more important in shaping young children's minds and prepare them for future learning and the cumulative benefit of living in a nuclear structure will manifest in better grade success and faster grade completion compared to children from single-parent households. As a result, children living in nuclear families complete grades faster than those living in other family types

Model V results on provinces show higher coefficients than those observed in Model IV, an effect of controlling for SES. Nonetheless, the average highest grade completed remained significantly higher for children living in Gauteng compared to children living in each of the other provinces (p 0.000 < α 0.05). The least average highest grade completed for every predicted grade level for children living in Gauteng was observed for children living in Free State (-0130) followed by those living in Northern Cape (-0.100), Western Cape (-0.079) and

Mpumalanga (-0.065). The observed coefficients for the four provinces imply that the average highest grades completed by children living in Free State, Northern Cape, Western Cape and Mpumalanga were respectively 87.0 percent, 90.0 percent, 92.1 percent and 94.5 percent of every predicted grade for children living in Gauteng. The least affected children by not living in Gauteng where those living KwaZulu Natal (-0.027) followed by children living in Eastern Cape (-0.035), Limpopo (-0.043) and North West (-0.061). Children living in KwaZulu Natal completed on average 97.3 percent of every predicted grade completed for children living in Gauteng. The coefficients observed for Eastern Cape, Limpopo and North West mean that children living in the three provinces completed on average 96.5 percent, 95.6 percent and 93.9 percent of every predicted grade for children living in Gauteng respectively.

The coefficient of the average highest grade completed for children enrolled in private schools relative to those in public schools remained positive after SES was controlled in Model V. However, as shown in table 5.2 above, the coefficient is lower in Model V (0.114) than the one observed in Model IV (0.147). The decrease can be interpreted as reflecting the extent of the benefit on grade completion for children enrolled in private schools derived from living in households with higher SES compared to children in public schools. Despite the decrease, the average highest grade completed by children in private schools remained significantly higher in Model V for every predicted grade for children in public schools ($p\ 0.000 < \alpha\ 0.05$). The observed coefficient implies that for every predicted grade completed for children enrolled in public schools, the average highest grade completed for children enrolled in private schools was higher by 11.4 percent. Consequently, holding all other factors constant, children enrolled in private schools would progress through grades significantly faster than those enrolled in public schools.

The results on SES in Model V presented in table 5.2 above show incremental benefit in the form of increasing average highest grade completed as SES increase. Children living in households with medium low (0.076), medium high (0.150) and high (0.233) SES completed on average significantly higher grades for every grade predicted for children living in households with low SES ($p\ 0.000 < \alpha\ 0.05$). Given the observed coefficients, children living in households with medium low SES completed a grade which was on average 7.6 percent higher for every predicted grade completed for children living in low SES households. As for children living in households with medium high and high SES, the average highest grades completed for every predicted grade completed for children living in low SES households were higher by 15.0 percent and 23.3 percent respectively. The results on SES show great disparities

in grade completion for children inasmuch as the benefit of being in a higher SES household almost doubled from medium low to medium high and from medium high to high SES. The more wealth a household possesses, the better the quality of education a child accesses which subsequently improves grade completion. It can therefore be concluded that SES was an important predictor of grade completion among children in the study sample.

5.5. Summary of the chapter

This chapter presented results on grade repetition, grade completion or completion and average highest grade completed. The first part described bivariate results which showed that grade repetition differed by grade level, sex, population group, family structure, province, type of school and SES. The second part described results on grade completion, showing that there were differences in grade completion that were associated with children's population group. The last part of results presentation discussed average highest grade completed. Six nested models were explored and it was observed that all variables were important predictors of average highest grade completed.

6.1. Introduction

The aim of this study was to investigate the impact of family structure on schooling outcomes for children in South Africa using data from the Community Survey of 2007. Bivariate techniques and two regression methods, logistic and ordinary least squares (OLS), were used to analyse the data. Logistic regression was used to determine odds of school enrolment for children while OLS regression was used to analyse grade completion. The results on school enrolment were presented in chapter 4 while those on grade repetition and grade completion were presented chapter 5. This chapter discusses the results of the study in light of the research questions, suggests recommendations for the study, and provides conclusion to the study. It starts with discussion of results, followed by recommendations and ends with conclusion. Incorporated in the recommendations section are study limitations while the conclusion will begin with a summary of the study.

