# Parents' socioeconomic status and children's academic performance

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# Foreword

This paper is a part of the longitudinal project 'Children's level of living – the impact of family incomes' (Barns levekår – betydningen av familiens inntekt)', conducted by the Norwegian Social Research Institute (NOVA) and financed by The Norwegian Women's Public Health Association (Norske Kvinners Sanitetsforening ) (NKS). The main sample was drawn from a population of children in families who in 2000 had incomes below 60 per cent of the median income. In this paper, we primarily utilize the data collected in 2006 to explore the correlation between parental socioeconomic status and children's prospective social status. Proxies for parental socio-economic status are their education level, employment and immigration status, and for the children, their academic performance in three central subjects. Furthermore, the paper studies the domestic assistance with home-work as a channel for impact of parental socioeconomic status on children's academics performance. Other factors considered in this paper are gender and family structure. The effect of family structure is tested for, with categories for those living with lone mothers, lone fathers, parents and stepparents. Statistical methods employed in this paper are bivariate and multivariate methods.

Finally, I would like to acknowledge Dr. Viggo Nordvik, senior researcher at NOVA, for supervision of this paper.

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# Summary

The aim of this paper is to investigate the relationship between parents' socioeconomic status and their children's performance at school. Proxies used for parents' socioeconomic status are their educational level, employment and cultural background; and for children's educational attainment, their grades in Norwegian, maths and English. The data were collected in the second round of the longitudinal project 'Children's level of living – the impact of family incomes" (Barns levekår – betydningen av familiens inntekt). A case sample was composed of children in families who lived below the poverty line in 2000, while a control group comprised all categories in the community in the same year. The poverty threshold was defined as 60 per cent of the median income. Here a subset of 499 pupils at lower secondary education is analyzed, 388 of them are in the case sample and 111 in the control group. They are aged 3 to 15, and are between their eight and tenth year of schooling. Fifty-nine per cent of the pupils in the case sample are native Norwegians, 15 per cent are western immigrants, 18 per cent are non-western immigrants, and 9 per cent are 'mixed', with one Norwegian and one immigrant parent.

The analysis methods used are cross tabulation and 'small population proportion' and regression. Most parents in the case sample have a secondary level education, and the education level of the fathers was slightly higher than that of the mothers. Both parents in the control group have on average a higher education than those in the case sample. The association between parental education level and children's academic performance was moderate in the case sample.

Eighty-two per cent of the fathers (N=284) and 62 per cent of the mothers (N=369) in the case sample were employed, while employment in the control group was 85 per cent (N=103) for the mothers and 94 per cent (N= 90) for the fathers. The analysis shows a positive association between the children's school grades and their parents' labour market status.

Parents' cultural background affects through mediation of access to education and labour market. We found that education levels and employment improve as we go from the non-western immigrants to western immigrants, Norwegian to mixed parents.

As regards the association between children's academic performance and cultural background, the analysis showed a positive weak association between cultural background and pupils' performance. In other words, pupils' performance improves when we move from non-western immigrants to western immigrants, native Norwegians to MIX. Note that when controlling for education and employment (within a regression framework), the differences between children with different parental backgrounds vanishes.

The effect of family structure is also tested for, with categories for those living with lone mothers, lone fathers, parents and step-parents. The analysis showed no significant effects of family structure on pupils' performance. A number of previous studies of representative samples found that girls score significantly higher than boys. This difference is also found between boys and girls in our sample of families with a recent poverty history.

Assistance with homework was studied as a means of testing the association between parents' socioeconomic status and children's academic performance. The test showed that native Norwegians parents are most likely to help their children with homework (85 per cent) followed by MIX parents (84 per cent), western immigrants (67 per cent) and non-western immigrants (46 per cent). Furthermore, the proportion of those who get no assistance at all is very high among the non-western immigrant (19 per cent) group compared to 3 per cent among native Norwegians and western immigrants, and zero for the MIX category. The test showed a considerable positive association between assistance with homework and children's achievement, regardless of the source of assistance.

# 1 Introduction

In Norwegian schools, pupils' educational attainments are measured by grades from the 8th year onwards. The grades are affected by learning capabilities and the effort put into schoolwork. School results are not randomly distributed across groups. In this Working Paper, we explore how school grades differ between different groups. The main data employed are a sample drawn from a population of children in families who in 2000 had incomes below 60 per cent of the median income. Hence, the paper is about variation in school grades among children from families who 5-6 years prior to the survey had quite low family incomes. Our interest in the correlation patterns of school grades within a group that has experienced (and may still be experiencing) poverty is threefold. First, school grades in the final years of compulsory schooling affect future opportunities in the education system and the labour market. Second, grades can be understood as an indicator of well-being, and third, they can in turn affect the well-being of schoolchildren.

This paper is a part of the project 'Children's level of living – the impact of family incomes' (Barns levekår – betydningen av familiens inntekt)', conducted by Norwegian Social Research (NOVA) and financed by The Norwegian Women's Public Health Association (Norske Kvinners Sanitetsforening, NKS). Data for this project were collected from a random draw of families with children and an income level below a poverty threshold in the year 2000. A smaller control group of families with children was also drawn. Personal interviews were conducted with families in 2003 and 2006, and children and parents were asked to fill in a postal questionnaire[1] (for more details on the sample, see Sandbæk and Sture 2003; Sandbæk 2008). In this paper, we primarily utilize the 2006 data.

Some studies (such as Hansen 2001 b; 2001a; Bakken 2003; Hansen and Mastekaasa 2006; Huang 2007; Bakken 2008) show that social position

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[1] A third wave takes place in 2009.

has a propensity to pass from one generation to the next. Even if there is little question of social determinism, it may be fair to say that children tend to inherit their potentials from their parents. It is not unreasonable to hypothesize that school outcomes differ between children from different family types, and that there are systematic differences between the grades of children of highly educated parents and parents with less formal education. Parents' labour market participation is also analyzed as a phenomenon that may correlate with school outcomes. We also ask whether there are systematic differences in our sample between native Norwegians and immigrants.

The paper is organized as follows: after this introduction, hypotheses and possible mechanisms are presented. Here the concept of cultural capital, as well as the concept of poverty and its measurements, are introduced. Chapter 3 presents the project 'Children's level of living – the impact of family incomes" and the method of statistical analysis used in this paper. Chapter 4, the empirical section, employs bivariate and multivariate methods to elicit associations between parents' socioeconomic status and children's achievements. Chapter 5 shows the effect of assistance with homework on children's performance. The last chapter summarizes the paper.

# 2 Hypotheses and possible mechanisms

The paper is about the correlation between parental social status and the prospective social status of their children. This section introduces some conceptual issues that can help to explain this correlation. The discussion starts from the premise that even though children in the age group targeted here have lives of their own outside the family, their most immediate point of attachment and origin is still within the family.

## 2.1 Cultural capital

Bourdieu and others argue that households' economic status is not sufficient to explain disparities in the educational attainment of the offspring. Inherited habits of the household are fundamentally connected to educational attainment. The term 'cultural capital' generally refers to people's knowledge, skills and education level that may influence the status of the individual in the community. This status will be transmitted through generations. In other words, parents provide their offspring with the attitudes and knowledge needed for their educational and occupational success (Bourdieu and Passeron 1990). The concept of cultural capital is widely used among sociologists in particular to explore the association between parents' education level and their offspring's educational and occupational choice and attainment. Anders Bakken (2003) summarises the mechanisms that may underlie correlations between parental education, parents' social position and children's school achievement:

1. Valuation of education: families of differing social status put different values on education and school outcomes.
2. Children with differing socioeconomic backgrounds have differing access to books and school related input.
3. Teachers may have higher expectations of pupils from families where the parents have a 'solid educational background'. Higher expectations may induce pupils to make an extra effort and may encourage teachers to take notice of positive achievements.

Regardless of the education level at which such studies are conducted, it is generally agreed that parents' (mother/father or both) education level has a considerable effect on children's educational attainment. For example, Anders Bakken found a positive correlation between parents' socioeconomic status and children's academic performance at lower and upper secondary school (Bakken 2003), while Lihong Huang found a positive correlation between parents' education level and children's motivation and achievement at upper secondary school (Huang 2007).

At the university level, Marianne Nordli Hansen found that social origin affects educational success and career choice in Norway. Students of law who grow up in a family steeped in law perform better than students with other academic backgrounds (Hansen 2001a). She explained this in terms of familiarity with law terminology, mastery of the law group culture, and networks in a similar field (Hansen 2001a). Further, Hansen and Mastekaasa (2006), in a longitudinal study, concluded that variation in academic performance at different education levels and fields is affected by the level of cultural capital. For example, students who originated in a farm household show the lowest educational attainment while those who originated in an academic household perform best (Hansen and Mastekaasa 2006).

Furthermore, studies show that social class origin has effect on access to the labour market (Munk 2000; Hansen 2001a); trust in financial institutions (Fekjær 2000a); financial rewards for people with the same education level and field (Hansen 2001 b), and attainment of elite positions[2] particularly, for people without university degrees (Mastekaasa 2004).

Family composition can also affect school outcomes. Such effects can work through many different channels. Adults, brothers, sisters, and other children in the family can function as resources that contribute positively into the schoolwork. On the other hand, family life can be too crowded, leaving less than desirable scope and peace for schoolwork. The ambiguity of these influences is illustrated by the following example. Consider a single-parent family: if a second adult arrives in the family (s)he may be a further

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[2] Formal positions in important organizations such as the business sector and central and local governmental administration.

resource person; (s)he may also be a person who provokes stress and antipathy on the part of the youngsters in the family. Stepfathers, step-mothers, and the stepchildren's attitudes and reaction towards them vary considerably. Hence, it is not possible to determine a priori exactly how school results vary between family types. However, this is a topic worth analyzing empirically (Lauglo 2008).

Children of immigrant background are in some studies found to achieve somewhat lower grades than native Norwegians do. In the group of non-western immigrants, we also find lower educational levels, lower labour market participation and lower economic status. For example, in the present project Tormod Øia and others found that immigrants in the low- income sample have lower income and living standards than low income Norwegians (Øia et al. 2006). An important question to settle is therefore whether any differences in school outcomes of native Norwegians and children from immigrant families can be explained by stronger exposures to risk connected to parental education and labour market participation.

Numerous empirical studies have shown low educational achievement among ethnic minorities. For example, Bakken (2008) in his study of minority students at lower and upper secondary school found that students with a minority background achieved lower result than those with a non-minority background.

Another example concerns variation in recruitment to higher education, where there is clear variation between non-western immigrants and native Norwegian youth. Yet this variation diminishes when social class is controlled for (Dæhlen 2001). Moreover, a British study shows that non-western immigrants are not underrepresented in recruitment to higher education, and their share (except the Caribbean) has increased since 1990 (Modood 2004). Lucinda Platt found that first generation migrants with solid cultural capital face social degradation, but that they reassert their social background in their second generation, while those with low cultural capital (labour class) remain in the same social class in their second generation (Platt 2005a).

Children are often assumed to benefit from parental participation in the labour market. The argument is that labour market participation provides economic resources and stability. It may also yield access to networks

valuable to the whole family and promote integration into society. This may be especially important for families who have experienced poverty for longer or shorter periods. Employment, or labour market participation, can also potentially have a negative effect on the effort made by parents to help and supervise children's homework, which in turn can have a depressing effect on school results. This is due to the fact that employment is time consuming and time in employment cannot be used for other purposes.

## 2.2 Poverty and children

This paper analyses the covariates of school achievement in a sample dominated by children from families whose incomes were below the poverty line six years prior to the situation analyzed here. One obvious reason for being interested in such a topic is that school achievement can contribute to future opportunities and outcomes, as will be explained in this section.

Before turning to the empirical analyses, we therefore summarize some aspects of the discussion and research on poverty. A particular focus is given to child poverty and the dynamic effects of child poverty. This serves as a part of the background for the remainder of the paper. An extensive literature exists on a wide range of aspects related to poverty. While it is beyond the scope of this paper to present a comprehensive review, I will briefly outline the concept of poverty, its historical development, as well as consequential effects of growing up in poverty.

### 2.2.1 Concept of poverty

There is no single, universally accepted definition of poverty. Moreover, the question of how poverty ought to be defined and measured is a contentious issue in both the public debate and in research. Definition and interpretation of poverty vary according to researchers' and policy advisors' disciplinary and ideological values. Further, it varies over time and space due to variations in political, economical, cultural and ecological conditions of the contexts in question (Lister 2004; Sen 1985). Nevertheless, there is a consensus that poverty has fundamentally to do with deprivation and ill-being (Chambers 1995). This project employs an income-based poverty definition.

