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SOCIAL POLICY, FAMILY STRUCTURE, AND CHILDREN'S
EDUCATIONAL ACHIEVEMENT: A COMPARATIVE STUDY

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by

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ABSTRACT

This study explored the interface between policy and the family. More specifically, this research examined how the relationship between single motherhood and children's literacy achievement is affected by a country's family policy environment. Using data from the Program for International Student Assessment (PISA), the size of the literacy achievement gap between 15-year-old students from two-parent and those from single-mother households was compared across 18 industrialized nations. This study found that cross-national differences exist in the relationship between single motherhood and literacy achievement. The research findings also demonstrate that economic deprivation is the dominant explanation as to why children in single-mother homes fare worse educationally than their two-parent counterparts. The results of the multilevel analysis, which included country-level data from the Social Policy Research Unit (SPRU) at the University of York (England), indicate that there is a relationship between the family policy environment of a country and the literacy achievement gap between the two family structures. Overall, the results of this study highlight an intricate relationship between policy and the family.

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CHAPTER ONE

INTRODUCTION

Family structure is not the most critical factor in determining educational attainment, but it is a factor that has significant and measurable consequences (p. 356).

Sandefur and Wells (1999)

Background

Less than a week into his presidential term, George W. Bush announced a framework for reforming the Elementary and Secondary Education Act (ESEA). In January 2002, the “No Child Left Behind Act of 2001” was signed into law with the belief that its basic principles would succeed in closing the achievement gap between minority and disadvantaged students and their peers. While education policies aimed at helping disadvantaged students are prominent in the political landscape, other branches of social policy have been heading in a different direction.

In the United States, family policies aimed at the needy have been seriously undermined, particularly with the introduction of the Personal Responsibility and Work Opportunity Reconciliation Act of 1996 (PRWORA). Under this act, federally guaranteed cash assistance to those most in need and at risk, particularly low-income mothers with children, was effectively ended. Many single-parent families, which are predominately headed by women, live in poverty and, as a consequence, the children who reside in these homes continue to face many social and educational disadvantages. This research empirically examines the role of family policymaking, both in the United States and abroad, in ensuring that no child is indeed left behind. More specifically, I study the influence of family policy in moderating the effects of family structure on resource allocation and, in turn, educational achievement.

Due to the increasing trend of single-mother families, not only in the United States but worldwide, researchers and policymakers have been increasingly concerned if children are at an educational disadvantage in these homes. The social institutions of the family and school are often the focus of researchers and policymakers, however, such attention tends to center exclusively on micro-level causes for low achievement scores and not the macro level (national policies). This research explores how family policy intersects education, and searches for educational solutions beyond the school context by recognizing the importance of the family and other branches of social policy.

Cross-national analysis of the relationship between single motherhood and educational outcomes has been scarce; coupled with this, few studies have explored the impact of family policies and children's educational outcomes. In this study, I use a comparative approach to explore further the relationship between family structure and literacy achievement. In addition, I investigate the influence of family policies on the literacy achievement gap between students from mother-only and two-parent households.

In total, approximately 115,000 students across 18 countries provide the total sample for this study. The countries include; the North American countries of the United States and Canada, the Pacific Rim countries of Australia and New Zealand, and the European countries of Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Norway, Portugal, Spain, Sweden, and the United Kingdom. This study draws upon two data sources. The student-level data comes from the Program for International Student Assessment (PISA) 2000, in which 15-year-old students were measured in reading, mathematics, and science literacy using multi-step reasoning and real-world situational test items. In addition to the tests, students also filled out background survey questionnaires concerning their family situations and their experiences at school. The country-level data was drawn from the Social Policy Research Unit's (SPRU) database at the University of York, England. National informants from each of the countries in this study provided information on a number of family policies that included those that impact

the economic resources of families and those policies that influence parental time inputs.

In order to study the relationships between social policy, family structure, and children's education achievement, it was necessary to draw upon two distinct types of literature, therefore, the literature review for this research is divided into two parts. In the following chapter, I examine the prevalence of single motherhood across the 18 countries in this study and investigate both the sources and causes of single motherhood. In the second part of Chapter Two, I go on to explore the relationship between single motherhood and children's educational outcomes. Abundant research indicates that children who reside in these homes fare worse educationally than their two-parent counterparts. I provide four micro-level and one macro-level theoretical perspectives as to why the children who reside in these homes appear to be at an educational disadvantage. The macro-level explanation of the influence of family policy environments on the relationship between single motherhood and educational achievement leads in to the third chapter, which explores family policy environments cross-nationally.

In Chapter Three, I trace the rise of the modern welfare state and how these states have been classified and categorized in recent years for the purposes of comparative analysis. Esping-Andersen's *Three Worlds of Welfare Capitalism* is the framework I adopt to further investigate the family policy similarities and differences across the 18 countries in this study. In addition to comparing countries as they are clustered according to Esping-Andersen's framework, I also provide an

overview of individual family policies that affect the lives of children who reside in single-mother homes.

Making the connection between national policies and micro-outcomes is the focus of Chapter Four, where I present my research questions. In this chapter, I make the argument that two distinct mechanisms (economic and parental time inputs) moderate the relationship between family policies and children's educational achievement. The main focus of this study is to compare the achievement "gaps" between children from single-mother families with their counterparts from two-parent households. I expected that children from single-mother families have less economic and parent time inputs than those children who reside with two parents. In addition, I expected that the achievement gap between the two family structures was smaller in countries that have explicit and generous family policies.

In Chapter Five, I present the data and variables used in this study, as well as the three analytical strategies of descriptive, ordinary least squares regression, and multi-level analysis (Hierarchical Linear Modeling), which I employ to seek answers to the questions that guide this research. In this chapter I describe all the variables used in this study and highlight relevant characteristics of both the student- and country-level data.

The results of the analysis are presented in Chapter Six. The descriptive analysis is divided into two separate parts. First, I provide the statistics for the entire sample of 18 countries and then second, I present the descriptive statistics for

each country individually. The individual country OLS regression analysis makes up the second part of the results chapter in which I present the regression models that illustrate the relationship between single motherhood and children's literacy achievement. In addition, I show the influence of parental involvement and economic resource variables on the achievement gap between the two family structures. The individual country results for each of the three literacy measures are presented according to Esping-Andersen's welfare regime classifications. The final section of this chapter includes the results for the multi-level analysis in which the country-level family policy data is included in the models. The results of this analysis indicate that the family policy environments of a country do influence the relationship between single motherhood and reading, mathematics, and science literacy achievement.

The final chapter in this dissertation provides an overview of the study's results and goes on to interpret the findings. In this chapter I explore various explanations for the study's findings and go on to discuss the limitations and possible areas of future research. This study looks for educational solutions beyond the school context by recognizing the importance of the family and other branches of social policy, in this case, family policy. This study does not only consider the role of the family in facilitating or impeding a child's educational achievement, but it also explores the role of social policymaking. The results from this research will help policymakers to formulate better social policies that promote higher academic achievement for all children.

CHAPTER TWO

REVIEW OF LITERATURE

(PART I)

The Single-Parent Family

“Single parent” is a term that has developed and undergone significant metamorphosis over many decades. Still today, there exist many different terms that mean, more or less, the same thing. Single parent, and the European-preferred term of “lone parent,” has developed over the years into largely gender-blind terms. Until very recently, single-parent families were often given the following labels: broken families, fatherless families, and deserted wife (Millar, 1989). While the term “single-parent family” has overtones of political correctness, it does, however, lack the descriptive nature of the early labels. For example, we are left in no doubt about the unfortunate consequences that have resulted in a woman being referred to as a deserted wife. Fortunately these terms are no longer commonly used, but it is important to recognize that while single-parent families share one common characteristic, they are far from being a homogeneous group.

Single-parent families are an extremely diverse group in which their experiences and the way society perceives and views them can vary dramatically. In many different cultures unmarried mothers who are poor and rely heavily on social assistance carry with them social stigmas that are not necessarily experienced by women who are single mothers as the result of their husbands' death. Similarly, a man who is a single father because his wife abandoned him is often viewed differently than a young woman who gave birth under the legal age.

According to Rowlingson and McKay (1998), there are essentially four routes to single parenthood: death of a parent, birth to a single non-cohabiting woman, separation of a married couple with dependents, and separation of a cohabiting couple with dependents. It is also important to recognize that the status of single parents can be either a temporary or permanent and is subject to a change in personal circumstances. Divorced single parents may remarry or form a cohabiting relationship, and teenage mothers may form unions several years after the birth of their child.

Social scientists often have focused upon the ever-changing landscape of the family and the consequences of the rise in single parenthood. While some researchers have distinguished between the different groups that make up the category of single parent, some have failed to recognize the heterogeneous nature of this particular family structure. The limitations of the PISA data prevent me from identifying single parents who are raising their family solo because of the death of a partner, because of divorce, or because they were never married; however, I am

able to distinguish between mother-only and father-only families. Prior research indicates that single-father families differ from single-mother families in many different dimensions that are known to affect children's educational outcomes (Downey, 1994). For example, single fathers are more likely to invest economic resources in their children, while single mothers tend to make more interpersonal investments. Given this, I focus on children who reside in mother-only families. It should be noted that while I make the distinction between the two forms of single parenthood, some of the literature reviewed in this chapter does not make the same distinction.

Definition of single motherhood. For the purposes of this study, I use a standard definition, also used by Kilkey (2000) in her cross-national study of mother-only families, in order to describe the characteristics of a single-mother family. A single-mother family consists of “a mother who is not living in a couple (meaning either a married or cohabiting couple), may or may not be living with others (for example, friends or own parents), and is living with at least one of her children under 18 years” (p. 275). It also should be recognized that while this is the definition used by this study, other researchers whose work is reviewed in this chapter may have used slightly different definitions to describe single-mother families.

As previously discussed, there are a number of reasons why mothers and fathers end up as single parents. The sources and causes of single parenthood vary not only within countries but also across national borders. In the next section I

provide background information that illustrates these variations both within and between countries.

The Sources and Causes of Single-Mother Families

Table 1 shows the percentage of single-parent families, single-mother families, and the percentage of single-mother families as a percentage of all single-parent families in the late 1990s and early 2000s. The percentage of single-parent families ranges from a high of 29 percent in both the United States and New Zealand to a low of 3 percent in Greece. The other three southern European countries of Italy (10 percent), Portugal (13 percent), and Spain (9 percent) share a relatively low prevalence of single-parent families compared with the other countries in this study. As the second and third columns illustrate, females head the overwhelming majority of single-parent households. In Spain, nearly all single-parent families (99 percent) are headed by women. However, it is interesting to note that in some cases the number of father-only families is on the increase. For example, in the United States the number of single mothers has remained constant at just under 10 million, while the number of single fathers grew by 25 percent in three years to 2.1 million in 1998. In 2000, 4.2 percent of all United States children lived with their father only, compared with just 1 percent in 1970 (United States Bureau of the Census, 2000).

Table 1.

Single-parent families and single-mother families as a percentage of all families with children.

Countries	% Single Parents	% Single Mothers	Single Mothers as % of Single Parents
Australia (2000)	21	18	86
Austria (1999)	15	14	90
Belgium (1997)	12	11	89
Canada (1998)	17	(1996) 14	(1996) 83
Denmark (2001)	22	18	87
Finland (1999)	19	17	88
France (1999)	12	10	85
Germany (2000)	21	18	85
Greece (1999)	3	--	82
Ireland (1999)	14	14	95
Italy (1995)	10	--	(1998) 84
New Zealand (2001)	29	24	84
Norway (1998)	19	(2000) 16	(2000) 89
Portugal (1996)	13	13	99
Spain (1995)	9	--	(1999) 88
Sweden (1990)	18	16	85
United Kingdom (2001)	22	20	91
United States (2000)	29	23	83

Source: Bradshaw & Finch (2002)

In the early 1970s, Sweden had the highest prevalence of single-mother families. However, by the mid 1980s the United States was reporting the highest rates of single-motherhood (Burns & Scott, 1994). Interestingly, single-motherhood cuts across all of Swedish society, while in the United States single mothers are more likely to live in an urban area, be either black or Hispanic, and live in poverty (United States Bureau of the Census, 1999). Similarly, in the United

Kingdom a large number of Afro-Caribbean's are single mothers and in Australia the aboriginal people have higher rates of single motherhood than do other races.