6.2. Discussion of results

The overall aim of this study is achieved through answering the following research questions pertaining to the two measures of schooling outcomes analysed in chapter 4 and chapter;

i. What is the relationship between family structure and school enrolment for children in South Africa?
ii. Does family structure affect grade repetition and grade completion by children in South Africa?

This research found evidence to suggest that family structure has important implications on schooling outcomes for children as measured by odds of school enrolment, grade repetition and grade completion for children in South Africa. Chapter 4 observed that there was a significant relationship between family structure and school enrolment for children in South Africa. Children living in solitary, couple, extended, skipped generation, complex and 'other' family types were significantly less likely to be enrolled in school compared to children living in nuclear structures. Similarly, chapter 5 observed that family structure was systematically associated with schooling outcomes for children inasmuch as living in a nuclear structure was associated with better grade completion and less risk of grade repetition compared to living in any other family type. The present study thus confirms conclusions from previous research

conducted in South Africa and other countries from sub-Saharan Africa that children living in nuclear families tend to do better on schooling outcomes than those living in other types of family structures (UNESCO, 2012; Niño-Zarazua, 2010; Social Surveys Africa, 2010; Grosh *et al.* 2008; Case and Ardington; 2006). Despite identifying a unique taxonomy of family structures, results from this study were also consistent with those observed in USA, Germany, Canada, Australia and Latin America in studies which observed better schooling outcomes for children living in two-parent intact families, for example, Cheadle *et al.,* 2010; Pong *et al.,* 2005; Ermisch and Francesconi, 2001; Ermisch and Francesconi, 2001; Boyle *et al.,* 2001; Dronkers, 1994; McLanahan and Sandefur, 1994).

Meanwhile, this study observed that children living in nuclear structures were not better off in terms of odds of school enrolment compared to those living in incomplete nuclear structures. Instead, children living in single-parent households were more likely to be enrolled in school once socioeconomic (SES) was controlled. Results on grade repetition and grade completion however, helped show that it was because of high grade repetition rates among children living in incomplete nuclear structures that they were observed to be more likely to be enrolled in school compared to children living in nuclear structures. Consequently, most 17 year olds living in incomplete nuclear households were still in school while their counterparts living in nuclear structures had completed matric especially given that a large proportion of children in South Africa enrol for grade 1 aged 6 years old instead of 7 years old. Therefore, it cannot be stated that the results on odds of school enrolment from this study are comparable to those observed in Steele *et al.* (2009); Park (2007); and Brooks-Gum and Klebanov (1997) which were based on data from the social democracies of Iceland, Norway and Asian countries excluding Japan where schooling outcomes were similar for children living in nuclear and incomplete nuclear families. It is also worth pointing out that the higher odds of school enrolment in the less developed provinces relative to Gauteng can be accounted for by differences in grade repetition rates given that children living in Gauteng had on average faster grade completion rate compared to those living in provinces such as Limpopo, Free State and Mpumalanga.

This study observed significant importance of the sex of household head with regards to odds of school enrolment for children living in incomplete nuclear structures. There were better outcomes for children living in female-headed incomplete nuclear structures compared to those living in male-headed incomplete nuclear structures. This finding is consistent with the observations made by Dronkers (1994) where living in a female-headed single-parent

household was associated with better schooling outcomes compared to living in a male-headed single-parent family. However, the comparison on grade repetition and grade completion could not be conducted once the sample was restricted to children enrolled in school only because of the too small sample of children living in male-headed incomplete nuclear families compared to that of children living in female-headed incomplete nuclear families.