The concept of 'poverty' has evolved rapidly over the last four decades. According to Simon Maxwell (1999), the concept of poverty emerged at the beginning of the twentieth century with a focus on nutritional status. In the 1960s the focus shifted to income, reflected in macro-economic indicators such as per capita GNP. Since 1980 new concepts have been added to the definition of poverty such as participation, vulnerability, livelihood, capabilities and functioning, empowerment and liberty. In the 1990s the idea of 'well-being' was used as a metaphor for the absence of poverty, with the emphasis on subjective evaluation of poverty. At the same time the United Nations Development programme (UNDP), inspired by Sen, developed the idea of 'human development': 'the denial of opportunities and choices… to lead a long, healthy, creative life and to enjoy a decent standard of living, freedom, dignity, self-esteem and the respect of others...'. A counterpart of 'human development' in rich countries is 'social exclusion' and 'deprivation' (Maxwell 1999).

The current debate on poverty is dominated by distinctions between absolute and relative concepts, subjective and objective indicators, and by discussions of which measurements and indicators should be used, particularly in the rich countries. Moreover, the debate on poverty often touches upon discussions of related terms, such as empowerment, social inclusion/ social exclusion, discrimination and inequality. Social exclusion, in particular, is frequently used as a synonym for 'poverty' or as part of the wider definition of poverty (as in contributions on "poverty and social exclusion") (The Poverty Site 2008). However, Tone Fløtten argues that the two concepts are different and that also non-poor people can be socially excluded (Fløtten 2006).

## 2.2.2 Measurement of poverty

Poverty is defined in either absolute or relative terms. *Absolute poverty* is defined as a universal measure that quantifies the number of people below a poverty threshold, and posits a fixed level across different countries, cultures, and technological levels. Absolute poverty is sometimes used as a synonym for '*extreme poverty*' which is the severest state of poverty where people lack the basic necessities for survival (food, shelter, clothing etc. used in developing countries) or lack minimal acceptable standards of living (used in

rich countries). Absolute poverty is a minimum standard of living below which no one anywhere in the world should ever fall (Draman 2003; The Poverty Site 2008). In contrast, *relative poverty* is defined as being below some relative poverty threshold. This threshold is dynamic over time and space, and some argue that it should be updated regularly (UNICEF 2000; Draman 2003; Lister 2004; UNICEF 2005; De Neubourg 2007; The Poverty Site 2008).

Both absolute and relative poverty are valid concepts. They measure the incidence of various phenomena; both of them yield information relevant for welfare assessments and for policy purposes. Their common component is that they measure the numbers and proportions of households with an income and consumption level that falls below a socially acceptable threshold. The minimum threshold in the relative concept varies by context, while that of absolute poverty is drawn at a fixed level. Fløtten and others argue that the concept of relative poverty is used where people satisfy their basic needs, but lack the opportunity to maintain a socially accepted living standard in their community (Fløtten et al. 2001). Relative poverty is now a widely accepted yardstick for assessing the overall performance of rich countries (Tentschert et al. 2000; UNICEF 2000; Epland 2001; Pedersen 2004; UNICEF 2005; Trinczek 2007; UNICEF 2007; EU 2008; The Poverty Site 2008). However, a number of different approaches to measuring poverty have been proposed and applied. It is usually measured by setting a relative income poverty line at a level between 40% and 70% of the national median income (UNICEF 2000; 2005; Trinczek 2007; EU 2008; Fløtten and Pedersen 2008).

Household size and composition are the main factors influencing the size of income needed to attain a socially acceptable standard of living (EU 2008). Equivalence scales are therefore adopted to compare statuses of different types of households. Equivalised income is defined as the total income of a household divided by its equivalent size (OECD). In the late 1990s the Statistical Office of the European Union (EUROSTAT) adopted the so-called "OECD-modified equivalence scale". This scale assigns the weight 1 to the first adult in the household, 0.5 to each additional adult member, and 0.3 to each child. A child is defined here as a person below the age of 16. This scale is currently widely used in the industrialized world.

### 2.2.3 Child Poverty

Child poverty, as with poverty itself, is a complex notion to define precisely. One widely used definition is 'children living in households with equivalent income below the income threshold are considered to be poor' (Backe-Hansen 2002). In some cases, however, children's economic situation might not be identical to that of their parents. As Mona Sandbæk argues, children might have sources of income in addition to what the family provides; or parents in relatively poor families might protect their children by prioritizing children's needs over their own needs when distributing the family's limited resources (Sandbæk 2007). Similarly, the opposite is equally possible. A child in an affluent family could be 'deprived of the goods and services considered necessary to enjoy a decent standard of living in her community'. Moreover, Anne Grødem has shown that children's experience of poverty does not necessarily match that of their parents (cf. Grødem 2008b). It is not given, therefore, that the poverty experience of children will match that of their parents. Nevertheless, in this project we rely on the standard definition of child poverty, and define children as "poor" if they live in a household with incomes below the EU poverty line.

### 2.2.4 The meaning of inheritance

Numerous studies (such as Caspi et al. 2006; Melchior et al. 2007; Lynch 2004) focus on the relationship between child health and adulthood capability and productivity, as well as the interrelationship between parents' socio-economic status and the socioeconomic potential of their children. Shahin Yaqub reviews a large number of studies related to this issue and illustrates the interdependency between childhood and adulthood. He demonstrates how childhood situation and experiences affect the potential of adulthood physiologically, psychologically and sociologically. It affects the development of the personality, cognition and physical abilities (Yaqub 2002).

These studies show that childhood is a sensitive stage of human development and the foundation for adulthood. For example, malnutrition in childhood is negatively correlated with adolescent and young-adult attainments in cognition, education, and occupational outcomes. In addition, he views the living setting as one of the determinants of socioeconomic

opportunities; and 'a person's attainments in incomes, class, education, health, and employment have been shown to correlate to attainments of their parents, siblings, and themselves at a prior time'(Yaqub 2002). Further, a longitudinal study shows that social isolation in childhood has a detrimental effect on adulthood (Caspi et al. 2006). In education, disadvantaged children fall short of achieving their academic potential and are more likely to enter adulthood lacking the skills to compete in the labour market. Further, they are more likely to have health problems and to participate in crime (Melchior et al. 2007), and are unable to participate in the economic growth and well-being of their community (Lynch 2004).

These findings support the claim that childhood experiences and parents socioeconomic status have an effect on adult poverty. Consequently, those who grow up in poor families are more likely to be poor in their adulthood. Sen and Brundtland (1999) argue that intervention to break the poverty cycle is not only important for the quality of childhood, but also for their adulthood; because 'The capabilities that adults enjoy are deeply conditional on their experiences as children' (Sen and Brundtland 1999). Most debates on, and efforts to reduce, child poverty are fuelled with moral arguments such as rights, fairness and justice. This approach focuses on the high cost imposed on the poor. Another approach to poverty reduction intervention is based on economic arguments. It views poverty as a burden on the rest of the community which robs its productive potentials in term of public expenditures on the poor, along with the foregone opportunity cost for the poor's productivity and contribution to the production of goods and services in society. Hence this approach views investment in poverty reduction as public investments that generate future returns to the community (Holzer et al. 2007). These two approaches are not mutually exclusive, particularly in the welfare states, where human rights and dignity are a priority and the state seeks an equitable distribution of resources with the poor given higher weight.

# 3  Background of the project and data analysis

## 3.1 Background of the project

The project "Children's level of living – the impact of family incomes" (Barns levekår – betydningen av familiens inntekt) is carried out by Norwegian Social Research (NOVA), and financed by The Norwegian Women's Public Health Association (Norske Kvinners Sanitetsforening, N.K.S.). It is a large-scale study in Norway that investigates the living standards of children living under the income threshold; using children (as well as their parents) as informants and the unit of analysis (Sandbæk 2008). The project started in 2000, with the aim of studying the relationship between family income and everyday life of children. The focus is on families with low income: what does it mean for a child to grow up in a low-income family? How does the child experience living in a household with an aggregated income clearly below the average national income in Norway (Sandbæk and Sture 2003)?

This project is a longitudinal study in which data were collected at three points in time over a seven-year period. The third round of data collection is in progress (2009), while the first was in 2003 and the second in 2006. Statistics Norway (SSB) is responsible for sampling and data collection. Sampling was based on register data for household incomes for the year 2000. The sample is composed of two groups:

1. The case group, which is a sample of children who lived in families with aggregated incomes per consumption unit below the poverty threshold (60 per cent of the contemporary median income).

2. The control group, which is a smaller representative sample that covers children living in all income categories (for detailed information on sampling and data collection, see the documentation report '*Barns levekår i lavinntektsfamilier*' (Flåte 2004).

The sample is gender balanced. The respondent children are grouped into two age groups; in the first round of data collection (2003), group one was between six and nine years old and group two between ten and twelve. Many of the living standard indicators for children are related to the family, such as parents' employment and economic situation. On these issues information is collected from the parents, since the children lack sufficient knowledge. Information about children's everyday life includes aspects related to school, leisure time, and friends. This information is gathered partly from the children themselves and partly from the parents. One of the arguments for the longitudinal design is the interest in the processes that decides whether the children are integrated or socially excluded over time and how this interacts with the financial situation of the family (Sandbæk and Sture 2003).

The total response rate in the first round of data collection was 54.4 per cent, breaking down to 52.9 per cent in the low-income sample and 63.8 per cent in the control group. Such a relatively low response rate is normal when the focus is on low income families. The difference in the response rate between the two samples suggests that families with most economic problems are underrepresented in the low income sample (Sandbæk 2004). Only those who participated in the first round were contacted for participation in the second round. Thirty three per cent were missing in the second round: 34.4 per cent of the low-income sample and 24.2 per cent of the control group. A high non-response rate is normal in panel studies; nevertheless, it draws attention to potential sample bias. An analysis of non-response indicates that the highest rates of non-response are found among non-western immigrants, parents with a low education level and families with weak ties to the labour market (Grødem 2008a).

The main approach applied in this project is the living standard approach, which is used to survey the socioeconomic situation. The focus is on living standards, poverty and social exclusion. The OECD equivalence scale is used, with the income threshold placed at 60 per cent of the annual median income; and a poor child is defined as a child who lives in a household with aggregated income below this threshold (Sandbæk and Sture 2003). Statistics Norway's definition of 'immigrant' is adopted in this

project: an immigrant is a person whose parents are born abroad, regardless of where that person is born. Most immigrant children in this project were born in Norway.

## 3.2  Data analysis

Our analysis is based on both bivariate and multivariate methods. In the bivariate analysis, cross tabulation with the ordinal measure of association, gamma 'γ', is used to test the association between two variables. For comparisons between scores across different groups, we use a traditional binominal population proportion test. Multivariate analysis is conducted by linear regression, with the sum of the marks in each of the three subjects as the response variable.

Gamma is an ordinal measure of association between two ordinal variables. It utilises the concepts of concordant and discordant pairs of observations. Although gamma is both a powerful and intuitive interpretable statistic, it is not frequently used. We therefore give a brief explanation of the concepts of concordant and discordant pairs and the gamma measure (for a more complete and somewhat more formal description, see Agresti and Finlay 2009). In our description here we use pupils' grades and parents' education as an example. From a sample with n observations, n*(n-1)/2 pairs can be drawn. A concordant pair is a pair of observations where the observation with the (strictly) highest score on parental education also has the (strictly) highest score on children's school results. A discordant pair is a pair of observations where the observation with the (strictly) highest value on parental education has the (strictly) lowest value on children's school achievements.[3]

The gamma measure is based on a count of concordant and discordant pairs of observations. It is the standardized difference between the total number of concordant pairs (positively associated pairs) and the total number of discordant pairs (negatively associated pairs) in the resulting contingency table of two variables. In other words, gamma is the difference

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[3] A pair that is neither concordant nor discordant is termed a tie. The incidence of ties is not utilised in the calculation of the gamma-statistic.

between the proportion of concordant and discordant pairs. The value of gamma falls in the interval between -1 and +1, and a high absolute value indicates a strong association. The sign of gamma indicates whether the sum of concordant pairs is more than that of discordant or the reverse. In other words, it indicates the type of association between the variables (positive or negative).

The gamma measure is used here because it is both more powerful and more informative than chi square ($\chi^2$) when both variables are ordinal. The fact that gamma considers the order in the variable categories gives it a merit over chi square ($\chi^2$). Furthermore, chi squire ($\chi^2$) does not measure the strength of association while gamma does. Another advantage with the gamma statistic is that it has a known statistical distribution. Consequently, it enables us both to test for the sign of the association and to produce confidence intervals. A confidence interval gives more information than point estimates. The formula for a 95 per cent confidence interval for the gamma value is $\gamma \pm 1.96$ (se), where '$\gamma$' is the gamma value and 'se' is the estimated standard error.

In addition, a 'difference in population proportion' test is used to compare the existence of a 'phenomenon' in two groups. The null hypothesis, here, the difference 'D' between the proportion of the two groups concerned ($P_1 - P_2$) = zero. $P_1$ is the proportion of the first group that has the phenomenon, and $P_2$ of the second. A 95 per cent confidence interval for the difference = D ± 1.96 'Se (D)', where 'Se (D)' is the positive square root of the sum of the variances of the two groups. The sign of 'D' shows which sample is dominant; those with positive signs show that the first group is dominant, and those with negative show the reverse.