The marital status of single mothers can be viewed in Table 2. Very few countries collect statistics on the number of single-parent families that are formed due to the break-up of a cohabiting union; therefore I can present data only on what many consider to be the three major sources of single parenthood—unmarried mothers, divorce, and death of a spouse. In Ireland, 63 percent of single mothers have never been married, in contrast to Italy, where only seven percent of all single mothers have never been wed. In all 18 countries in this study, the percentage of live births outside marriage (as a percentage of total live births) rose dramatically between 1980 and 1999. For example, in Austria the percentage rose from 17.8% to 30.5%, while in Norway and Sweden the percentage increased from 14.5% to 49.1% and 39.7% to 55.3%, respectively (Eurostat, 2001). Clearly, this particular demographic shift has contributed significantly to the number of single mothers.

Table 2.

Marital status of single mothers.

Countries	Single Mothers (%)			
	Never married	Separated	Divorced	Widowed
Australia (2000)	--	--	--	--
Austria (1999)	26	8	34	32
Belgium (1997)	16	29	39	14
Canada (1996)	--	--	--	--
Denmark (1995)	--	--	--	--
Finland (1999)	34	13	48	5
France (2000)	--	--	--	--
Germany (1999)	27	13	39	22
Greece (1996)	--	--	--	--
Ireland (1999)	63	29	2	6
Italy (1998)	7	--	31	63
New Zealand (1996)	46	29	20	5
Norway (1999)	--	--	--	--
Portugal (1996)	13	19	31	30
Spain (1999)	12	4	57	27
Sweden (1998)	--	--	--	--
United Kingdom (2001)	46	20	29	4
United States (2000)	43	18	35	4

Source: Bradshaw & Finch (2002)

The second major source of single motherhood is divorce. Spain and Finland have the highest percentages of single mothers who are divorced (57 and 48 percent, respectively). Although rates of divorce have in recent years declined, divorce is still a significant cause of families being headed by one parent. According to Eurostat (2000), for every 100 marriages in the United States, 49.1 end in divorce. The same statistic for Finland is 57, for Spain 17, and for Germany 46. In this study Ireland and Portugal had the fewest (17) legal separations for every 100 marriages (Eurostat, 2000).

Death is the third significant source of single-mother families. As Table 2 indicates, in several countries, losing a husband is a significant reason for becoming a single mother. In Italy nearly two-thirds of all single-mother families are caused by the death of the father; in Austria and Portugal, approximately one-third of all single mothers are widows. In contrast, very few single mothers in the United Kingdom and the United States are the result of losing a spouse.

As this cross-national data illustrates, the number and causes of single-mother families varies significantly across the 18 countries in this study. In some countries many women are heading families on their own due to divorce (Spain and Finland), while others are left to cope after suffering the death of their partner (Italy). The one statistic that appears constant, however, is the large proportion of single-parent households headed by women. During the later part of the 20th century, births outside marriage and increased rates of divorce are two demographic shifts that have contributed significantly to the number of children who reside in mother-only families. According to Burns and Scott (1994), there has been a “chain of developments” that have resulted in more children residing in mother-only families. They conclude:

The social and economic changes in Western countries have inevitably undermined traditional marriage. The social forces impelling women and men to complement one another within marriage have declined: Personal fulfillment within relationships has become more important, and loyalty to the institution of marriage less. This has been in general a popular development, as it increases personal freedom. However, it results in an increasing number of mother-headed families. (p. 193)

Along with the social and economic changes that have “undermined” traditional marriage, legal and religious shifts also have contributed to the causes of single motherhood. Prior to the 1970s there were many pressures that deterred husbands and wives from getting a divorce. According to Lewis and Spanier (1979) pressures were felt by couples due to strict divorce laws, strong social disapproval, religious proscriptions, economic pressures, the importance of staying together for the sake of the children, and a fear of “going it alone.” Since that time, “no-fault” divorce legislation has been introduced in many countries (Ireland legalized divorce in 1990), and public opinion towards divorce has experienced changed significantly. In addition, from a woman’s perspective, divorce has become a more viable option with more women achieving economic independence from their husbands through participation in the labor force.

In addition, during the same time period attitudes towards marriage have changed; a significant number of women have decided to bypass marriage

altogether. As previously described, children born to unwed mothers have contributed significantly to the rising number of single-mother households. Sweden has increasingly large numbers of children born out of wedlock: As early as 1984 approximately 45 percent of all births occurred outside marriage; by 1989 this figure had risen to 52 percent. Many other Western countries also have experienced an increase in mother-only families as a result of out of wedlock births. The unmarried population is, however, a diverse one, with some mothers cohabiting with a partner and uninterested in entering into a formal union. In contrast to the Nordic countries, where out-of-wedlock births are often perceived as being a matter of choice exercised by privileged young people, in countries like the United States these births often are concentrated among young African-American women.

According to Burns and Scott (1994), the number of children who reside in mother-only homes as a result of out-of-wedlock births can be attributed to a number of social, economic, and religious changes over recent years. Women's increased participation in the labor force has placed unmarried mothers in a feasible position to support and care for their children independently of men. In addition, the influence and dominance of the Christian church has declined, which has resulted in a greater social acceptance of births to unmarried mothers.

In sum, there are essentially three sources of single motherhood: births to unmarried women, divorce, and widowhood. Cross-nationally there are significant variations in the percentages of single mothers who fall into each of the three categories. In Italy many women are single mothers due to the death of a spouse,

while in Finland and Spain single motherhood is as the result of divorce. Births to unmarried mothers are significant sources of single mothers in the Anglo Saxon countries of Ireland, the United Kingdom, and the United States.

Increased divorce rates and births to unmarried mothers are the result of many different social, economic, religious, and legal changes. No-fault divorce, the decline in the dominance of the Christian church, female labor force participation, and changing attitudes towards divorce and unmarried mothers all have caused an increase in the number of single-mother families in Western countries. This dramatic shift in the number of mother-only families has resulted in a body of research that has aimed to determine the effects of residing in such a family structure. Much of the research has focused exclusively on the impact of single-motherhood and single-parenthood on children's well-being.

While some researchers have found a number of strengths associated with single-parent families (Amato, 1987; Olsen & Haynes, 1993; Richards & Schmiede, 1993; Shaw, 1991), the vast majority of researchers have highlighted the negative consequences for children living with one parent. Findings indicate that as a result of divorce, children suffer from depression and emotional distress (Hetherington, Cox, & Cox, 1985; McGrab, 1978; Wallerstein & Kelly, 1980), may be required at an early age to take on adult responsibilities (Wallerstein, 1985), and show signs of learning difficulties and behavioral problems in school (Astone & McLanahan, 1991; Hetherington et al., 1985). The long-term consequences of children's residing in a single-parent family include an increased likelihood to

become single parents themselves (McLanahan, 1988; Mueller & Cooper, 1986) and to have difficulties forming lasting relationships with their partners (Wallerstein & Blakeslee, 1989). In addition, Uhlenberg and Eggebeen (1986) used American data to show that an increase in divorce (marital instability) had resulted in worsening in child delinquency, alcohol and drug use, suicide, sexual conduct, and academic test scores.

Clearly, the impact of residing in a single-parent family is widespread and covers many different aspects of child well-being. This research focuses exclusively on the educational consequences of residing in a single-mother home rather than a two-parent household. As previously stated, some research fails to distinguish between single-mother and single-father families; however, given that mother-only families are the overwhelming majority of single-parent households, it is assumed that the results of many of these studies that focus on single-parent families would probably differ little if they had focused exclusively on single-mother families only. Therefore, I review literatures that are concerned with both single-parent and mother-only family structures. It also should be noted that research in the United States has dominated the literature concerned with family structure and children's educational outcomes. However, there are a number of international studies, which will be highlighted.

Single-Mother and Single-Parent Families and Children's Educational

Outcomes

In this section I focus on the educational differences between children from single-parent families and those from two-parent homes. Some of the studies reviewed in this section are concerned with the effect of divorce on children's educational outcomes while a few consider the consequences of widowhood. Some of the studies are similar to this one in that they are unable to distinguish between the sources of single-parenthood. Despite these variations, the majority of these studies tell a similar story, which is that there are educational consequences to living with just one parent compared to living with two.

Some researchers have found that living in a single-parent family does not impair the achievement or attainment levels of children (Coontz, 1995; Desai, Chase-Landsdale, & Michael, 1989), while many others have concluded that an effect does exist (Amato & Keith, 1991a, 1991b; Beller & Chung, 1992; Biblarz & Gottainer, 2000; Downey, 1994; Furstenberg & Teitler, 1994; McLanahan, 1985; McLanahan & Sandefur, 1994; Pong & Ju, 2000; Sandefur, McLanahan, & Wojtkiewicz, 1992; Zill, Morrison, & Coiro, 1993; Zimilies & Lee, 1991). Significant differences have been noted between children from single-parent families and those from two-parent homes across a variety of educational outcomes, including high school drop-out rates, the attainment of a high school diploma or General Equivalency Diploma (GED), college attendance, performance on standardized achievement tests, and grade-point average. Many studies have found

that children from single-parent homes fare worse educationally than those who live with both parents.

Using data from the Michigan Panel Study of Income Dynamics, McLanahan (1985) found that 17-year-old youths who resided in single-mother households were more likely to drop out of high school, have lower test scores and grades, and have poorer attendance at school than youths from two-parent homes. In a slightly earlier study conducted in the Netherlands, Bosman and Louwes (1982) found that secondary school students from single-parent families had lower intelligence and scholastic scores and received lower evaluations from teachers. In the United Kingdom, Ermisch and Francesconi (2001) found that children who had lived in a single-mother family had a lower probability of achieving A-level qualifications.¹ In a study by Cherlin et al. (1991) that included 11-year-olds from England, the researchers found that divorce had a negative effect on children's reading and mathematics scores.

McLanahan and Sandefur's (1994) book entitled "Growing up with a single parent" was a seminal piece of research in the area of family structure and children's well-being. Utilizing data from four national datasets, McLanahan and Sandefur studied the effects of single parenthood on a number of child well-being measures including educational achievement, idleness, and early family formation. They also looked for differences by sex, race, and educational level. Their results for educational achievement indicated that children from single-parent families

¹ A-level is the equivalent to University entrance exams.

were twice as likely to drop out of school as those children who resided with both their parents. The high school graduation, college enrollment, and college graduation rates for children from single-parent families were below those of children who resided in two-parent families. Also, the high school completion of children from single-parent families did not vary by the number of family disruptions experienced by the child, the length of time spent in a single-parent family, or by the age at which the child experienced the disruption.

Similar findings were reported by Zimilies and Lee (1991), who used the High School and Beyond data to compare the effects of different family structures on a child's educational persistence.² Even after controlling for ability and socioeconomic status, they found that students from both step- and single-parent families were three times as likely not to graduate high school as students from two-parent families. The researchers also found some interesting, if not complex, interactions between family structure and gender. First, males from single-parent and intact families were more likely to drop out of school than females, and females were more likely to drop-out of school if they lived in a stepfamily. Second, the drop out rate varied depending on the gender of the head of the household. For example, the male drop-out rate was higher when the boys lived with single mothers, and the female drop-out rate was higher when girls lived with a single father.

² Zimilies and Lee (1991) also studied the effects of family structure on grade-point average and standardized achievement test performance.

The relationship between high school persistence and family structure also was studied by Astone and McLanahan (1991). They found that children who resided in single-parent families when compared with their counterparts from two-parent homes were less likely to receive parental encouragement and attention regarding educational activities, and they were more likely to drop out of high school. Similar results, in which children with absent fathers were more likely to drop out of school than children who lived with both biological parents were also reported by Lang and Zagorsky (2001); Manski, Sandefur, McLanahan, and Powers (1992); and Painter and Levine (2000). A study in Switzerland compared the educational and occupational life courses of children from single-parent and two-parent homes and found lower educational attainment and earlier transition to work for children from single-parent families (Oggenfuss, 1984). In another European study Kiernan (1992) found that single-parenthood increased English children's likelihood of dropping out of school.

Beller and Chung (1992), using educational outcome measures similar to those of Zimilias and Lee (1991), found that living in a mother-only household had a negative effect on educational outcomes for young adults aged 16-20 years. This effect was consistent across all three measures: number of years of schooling completed, high school completion, and entrance into college. The researchers also found that remarriage did mitigate the negative effects on educational outcomes for children from female-headed households. Using an age group similar to that used by Beller and Chung (1992), McNab and Murray (1985) and Murray and

Sandqvist (1990) found that early residence with a single mother at age 13 even had adverse consequences in later life for Swedish children, resulting in lower educational attainment by age 21.