The nature of the results of this study, being more consistent with those from western countries can be understood from the standpoint that uses a sociological perspective of the macro socioeconomic and cultural environment of South Africa as the explanatory context for individual outcomes. South Africa is largely influenced by developmental trends and values in the western world particularly USA and Western Europe. While South Africa has a progressive social welfare system aimed to reduce the adverse impacts of poverty, the country's dominant economic system largely comparable to the capitalistic economies of the western world can be argued to provide the context for understanding the results observed in this study. This is more so given that changes in family structures over time barring HIV/AIDS and the effect of the labour policies of the oppressive political administrations of pre-1994 have been strongly influenced by factors largely a result of capitalistic values, for example, rising divorce rates, declining fertility and delayed marriages. Moreover, the majority of schools in under-resourced areas still charge fees even when the ability of the surrounding communities to afford the cost of primary and secondary education for children is limited. As a result, results from this study could not find relevance with those observed in the social democracies of Asia and parts of Eastern Europe where the cultural environment is different from that of South Africa, but those observed in the western countries and Australia.

Although not part of the results, it is worth noting that the typology of family structures can differ from country to country even when trends in economic and social development are similar across nations. The taxonomy of family structures existing in South Africa are different from those observed in the western world despite increased urbanisation and decreasing fertility levels. The observed family structures in South African can be explained by long term labour migration trends and emergence of HIV/AIDS as a major cause of family dissolutions beginning in the 1990s, resulting in more complex forms of living arrangements in the country.

6.3. Study limitations and recommendations

6.3.1. Limitations

The limitations of this study originate from the type of data set used. One of the limitations pertained to the fact that the Community Survey of 2007 (CS2007) was conducted for a purpose different from that for this study. Consequently, important questions on other schooling outcomes, for example, school dropout, specific grade and age when repeated for the first time, and the number of times repeated were not included in the CS2007 questionnaire. Another limitation linked to the data set is that the CS2007 sampled at household level and not individual thus it can only be assumed that the sample of children of school going age was truly nationally representative. This can be reason why sample sizes of adequate size for children living in solitary, couple and to some extent complex structures could not be obtained. The same can also be stated for the sample of children living in male-headed incomplete nuclear structures which could have been improved had the CS2007 been focused on collecting data for analysis of schooling outcomes for children.

6.3.2. Recommendations for the study

In light of the limitations highlighted above, this study can benefit from using census survey data which enumerates all children in in South Africa. This will improve the integrity of sample sizes observed for children living in solitary, couple, complex and male-headed incomplete nuclear structures. However, given that census surveys are decennial, surveys which sample at school level can be used to provide data for the years which not close to census years, particularly for schooling outcomes concerning children who are enrolled in school. Such surveys can take advantage of modern information technology to capture all important data such as that highlighted above as missing in the CS2007. This will enable access to longitudinal data which is important in examining school survivorship of learners by tracking their progress from grade 1 to grade 12. Such data will benefit both research related to this study as well as government policies which may find findings from the studies useful for policy interventions.

The results observed in this study regarding the importance of family structure on schooling outcomes for children have important implications on the government. In light of the Demographic Transition Theory (DTT), the population of the South Africa, which is characterised by declining fertility, low marriage rates, high divorce rates and delayed union formation, arguably in the second phase of demographic transition and moving towards the third phase. This phase of demographic transition provides opportunities for the government to have policies which promote family structures that are associated with better child outcomes

which include education and health. The policies to promote living arrangements of the nuclear type will also benefit from improvements in HIV/AIDS treatment drugs since most children are living in extended and other alternative family types because they lost one or both of their parents to HIV/AIDS related mortality. The government can therefore capitalise on the current context of the demographic transition to ensure that children are raised in living arrangements that are most beneficial to educational attainment.

Better schooling outcomes for children have a positive effect on fighting poverty and improving the quality of the labour force in the long run besides being beneficial to children individually. If the majority of children continue to be raised in family structures associated with poor schooling outcomes, it will remain difficult to break the chain of intergenerational poverty because the global economic system which South Africa is an integral part of is incompatible with an uneducated labour force. Children will likely grow up to live a life of unemployment and this will put pressure on the government to provide social welfare benefits to a large proportion of the population when taxable proportion employed is small. Furthermore, better schooling outcomes to children improves the pool of potential skilled professionals such as engineers, doctors, demographers and researchers which are currently in short supply for a nation of over 50 million people. There is therefore enough compelling reason for government and its stakeholders to take interest in the results of this study.