# 4 Parental characteristics and school outcomes: some empirical evidence

This chapter shows how school results correlate with parental characteristics. It comprises two main parts, one based on bivariate and the other on multivariate analysis. The first part has four sections, the first of which provides descriptive statistics of the pupils and their performance. The remaining sections focus on the association between children's academic performance and parental socioeconomic status: the second section is on parents' education, the third on employment and the fourth on cultural background.

## 4.1 Descriptive statistics of children's academic achievement

Education policies in Norway promote equal access for all members of the community. Every child has the right to at least 13 years of free education before deciding to enter the labour market or continue to higher education. The first ten years of education are compulsory, and consist of primary (years one to seven) and lower secondary (years eight to ten), while the next three years (upper secondary) are optional (for more information, see the website of The Norwegian Ministry of Education and Research (Ministry of Education and Research 2009). The sample used in this paper consists of 499 pupils undergoing lower secondary education. Of them, 388 are drawn from a population of children in families with an income below 60 per cent of the median income in 2000 (from now on the case sample) and 111 from a general child population (from now on the control group). They are aged from 13 to 15 years, and 35.5 per cent (177) of them are in their eighth year, 32.9 (164) in their ninth year and 31.7 per cent (158) in their tenth year of schooling.

Academic achievement at school year eight and above is evaluated by grades, ranging from six as the highest to one as the lowest. Our focus is on

grades in the three central subjects: mathematics, Norwegian and English. Pupils have been asked about their latest grades in each of the three subjects. Hence some self-reporting errors are to be expected. Sources of such errors might be problems of recall, or that pupils might systematically want to improve their academic appearance before the interviewer. Around 11 per cent of the pupils in the case sample have not reported their grades in one of the three subjects. The total of reported grades in the case sample is 345 for Norwegian, 347 for maths, and 348 for English.

*Table 1. Pupils' original scores (per cent) in the case and control group.*

| Score | Norwegian | | Maths | | English | |
|---|---|---|---|---|---|---|
| | Case | Control | Case | Control | Case | Control |
| 6 | 0 | 2 | 3 | 3 | 2 | 4 |
| 5 | 24 | 26 | 19 | 22 | 24 | 27 |
| 4 | 46 | 45 | 31 | 43 | 40 | 43 |
| 3 | 25 | 24 | 30 | 26 | 25 | 21 |
| 2 | 5 | 3 | 16 | 5 | 8 | 5 |
| 1 | 0 | 0 | 1 | 1 | 1 | 0 |
| Missing | 11% | 7% | 11% | 7% | 10% | 6% |
| N | 345 | 103 | 347 | 103 | 348 | 104 |

Table 1 shows the distribution of the original scores in the three subjects for both samples. The highest proportion of the pupils in both the case and control groups, across the three subjects, is concentrated around score '4', with a decreasing proportion in both directions. For instance, the percentage of pupils who achieved the highest score in one of the three subjects ranges between 0 and 3 in the case sample and 2 and 4 in the control group, while not more than 1 per cent in either group achieved the lowest score. In other words, only a few (0-4%) achieved the highest or the lowest score, while between 62 and 71 per cent of the pupils achieved the middle score (3 or 4) in each subject. Considering the distribution of the scores achieved, and for the purpose of statistical analysis, these grades are condensed into three categories: 'Very Good' for the two upper scores, 'Good' for the two middle scores and 'Fair' for the two lower scores. Table 2 shows the distribution of the condensed scores in the three subjects.

*Table 2: Pupils' achievement (in per cent) in case and control group*

| Score | Norwegian | | Maths | | English | |
| --- | --- | --- | --- | --- | --- | --- |
| | Case | Control | Case | Control | Case | Control |
| Very Good | 24 | 28 | 21 | 25 | 26 | 31 |
| Good | 71 | 69 | 62 | 69 | 65 | 64 |
| Fair | 5 | 3 | 17 | 6 | 9 | 5 |
| N | 345 | 103 | 347 | 103 | 348 | 104 |

To compare performances of the pupils in each of the three subjects, in the two samples, a 'population proportion' test was used, with $P_1$ for the case sample and $P_2$ for the control group. Table (3) summarizes the result of the comparison. The confidence interval limits for the differences in the three categories of grades pass through the zero point for the three subjects, except for the 'Fair' category for maths. Hence, differences in this category are significant. The sign of 'D' is positive, indicating that pupils in the control group do better then their peers in the case sample. I conclude that there is no difference in pupils' performance in the subjects Norwegian and English, while the difference between the two samples is significant in maths.

*Table 3. Comparison of pupils' results. Between the case sample and control group*

| | Norwegian | | | Maths | | | English | | |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| | Very Good | Good | Fair | Very Good | Good | Fair | Very Good | Good | Fair |
| (D=$P_1$-$P_2$) | -0.04 | 0.01 | 0.02 | -0.04 | -0.07 | 0.11 | -0.05 | 0.01 | 0.04 |
| **Se(D)** | 0.05 | 0.05 | 0.02 | 0.05 | 0.05 | 0.03 | 0.05 | 0.05 | 0.05 |
| **95% CI** | (-0.1, 0.1 ) | (-0.1, 0.1 ) | (0.0, 0.1 ) | (-0.1, 0.1 ) | (-0.2, 0.0 ) | (0.1, 0.2 ) | (-0.2, 0.1 ) | (-0.1, 0.1) | (0.0, 0.1 ) |

In addition to scores in each of the three subjects, aggregates of the scores in the three subjects are also used. Figure (1) shows the distribution of the total for both the case sample and the control group. The total ranges from five to seventeen in the control and four to sixteen in the case sample.

*Figure 1: Total by case sample and control group*
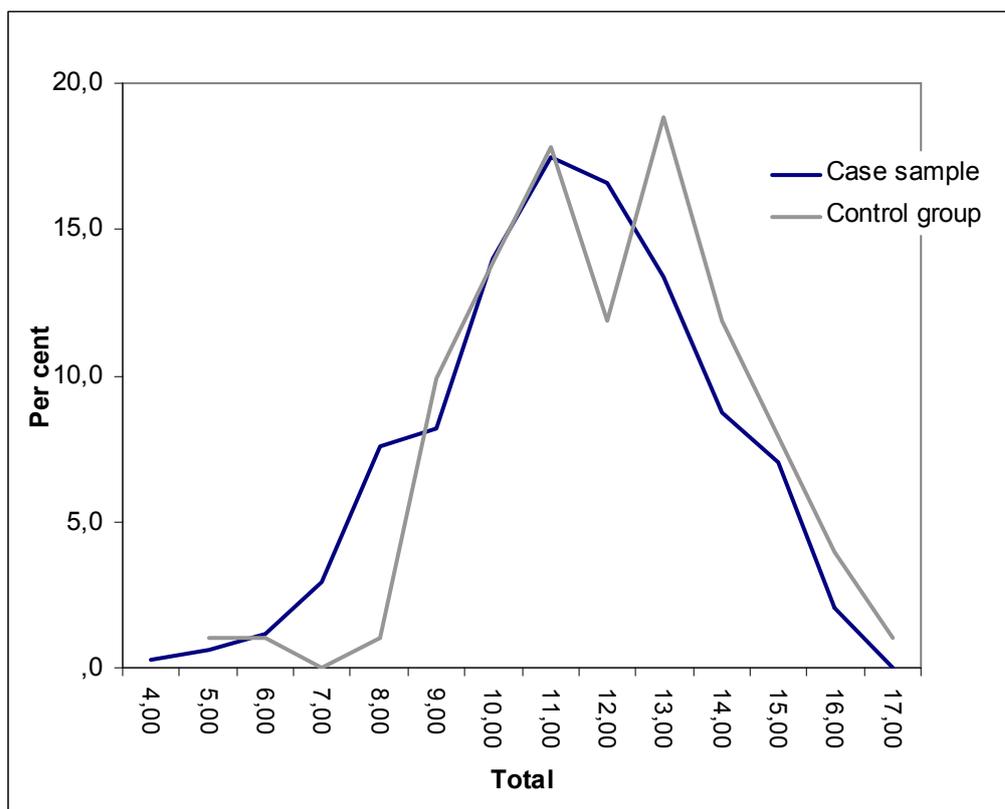


In the bivariate analysis, the total is aggregated into three categories: Fair (1-8), Good (9-12) and Very Good (13-17).

*Table 4: Comparison of the scores in the case sample and control group*

| Case – control | Coded total | | |
|---|---|---|---|
| | Very Good | Good | Fair |
| Difference (D=$P_1$-$P_2$) | -0.1 | 0.0 | 0.1 |
| **Se(D)** | 0.1 | 0.1 | 0.0 |
| **95% CI** | (-0.2, 0) | (-0.1, 0.2 ) | (0.0, 0.1 ) |

Table 4 above summarizes the results of the comparison between pupils in the case sample and control group. Confidence intervals in the categories 'very good' and 'good' contain zero, indicating no significant difference between the two samples. For the category 'fair', the confidence interval does not contain zero, although the figure shown in the table has been rounded to zero. I nevertheless conclude that the performance of pupils in the control group is similar to that of their peers in the case sample in terms of the total sum of the three subjects. Note that the dissimilarity in performance in the maths result disappeared in term of the total sum.

## 4.1.1 Parents' education level and children's academic achievements

**Descriptive statistic of the parents' education level**

The source of data on parental[4] education levels is data registered at Statistics Norway (SSB) for the year 2004. Education data for 4 per cent of the mothers and 14 per cent of the fathers are missing. Parents' registered education levels are categorized into nine categories: no formal education, primary school, lower secondary, three years of upper secondary, one to four years at university, more than four years at university, and 'not registered'[5] education level. In this study, I group these levels into three categories:

1. Basic education: the aggregate of the three first categories. This category encompasses those who completed compulsory education or lower (0-9 years). The share with no formal education is relatively low, 1.6 per cent of the mothers and 0.7 per cent of the fathers, and has been added to this first category

2. Secondary education: those who have completed all or part of upper secondary education (10-12 years), and

3. Higher education: college or university education.

The share whose education is 'not registered' is 4 per cent for the fathers and 5 per cent for the mothers. By analyzing their job type and country of origin, it is seen that the vast majority of these parents have unskilled jobs. 64 per cent of those whose education is not registered are non-western immigrants, 28 per cent are western immigrants and 8 per cent are Norwegian. Such a high percentage of immigrants in this category comes as no surprise since immigrants may in some cases have been unable to document their education, or the Norwegian education authority does not recognise their education level. These factors make it difficult to figure out the education level of this category. They are therefore added to the 'missing category'.

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[4] Both biological- and step-parents.

[5] 'Not registered', here, means not registered at SSB, while 'missing' means missing due to technical problems.
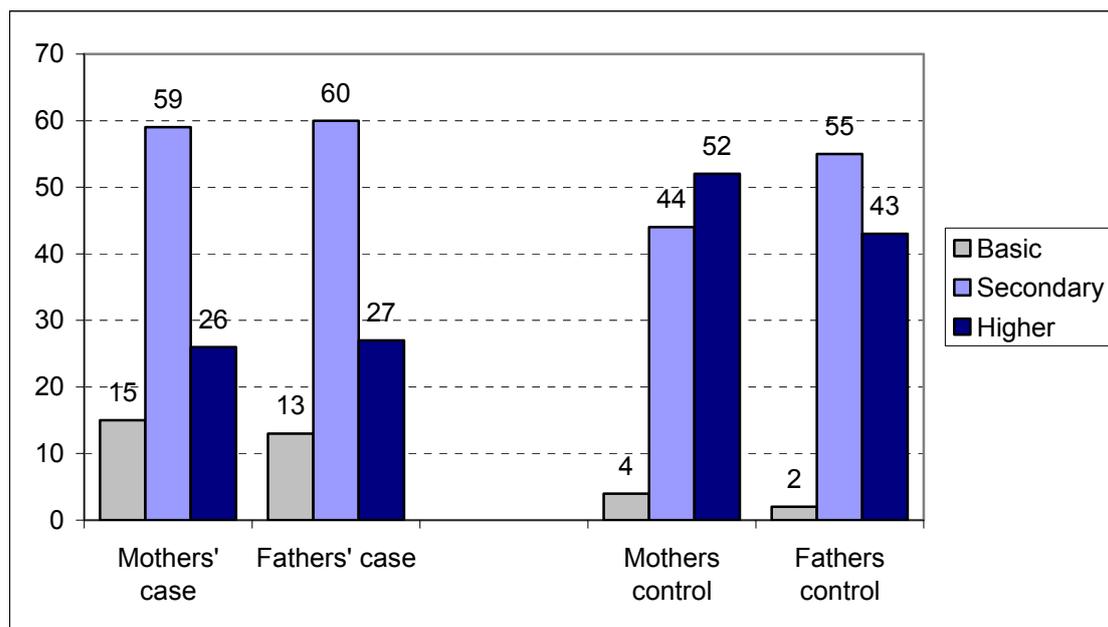
*Figure 2: Parents' education levels.*



Figure 2 shows parental education levels in both the case sample and control group, after removing the 'missing' category. Secondary level is the dominant education level among parents in both samples, except for the mothers in the control group where higher education is most frequent. Generally, mothers have higher education levels than fathers in the control group, while in the case sample the education level of the fathers is slightly higher than that of the mothers. The share of parents with higher education is higher in the control group.