In a study using the National Educational Longitudinal Study (NELS) dataset, DeLeire and Kalil (2002) were able to distinguish between divorced-mother and never-married-mother families. They found that teenagers from never-married-mother homes were less likely to graduate from high school or attend college than those who resided in divorced or two-parent households. The high school graduation rate for the teenagers from the never-married-mother families was 69 percent, for divorced-mother families 75 percent, and for two-parent families 90 percent.

In a different study, Downey (1994) distinguished between single-father and single-mother families. Using the NELS data, Downey compared three family structures: biological two-parent family, single-father family, and single-mother family. He found that children from both single-parent family structures had lower grades and performed worse on standardized tests than did children from two-parent families. Children from single-father homes performed better on standardized tests than their counterparts from single-mother families. However, these same children from single-father families were unable to transfer their success on standardized tests into better grades.

The relationship between divorce and many different educational outcomes has formed the basis of a great deal of research in recent years. The following

studies all identify the negative educational consequences for children who experience divorce and/or the loss of a parent due to death.

Biblarz and Gottainer (2000) studied the effects of parental divorce on children's educational outcomes. The researchers utilized the data from the General Social Surveys (1972-1996) to compare the effects on children of divorce and loss of a parent due to death with children from two-biological-parent families. The impact of parental divorce on educational outcomes (high school completion, college attendance, and college graduation) was significant, with children from single-parent homes faring worse across all three measures compared with children who lived with both biological parents. Overall, children who lived with their widowed mother fared no worse educationally than children from two-parent homes. In a study using Malaysian data Pong (1996) found that kinship support educationally benefited the children of widowed mothers. Children from divorced or separated families were found to be more likely to leave school than those from two-parent or widowed family types. For a child of a widowed mother, the collectivist culture of Malaysia provides greater kinship support (financial and material support) and, consequently, the child is less likely to drop out of school. Jonsson and Gahler (1997) studied the relationship between family structure and educational outcomes of transition to upper secondary school and early school-leaving in Sweden. The researchers found that children who lived in divorced-mother families were less likely to stay in school. However, they found no differences between intact families, cohabiting parents, and widowed parents.

The long-term effects of parental divorce on child and adult well-being are well documented (Amato & Keith, 1991a, 1991b; Zill et al., 1993).³ Amato and Keith (1991b), in their meta-analysis of 92 studies, found that children whose parents divorced had lower measures of well-being than those from two-parent and widowed families. However, the overall effect sizes were weak across all eight outcome measures of academic achievement, conduct, psychological adjustment, self-concept, social adjustment, mother-child relations, father-child relations, and “other.” The effect size for academic achievement was $-.16$, which indicated that children from divorced families fare worse educationally than their intact family counterparts. Children who resided in widowed families scored higher on well-being measures than those from divorced families but lower than children in intact two-parent households.

In a second meta-analysis, Amato and Keith (1991a) investigated the long-term consequences of parental divorce on 15 measures of well-being, which included educational attainment, psychological well-being, self-concept, marital quality occupational quality. The meta-analysis indicated that children who experience parental divorce had lower levels of well-being than did those individuals who came from intact families. In the case of educational attainment the effect size was $-.24$, indicating that children from divorced families scored lower on measures of educational attainment (high school graduation and years of

³ These well-being measures include educational outcome measures, such as high school completion and college attendance.

education) than those children who lived in two-parent intact families. The authors conclude that, based on their analysis, “individuals who experienced parental divorce as children, compared with those parents who were continuously married, have lower quality of life as adults” (p. 56).

Zill, Morrison, and Coiro (1993) also studied the long-term consequences of parental divorce with a sample of 18- to 22-year-olds. Using longitudinal data from the National Survey of Children, the researchers found that children who had experienced parental divorce before they turned 16 years of age were more likely to drop out of school.⁴ Using the same dataset, Furstenberg and Teitler (1994), not surprisingly, obtained results similar to those of Zill, Morrison, and Coiro with respect to the educational consequences of parental divorce. Furstenberg and Teitler found that children who experienced parental divorce were less likely to complete high school and college and more likely to be unemployed and not in school.

Sandefur, McLanahan, and Wojtkiewicz (1992) also studied the educational effects of marital dissolution on children aged 14-17 years and the effects of family structure on high school graduation rates. The timing of the parents’ divorce had a significant effect on whether or not a child graduated from high school. For children who experienced family disruption when they were between age 14 and age 17, graduation rates were lower than for children who resided in either a stable

⁴ The researchers also used other measures of child well-being, including parental relationships, emotional distress, and need for psychological help.

single- or a stable step-parent family. Consistent with other studies, Sandefur, McLanahan, and Wojtkiewicz also found that children from single- and step-parent families had lower graduation rates than children from two-biological-parent families.

This review of studies provides strong evidence that indicates that children who reside in single-parent and single-mother homes, whether because of separation, death, or out-of-wedlock birth, are at an educational disadvantage. Across many different measures, including grades, standardized test scores, high school completion, and college attendance, children from single-mother and single-parent homes fare worse than their counterparts in two-parent households. Various explanations have been offered and empirically tested in order to determine why children from two-parent families outperform children from single-mother homes.

Explaining the Negative Effects of Single Motherhood

Consistent with much research in the social sciences, many reasons have been put forth by researchers to explain the impact of single-parenthood on educational outcomes. Many of the mechanisms focus on micro-level explanations such as economic deprivation, parental involvement, family conflict, and parental absence to explain why children from single-mother homes fare worse than their two-parent counterparts. However, few studies have considered the linkages between a country's policy environment and the relationship between family structure and educational achievement. In this section, I focus on four of the more salient micro-

level explanations—economic deprivation, parental involvement, family conflict, and parental absence—and then go on to explain the moderating relationship between national family policy contexts and the achievement of children from single-mother households. This macro-level perspective is one that has received very little attention by researchers and as such, the literature is extremely scarce.

Micro-Level Explanations

Economic deprivation. This explanation suggests that low levels of educational achievement and attainment are attributable to low levels of household income. According to McLanahan and Sandefur (1994), a child's economic resources account for 50 percent of the factors explaining low achievement. Many single-parent households are headed by women, a significant number of whom (e.g., Canada-45%, Germany-43%, United Kingdom-40%, United States-60%) are living in poverty (Bradbury & Jantti, 1999). Low income levels for single-mother families are the result of a number of interrelated factors (Millar, 1989). Gender inequality of the labor market results in low levels of pay for all women. In addition, in some countries the indirect costs associated with employment are high (e.g., childcare costs in the United States), and these contribute to single mothers low income levels.

In addition, some of these financial constraints are the result of divorce. According to McLanahan and Sandefur (1994), “the average decline in income of a mother and child who are living in a non-poor family prior to separation is 50%” (p. 24). Separation and divorce significantly affect the household income of many families, and while children are often eligible for child support, approximately 40 percent do not receive any (McLanahan & Sandefur, 1994). Children’s financial well-being is largely a function of parents’ human capital. Separation and divorce often result in a disruption and a reduction in the transfer of human capital to the child.

While divorce or separation can significantly reduce the income of a single-mother family, children of unmarried mothers appear to experience even less financial support. According to Halpern (1999), in the United States children born within a marriage are more likely to receive financial support from their fathers than those born outside a marriage. When social assistance is forthcoming, children born outside marriage receive approximately half the dollar amount that those born within a marriage receive (\$2,087 and \$4,598, respectively).

Various researchers have studied the impact of a family’s income or economic status on educational outcomes. Duncan and Brooks-Gunn (1997) found that economic status was more strongly associated with children’s cognitive ability than any other child outcome. Duncan et al. (1998) and, in an earlier study, Haverman, Wolfe, and Spaulding (1991) found that a family’s economic status had the greatest impact on educational achievement during early childhood. According

to Smith, Brooks-Gunn, and Kleborov (1997), the effect of family income on children's educational outcomes is greater for low-income families. Using data from the National Survey of Families and Households, Thompson (1994) also found a family's economic resources to be a significant predictor of academic achievement. Thompson concludes by stating, "that economic disadvantages of single-mother families account for much of the disadvantage of children from these households. This is particularly true for academic performance ..." (p. 229).

For children from low-income families (e.g., single-mother families) these financial constraints are detrimental to a child's educational achievement and attainment for a number of reasons. Parents from these homes are unable to purchase educational resources and pay for extracurricular activities, such as computers and summer camps, all of which positively affect children's educational outcomes (Entwisle & Alexander, 1995; McNeal, 1999). In contrast, children from families with a high level of economic resources have greater access to educational materials, educational experiences, and quality schools in wealthy neighborhoods. Access to such educational resources and participation in enrichment activities are believed to enhance a child's cultural capital (Bourdieu, 1977). Reading books and participating in "highbrow" activities, such as attending operas or classical music concerts, are examples of the cultural resources to which high-income families have access. Although there is probably no direct link between attending an opera and performing better in school, it is believed that such activities are thought to be

intrinsically valuable to the dominant culture and, as such, are highly regarded by teachers and employers.

The economic deprivation perspective is an influential explanation for the educational disadvantages experienced by children from single-parent homes. Many researchers have demonstrated the impact of family income on child outcomes, particularly on educational achievement and attainment. Given that many single parents, particularly single mothers, live in low-income families, the economic deprivation explanation is undoubtedly a salient mechanism through which single motherhood influences educational achievement.

Parental involvement. Abundant research indicates that parental involvement in children's schooling improves student academic achievement (Baker & Stevenson, 1986; Epstein, 1991; Epstein, Coates, Clark-Salinas, Sauders, & Simon, 1997; Epstein, 1987; Fehrmann, Keith, & Reimers, 1987; Lareau, 1987; Muller, 1993; Stevenson & Baker, 1987). According to Muller (1993), parental involvement in children's education can be divided into two broad categories. First, whether the parental involvement is home-based (e.g., helping with school projects) or school-based (e.g., attending parent-teacher conferences), and second, whether the involvement is concerned with managing the child's educational career (e.g., monitoring homework) or intervening in times of crisis (e.g., helping the child when he or she is struggling academically).

As indicated, parental involvement can take a variety of forms and at the same time be influenced by a number of family-level factors such as socioeconomic

status, parents' employment status, and family structure. Previous research has indicated that there is a relationship between socioeconomic status (SES) and parental involvement. As previously discussed, many children who reside in single-mother households are low SES; as such the relationship between SES and parental involvement is salient for children from single-mother homes. In two separate studies, Baker and Stevenson (1986) and Lareau (1989) found that children from high-SES backgrounds did better in school than their counterparts from low-SES families. This was found to be the case because the high SES parents were more involved in their child's education and more connected to their child's school.

Useem (1992) found that highly educated mothers demonstrated a number of characteristics (e.g., knowledge of tracking system, influence over their child's choices, and the ability to integrate into school affairs and networks), all of which enhanced their child's placement in an accelerated mathematics track. The less-educated mothers were less involved in their child's schooling and, to some extent, trusted the teachers to make the correct assessment of their child. Given that children from single-mother families are less likely to have a college-educated parent than those from two-parent families (McLanahan & Sandefur, 1994), the relationship between parent education and parental involvement has significant meaning for children from single-mother homes.

A parent's employment status also can affect the level of involvement a parent has with his or her child at home, at the child's school, and in the neighborhood. Muller (1995) examined how the employment status of parents

affects their level of involvement with their child and their child's school and whether this had any consequence for their mathematic achievement. Using Coleman's basic theory of social capital, Muller conducted a large analysis using the NELS data from 1988. The principal findings indicate that mothers with part-time jobs tend to have higher levels of involvement and their children had higher base-year (8th grade) test scores when compared to mothers who either worked full time or stayed at home. By working part-time, the mother is not only contributing to the economic resources of the family, but also increasing the child's social capital through networking at work.

Mothers who work full time often have less time to interact with their children or participate in school activities. This can lead to both less supervision and monitoring of schoolwork and lower educational aspirations. Participation in the labor force is particularly problematic for single-mother families. By working, mothers increase their family's financial capital and consequently make more money available for educational resources. However, employment often results in the parent having less time to interact with their child and participate in school activities.

Coleman's theory of social capital suggests that intra- and inter-household relations may affect the transmission of familial resources (human and social capital) to children (Coleman, 1988). Inter-household linkages such as parental involvement in school activities, contact with school personnel, and knowledge of other children's parents allows the family to embed itself in beneficial social

networks and, in turn, benefits children's educational outcomes (Coleman, 1988; Schneider & Coleman, 1993). According to Coleman and Hoffer (1987), intra-household linkages are equally important.