This study's results also provide lessons on fighting teenage pregnancy. When girls are enrolled in school up to matric level with a chance of proceeding to tertiary education, they are less exposed to the risk of falling pregnant unlike when they are out of school and living with a grandparent, in complex or extended household. Furthermore, schools provide conducive environment for better socialisation of children which when combined with good home conditions help safeguard children from delinquent and antisocial behaviour which often result in criminal activities in adulthood. The benefits of promoting living arrangements associated with better schooling outcomes for children thus are both short and long term to the individual, society and the economy. Antisocial and criminal activities in adulthood can be understood as a long term outcome of lost opportunities for appropriate socialisation at home and in school during childhood often due to the absence of one or both parents starting in the early stages of psychosocial development of a child and initially manifest as poor schooling outcomes (Falicov, 2007; Afifi and Keith, 2004). It can therefore be stated that the results from this study provide reason for government to take appropriate policies for the promotion of family types associated with better schooling outcomes for children.

Improvements in HIV/AIDS treatment medication has important implications on certain family types like skipped generation and extended structures since HIV/AIDS mortality was the main driving factor for the growing prevalence of these family structures in recent times. The future of these family structures, as well as the entire taxonomy of family structures in South Africa, makes for an important subject of academic enquiry. There is therefore need for updated research on family structures and child outcomes in South Africa because as family structures change, outcomes for children are also likely to change. Furthermore, given that there were children living in solitary and couple structures, it will be interesting to investigate the such children's previous family structures so that if possible necessary policies can be devised in order to keep children from getting married at young ages or living alone. This is important because the 90 out of the 100 children living in couple structures were girls and may most likely be married to older men which constitute a form of child abuse. The reasons for children living in solitary structures also warrant exploring using qualitative methods especially considering that Meintjes *et al.* (2010) observed that most children living in child headed households had one of the parents alive. The poor schooling outcomes observed in this study can be avoided if such children were living in households with their parents and understanding the reasons for the children living alone will provide important information on devising policies to keep children in beneficial living arrangements.

6.4. General conclusion

6.4.1. Summary of the study

This quantitative study investigated the impact of family structure on schooling outcomes for children in South Africa using the Community Survey of 2007. The schooling outcomes were measured by odds of school enrolment, grade repetition and grade completion. Chapter 1 introduced the study, providing the background to the research problem and the motivation for conducting the study. Chapter 2 reviewed existing related literature which largely implied that better schooling outcomes for children are associated with living in nuclear structures. In chapter 3 the methodology of the study was discussed as well as the motivation for the methods which were used to analyse the data. Chapter 4 discussed results on odds of school enrolment while chapter 5 discussed results on grade repetition and grade completion. This chapter has discussed the main findings of the study in light of the research questions and identified potential limitations of the study. It has also provided recommendations for the study as well as reasons for government and its stakeholders to take necessary responses to the observed results. A conclusion to the study is provide below.

6.4.1. Conclusion to the study

This study established that family structure is an important variable affecting schooling outcomes for children in South Africa. It confirmed the assertion that children living in nuclear structures are more likely to do better on measures of schooling outcomes than their counterparts living in other family types. Other variables such as age, population group, province of residence and SES were also observed to be important predictors of school enrolment grade repetition and grade completion. Children were more likely to be enrolled in younger ages than in older ages as well as more likely to be in the right grade for age at younger ages. There were no differences in odds of school enrolment between boys and girls, but outcomes on grade completion were better for girls than for boys. Schooling outcomes in terms of grade repetition and grade completion were better for Coloured, Indian/Asian and White children compared to African children largely because of SES differences. Similarly, living in Gauteng was associated with better outcomes on grade repetition and grade completion than living in any other province. This study was able to achieve its main aim and offers insights into school enrolment, grade repetition and grade completion in South Africa using a national survey. It has managed to provide a systematic analysis of schooling outcomes for children in South Africa using a national sample which is an important addition to literature on family structure and schooling outcomes both in South Africa and other parts of the world.

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