**Association between parents' education level and children's academic achievements**

Here the association between parental education and children's academic achievement is analyzed for the three central subjects and for their sum. The null hypothesis in the tests is that there is no association between parental education level and pupils' academic achievement. Both parental education levels and pupils' academic achievement variables are ordinal; I therefore use cross tabulation with gamma measurement as described in section 3.2. Figure 3 illustrates this result. The proportion of pupils who achieved the highest grades increases with increasing parental education levels, while the proportion of those who achieved the lowest grades decreases in the same direction. Note that this analysis is done for only the control sample.

*Figure 3: Pupils' achievement by parental education level in the case sample (per cent):*
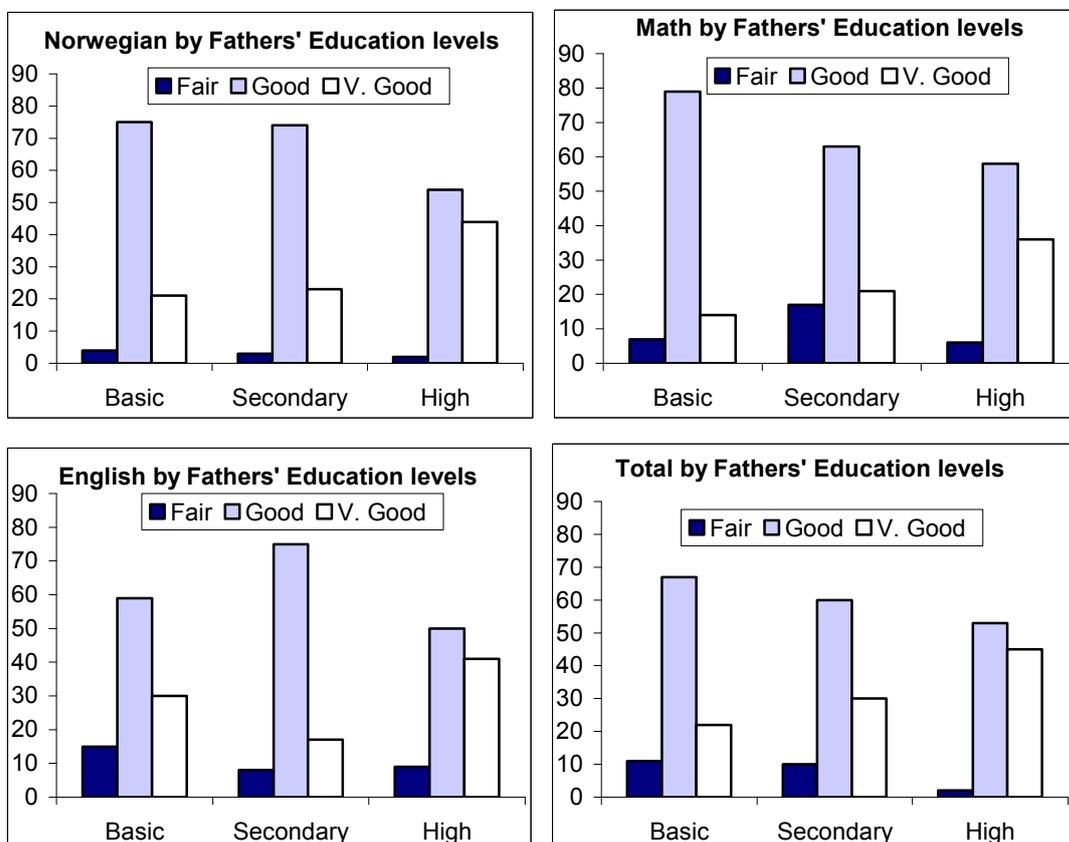
*MOTHERS:*
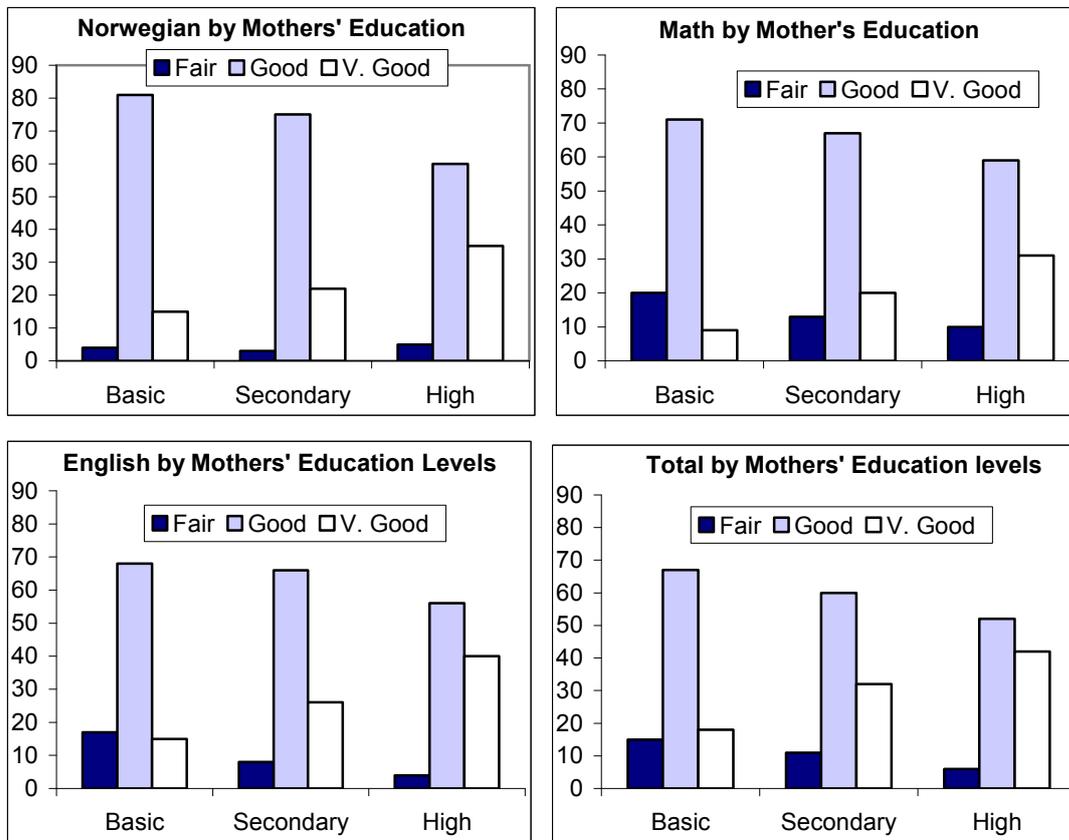


*FATHERS:*

Table 5 summarizes the results, and shows the gamma value, standard error and significant levels. The tests of associations are significant at p-values < 0.05. This provides sufficient evidence to reject the null hypothesis and to conclude that there is a positive association between parents' education level and their offspring's academic achievement. Signs of gamma value are positive across the three subjects in both samples. I therefore conclude that there is a positive association between parents' education and offspring achievement – as has also been documented in several other studies. The value of gamma indicates the strength of association, which is moderate in the case sample. This result coincides with the findings of Anders Bakken who found that parental education level correlated with children's academic performance ($r = 0.22$) (Bakken 2003). Huang (2007) also found positive moderate correlation between parental education levels and children's motivation and achievement (Huang 2007).

*Table 5: Children's academic achievement and parental education in the case sample and control group*

|  | Control group | | | | Case sample | | | |
|  | N | Y | Std. Error | Sig | N | Y | Std. Error | Sig. |
|---|---|---|---|---|---|---|---|---|
| **Mother** | | | | | | | | |
| Norwegian | 91 | .4 | .2 | .08 | 301 | .3 | .1 | .03 |
| Maths | 91 | .4 | .2 | .03 | 303 | .3 | .1 | .02 |
| English | 91 | .4 | .2 | .01 | 302 | .4 | .1 | .000 |
| Total | 89 | .4 | .2 | .02 | 293 | .3 | .1 | .003 |
| **Father** | | | | | | | | |
| Norwegian | 77 | .7 | .1 | .001 | 204 | .3 | .1 | .01 |
| Maths | 76 | .7 | .1 | .001 | 203 | .3 | .1 | .009 |
| English | 77 | .6 | .2 | .004 | 205 | .3 | .1 | .04 |
| Total | 75 | .7 | .1 | .000 | 200 | .33 | .1 | .004 |

## Not registered/missing category

The number of parents whose education level is not registered or missing is too large to be ignored: 89 mothers and 200 fathers. Therefore, the distributions of their children's grades are reported separately in table 6.

*Table 6: Achievement of pupils in the category not registered/missing*

|  | Norwegian | | | | Maths | | | | English | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Very good | Good | Fair | N | Very good | Good | Fair | N | Very good | Good | Fair | N |
| Mothers | .21 | .68 | .11 | 44 | .21 | .59 | .20 | 44 | .15 | .72 | .13 | 46 |
| Fathers | .17 | .75 | .08 | 141 | .17 | .59 | .24 | 144 | .28 | .63 | .09 | 143 |

Table 6 above summarizes the grades of those whose parental education level is 'not registered/missing'. It is interesting to note that they follow the same pattern as the rest of the pupils in that the bulk is concentrated in 'Good' grades for the three subjects. Overall, however, pupils in this category perform at about the same level as pupils whose parents have basic education.

## 4.1.2 Parental employment status and children's academic achievements

Employment, for the majority, implies economic security through income earning and access to financial resources. It also implies involvement in community and social networks. The relationship between network and employment is mutual: network is important asset in accessing the labour market, and employment is important in establishing or enhancing the network. For example, referees[6] are an essential part of curriculum vitae (CV), and they can be contacted by a prospective employer. In addition, employment can enhance one's self-confidence and social image, which in turn can encourage participation in social activities.

In this sense, parental employment is expected to have considerable effects on the welfare of their children. Concerning the children's educational achievement, parental employment might have two contradicting effects. On the one hand, having a source of income is essential for meeting children's educational needs, as well as for participating in social activities. Further, parents' exclusion from the labour market can lead to an absence of knowledge and experience that are of value for children's education (Bakken 2003). On the other hand, having a job reduces the time available for the parents to spend with their children and to involve themselves in their life at school. Hence, each household needs to find a balance that optimizes their time use.

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[6] Referee is person who is willing to provide a reference for someone for a job.

## Descriptive statistic of parental employment status

Data on parents' employment status were collected through interviews. Direct questions were addressed to the parent respondents about their employment status and that of their partner (if they had one). Employment included wage work, and self-employment such as farming and trading. Data on all the mothers show that 62 per cent of them are employed, while the same is true for 82 per cent of the fathers. Employment in the control group is 85 per cent (N=103) for the mothers and 94 per cent (N= 90) for the fathers.

## Children's academic achievements and parental employment

Gamma is used to measure the association between ordinal variables; however, non-ordinal variables with two categories might be treated as ordinal. Therefore, to benefit from gamma's merits as outlined above, the 'employment' variable is regarded as ordinal with unemployment as the lower category. The null hypothesis is that no association exists between parental employment and children's academic achievement.