The social capital of the family is the relations between children and parents (and when families include other members, relationships with them as well). That is, if human capital possessed by parents is not complemented by social capital embodied in family relations, it is irrelevant to the child's educational growth that the parent has a great deal, or small amount of human capital. (p. 223)

Also, as Coleman and Hoffer infer, a family can have very little human capital, but the child could enjoy a high level of social capital, which will give the child an educational advantage. The case of the Southeast Asian refugees provides an excellent example of how low human capital can be diminished by high levels of social capital. It was found that the children from these families often purchased two textbooks for each subject, one for themselves and one for their parents. The additional textbook allowed the parents to provide the maximum amount of help possible for their children. This example demonstrates how single mothers, while having little human capital due to poverty, can transmit social capital through high levels of intra-household linkages.

Inter-household relations for single mothers may be more difficult to establish and maintain due to such factors as residential mobility and parent employment status. As previously discussed, social capital exists not only within

the family (intra-household) but also within communities and neighborhoods (inter-household). Divorce may result in a child's moving from one new school to another. This mobility can seriously affect a family's social networks and relationship with the school, resulting in negative educational consequences for the child. Teachman, Paasch, and Carver (1996) found that changing schools increased the likelihood of the child's dropping out of school. Teachman, Paasch, and Carver interpret their findings by explaining, "changing schools reduces the ability of parents and children to make wise decisions about schooling. They have less information about schools, teachers, and classes. They may be less able to take advantage of resources that schools and teachers can provide" (p. 782).

McLanahan and Sandefur (1994) found that single mothers demonstrated lower levels of home-based parental involvement with their children. Compared with children from two-parent families, children from single-mother families spent less time with their mothers. Unmarried and divorced mothers also were less likely to share meal times with their children compared with mothers from two-parent families. Regarding talking to and helping a child with homework, McLanahan and Sandefur found that children of single mothers spoke to their mothers more often than those from two-parent homes, but they also found that mothers from intact families helped their children with their homework more frequently.

The differences in these parenting practices between the two family structures account for some of the differences found in children's educational outcomes. Astone and McLanahan (1991) found that approximately 10 percent of

the difference in drop-out rates between the two family structures could be accounted for by parenting practices. In contrast, when combined with parental aspirations and supervision, parental involvement was found by McLanahan and Sandefur (1994) to account for 40 percent of the differences in high school drop-out rates between single- and two-parent families.

As this discussion highlights, the parental involvement explanation is both broad and multi-faceted. In sum, due to a number of factors (e.g., SES, residential mobility, and employment status), single mothers tend to exhibit lower levels of parental involvement, the consequences of which can be lower educational outcomes in these children when compared with their two-parent counterparts.

Family conflict. The family conflict explanation is primarily concerned with describing the reasons children from divorced families have lower levels of well-being, including measures of academic outcomes, than those from two-parent households. Divorce rates have risen steadily in the Western world; consequently, many children are spending some time in a single-parent family as the result of parental divorce. It therefore becomes important to understand why children from divorced families have lower levels of child well-being.

Conflict within a family does not occur only at the time of separation. Children often are exposed to pre-divorce and post-divorce conflict, with parents arguing over visitation rights, child support payments, etc. for many years following the separation. However, living in a high-conflict two-parent household also can have negative consequences for children. According to Amato, Loomis,

and Booth (1995), “in general, studies of children and adults suggest that experiencing parental divorce and growing up in a high-conflict family are associated with long-term decrements in well-being” (p. 895). Therefore, we cannot simply conclude that it is the act of the divorce, as a simple one-time event, that negatively affects child well-being, but rather that high marital conflict appears to be the factor of greater saliency. In fact, divorce can greatly improve child well-being when children have been exposed to high-conflict marriages.

Amato and Keith (1991b), in their meta-analysis of 92 studies, compared the well-being (inclusive of measures of academic achievement) of children from two-parent families with those living in divorced and single-parent households. The family conflict explanation, along with the parental absence and economic disadvantage explanations, formed one of the three theoretical perspectives that were tested by the researchers. It should be noted that three of the four micro-level explanations presented in this chapter are consistent with the theoretical perspectives used by Amato and Keith.

The researchers found that children who resided in high-conflict, two-parent families fared worse educationally than children in low-conflict, two-parent households. Of the three theoretical perspectives, the family conflict explanation elicited the greatest support from their meta-analysis. However, the researchers concluded, “some support exists for all three positions, and no single perspective accounts fully for the pattern of our findings” (p. 40).

Zill, Morrison, and Coiro (1993) used longitudinal data from the National Survey of Children to determine the long-term effects of parental conflict and divorce on young adults aged 18 to 22 years. Using a number of measures that included indicators of academic success (dropping out of school, school suspension or expulsion, high school completion, etc.), the researchers found that youths from disruptive high-conflict families were more likely to drop out of school than children from intact families. Children who experience parental conflict and divorce are less likely to receive supervision and monitoring from their parent/parents, and the parent is less effective at dealing with the child (Hetherington, Cox, & Cox, 1982). In addition, according to Amato (1986) there is a marked deterioration in the parent-child relationship due to the child is being drawn into the conflict between the parents.

This family conflict perspective provides a persuasive argument for explaining the effects of divorce on measures of child well-being. It is reasonable to assume that a child who is exposed to high levels of parental conflict within the home would struggle to concentrate and perform well at school. In addition, if parents are arguing and fighting it is reasonable to assume that their attention is distracted, that the child is not being helped with his or her homework, and that the parents are less involved in their child's schooling than they might otherwise be. However, not all single-mother families are formed as a result of divorce; some are a result of women having a child out-of-wedlock or the due to the death of a spouse.

Therefore, the family conflict explanation is most applicable when considering the children of single-mother families that are formed due to divorce.

Parental absence. Women head the majority of single-parent families and, as such, a considerable amount of research has focused solely on father absence. Although some researchers have found that a family devoid of a father has no effect on academic or developmental outcomes (Coontz, 1995; Desai et al., 1989), many more have concluded that there is an effect (e.g., Milne, Myers, Rosenthal, & Ginsburg, 1986; Myers, Milne, Baker, & Ginsburg, 1987; Wallerstein, 1991; Wallerstein & Blakeslee, 1989). Parents often are often viewed as being important resources for their children. They can offer both economic and non-economic resources; these non-monetary resources include supervision, attention, and emotional support. From this perspective, two parents are better than one, because children from a single-mother family are essentially “missing” inputs that benefit their developmental and educational outcomes. Two-parent households are structurally stronger than families with only one parent (Amato, 1993; Downey, 1994). Reasons why two-parent families are stronger than single-parent families include parents can divide up tasks, parents can give breaks to each other, the authority structure is stronger because parents can monitor each other and the children, there is greater intellectual stimulation, there is increased adult attention, parents can provide both male and female role models, and parents are a model for adult male-female relationships.

The parental absence explanation is somewhat interwoven with other perspectives, such as the economic deprivation and parental involvement positions. Parental absence caused by divorce results in a significant decline in a family's income and, as previously discussed, this drop in income is negatively related to a number of educational outcomes (McLanahan & Sandefur, 1994). For those mothers who have never been married, a large percentage receives inadequate or no child support, resulting in significant poverty levels among single-parent families (McLanahan & Sandefur, 1994). Absent fathers also are believed to be less altruistic toward their children and, therefore are less likely to provide the necessary financial resources (McLanahan & Sandefur, 1994). This scenario is compounded by the need for the single parent to participate in the workforce, often full-time, to provide financial resources for the child. Maternal employment, as previously discussed, has many detrimental effects on children's educational outcomes.

Following divorce, the non-custodial parent tends to have less contact with the child (Amato, 1987; Seltzer, 1991), and therefore the child has access to fewer resources, particularly non-economic resources such as parental time inputs. Seltzer (1991) found that when fathers maintained contact with their children they were more likely to both provide financial assistance and be more involved in the raising of the child. However, as researchers also have reported, many children have very little contact with their absent fathers (McLanahan & Sandefur, 1994; Seltzer, 1991).

Even though the parental absence explanation is concerned with family structure and not family process, it supports a commonly held belief that two parents are better than one. As Whitehead (1993) suggests:

A growing mass of evidence gives rise to an obvious conclusion: growing up in an intact two-parent family is an important source of advantage ... Though far from perfect as a social institution, the intact family offers children greater security and better outcomes than its fast-growing alternatives: single-parent and step-parent families. Not only does the intact family protect the child from poverty ... it also provides greater non-economic investments of parental time, attention, and emotional support. (p. 80)

It is not necessarily the case that single mothers have poor parenting skills; however, parental absence places the single mother in two distinct roles—that of breadwinner, and that of caretaker—that would traditionally be fulfilled by two parents, not one.

In summation, from this review of each of the four theoretical perspectives, it becomes clear that there is no one perspective that succinctly explains the differences in the educational outcomes of children from two-parent versus single-mother families. All four micro-level explanations have been well researched and are supported by sound theoretical arguments. Next, I consider a complementary macro-level explanation that elucidates the linkages between family policy, single-motherhood, and children's educational achievement.

Macro-Level Explanation

In recent years a small number of studies have extended our understanding of the relationship between single-parenthood and children's educational outcomes by comparing cross-national differences (Cherlin et al., 1991). However, the great majority of research in this area has been dominated by studies conducted exclusively in the United States. Compared with the abundant American literature, studies conducted in other countries have been limited and cross-national studies have been virtually non-existent. Similarly, despite the interest in the well-being of children, few studies have looked at the impact of family policies on children's educational outcomes (for exceptions see Phipps, 1999; Ripke & Crosby, 2002).

Recently, a couple of studies have not only used comparative research to analyze the relationship between single-parenthood and children's educational achievement within different national contexts, but also considered the linkages between family policies and the achievement gap between children from two- and single-parent households. Pong, Dronkers, and Hampden-Thompson (2003) used the Third International Mathematics and Science Study's (TIMSS) data to investigate whether family policies mitigated or exacerbated the educational consequences of living in a single-parent family. By focusing on 11 North American, Pacific Rim, and European countries, the researchers found that third- and fourth- grade students from single-parent homes fared worse in mathematics and science achievement tests than their two-parent counterparts when all countries were combined in the multi-level analysis. In the individual country analysis there

was a gap between the two family structures in nine of the 11 countries (the exceptions being Austria and Iceland). In addition, the researchers found that the achievement gap was greatest in those countries where single-parenthood was most prevalent. The primary focus of this study, however, was to determine the relationship between family policies and the achievement gap between the two family structures. Their results indicated that single-parenthood was least detrimental in those countries where the family policies equalized resources between the two- and single-parent families.

A similar study by Hampden-Thompson and Pong (forthcoming) also used the TIMSS data to investigate the moderating role of family policy environments on the achievement gap between two- and single-parent families in 14 European countries. Their results indicated that the achievement gap between students from two-parent and single-parent families is far greater in England than it is in all other countries studied except Scotland. By grouping the countries by their family policy environments Hampden-Thompson and Pong were able to analyze the moderating role of family policy environments on the achievement gap. They found that the continental conservative (e.g., Austria), Mediterranean conservative (e.g., Greece), and social democratic countries (e.g., Norway) appeared more successful in mitigating the effects of single-parenthood on science and math achievement than were the liberal regime countries (e.g., England). The evidence provided in this study suggests that a nation's family policy environment plays an important role in moderating the influence of single-parenthood on children's academic achievement.

These two studies make an important contribution to the family structure literature; in addition they provide a macro-level explanation that complements the micro-level explanations, as to why children from single-parent homes fare worse on achievement tests than their two-parent counterparts. Also, this cross-national analysis of the relationship between family structure and achievement makes a significant contribution to an area of research that has typically focused on American and single-country studies.

Summary

From this chapter it is clear to see that single-mother families are not a homogeneous group. Mother-headed families are typically the result of divorce, out-of-wedlock births, or the death of a husband. Many different social, economic, religious, and legal changes resulted in the significant rise in the number of single-mother households in the Western world over the last part of the 20th century. The consequences of single-motherhood have been well documented, particularly those that pertain to the well-being of the children who reside in these homes. On the whole, there are a number of negative ramifications of residing with one parent versus two, including difficulties in forming lasting relationships, child delinquency, and alcohol and drug use. In terms of children's educational outcomes a number of researchers have shown that children who reside in single-mother homes are more likely to drop out of school early, have lower achievement,

and are less likely to attend college when compared with children from two-parent families.

A number of perspectives have been put forth to explain why children from single-mother households fare worse than their two-parent counterparts. The theoretical perspectives fit into two broad categories: micro-level and macro-level explanations. In the next chapter, I present part two of my literature review, which provides the necessary background literature in order to better understand the macro-level explanation of the role of family policies in moderating the relationship between family structure and children's educational achievement.