*Figure 4: Pupils' performance by parental employment status in the case sample (per cent):*
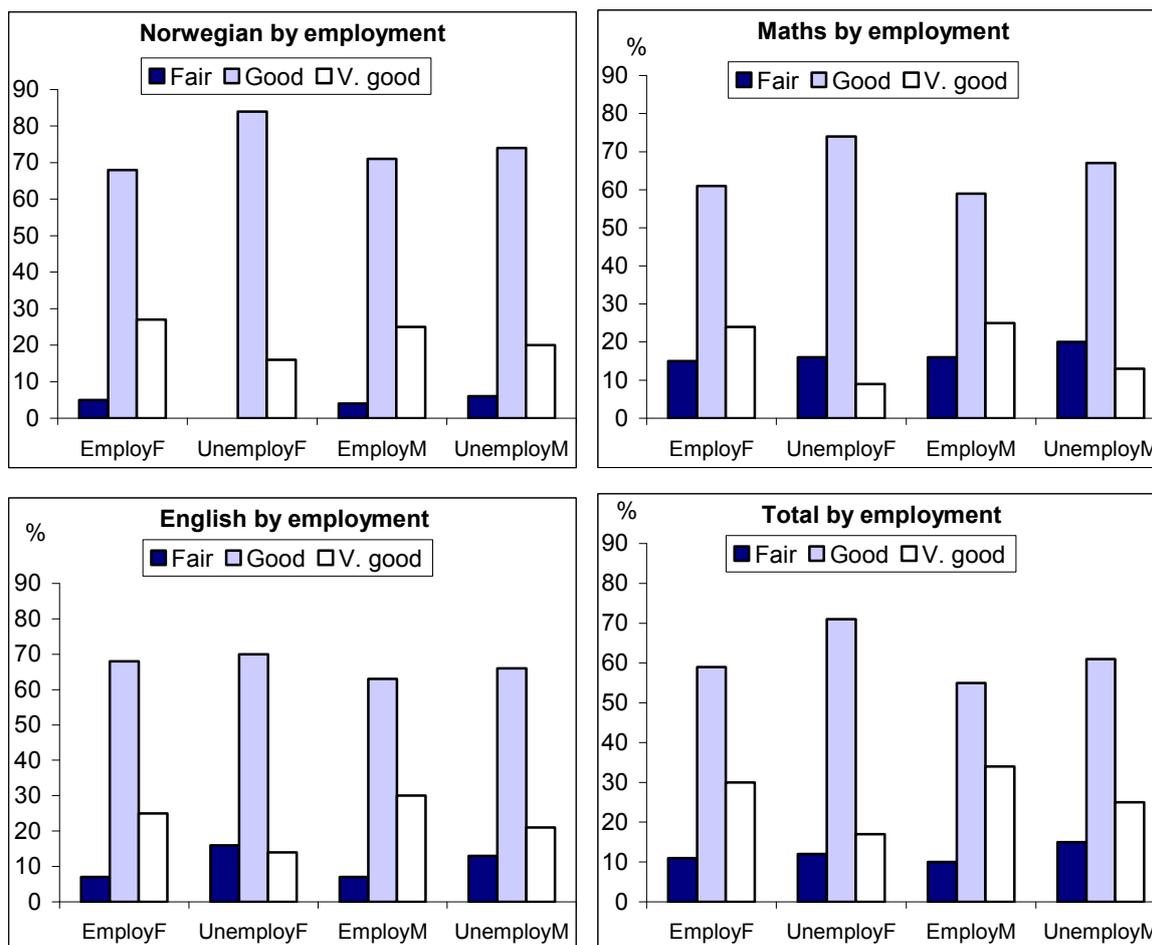


Figure 4 illustrates the association between parental employment and children's performance in the three subjects and their sum. The subscript 'M' is for mothers and 'F' for fathers. The proportion of those who achieved the highest grades is higher among those whose parents are employed than their counterparts, while the situation is reverse in the lowest grades. The results are summarized in table 7.

*Table 7: Children's academic achievement by parental employment (case sample and control group)*

| | Control group | | | | Case sample | | | |
| | N | γ | Std. Error | Sig. | N | γ | Std. Error | Sig. |
|---|---|---|---|---|---|---|---|---|
| **Mother** | | | | | | | | |
| Norwegian | 96 | .148 | .3 | .6 | 328 | .13 | .1 | .3 |
| Maths | 96 | .158 | .3 | .6 | 329 | .23 | .1 | .02 |
| English | 97 | -.147 | .3 | .6 | 330 | .25 | .1 | .02 |
| Total | 94 | .086 | .3 | .8 | 319 | .2 | .1 | .05 |
| **Father** | | | | | | | | |
| Norwegian | 83 | .39 | .4 | .4 | 253 | .18 | .2 | .3 |
| Maths | 82 | .05 | .4 | .9 | 252 | .28 | .1 | .05 |
| English | 83 | .838 | .1 | .05 | 252 | .36 | .2 | .03 |
| Total | 81 | .571 | .3 | .2 | 246 | .29 | .1 | .05 |

There is a striking difference between the tests in the control group and the case sample. The test is statistically significant in the case sample at a P-value below .05, except for Norwegian language, and not significant in the control group except for English. This could partly be a result of the size of the control group. It may also be partly related to the fact that employment in the control group is quite high. It is also possible that the nature of employment in the case and the control group differs. In this respect, the data indicate a positive association between the school grades of children and parental labour market status.

### 4.1.3   Children's academic achievements and cultural background

Nowadays, where one country might have citizens from the six continents, cultural background can form an important dimension in social science. Norway, like most other countries, is no longer a homogenous community. According to Statistics Norway, immigration to Norway has increased continuously since the 1970s. Immigrants currently make up about 10 per cent of the population. They have emigrated from 213 different countries (Statistics Norway 2009). Further, heterogeneity extends to the family. Due to intermarriage between immigrants and the host community, some children can be expected to live in a multicultural household. In such contexts, it is necessary to consider the impact of cultural background in social studies.

## Descriptive statistics

As used here, the term 'cultural background' refers to whether the children are immigrants, native Norwegians, or have one native Norwegian and one immigrant parent. Similar studies, (such as Platt 2005 b; 2005a; 2005c), have shown that the association between immigrant status and socio-economic status varies according to country of origin. However, in view of the small sample size, I group pupils into four groups. The grouping is based on the parents' registered immigrant status and region of origin. With regard to immigrant status, we distinguish between children with both parents born in Norway (no immigrant status, "native Norwegians"), children with one Norwegian-born parent and one parent born abroad (mixed status), and children with two parents born abroad (immigrant families). The latter category – immigrant families – is further divided into two sub-groups: western immigrants (originating from Europe, North America and Oceania), and non-western immigrants (originating from Asia, Africa and Latin America). It might be interesting to subdivide the mixed category by the foreign-born parents' region of origin as well, but due to the small sample size, we have opted not to do this.

Fifty-nine per cent of the pupils in the case sample (see figure 5) are native Norwegians (NN), 15 per cent are western immigrants (WI), 18 per cent are non-western immigrants (NWI) and 8 per cent have one native Norwegian and one foreign-born parent (MIX). While 89 per cent of the control group are native Norwegians, 4 per cent are western immigrants, one is a non-western immigrant and six are MIX. Due to the relative cultural homogeneity of the control group, it will not be considered in this section.

*Figure 5: Children's cultural background in per cent (case sample)*
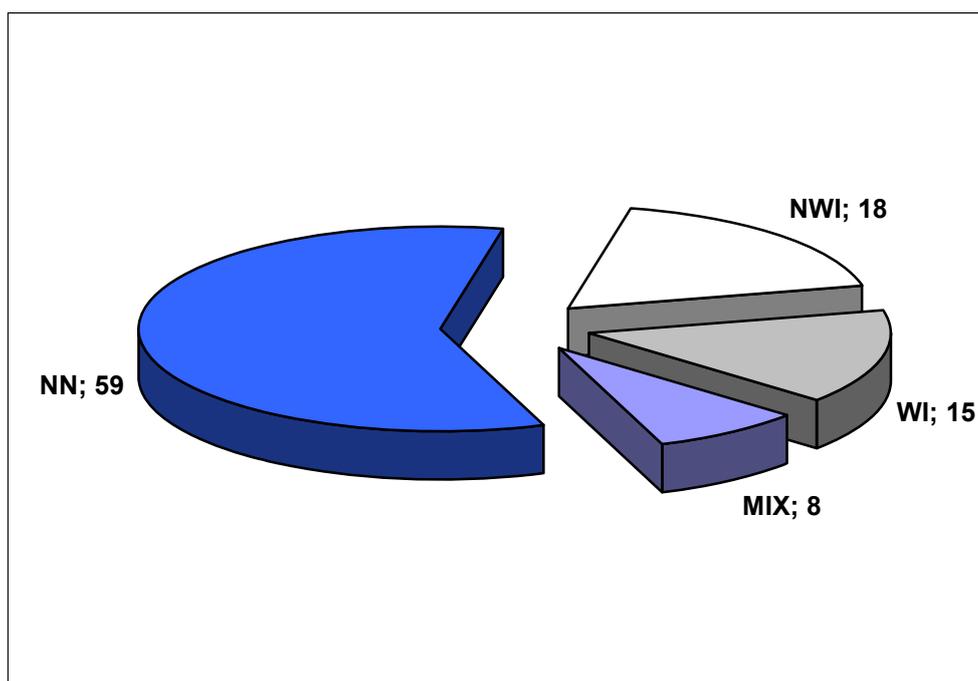


Cultural background affects parents' access to education and the labour market. For this reason, I will elaborate on parental education level and employment status by cultural background.

*Parents' education levels*

With regard to the original variables of parental education levels (see 4.1.2), we find that none of the native Norwegians or MIX parents have education levels below compulsory schooling. The proportion of those who have taken only the compulsory level is relatively low among both the native Norwegians and MIX parents: only 8 per cent of the native Norwegians and 7 per cent of MIX mothers and 7 per cent of native Norwegians and none of MIX fathers. However, education levels among immigrants are relatively lower. Four per cent of the western immigrant mothers, 6 per cent of non-western immigrant mothers and 4 per cent of non-western immigrant fathers have no formal education. Further, 22 per cent of the fathers in both immigrant categories, 22 per cent of the western immigrant mothers and 33 per cent of non-western immigrants have not completed compulsory schooling. Those whose education level is 'not registered' at Statistics Norway comprise 19 per cent of the non-western immigrant mothers and 9

per cent of the non-western immigrant fathers, and 10 per cent of western immigrant mothers and 10 per cent of western immigrant fathers.

*Table 8: Parental education levels by cultural background*

|  | N | Gamma | Std. Error | Sig. gamma |
|---|---|---|---|---|
| Mother | 337 | .3 | .1 | .001 |
| Father | 226 | .3 | .1 | .000 |

The association between parental education level and cultural background is tested by cross tabulation. The test is significant, with P- values below 0.05. A gamma value of 0.3 and standard error of 0.1 shows a reasonably positive association between parents' education level and cultural background. Figure 6 below illustrates the association between parental education level and cultural background. It shows that secondary level is the most dominant educational level for both parents, except non-western immigrant mothers. Education level increases as we go from non-western immigrants to western immigrants, native Norwegians to MIX for the mothers. The same order holds true for the fathers, except that non-western immigrants have a higher education level than western immigrants.

*Figure 6: Parental education level by cultural background (case sample)*
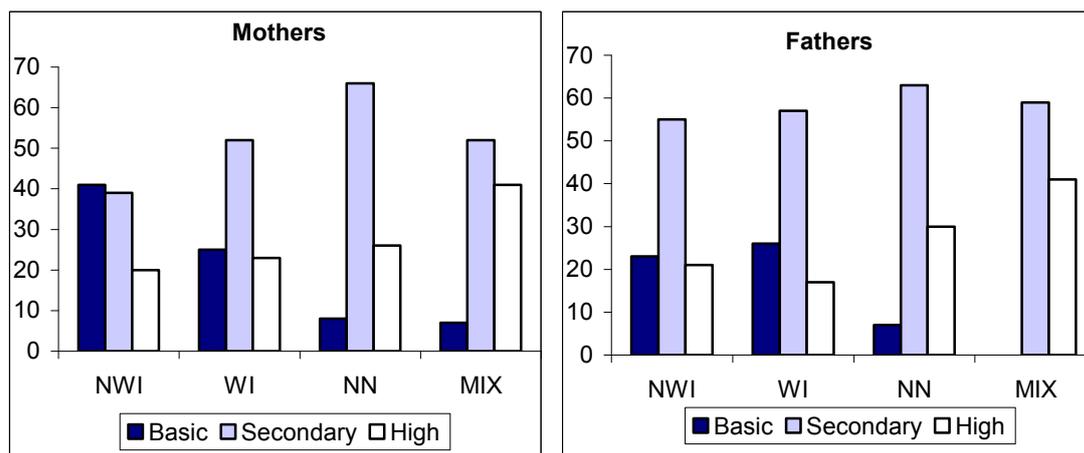


Despite the fact that our sample comprises a special category, i.e. those with incomes below the poverty line in 2000, the education level of the sample coincides with that found by Østby (2004) in a study of the age group 30-44, in that non-western immigrants have the lowest education level (Østby

2004). Yet it differs in so far as western immigrants are not overrepresented at the higher education level.

The low education level among non-western immigrants may be explained by a relatively low literacy rate and conflicts and instability in their countries of origin. The latter factors may also explain the high proportion of those whose education is not registered, as they may be unable to document their education level. Another reason might be that their education is not recognised as matching Norwegian standards.

*Parents' employment*

Employment has both financial and social dimensions. The social dimension includes involvement in the social arena, which is particularly important and useful in multicultural societies. On the one hand, immigrants need to be aware of culture and norms of the host society and establish their own networks. On the other hand, and similarly, the host community needs to be aware of similarities and differences of immigrants' cultures in order to facilitate their integration. Language is important in this respect. However, in communities where the official language has limited global spread such as Norwegian, language might initially be an obstacle to immigrants' participation in the community and access to the labour market. Other obstacles that pose a challenge to immigrants are the lack of referees, and lack of integration in civil society, as mentioned above.