CHAPTER THREE

REVIEW OF LITERATURE

(PART II)

The Welfare State and Social Policy

Introduction

The well-being of children is at the forefront of many political and policy debates. Indeed a great deal of social policymaking is concerned with children and family life. Children's well-being is important not only because it is often viewed as an indicator of a society's moral worth, but also because children are a vital source of human capital (Bradshaw, 1997; Ringen, 1997). Consequently, the welfare state affects significantly the lives of children and their families both directly and indirectly. In this chapter, I trace the rise of the modern welfare state and discuss the various classification systems used to compare welfare states cross-nationally. In addition, I highlight a number of family policies that affect and influence the lives of children and the financial well-being of families.

The Rise of the Welfare State

The modern welfare state was an intricate part of the postwar “Golden Age,” in which economic growth led to prosperity, equality, and full employment. The post-war economies of the advanced nations (i.e., those countries in Western Europe and the United States) were dominated by industrial mass production and, as such, the “new” welfare state reflected this rapid development and growth. The welfare state during this era of post war expansion experienced a significant upgrading of existing social policies, which resulted in income and employment security for workers and a promise for more universal, classless justice and solidarity for the people. The most instrumental aspect, according to Esping-Andersen (1996), was the role the welfare state played in nation building. As Esping-Andersen explains, “Many countries became self-proclaimed welfare states, not so much to give a label to their social policies as to foster national social integration” (p. 2). The final pillar of welfare capitalism was the expansion of mass education and the right to be educated (Esping-Andersen, 1999).

The modern welfare state was born, for the most part, out of a desire to address the need for equality during the post-war era. The expansion of education was, in part, the solution to the inequity that existed during this period and to the role it played in human capital investment. The problem of equality had long been on the political landscape in Europe with “la question sociale” (the social question)

in France, and Prime Minister Benjamin Disraeli in his book *Sybil* (1845) referring to the United Kingdom as a country of “Two Nations.”

Two nations between whom there is no intercourse and no sympathy; who are as ignorant of each other's habits, thoughts, and feelings, as if they were dwellers in different zones, or inhabitants of different planets; who are formed by different breeding, are fed by different food, are ordered by different manners, and are not governed by the same laws ... *The rich and the poor* (Smith, 1980).

Despite the similar histories shared by the developed nation states of Western Europe and North America, the welfare states that exist today have been shaped by the unique ideologies of each country. In addition to such ideologies as Marxism, which had shaped welfare capitalism during the 20th century, there emerged two distinct models of social welfare that have developed in more recent years (Mishra, 1990). The first is concerned with a strategy and policy of retrenching the welfare state, while the latter is concerned with maintaining the welfare state. The neo-conservative governments of the United States and the United Kingdom during the 1980s are prime examples of where social welfare provision was rolled back and, in some cases, replaced by private enterprise. This approach was in contrast to countries such as Sweden and Austria where those governments opted to maintain the welfare state. The policy choices made by these countries during the later part of the 20th century, demonstrate the different paths that have been carved for the provision of social welfare from very similar

beginnings. In the following sections, I discuss both the similarities and differences between countries in social welfare, particularly in their family policies and I highlight the various ways countries have been classified by researchers according to the type of family policies a country promotes.

Family Policy

Family policy, broadly defined, refers to “a coherent set of principles about the state’s role in family life which is implemented through legislation or a plan of action” (Baker, 1995). Family policies encompass three areas of policymaking. First, there are laws relating to family issues, such as marriage, adoption, reproduction, divorce, and child custody. Second, there are policies to help support family income, such as maternity leave, childcare costs and availability, family and child allowances, maternity and parental leave, and child benefits and support. The third category refers to the provision of direct services that may include childcare provision, home care, health services, and subsidized housing (Baker, 1995).

Some countries have explicit family policies in which the government clearly states its role concerning family life, while family policies in other countries are implicit in nature with many family policies integrated into laws and other broader social policies (Baker, 1995; Kamerman & Kahn, 1978). The European Union provides an excellent example of this diverse approach to family policymaking. The word “family” does not figure in the Treaty of the European Economic Community (Commaille & de Singly, 1997; Hantrais, 2000) and therefore, the commission has been reluctant to coordinate any family policies

between the member nations (Hantrais, 2000). The ideologies of the member nations differ considerably on the issue of state intervention concerning the family. For some nations family welfare is a public issue, while for others it remains a private domain.

Researchers have grouped countries into different welfare regime categories and family policy environments according to a number of different criteria. Some focus on the political and economic ideology toward family policymaking (Esping-Andersen, 1990), while others emphasize the explicit or implicit nature of family policy (Kamerman & Kahn, 1978), the ideology of women's position that shapes family policy (Duncan & Edwards, 1999), or the type of family (nuclear or extended) that national policies aim to promote (Millar & Warman, 1996). Classifying countries based upon their approach to welfare and family policymaking can be problematic as each country is unique in so many ways. However, all the frameworks discussed above share many commonalities. Countries are grouped in similar ways even though the criteria used are different. The following section provides a detailed description of Esping-Andersen's classification framework followed by an overview of competing frameworks.

Esping-Andersen's Framework of Welfare States

Esping-Andersen's (1990) framework of welfare capitalism was one of many devised during the 1980s for the purpose of cross-national comparative analysis of welfare systems. This framework of three welfare regimes is widely referenced (Baker, 1995; Duncan & Edwards, 1999; Forssen, 1999; Kilkey, 2000;

McLanahan, Casper, & Sorensen, 1995; Rowlingson & McKay, 2002) and is arguably the most influential (Pringle, 1998). Many notable researchers consider Esping-Andersen's book, *The Three Worlds of Welfare Capitalism* as influential (Castles, 1998), seminal (Alcock, 2001), and "undoubtedly the most influential comparative study in recent years" (Kleinman, 2002).

De-commodification and de-familialization form the basis of Gosta Esping-Andersen's typology of welfare states. De-commodification is a concept originally derived from Polanyi (1944) and refers to the extent to which the welfare state reduces its workers' dependence on the market by granting them the right to opt out of the labor market and still be able to maintain a livelihood. The nature of pre-capitalist societies resulted in few workers having to rely on selling their labor power in order to survive. As the markets developed and became more universal and hegemonic, workers' livelihoods became increasingly more reliant and dependent on the market itself (Esping-Andersen, 1990). Social rights and citizenship formed the basis of the modern welfare state, therefore, social policies such as social assistance and insurance were introduced in order that workers could detach themselves from the market while at the same time maintain an adequate life style.

The second key aspect of Esping-Andersen's classification is concerned with de-familialization. This term refers to the extent to which the state frees the household from its welfare obligations. Historically, family welfare has exclusively been the responsibility of the family itself. In some countries this model is still

maintained. However, in others, the role of the family has been reduced and the state has taken a greater responsibility for the welfare of its citizens. According to Esping-Andersen (1999) de-familialistic social policies are concerned with reducing the individual's dependence on the family. In the case of mothers, de-familialistic policies allow women to gain economic independence by entering the work force. In some countries, such as the Nordic countries, these policies are actively pursued in order to maximize a female's economic independence. In contrast, welfare state regimes that assign the welfare obligations to the household are viewed as being familialistic in their approach (Esping-Andersen, 1999). It is important to note that policies that pursue de-familialization are not anti-family. Instead, de-familialization refers to the provision of welfare via other sources, such as the state and the market. Equally, it is important to realize that familialistic regimes are not pro-family, instead, the family unit is the first provider of welfare for its members. In familialistic regimes, the state or charitable institutions will only intervene to provide social assistance when families themselves fail to service their members.

In the case of women the relationship between de-commodification and de-familialization is interesting. In the Nordic countries the welfare state helps commodify women (i.e., make them reliant on the market) in order that they can become less dependent on men (de-familialization). This process comes full circle because a working mother who is independent of her husband can then benefit from social policies that de-commodify her from the market (Esping-Andersen, 1999).

The relative level of a country's de-commodification and de-familialization was measured by Esping-Andersen and from this analysis three clusters of countries emerged. As a way of comparing welfare states, Esping-Andersen developed a framework of what he referred to as the *three regimes of welfare capitalism*. In his typology of regimes, Esping-Andersen distinguishes between the universalistic welfare states of the Nordic countries, the conservative welfare states of continental Europe, and lastly the liberal welfare states that consist of the Anglo-Saxon countries. The three worlds of welfare capitalism are defined as the *social democratic*, *conservative*, and *liberal* regimes.

Social democratic regime. In countries belonging to the social democratic regime, the state takes an active role in and demonstrates a strong commitment to family policymaking. Family and welfare policies are based upon principles of universalism and egalitarianism with a strong emphasis on the protection of the child and the equalization of men and women. The Nordic countries of Denmark, Finland, Norway, and Sweden are the prime examples of the social democratic regime.

A commitment to full employment is an important element of the social democratic regimes. As such, female participation in the labor force is particularly high and, as previously discussed, it is an important aspect of both de-commodification and de-familialization. The primary aim of de-familialization policies is to minimize family dependence and maximize independence among the

citizenry. The state further achieves de-familialization by dissolving the family of two of its key responsibilities; the support of children and the elderly.

The right to work and the right to income protection is a key characteristic of the social democratic regimes. Due to the enormous cost associated with such welfare provision, this particular regime is most successful when most people who can work do work, which results in fewer people receiving social transfers from the state. Esping-Andersen (1990) characterizes the social democratic regimes as a fusion between liberalism and socialism.

Equalization between the sexes and across classes is achieved through universal programs. In theory, manual and white-collar workers enjoy the same protection and rights. As Esping-Andersen (1990) highlights, “This model crowds out the market, and consequently constructs an essentially universal solidarity in favor of the welfare state. All benefit; all are dependent; and all will presumably feel obliged to pay” (p. 28).

Conservative regime. The term “conservative” is used by Esping-Andersen to emphasize the strong political ideology that drives the welfare state in this cluster of countries. Similar to the social democratic regime, countries in the conservative regime are characterized by highly regulated state intervention. However, the intervention is concerned with the preservation of social status differences rather than eliminating them. The modern welfare state is a mechanism that can intervene and correct the structures of inequality that exist in a country. This can be seen in the Nordic countries where equality between the sexes and across class differentials

is accomplished, through social policies. Equally, the welfare state, through social policymaking, can maintain a system of stratification. This is achieved in the conservative regime countries by using a system of means-tested social assistance that is designed to maintain social class differentials. In this regime those receiving social assistance are stigmatized and this, in turn, helps to promote social dualisms (Esping-Andersen, 1990).

The church dominates the ideology of the conservative regime countries, with the Roman Catholic political parties' dominant on the political landscape. The influence of the church also promotes the maintenance of the traditional family model, in which the married women's entry into the labor market is discouraged with family policies that promote motherhood. The male breadwinner model is dominant with the husband expected to work to support his family and the wife encouraged to stay at home. As such, childcare provision is undeveloped.

In these conservative regime countries, the state aims to support not replace social institutions such as the family. The principle of subsidiarity is pursued in these countries, in which the state will only intervene when the family can no longer help its own family members. Strong family ties, instead of state intervention, are emphasized for the provision of individuals' welfare. This is particularly evident in the Southern European countries of Greece, Italy, Portugal, and Spain. Lewis (1997) highlights this particular type of family solidarity that can be found among these Mediterranean group of countries.

Different generations of Southern European families are more likely to be co-resident and are in a very real way dependent on each other. The family is likely to be a means of integrating different kinds of income from various family members, many of whom may engage in casual labor in the underground economy ... Families thus play a more critical role in both care and material provision and may act as a buffer between the individual and social exclusion (p. 309).

In principle, and particularly in the case of the Southern European countries, the state will only intervene when social institutions such as the family have exhausted their capacity to service their members.

Liberal regime. The liberal regime countries guiding principles are based upon the free market economy. As such, social assistance is market-based as opposed to state-based, as in the social democratic and conservative regime countries. Compared to the social democratic regime countries, social assistance and universal transfer payments are modest. Private schemes such as private pensions, private health care, and private childcare are encouraged and, in some cases, are subsidized by the state. This support of private schemes emphasizes the importance of the market over the state in providing welfare to its citizens.

Social assistance is primarily aimed at the poor, making them dependent on the state and this approach results in a highly differentiated and stratified welfare state. Social assistance and benefits are often means-tested, low, and to some

degree carry a social stigma. Benefits are purposely kept low on the assumption that high levels of benefits would discourage incentives to work. Paradoxically, welfare dependency is not an issue in the social democratic regime countries where social assistance and benefits are high. In these countries, full employment is encouraged for both men and women, which results in low levels of dependency on social assistance.

It is important to note that even within each of Esping-Andersen's regime classifications there exists a continuum. For example, the United States is considered the archetypal liberal regime country, while the United Kingdom has a number of policies that distinguish it from the United States, such as universal family allowances that are more indicative of those programs found in many social democratic and conservative regime countries. Therefore, while these countries for the most part fit clearly fit in to one of the three categories, it is necessary to realize that family policy differences exist between countries within each of the three regimes.

The countries in this study fit into the following welfare state categories. The liberal countries are Australia, Canada, Ireland, New Zealand, the United Kingdom, and the United States. The social democratic countries include Denmark, Finland, Norway, and Sweden. The conservative welfare regime countries consist of Austria, Belgium, France, Germany, Greece, Italy, Portugal, and Spain.

Other Frameworks

Esping-Andersen's schema has provided a starting point for many debates in the cross-national discussion of welfare systems (Pringle, 1998). Since the initial development of Esping-Andersen's schema, other interesting categorizations have emerged (Duncan & Edwards, 1999; Gauthier, 1996; Millar & Warman, 1996). Kamerman and Kahn's (1978) framework preceded Esping-Andersen's. They based their categorization on individual countries' approach to family policy-making. Similar to Esping-Andersen, Sheila Kamerman and Alfred Kahn identified three distinct approaches. The first approach prescribes that countries have *comprehensive, explicit family policies*. Examples of these countries are Norway, Hungary, and the Czech Republic. The second approach prescribes that the countries have *explicit but narrowly focused family policies* (e.g., Austria). Finally, there are countries that have *no explicit family policies and reject the idea of such policy-making*. Examples are the United Kingdom and United States.

Gauthier (1996), in contrast, identifies four distinct clusters of countries that are based on family policy indicators such as family allowances, maternity and childcare schemes, childcare provision, and abortion legislation. Her first model, *pro-family/pro-natalist*, clusters countries based upon a common concern of low fertility and policy-making decisions that are designed to encourage families not only to have more children (e.g., France), but to reconcile the work-family conflict. The *pro-traditional* model is based upon family preservation. Countries that fit this model take some state level responsibility for supporting families, however, there

remains an expectation that the family will share this charge (e.g., Germany). In other words, these countries require some degree of welfare to be provided by the family. The third model, *pro-egalitarian*, is comprised of countries (e.g., Sweden and Denmark) characterized by liberal policies that promote gender equality. Gauthier's fourth and final model, *pro-family/non interventionist*, is countries (e.g., United Kingdom and United States) that view the family as self-sufficient and a belief that the free market conditions will meet family needs.

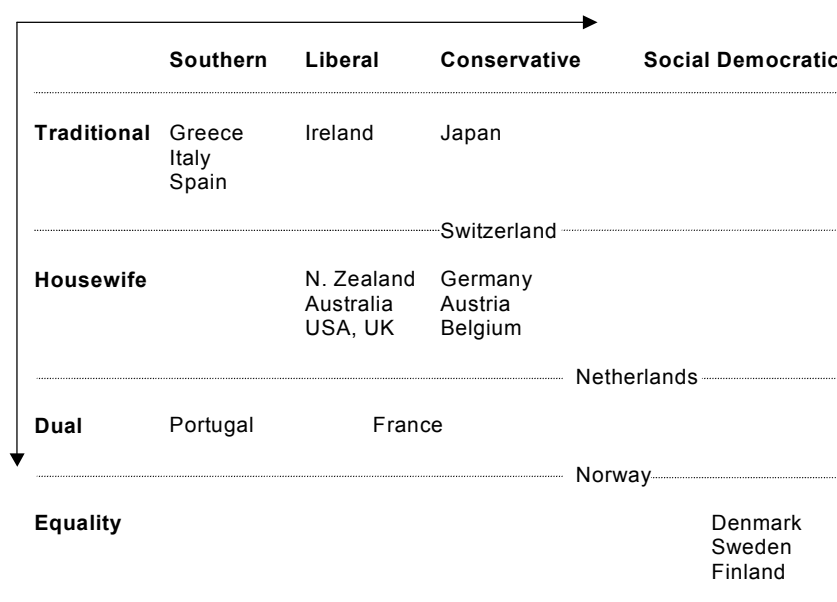
Millar and Warman (1996) allocate countries to various clusters based upon a nation's attitude toward a family's obligations. In Scandinavian countries, the emphasis is on the individual as opposed to obligations lying within the *nuclear family*. Countries that fall into the nuclear family obligations include Austria, Ireland, Netherlands, the United Kingdom, and Scotland. In other countries, such as Portugal, the expectation is that the *extended family* should play a supportive role. In Greece, however, services do exist for those who do not have a family to support them.

The final framework to be discussed is Duncan and Edwards' (1999) *Genderfare* model (Figure 1). Figure 1 illustrates Duncan and Edwards' relative set of "genderfare" positions for developed countries. The model is, in essence, a combination of Esping-Andersen welfare state regime model with Hirdmann's (1990) "housewife contract" model. Duncan and Edwards adapt Esping-Andersen's framework by adding an additional regime category of southern European regimes. The southern regimes include the Mediterranean countries of

Greece, Italy, Portugal, and Spain. The researchers combine Esping-Andersen's framework with a model that incorporates the gender divisions between male and female, and the subordinate position of females in society.

Figure 1.

Genderfare in developed countries (adapted from Duncan & Edwards, 1999).



Hirdmanns' "housewife" contract consists of four categories; *traditional* (e.g., Italy, Spain etc.), *housewife* (Australia, Austria, United States etc.), *dual role* (e.g., France and Portugal), and *equality* (Denmark, Finland, and Sweden). This framework is responsive to the basic criticism that Esping-Andersen's model is gender blind (Duncan & Edwards, 1999). Women, in contrast, are the central focus of this *Gender contract* framework. The two-dimensional nature of this model

presents an obvious weakness for analytical purposes. As the figure indicates, some countries fall between two or more categories. For example, Norway falls between conservative and social democratic, and between dual role and equality.

Welfare Regimes and the Single-Mother Family

I adopt Esping-Andersen's framework and use it as an integral part of my analysis to determine the moderating influence of family policy environments on the relationship between single motherhood and children's educational achievement. I selected this framework for a number of key reasons. First, Esping-Andersen's framework of the three worlds of welfare capitalism is undoubtedly one of the most significant classifications of welfare state regimes. Secondly, in contrast to frameworks such as Duncan and Edwards' *Genderfare* model, the regime categories are more distinct. Thirdly, Esping-Andersen's framework is not just an *ad hoc* and descriptive classification, but is based upon a systematic analysis of the social policies of industrialized nations. The basis of his analysis is primarily concerned with the extent to which the welfare state removes workers' reliance on the market place and frees individuals from their family obligations. As previously indicated, my study focuses on children from single-mother homes. For these families, balancing work and family commitments is particularly challenging, therefore, policies that may mitigate or exacerbate this work-family nexus are particularly relevant for an analysis that includes single-mother families.

Because of the increasing trend of single-parent families, particularly those headed by women, various studies have examined this subject in order to discover whether children are at an educational disadvantage because of the absence of one of their biological parents. As discussed in the previous chapter, many researchers have found that single motherhood does have an effect on educational outcomes. In order to highlight the essential differences across Esping-Andersen's three regimes, I have provided some family policy indicators that are relevant to children who reside in single-mother homes.

Table 3 illustrates the percentage of single-mother families who live below the poverty line. In order to emphasize the differences between the various approaches to social policymaking, I have grouped a sample of countries from this study according to Esping-Andersen's typology.⁵ As the table clearly illustrates, children in single-mother homes are at a greater risk of living in poverty than those children who reside with two parents. Nearly 60 percent of all children from single-mother homes in the United States live in poverty, compared to Sweden where only 4.5 percent live in poverty. It is also interesting to note that although both the United States and the United Kingdom have high rates of single-parent homes, this does not, according to Bradbury and Jantti (1999), explain the high rates of poverty. They found that both Norway and Sweden have high instances of single-parent homes, but they also have the lowest rates of child poverty.

⁵ These countries were selected for illustrative purposes in order to highlight the differences across the three regimes.

Table 3.

The child poverty rates^a, by country and regimes, for children in single-mother families compared to those from two-parent families.

	Single-Mother Family	Two-Parent Family
Conservative Regime		
Austria	33.2	2.9
Belgium	11.8	6.1
Germany	43.3	8.5
Average	29.4	5.8
Liberal Regime		
Australia	38.3	14.7
Canada	45.3	12.3
United Kingdom	40.3	17.5
United States	59.6	16.7
Average	45.9	15.3
Social Democratic Regime		
Denmark	10.5	5.5
Finland	6.2	3.0
Norway	10.4	3.4
Sweden	4.5	3.6
Average	7.9	3.9

Source. Bradbury & Jantti (1999)

By grouping the countries based upon their approaches to social policymaking and welfare, it becomes easy to compare countries with similar policy environments.⁶ The low poverty rates among the social democratic countries are consistent with their history of generous family and child allowances and their commitment to full employment. The liberal countries, which rely on the market to

⁶ The following tables are grouped by welfare state regimes and averages calculated by the author.

provide when the family fails, appear ineffective at moving single-mother families out of the poverty trap.

In addition to the greater poverty rates among single-mother families in the liberal regimes, these nations do not adequately resolve the work-family conflict. While 84 percent of single mothers in Denmark participate in the workforce, only 34 percent in the United Kingdom work (Kamerman, 2000). Table 4 shows the percentage of single mothers who are employed, as well as the percentage of children in early childhood education and care. This table illustrates clearly how some countries appear successful at resolving the work-family conflict. In Denmark, a single mother can enjoy the financial rewards and benefits of work and have access to childcare. The Nordic countries appear to be committed to early childhood education and care. Around 50 percent of all children, from newborns to age three in Denmark, Finland, and Sweden, participate in full- or part-day care. This is obviously a necessity with so many mothers in the workforce.

Table 4.

Percentage of single mothers employed and the percentage of young children in out of the home early childhood education and care.

Country	Single Mothers	Percentage of children by age in early childhood education and care (full-day & part-day)	
		0-3	3-6
Conservative Regime			
Austria	46	3	80
Belgium	61	30	97
Germany	41	5	85
Average	49.3	12.6	87.3
Liberal Regime			
Australia	56	n/a	80
Ireland	32	2	55
United Kingdom	62	2	60
United States	68	26	71
Average	54.5	10	66.5
Social Democratic Regime			
Denmark	84	58	83
Finland	70	48	73
Norway	77	n/a	n/a
Sweden	80	48	79
Average	77.8	51.3	78.3

Source: Kamerman (2000)

If a country such as those labeled conservative is committed to preserving the traditional family model of the mother staying at home and raising their children, then we would expect generous benefits in order that the mother could fulfill this role. Table 5 shows the net replacement rates for a single parent with

two children.⁷ These statistics indicate much about the respective welfare regimes. From this table we can conclude that the conservative countries provide a consistent level of benefits to those single parents who opt to stay at home and care for their children. For the social democratic countries, the net replacement rates are generous in the short term however, the expectation on the parent is to be employed in the immediate future. In the liberal welfare regime countries, the benefits appear meager, both in the short and long term, when compared to the other two clusters of countries.

⁷ As the overwhelming majority of single-parent families are headed by women, it is appropriate to use statistics that refer to single parents, as well as just single mothers.

Table 5.

Net replacement rates^a by the Average Production Worker (APW) for single parents with two children.

Country	Single parent with two children	
	In the first month of benefit receipt	For long-term benefit recipients
	%	%
Conservative Regime		
Austria	72	70
Belgium	65	69
Germany	71	63
Average	69	67
Liberal Regime		
Australia	59	60
Canada	68	58
United Kingdom	54	63
United States	62	41
Average	61	56
Social Democratic Regime		
Denmark	75	70
Finland	84	68
Norway	74	62
Sweden	95	75
Average	82	69

^a Replacement rate = $\frac{\text{Income when receiving benefits}}{\text{Income when employed}}$

Source: OECD (1999)

The following table (Table 6) provides a summary that differentiates the level and nature of the policies that are sources of income for a single-mother family. The three main sources of income for single-mother families according to

Millar (1996) are; social security benefits (child benefit package), paid work, and child maintenance.

Table 6.

Nature and level of policies that are sources of income for single-parent families.