*Table 9: Parental employment by cultural background*

|  | N | Gamma | Std. Error | Sig |
|---|---|---|---|---|
| Mother | 369 | .3 | .1 | .00 |
| Father | 281 | .4 | .1 | .01 |

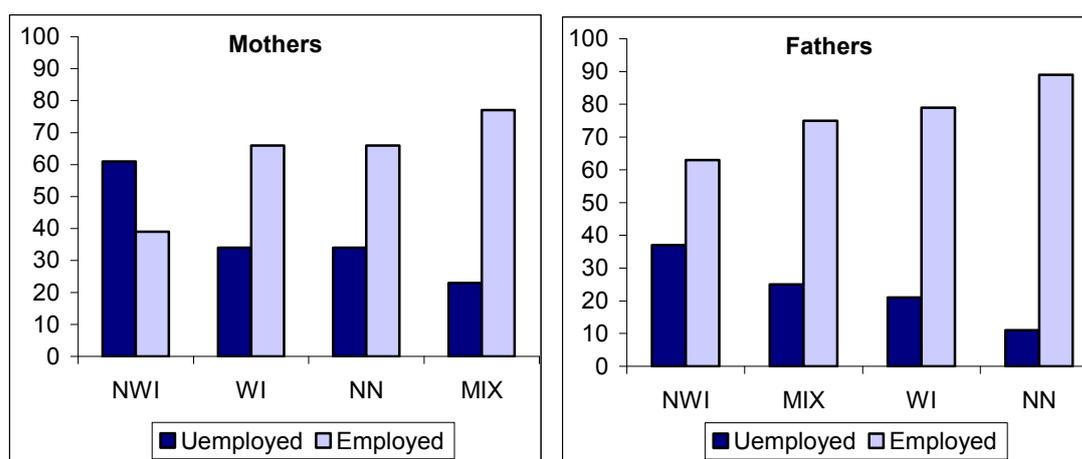*Figure 7: Parental employment by cultural background*

Table 9 summarizes the results of testing of the association between parental employment status and cultural background. The association is positive for both parents with an employment increase from non-western immigrants to western immigrants and native Norwegians to MIX for the mothers, and from non-western immigrants, MIX and western immigrants to native Norwegians for the fathers, as illustrated in figure 7. Note that the employment rate is similar for western immigrants and native Norwegian mothers. This could be explained by cultural similarity or by the fact that western immigrants are labour immigrants. In all groups except among mothers with non-western immigrant backgrounds, the proportion in employment is higher than the proportion not in employment. The under-representation of non-western immigrants in the labour market has been reported by other researchers (e.g. Østby 2004).

*Table 10. Parental employment by education level and cultural background*

|  | N | Gamma | Std. Error | Sig. |
|---|---|---|---|---|
| **Mother** | | | | |
| NWI | 51 | .3 | .2 | .1 |
| WI | 47 | .9 | .1 | .000 |
| N | 207 | .7 | .1 | .000 |
| MIX | 29 | 1 | 0 | .01 |
| **Father** | | | | |
| NWI | 46 | -.2 | .3 | .5 |
| WI | 32 | .9 | .1 | .00 |
| N | 125 | .7 | .2 | .01 |
| MIX | 16 | 1 | 0 | .01 |

Table 10 shows a strong association between education level and employment status for all cultural origin groups, except for non-western immigrants, where the association is moderate for the mothers and weak for the fathers. Further, the association is positive for all groups except fathers with a non-western immigrant background. In other words, employment opportunities increase with increasing education level, except for non-western immigrants, where education appears to have little effect.

## Pupils' achievement and cultural background

Previously in this chapter we demonstrated a positive association between parent's education level and employment status, and children's academic performance. In this section the focus is on the association between cultural background and children's performance. In order to benefit from the gamma measurement, the groups are ordered according to cultural similarity to the Norwegian context. Accordingly, I consider 'native Norwegians' as the highest in terms of adaptation to the Norwegian context, followed by 'MIX', 'western immigrants' and 'non-western immigrants'. The null hypothesis is that there is no association between pupils' achievement and cultural backgrounds. Table 11 summarizes the results of testing this hypothesis. The test shows a weak positive association between cultural background and pupils' performance. In other words, pupils' performance improves when we move from non-western immigrants to western immigrants to mixed parental couples and native Norwegians.

*Table 11: Achievement by cultural background*

|  | N | γ | Std. Error | Sig. |
|---|---|---|---|---|
| Norwegian | 345 | .1 | .1 | .1 |
| Maths | 347 | .2 | .1 | .02 |
| English | 348 | .04 | .1 | .6 |
| Total | 336 | .2 | .1 | .02 |

*Table 12: Pupils' achievement by cultural background*

|  | Norwegian | | | | Maths | | | | English | | | | Total | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  | Fair | Good | Very good | N | Fair | Good | Very good | N | Fair | Good | Very good | N | Fair | Good | Very good | N |
| **NWI** | 6 | 81 | 13 | 63 | 19 | 69 | 12 | 64 | 12 | 66 | 22 | 64 | 15 | 69 | 16 | 62 |
| **WI** | 4 | 79 | 17 | 47 | 25 | 64 | 11 | 47 | 9 | 61 | 30 | 46 | 13 | 60 | 27 | 45 |
| **NN** | 5 | 70 | 25 | 205 | 16 | 59 | 25 | 207 | 8 | 67 | 25 | 208 | 13 | 51 | 36 | 200 |
| **MIX** | 0 | 50 | 50 | 30 | 10 | 59 | 31 | 29 | 13 | 53 | 34 | 30 | 3 | 59 | 38 | 29 |

Table 12 shows the distribution of grades by cultural background. Overall, there is limited variation on this measure. Pupils with one Norwegian and one foreign-born parent achieve the best overall results, followed by native Norwegian children and, with regard to English, children with western immigrant backgrounds. The very high achievement of children of mixed couples has not been seen in other studies, and we cannot rule out that that this finding here is caused by the very small sample size.

*Pupils' achievement by cultural background and parental education*
We have seen that parents' education level varies with cultural background. Recognising this, I have looked at the combined effects of parental education levels and cultural backgrounds on children's achievement. The positive association between parental education level and children's achievement that has been seen previously in this chapter is no longer significant when the groups are broken down by cultural background. The groups are however very small and no significant differences are found.

*Table 13: Children's achievement in 'Total' by cultural background and parental employment*

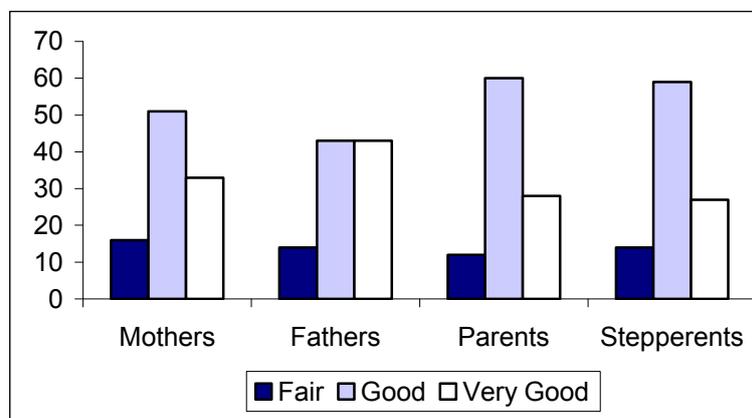|  | Mothers | | | | Fathers | | | |
|---|---|---|---|---|---|---|---|---|
|  | N | γ | Std. Error | Sig. | N | γ | Std. Error | Sig. |
| MIX | 29 | 0.1 | .4 | .9 | 18 | 1 | .0 | .02 |
| NN | 168 | 0.1 | .1 | .6 | 146 | .4 | .2 | .2 |
| WI | 44 | 0.6 | .2 | .03 | 35 | .2 | .4 | .6 |
| NWI | 60 | 0.1 | .3 | .8 | 47 | -.4 | .3 | .2 |

When breaking down the analysis of the association between parental employment and children's academic performance by cultural background, we found that fathers of non-western immigrant background again yielded a different result (table 13). The sign of the gamma value is negative, indicating a negative association between these fathers' employment and children's academic performance. The positive association, as explained previously, can be due to economic and social effects, while the negative association may be caused by shortage of time devoted to the children. Then again, the sample is very small, and there are a number of factors in these families we have not been able to control for.

## 4.1.4 Pupils' achievement and family structure

According to Jon Lauglo, we know little about how family structure influences children's academic performance. This is particularly important given the dramatic changes in family structure over the last 50 years. In his study of family structures and their effect on children's academic performance, Lauglo (2008) initially found no significant differences. However, when he controlled for mothers' education he found a clear tendency for children who lived with two formally married parents to achieve the best results, followed by those who lived with cohabiting parents, and then those whose parents were separated or divorced (Lauglo 2008).

Our data do not allow a similar study, but they do allow other analyses related to family structure. By family structure we mean whether the child lives with one or two parents, as well as whether the child lives with two parents or one parent and one step-parent. Information about pupils' family situation is collected through the interviews, where respondents were asked to indicate 'who the child concerned is living with'. Six alternative family situations were pre-coded: living with biological parents (57.7), with mother and stepfather (12), with father and stepmother (1), with lone mother (25), with lone father (4) and with foster parents (0.3). In order to avoid the problem of very small sub-categories, I aggregate the answers into four categories, where those who live with one parent (mother/father) are grouped into one category and the foster child is added to the parents' category. Figure 9 shows pupils' achievement on the aggregated score by family structure in the case sample.

*Figure 9: Pupils' attainment by family structure in the case sample:*

The differences in scores are not significant, which confirms the initial finding by Lauglo (2008). Somewhat surprisingly, those who live with lone fathers are most likely to get the highest grades, followed by those who live with lone mothers. The performance of pupils who live with their parents and those who live with step-parents is almost identical. However, the subgroups are small, and the findings are not statistically significant.

## 4.2 Multivariate analyses

In the previous paragraphs, the effects of some dimensions of parents' socioeconomic status on children's achievement were explored using various bivariate methods. However, the socioeconomic factors affect one another; hence, in this section some of the analyses are extended using a multivariate approach.

Linear regression is employed as a tool in these analyses. The model estimated is: Children's educational performance (CEP) = g (Education, mothers' employment, fathers' employment, cultural background, gender, family structure). The null hypothesis is that there is no dependence between parents' socioeconomic factors and the education attainments of their children.

Most of the variables have been defined above; here, I will introduce the dummy variable sets of the relevant variables. The model includes only pupils who reported the results of the three subjects (N=447). The dependent variable 'Total' is the sum of the results of the three subjects Norwegian, maths and English. It is a continuous variable ranging from four to seventeen. The 'CASCON' variable is 1 if the respondent belongs to the case (N=336) and 0 if to the control group (N=101). The gender variable 'Gender' is 1 if the respondent is a girl (N=239) and 0 if a boy. The family structure variable is disaggregated into a set of dummy variables; 1 if the respondent lives with a lone mother (N=96) and 0 otherwise; 'father' is 1 if with lone father (N=23) and 0 otherwise; 'step-parent' is 1 if the child lives with one parent and one step-parent (N=48). Living with two parents (N=263) is the control for this set. Educational level, here, is a dummy set for the highest education level in the household. 'Basic' (N=93) is a dummy variable which equals 1 if the highest education level in the household is the basic level and zero if otherwise.

'SECONDARY' (N=186) is 1 if the highest education level is secondary, 'High' (N=142) equals 1 if the highest is high, and the control is non-registered (N=16) which equals 1 if neither parent has a known education level. $EMPLOY_M$ is '1' for an employed mother (N=282) and $EMPLOY_F$ for employed fathers (N=281), and unemployment is the control for each. The control for the cultural background is the native Norwegians 'NN' (N=290), and western immigrants (N=49), MIX (N=35), and non-western immigrants (N=63) is 1 for western immigrants, mixed and non-western immigrants respectively. The estimated model is given in table (15).

*Table 15. Regression Model for the Total score (sum marks)*

| Model | Unstandardized Coefficients | | | |
|---|---|---|---|---|
| | B | Std. Error | T | Sig. |
| (Constant) | 10.38 | .496 | 20.92 | .000 |
| CASCON | -.20 | .265 | -.77 | .444 |
| Gender | .47 | .212 | 2.2 | .028 |
| Mother | -.25 | .372 | -.67 | .502 |
| Father | .24 | .504 | .48 | .635 |
| Step-parents | -.31 | .381 | -.81 | .421 |
| $Employ_M$ | .18 | .243 | .73 | .467 |
| $Employ_F$ | .19 | .325 | .59 | .557 |
| BASIC | .43 | .541 | .79 | .431 |
| SECONDARY | .81 | .319 | 2.55 | .011 |
| HIGH | 1.59 | .332 | 4.79 | .000 |
| WI | -.32 | .347 | -.93 | .355 |
| NWI | -.45 | .336 | -1.35 | .178 |
| MIX | .55 | .398 | 1.37 | .172 |

a. Dependent variable: TOTAL, $r^2$ = .12, R= .4, N = 437, P =.000

Table 15 shows the result of the estimated regression model. The significance value of the F statistic is less than .05; however, most of the partial coefficients are not significant. The model explains about 12 per cent of the variation in the pupils' performance ($R^2$). The coefficient of the dummy variables gives the expected difference in Total of the scores between a pupil with the corresponding characteristic and one with the reference charac-teristic, controlling for the other factors. For example, pupils in the case sample are expected to have 0.2 points lower score than those in the control group, and the girls are expected to perform better than the boys do by 0.47

points, controlling for the other variables. In the following paragraphs, we explore coefficients of some dummy sets. Furthermore, we use the estimated regression equation to predict the expected levels of the grades for the pupils.