Country	Child Benefit Package	Maintenance System	Employment Rate of Single Mothers: Partnered Mothers
Conservative Regime			
Austria	Medium	Mixed	Higher
Belgium	Medium-High	Mixed	Lower
France	High	Mixed	Equally High
Germany	Medium	Mixed	Higher
Greece	Low	Private	Higher
Italy	Low	Private	Higher
Portugal	Low	Private	Higher
Spain	Low	Private	Higher
Liberal Regime			
Australia	Medium-Low	Private/Child Support	Lower
Ireland	Low	Private	Equally Lower
New Zealand	Medium-Low	Private/Child Support	Lower
United Kingdom	Medium-Low	Private/Child Support	Lower
United States	Medium-Low	Private/Child Support	Equal
Social Democratic Regime			
Denmark	High	State Advanced	Equally High
Finland	High	State Advanced	Equally High
Norway	High	State Advanced	Equally High
Sweden	High	State Advanced	Equally High

Source: adapted from Millar (1996)

The generosity of the child benefit packages for single-mother families is high in those same countries (i.e., Nordic countries) where the packages are high for all family types. This pattern is also consistent in those countries that have the

lowest levels of support (i.e., Southern European countries). In the case of child maintenance, there are, according to Millar (1996), essentially two policy strategies for providing payment to single parents; child support schemes and state advanced maintenance. As Table 6 indicates, the social democratic countries have a state advanced system of child maintenance in which the payments are guaranteed by the state. In practice, the state pays the single-parent family their appropriate payments and then they recoup the costs from the absent parent. In the case of child support, maintenance payments are often based upon a standard formula with the absent parent required to pay the amount that is calculated. In reality, these child support payments are often not met by the absent parent. Many of the countries in this study have a combination of private arrangements between the custodial and absent parent along with child support maintenance programs. This is the case in Austria, where there is a combination of state guaranteed funds and private arrangements between the two parties.

The third major source of income for single-mother families is paid employment. As Table 6 illustrates, there is considerable variation across the countries in this study in the employment rates of single mothers compared to mothers who reside with a partner. Consistent with the ideology of full employment, the social democratic countries have high employment rates for all women, irrespective of their marital status. The employment rate of single mothers in this cluster of countries is somewhat paradoxical. In the case of Sweden, the replacement rate for a single mother who transitions from employment to benefits is

95 percent (see Table 5). This would suggest that many single mothers in Sweden would opt not to work, however, this is not the case. Similarly, in the United Kingdom where the replacement rate is low (54 percent), you would expect more single mothers to participate in the work force. However, paradoxically, the employment rates are low. As Millar (1996) concludes, this is reflective of the overall policy regime of these countries. In Sweden, for example, policies that help women enter the work place, such as childcare and parental leave, encourage single mothers to enter the labor force.

Family policy may alter the relationship between single motherhood and parental involvement through parental leave and public day care. In some countries, single parents can take paid leave for a newborn or when a child is sick. In Austria, for example, a parent can take up to two years in leave to spend with their child/children, while in Canada, a parent qualifies for 55 percent wage replacement during their ten weeks for parental leave. A parent in Finland can qualify for a flat rate amount paid until the child is three years old in order that they can rear their child. Such policies can clearly enhance the time a parent spends with their child and allow the parent to participate more actively in their child's education and development.

The final table (Table 7) paints a broad picture of 10 countries' commitment to spending on family policies and may indeed be interpreted as how child-centered a country is. Column one shows the spending on family policies as a percentage of the total social spending. Again, the social democratic countries appear more

committed to family policymaking compared to both the conservative and liberal regimes. Finland allocates 8.7 percent of its social spending budget to family policies in comparison to Germany and the United States who both allocate only 4.4 percent. Family policy expenditure as calculated by spending on family policy programs per child produces some interesting statistics. The richest nation in the world, the United States, spends the least amount of money on family policy programs per child when compared to ten other industrialized nations. As Table 7 illustrates, the liberal welfare regime countries appear to be the least generous when it comes to family policy spending.

Table 7.

Family policy expenditure, by country and regime, as a percentage of total social spending, and spending on family policy programs per child.

Country	Family policy as a percent of total social spending (%)	Spending on family policy programs per child (\$)
Conservative Regime		
Austria	7.3	1,447
Belgium	8.1	1,540
Germany	4.4	961
Average	6.6	1,316
Liberal Regime		
Ireland	8.1	687
United Kingdom	8.3	1,226
United States	4.4	575
Average	6.9	829
Social Democratic Regime		
Denmark	6.5	1,598
Finland	8.7	1,690
Norway	8.2	1,792
Sweden	7.3	1,740
Average	7.7	1,705

Source: Gornick and Meyers, (2001)

From this presentation of family policy indicators, it is possible to see the big picture of how the countries that make up these three regime categories differ in their policy environments. In the next section, I provide a detailed breakdown of the family policies that influence the lives of children from single-mother homes.

An Overview of Family Policies in Selected Countries

Many family policies that affect mother-only families are concerned with providing some financial assistance or exemption from taxes and charges. Every country in this study has some sort of benefit package that assists parents with the costs of raising their children. These child benefit packages include tax benefits, cash benefits, subsidies, various services in kind, and exemptions from charges. Previous research has shown that these child benefit packages vary between countries according to family structure, income, and employment status (Bradshaw, Ditch, Holmes, & Whiteford, 1993; Bradshaw & Piachaud, 1980; Ditch, Barnes, & Bradshaw, 1996; Ditch, Barnes, Bradshaw, Commaille, & Earle, 1995; Ditch, Barnes, Bradshaw, & Kilkey, 1998). Some countries provide benefits that are aimed at single-parent families, while other countries do not have any provisions for this family structure. Equally, social assistance is sometimes dependent on earnings level, for example, low-income families in some nations receive extra cash transfers or additional housing subsidies.

For the remainder of this section, I emphasize the key aspects of the child benefit packages of seven countries from this study in order to illustrate the type of policies that exist and how some of these policies financially assist single-parent families. The policies highlighted in this section are those that help support family income (e.g., child benefits) and those that are concerned with the provision of direct services such as early childhood education (see Baker, 1995).

The countries are selected based upon their welfare state classification. From the liberal regime, I have selected the United States and Australia. The United States is considered the archetypical liberal welfare state country where social assistance is considered residual and meager (Esping-Andersen, 1990). For the social democratic welfare states, I have chosen Sweden because it is considered the most representative of this particular cluster of countries when it comes to social policymaking. Along with Sweden, I provide an overview of the Norwegian child benefit packages and other relevant family policies. For the conservative regime countries, I have chosen to provide an overview for three of eight countries. Austria and France represent the continental conservative countries, while Portugal represents the southern European conservative countries.

Liberal Regime Countries

United States. The United States is characterized as having implicit family policies with benefits and social assistance programs that are means-tested, low, and carry some degree of social stigma. Parents can claim a \$600 tax credit for each child under the age of 17, in addition, low-income families qualify for *Earned Income Tax Credit* that is primarily aimed at working families with children. The United States has no universal family allowance benefits but, instead, the *Temporary Assistance for Needy Families* (TANF) provides cash assistance for low-income families with children. The benefit amount varies by family size but not by family type, therefore single-parent families do not receive any extra assistance via this program. Child maintenance is not guaranteed, however, the

government does have the right to pursue support from the absent parent and in return provides cash benefits to the recipients (Bradshaw & Finch, 2002).

There is no national system of early childhood education and care in the United States. This is also the case at the state level. The majority of childcare for children aged five and under is center-based with parents paying fees that cover about 75 percent of the costs. Federal funds, are for the most part, targeted at low-income families (i.e., Head Start and Early Head Start) and children with disabilities. The Childcare Development Fund Block Grant, which was created in 1996, is the main source of subsidy for poor families with children.

Australia. Consistent with the other liberal regime countries, Australia is known for its residual approach to social provision. Many benefits and services are both income- and asset-tested. Family allowances in Australia are subject to means testing and vary according to age groups (under 13, 13-15, 16-18, and 18-24). The minimum amount for a child aged 0-17 years of age in 1999 was \$31.76 for two weeks. It should be noted that all currencies, unless otherwise stated, are converted into U.S. dollars by using purchasing power parities. The maximum amount for a child under 13 was \$132.66 and for a child 13-15 was \$172.50 (Social Security Administration, 1999).

The Family Tax Benefit is aimed at providing assistance to low-income families and single-parent households. This benefit can be paid to the recipient in one of three ways: as a tax deduction, as an end-of-year lump sum, or as a regular income support payment. Other child-conditioned income transfers include the

Additional Family Payment that provides means-tested assistance to working families with children. Single parents with a child under the age of 16 can qualify for the Sole Parent Pension. To receive this allowance the parent is not required to seek work and, as such, the number of payments to sole parents has risen from 240,00 to 382,000 in ten years (Clearinghouse, 2001). Child maintenance is not guaranteed by the government that means that if funds are not forthcoming from the absent parent, the government does not meet the shortfall. This is in contrast to a number of European countries.

State-provided childcare is not guaranteed in Australia, mainly due to limited childcare provision across the country. The majority of childcare in Australia is provided by private enterprise. However, priority is given to children who are at risk and those from single-parent families whose parents need childcare in order to work. Low to middle-income families, whose children are in approved childcare, can claim Childcare Assistance.

Social Democratic Countries

Sweden. Equality and solidarity are the two principles that guide Swedish family policymaking (Meisaari-Polsa, 1997). Sweden is known for its universal entitlement with benefits aimed at the individual with a support system which, for the most part, is financed by taxes. Sweden has a universal, non means-tested family allowance program, “Barnbidrag”, which is payable to all families with

children under the age of 16.⁸ In 2001, this monthly allowance was approximately \$100 with a special child allowance paid to single parents and the children of widows. For children of separated, divorced, or unmarried parents, the non-custodial parent is expected to pay child support. If this money is not forthcoming, the government guarantees a minimum amount of \$123.73 for the child (Bradshaw & Finch, 2002). Additional income transfers, such as the Social Welfare Allowances, “Socialbidrag”, are available to those families who are in need of help. Single-parent families account for approximately 60 percent of the families that claim Social Assistance.

Early childhood education forms one of the key elements of Sweden’s family policy (Kamerman, 1998). Early childhood education and care in Sweden is universal and is heavily subsidized at both the national and local level. Parents pay an income-related fee that is in the region of 1 - 3 percent of their annual income. These fees cover approximately 17 percent of the operating costs. Approximately 75 percent of Swedish children between the ages of 0-6 attend these early childhood education and care programs, allowing many mothers the opportunity to enter the workforce. Priority is given to children from mother-only families, working mothers, and low income and immigrant families.

Norway. Family policies in Norway are based upon principles of universalism and egalitarianism with a strong emphasis on the protection of the child and the equalization of men and women. As such, the reconciliation of work

⁸ Young adults up to the age of 20 also receive family allowance providing they are in full-time education.

and family life is central to Norway's family policymaking. In Norway, incomes below \$2,104 are not subject to tax. However, for single parents this amount doubles to \$4,208 before tax is paid (Bradshaw & Finch, 2002). Norway also has universal family allowance that is paid to all families that have dependent children under the age of 18. Families receive \$1,034.64 a year each for the first and second child and then \$1,218.99 for each additional child (Social Security Administration, 1999). Single parents receive an additional payment equivalent to having an additional child. For example, a single parent with one child receives the same amount of family allowance as a two-parent family with two children. Single parents are also entitled to a *Transitional Allowance* that is an income-tested benefit payable to single parents whose youngest child is under 10 years of age (Clearinghouse, 2001). Norway also has guaranteed child maintenance that is paid to the custodial parent if the non-resident parent does not meet their financial obligations. This state-paid maintenance is the equivalent of \$108 a month (Bradshaw & Finch, 2002).

Norway has a diverse system of early childhood education and care that includes part-day and full-day centers, parent co-operatives, centers for children and their caregivers, and supervised family daycare homes. Norway's universal early childhood education and care, "Barnehage", is funded at both the state and local level. The national government contributes 40 percent, the local municipality funds 30 percent, and parent fees cover the remaining 30 percent of the early childhood education and care costs.

Conservative Countries

Austria. The family benefits in Austria are very generous, especially when they are compared to the rest of the European Union (EU). However, the dominant ideology that emphasizes the male breadwinner model has resulted in a policy package that does little to reconcile the work-family conflict. Single parents and one-earner families are entitled to a \$5,000-a-year tax credit, and for each dependent child there is a monthly tax credit of \$54.26 (Bradshaw & Finch, 2002). Austria has universal family allowance benefits for which parents receive a monthly amount for each dependent child. This amount varies by the age of the child and the birth order, however, generally speaking the family receives the equivalent of \$100.76 per month for children up to 10 years of age, and \$120.16 for a child aged up to 19 years of age (Social Security Administration, 1999). Absent parents are required to pay child maintenance. However, if this money is not forthcoming, the child maintenance money is guaranteed and paid by the state (Bradshaw & Finch, 2002).