## 4.2.1 Gender

Gender is among the essential analytical dimensions in social education research. In the Norwegian context, studies show that girls achieved better results than boys do in basic school. Anders Bakken (2008), for example, in his study of gender differences at basic school, found that girls do on average better than boys. Breaking down the same analysis by minority (immigrant) background, he found gender variation to be lower. Further, he analysed gender differences with relation to parental education level. In this analysis he found gender differences in academic achievement among pupils whose parent have not completed secondary level education to be higher than among pupils whose parents had a university degree (Bakken 2008). The data set used in this study shows clear gender variation in term of pupils' results in individual subjects (Kristofersen 2008). In terms of the total sum of the three subjects, the result is shown by multivariate analysis. The coefficient of the gender dummy variable shows that the girls achieve better results than boys by about 0.47 points. With a t-value of 2.2, this result is also significantly larger than zero.

## 4.2.2 Parents' Education

The education coefficients are positive, indicating that a pupil whose parents' education level is not registered is expected to show a lower performance than others. This pattern is significantly identified. Those whose parents have basic education only do not differ significantly from those whose parents' education is unregistered, but apart from that, the coefficient values increase with increasing educational level. This confirms the positive association between parent's education level and children's performance, which was demonstrated by bivariate methods earlier in the paper. Figure (10) illustrates this result and shows the effect of parental education on children's achievement, controlling for other factors.
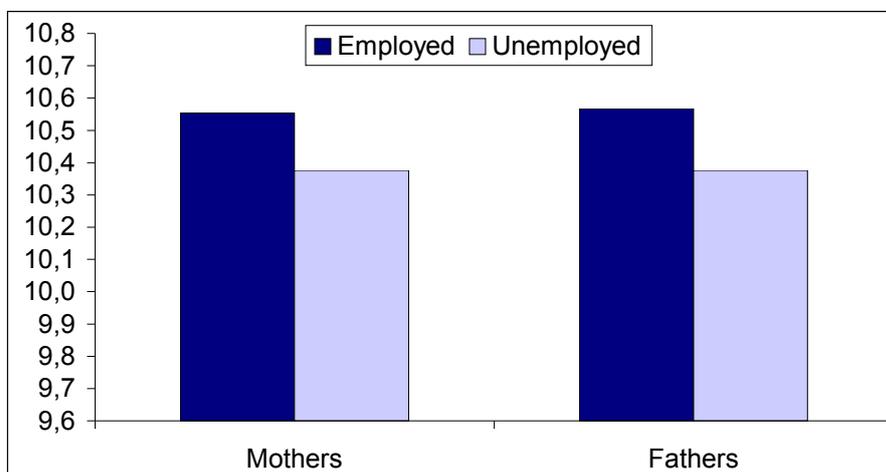
*Figure 10: Pupils' average result by parents' education*
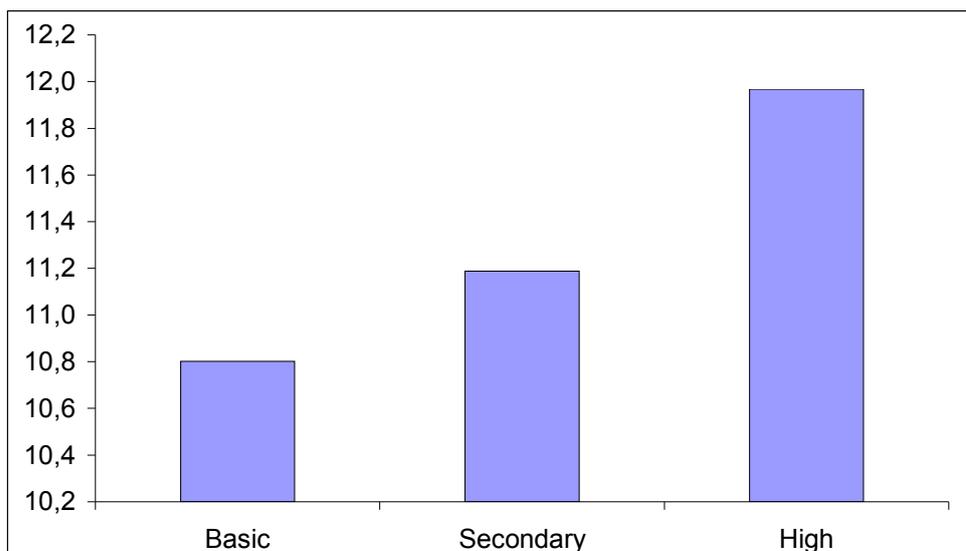


## 4.2.3. Parents' employment

The coefficients of parents' employment are positive. However, coefficient values are small (0.2), indicating a weak effect of parent's employment, as shown in figure (11).

*Figure 11: Pupils' average achievement by parents' employment*



Note that a significant and positive association was found in the bivariate analysis between employment and school achievement as measure by the sum of grades in the three main subjects. When other factors are controlled for in a multivariate setting, this pattern vanishes. While the estimated effect is positive, it is small and not significantly different from zero.

## 4.2.4 Cultural background

Coefficients for the cultural background variables show that pupils with one Norwegian-born and one foreign-born parent achieve better results than native Norwegians, and that pupils with a western immigrant cultural background achieve lower grades. Neither of these effects are however significantly different from zero. The pupils with a non-western immigrant background achieve the lowest result, but again, the coefficients are not significantly different from zero. It can however be shown that the scores of pupils with a mixed background is significantly higher than the scores of either of the pure immigrant categories. Figure (12) show the expected result by cultural background, controlling for the other factors.

*Figure 12: Pupils' average achievement by cultural background*
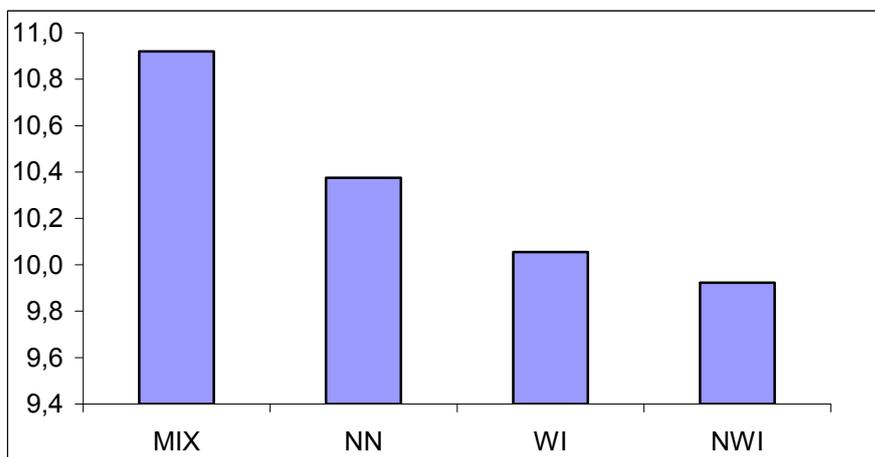


This chapter has described the correlation between parents' socioeconomic factors (education, employment and cultural background) and children's academic achievement in three subjects (mathematics, Norwegian and English). The analyses show a positive association between parental socioeconomic status and children's academic performance. The next chapter deals with the effect of domestic assistance with homework, as a mediating factor between parents' socioeconomic status and children's academic performance.

# 5 Do pupils get assistance with homework at home?

The hypotheses studied thus far have centred on the association between characteristics of the parents and the school results of their children. Here the focus is on one channel through which such associations may work, namely assistance with homework. The questions of whether the pupils get assistance, and a question about 'who most often assists them', were asked to the pupils in the interviews. If they answered the first question affirmatively, they were asked to choose an answer to the second question from four alternatives: mother, father, sibling, or others. The last two alternatives are aggregated in 'others', and a category for those who do not get assistance, 'NONE', is also added. The categories are mutually exclusive, thus we do not know which of the respondents get help from more than one source.

*Figure 13: Domestic assistance with homework by source in the case sample (per cent)*
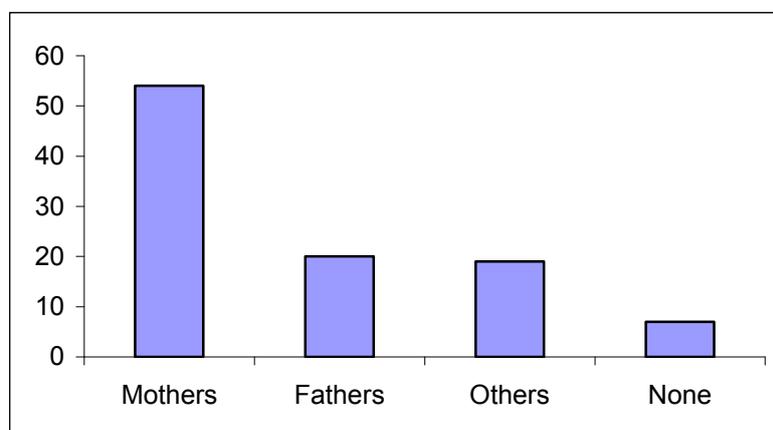


Figure 13 shows the distribution of domestic assistance with homework by source. The contribution from mothers is high: more than 50 per cent of the pupils mention mother as the person who most frequently helps with schoolwork. Note also that three out of four pupils get help with schoolwork from at least one of the parents.

# 5.1 Assistance by parents' education level

It is not unreasonable to assume that parents' interest in, and ability to help with, their children's schoolwork varies with the educational level of the parents. We therefore now consider how the incidence of help with schoolwork correlates with parental education level.

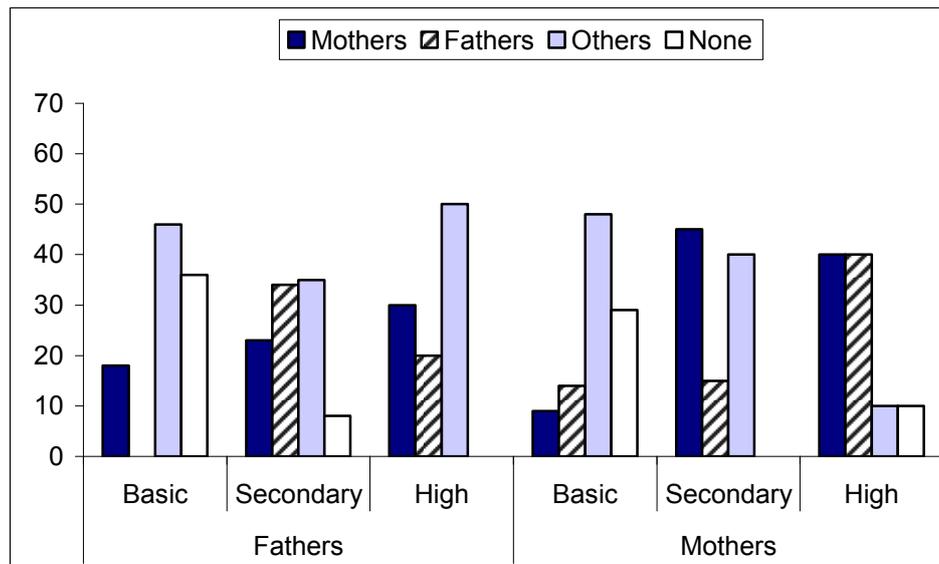*Figure 14. Assistance with schoolwork by parents' education (case sample)*



Figure 14 shows domestic sources of assistance by parental education level in the case sample. The test is significant at (Chi Square <.001 for both parents). Parents with low education levels make a small contribution to their children's homework. For example, about 9 per cent of the mothers with basic education level help their children with homework, as compared with none of the fathers with this education level. It is advisable at this education level to obtain other sources for assistance with homework to children. The proportion of those who get help from sources other than the parents is 48 and 46 per cent for those whose mothers or fathers have basic level education. However, 29 and 36 per cent get no assistance at all.

## 5.2. Domestic assistance by parents' employment

*Figure 15: Assistance by parents' employment (case sample)*



P < 0.02

Figure 15 shows sources of assistance by parents' employment. A systematic pattern is found among employed parents in so far as mothers are the most frequent providers of help, followed by fathers, others, and none. Mothers' contribution is dominant in all situations. Sixty per cent of employed mothers are directly involved with children's homework. The same pattern is found among fathers; however, the proportion is almost half of that of the mothers. Unemployed parents might have been expected to have more time for their children than employed ones. Both parents show the opposite of this hypothesis in that the proportion of employed parents who assist their children exceeds that of unemployed ones by almost ten percentage points. Furthermore, the share of those who get assistance from others or no assistance from anyone is higher among those whose parents are unemployed than those with employed parents.

## 5.3 Assistance by cultural background

Figure 16 illustrates assistance with homework at home among children with parents with different geographical backgrounds. The test is by bivariate cross tabulation, which is significant at P =.000.

*Figure 16: Assistance with homework at home by cultural background*
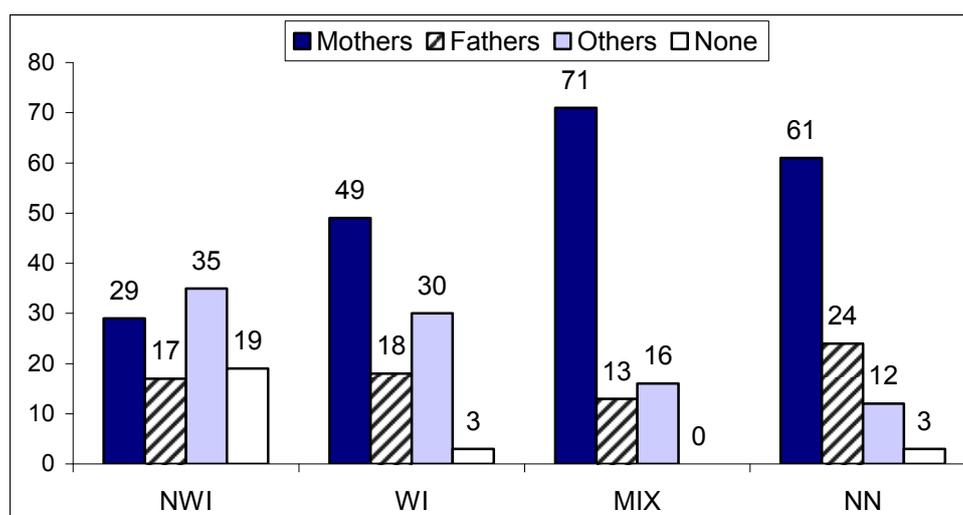


P =. 000

Note that pupils who get assistance from their mothers are overrepresented in all the groups, except the non-western immigrants where the highest proportion is for those who get assistance from others. Those who get assistance from 'other' sources come in the second order, except for the native Norwegians. Furthermore, the proportion who get no help at all is very high among non-western immigrants (19 per cent) compared to the other groups: the proportion is 3 per cent among native Norwegians and western immigrants, and zero for children from mixed parental couples.

When we consider the assistance provided by any one of the parents in each group, we found that native Norwegian parents make the highest contribution (85 per cent) followed by MIX parents (84 per cent), western immigrants (67) and non-western immigrants (46). Hence, immigrant parents have the lowest direct involvement with children schoolwork. This could be related to the low educational level of the parents, and the time they need to qualify themselves for the labour market. It is also possible that they do a type of job that makes physical demands, and are physically tired when they return home.

Does children's achievement vary by the source of assistance? To answer this question, the association between pupils' achievement and source of assistance is tested by cross tabulation. The test is significant at a P- value below 0.05. Figure 17 illustrates the result.

*Figure 17: Pupils' achievement by source of assistance:*



**17A: Pupils' achievement by source of assistance**



**17B: Pupils' achievement by assistance:(B)**
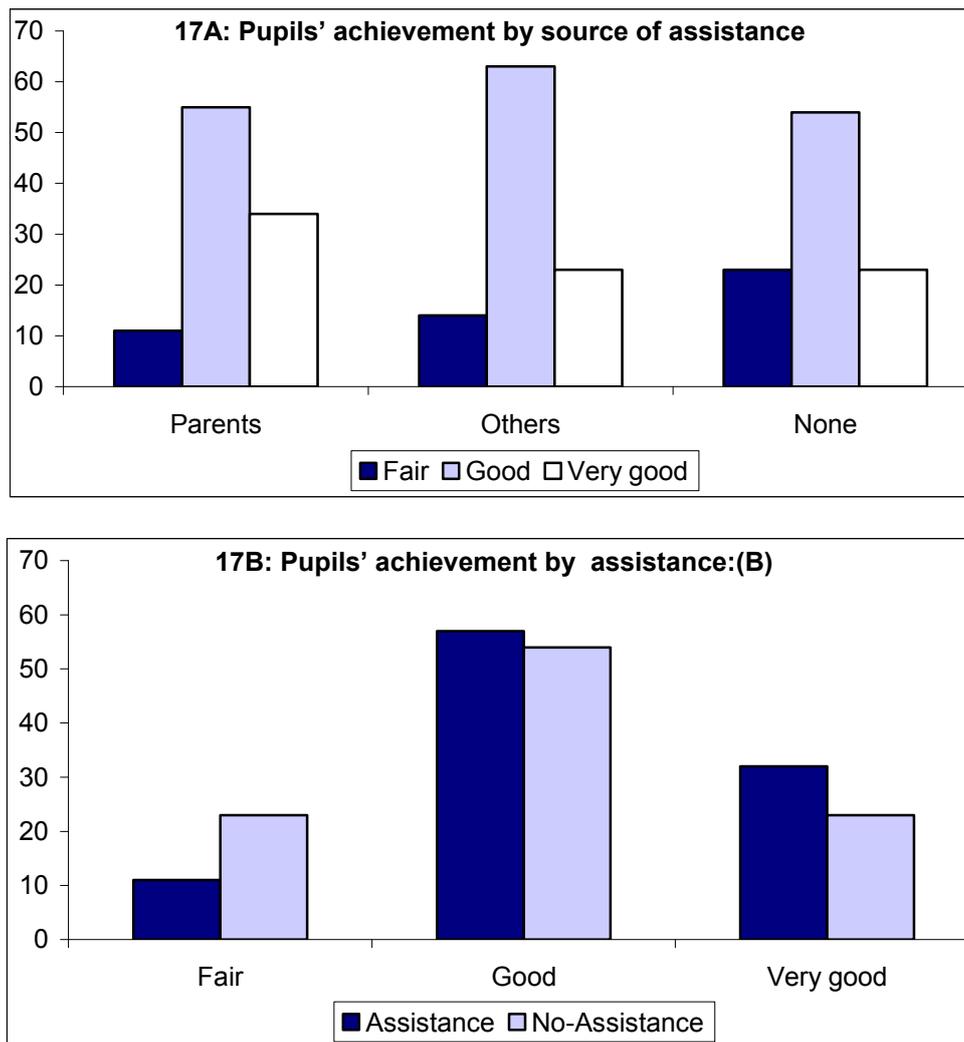
The figure 17A shows that those who get assistance from their fathers achieved the best result, followed by those who get assistance from their mothers, sibling or others, and then those who get no help at all. Comparing the results for those who get assistance with that of those who get no assistance at all (figure 17B), it is seen that assistance has a considerable effect, regardless of its source. In other words, among those who got "fair" grades there were twice as many who reported not getting help with homework than who reported that they did, while a clear majority of those who got the "very good" grades had received help with homework. While it is true that our sample is composed of a special group of people, it is still fair to conclude that access to assistance with homework has a positive effect on school achievements.

# 6  Summing up the findings

This paper has investigated the relationship between parents' socioeconomic status and their children's performance at school. Data were found in the second round of the longitudinal survey 'Children's level of living – the impact of family incomes" (Barns levekår – betydningen av familiens inntekt), which focuses in particular on families with recent experience of low incomes. The low-income sample in this survey contains a large group of children with ethnic minority backgrounds. The children analysed here are 13 to 15 years of age(2006), that is, between their eight and tenth year of schooling. The analyses show:

- That girls on average get better grades than boys,

- that the association between parental education level and children's academic performance is moderate and positive,

- that there is a positive association between the children's school grades and their parents' labour market status,

- that children with a non-western immigrant background on average get the lowest grades, followed by immigrants with western backgrounds and native Norwegian children. The small group of children who have one native Norwegian parent and one immigrant parent on average get the highest grades. However, when parents' education and employment are controlled for, these differences vanish.

It is beyond the scope of this working paper to explain the mechanisms that determine why some children do better in school than others. We have however looked into children's access to help with homework as one possible explanatory factor. Children who have at least one native Norwegian parent are most likely to get help from their parents, while children with two foreign-born parents are less likely to do so. Parents who have immigrated from non-western countries are least likely to help their children with homework. Children with non-western immigrant background frequently seek help with homework from other sources, but a high proportion of these

children have no-one to turn to for such help. The analyses showed a considerable positive association between assistance with homework and children's achievement, regardless of the source of assistance. Parents' inability to help with homework is thus one possible explanatory factor behind the lower school achievement of children with a non-western immigrant background.

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# Sammendrag

Målet med dette notatet har vært å undersøke forholdet mellom foreldrenes sosioøkonomiske status og barnas skoleprestasjoner. Indikatorer på foreldrenes sosioøkonomiske status er deres utdanningsnivå, sysselsetting og kulturelle bakgrunn, og for barnas skoleprestasjoner, deres karakterer i norsk, matematikk og engelsk. Data er hentet fra andre runde av det longitudinelle prosjektet «Barns levekår – betydningen av familiens inntekt for barns hverdag». Lavinntektsutvalget var sammensatt av barn i familier som hadde inntekter under EUs fattigdomsgrense i 2000, mens kontrollutvalget består av alle inntektskategorier i samme år. Fattigdomsgrensen var seksti prosent av medianinntekten. Her er et underutvalg av 499 elever i ungdomsskolen analysert, 388 av dem er i lavinntektsutvalget og 111 i kontrollutvalget. De er mellom 13 og 15 år gamle, og går i 8.–10.klasse. Femtini prosent av elevene i lavinntektsutvalget er norske uten innvandrerbakgrunn, femten prosent var vestlige innvandrere, atten var ikke-vestlige innvandrere og åtte prosent var «blandet», med én norsk og én innvandrerforelder.

Analysemetodene er krysstabeller, tester av forskjeller mellom delutvalg og regresjon. De fleste foreldrene i lavinntektsutvalget har videregående skole som høyeste utdanningsnivå. Utdanningsnivået for fedre var litt høyere enn for mødre. Begge foreldrene i kontrollutvalget har i gjennomsnitt høyere utdanning enn de i lavinntektsutvalget. Korrelasjon mellom foreldrenes utdanning og barnas akademiske resultater var moderat. 82 prosent av fedrene (n = 284) og 62 prosent av mødrene (n = 369) i lavinntektsutvalget er yrkesaktive, mens sysselsettingen i kontrollutvalg var 85 prosent (n = 103) for mødre og 94 prosent (n = 90) for fedre. Analysene har vist en negativ sammenheng mellom skoleresultater for barn og en marginal posisjon på arbeidsmarkedet for foreldre.

Foreldrenes kulturelle bakgrunn påvirker gjennom formidling av tilgang til utdanning og arbeidsmarkedet. Vi fant at «blandede» foreldrepar (en norsk, en med innvandrerbakgrunn) har den høyeste utdanningen og sysselsettingen, etterfulgt av nordmenn, vestlige innvandrere, og ikke-vestlige innvandrere. En test av sammenhengen mellom barns skoleresultat og

kulturell bakgrunn viste positive svake resultat. Det vil si at elevenes resultater forbedrer seg når vi går fra ikke-vestlige innvandrere til vestlige innvandrere, norske uten innvandrerbakgrunn og de med en norsk og en innvandrerforelder.

Effekten av familiestrukturen er også testet, med kategorier for de som lever med enslige mødre, enslige fedre, begge biologiske foreldre, og en biologisk forelder og en steforelder. Analysene viste ingen signifikant effekt av familiens struktur på elevenes resultater. I denne studien av barn i familier som seks år tidligere hadde en inntekt under fattigdomsgrensen, bekreftes tidligere studier på mer generelle utvalg som viser at jenter scorer betydelig bedre enn gutter.

Hjelp med lekser ble studert som en kanal for å teste sammenhengen mellom foreldrenes sosioøkonomiske status og barnas akademiske resultater. Testen viste at norske foreldre uten innvandrerbakgrunn og blandede foreldrepar oftest hjelper barna med lekser (85 og 84 %) etterfulgt av vestlige innvandrere (67 %) og deretter ikke-vestlige innvandrere (46 %). Videre er andelen av dem som ikke får hjelp i det hele tatt svært høy innen gruppen av ikke-vestlige innvandrere (19 %), blant norske uten innvandrerbakgrunn og vestlige innvandrere var andelen bare tre prosent, og null for de blandede foreldreparene. Testen viste en betydelig positiv sammenheng mellom hjelp med lekser og barnas prestasjon, uavhengig av kilde til hjelp.