Consistent with the male breadwinner ideology, early childhood education and care in Austria is not high on the national policy agenda. The care of children is the responsibility of the mother and, as such, the structure of childcare provision does little to help women resolve the work-family conflict. Early childhood education and care programs are subsidized through the national and local governments, and parents contribute through income related fees. Only three

percent of children aged three and under are in early childhood education and care programs in Austria.

France. France also has explicit family policies, however, despite generous family policies, single-parent families still tend to have a lower disposable income compared to two-parent households. This is a point made by Lefaucheur and Martin (1997) when they say, “the mean size-adjusted disposable income of single-parent families is lower than that of two-parent families. One out of four families is “on welfare”. Single parents’ circumstances are on average poorer than those of partnered parents” (p. 237). Kilkey (2000) makes a similar observation that despite high employment rates among single mothers many find themselves living in poverty. She suggests that French single mothers are not financially supported as care-givers and, as a consequence of this low level of support, they find themselves “pushed” into paid-work. Paid-work for French single mothers then results in high costs associated with working (e.g., childcare payments).

The income tax system takes into account household size and number of dependent children. In addition, tax credits exist for each child either in compulsory education or in pursuing further education. The *prime pour l'emploi* (working tax credit) includes supplements for various family types, including single-parent families. All families with dependent children are entitled to the universally available family allowance. A family with two children receives \$111.56 per month, a family with three children receives \$254.38, and a payment of \$143.70 is available for each additional child. A monthly benefit of \$78 per child is

available to a single parent in lieu of child maintenance if the other parent is dead, unknown, or unable to pay (Bradshaw & Finch, 2002).

In France, public schooling is guaranteed for children aged three years and older but childcare is not guaranteed. Ecole Maternelle, which is the model of preschool education for 2-6 year olds, is considered an “international exemplar” of early childhood education and care programs. Ecole Maternelle is universal and, as such, is available to all children regardless of parent’s income or employment status. Children under the age of two typically attend crèches or other childcare facilities, all of which are administered by the Ministry of Health. Parents receive subsidies to help cover the costs of childcare.

Portugal. As previously highlighted, the Southern European countries rely heavily on the family, as opposed to the state, to provide welfare for its members. As Karin Wall (2000) emphasizes, the family still “is expected to compensate for weaknesses of social policies” (p. 36). Portugal has a universal cash benefit, dependent on the age of the children and the income of the family, for families with one or two children. For example, a family with a child under the age of one receives a higher amount than a family with older infants and low-income families receive some additional allowances because of their financial situation. According to 1999 data, a single parent with two children aged four and six would receive \$803.64 annually (Social Security Administration, 1999). There are no special allowances for single-parent families with children so this amount would be the same for a married couple with two children. In addition, there are no tax credits

for single-parent families or for families with dependent children. Moreover, child maintenance for single-parent families is not guaranteed by the state.

Early childhood education and care is seriously lacking in Portugal with only 12 percent of children aged 0-3 in childcare (Clearinghouse, 2001). In addition, many of the care facilities are only open for five hours a day and are often closed during lunch (Wall, 2000). “Not-for-profit” childcare facilities do receive some subsidies from the government and children from low-income families can receive a reduction in their fees at these “not-for-profit” facilities.

Summary. The following table (Table 8) provides a summary of three family policies (family and child allowance, child maintenance, and early childhood education and care) for each of the seven countries. The table also allows policies to be compared across the three regimes. The two liberal countries of Australia and the United States share similar policies. For example, child maintenance is not guaranteed in either country, therefore, if the custodial parent does not make a financial contribution to their child’s upbringing, the state does not intervene with funds. This is in contrast to the social democratic countries of Sweden and Norway. Early childhood education and care provision in the liberal countries is also limited and, as such, it becomes difficult for a single parent to adequately resolve the work-family conflict.

Table 8.

A summary of three family policies for seven countries.

Family Policies	Liberal		Social Democratic		Conservative		
	United States	Australia	Sweden	Norway	Austria	France	Portugal
Family & Child Allowance	No Universal Allowances	Universal Allowance Means-Tested	Universal Allowance Non Means-Tested	Universal Allowance Non Means-Tested	Universal Allowance Non Means-Tested	Universal Allowance Non Means-Tested	Universal Allowance Means-Tested
Child Maintenance	Not Guaranteed	Not Guaranteed	Guaranteed	Guaranteed	Guaranteed	Guaranteed	Not Guaranteed
Early Childhood Education & Care	No national or state-wide system	Limited provision	Universal and heavily subsidized	Universal and subsidized	Limited due to ideology	Universal and highly regarded	Limited provision

Clearly, the social democratic countries of Sweden and Norway are similar when we compare the three family policies of family allowances, child maintenance, and early childhood education and care. Family allowances are available to every family who has children regardless of their marital status or income. Child maintenance is guaranteed by the state if the funds from the non-custodial parent are not forthcoming. Finally, early childhood education and care programs in these countries are abundant and highly subsidized by both national and local governments, resulting in a high number of women entering the labor market, including single mothers.

The conservative countries appear to be a mix of both liberal and social democratic regime countries. Portugal, a southern European country, appears very similar to the liberal countries with means-tested family allowances, no child maintenance guarantee, and poor early childhood education and care provision. In contrast, Austria and France have similar policies to the social democratic countries. The exception being early childhood education and care provision in Austria. As previously discussed, the male breadwinner ideology of Austria heavily influences the provision of early childhood education and care in this country due to the expectation that the mother will care for the child in the home. This, of course, becomes a serious conflict for single mothers who are caught between caring for their child at home and working to provide financial support.

As previously highlighted, countries do not always fit snugly into one regime, however, as this overview of family policies indicates, there are definite

patterns and similarities among groups of countries. The United States and Sweden are clearly the archetypical countries for their respective regimes, and appear quite different in their approaches to family policymaking. In this preceding section I have provided a more detailed picture of the actual family policies that impact the lives of single-mother families. The countries selected are representative of the other 11 nations that make up this study, however, it should be noted that family policies do vary between countries in each of the three regime categories. In the next chapter, I provide an overview of the study's conceptual model and present my research questions.

CHAPTER FOUR

RESEARCH QUESTIONS

Introduction

In this study, I consider not only the micro-level mechanisms that may explain the achievement gap between the children from two-parent and mother-only homes, but I also analyze the moderating effect of national policy environments on this educational achievement difference. This dissertation extends previous research (Hampden-Thompson & Pong, forthcoming; Pong, Dronkers, & Hampden-Thompson, 2003) in several key areas. These differences include the use of newer and more substantial student and family policy data, an older age group of children, different outcome variables, and more countries. In addition, and most importantly of all, this study examines the mechanisms through which family policy influences the educational achievement gap between children from single-mother and two-parent families.

This research extends this previous project by utilizing the newer PISA dataset, instead of, the Third International Mathematics and Science Study (TIMSS) dataset used in the Pong, Dronkers, and Hampden-Thompson (2003) and Hampden-Thompson and Pong (forthcoming) studies. PISA 2000 has better measures of family background variables,

including socio-economic and parental involvement measures. The availability of these family economic and parental involvement indicators allows an analysis of the mechanisms through which family policy influences the educational achievement gap of children from single-mother and two-parent families. Besides using a newer student-level database, I use an updated set of country level policy variables made available by the Social Policy Research Unit (SPRU), at the University of York. This set of data, which has only recently become available, is more comprehensive, providing detailed information on taxes, benefits, and services for both family types (single- and two-parent families) across all 18 countries.

This research uses a larger and broader range of countries than the previous research. I include in my analysis 18 countries that are diverse in their approach to family policymaking and in the role of the welfare state. In addition, I examine a different age group. The students in the PISA study are 15 years of age, as opposed to nine years as in the TIMSS population one survey. Therefore, this study will analyze the effect of family policies on high school students who are about to leave compulsory education, rather than nine-year-olds who are in elementary school. I expect that measures of family resources, economic inputs and parental time inputs, are more important to high school adolescents than to elementary school children. To the extent that the influence of single-parenthood may be linked to the type of outcome measures, I extend previous studies by including reading literary, in addition to previous outcomes measures in TIMSS of mathematics and science achievement scores.

In contrast to TIMSS, PISA was concerned with assessing the knowledge and skills a child would need to function in an ever changing world rather than how well they had mastered a specific country's curriculum. The principle guiding data collection in PISA is that reading and mathematics literacy skills are related to labor market success and earnings. Thus it is important for all children to master these skills. These skills are even more important to children from disadvantaged home backgrounds, such as single-parent families, to possess literacy knowledge and skills.

Different from previous research, this study measures family policies two different ways. I differentiate between family policies that pertain to a family's economic inputs (*economic family policy environment*) and policies that are concerned with parental time inputs (*parental time policy environment*).

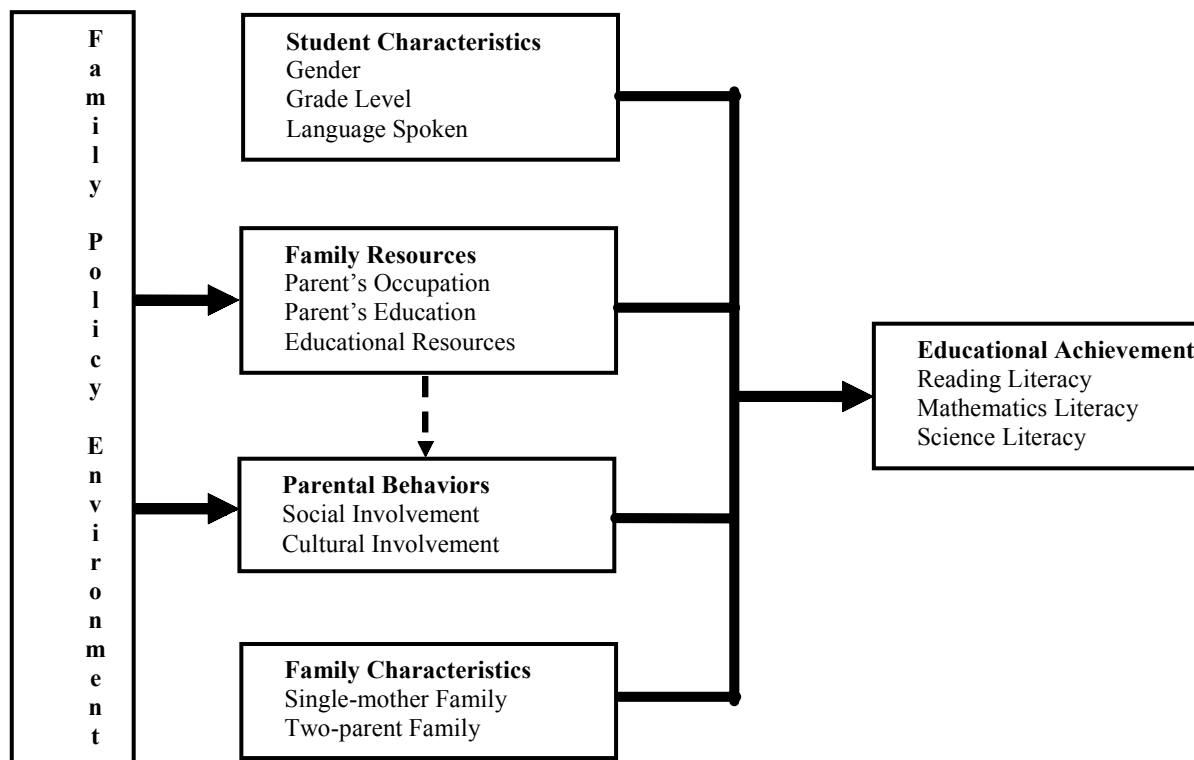
As previously discussed in chapter two, cross-national studies on the effect of single-motherhood on children's educational achievement have been scarce. Even more scant are studies that look at the relationships between family policies and children's academic outcomes. With the growing number of children residing in single-mother homes, additional research that investigates, in more detail, the relationships between family policymaking and children's academic achievement is needed. Comparative research is essential in order to better understand the relative importance of family policy in magnifying, shrinking or indeed eradicating the educational hurdles associated with residing in a single-mother home.

Conceptual Model

Figure 2 illustrates the relationship between the variables used in this study. My primary focus is on the micro-level relationship between literacy achievement and the economic resources of a family as well as the relationship between parental involvement and the literacy achievement gap between children from single-mother and those from two-parent families. In addition, I build the macro-level relationship between family policies and the literacy achievement gap by family types. In chapter two I highlighted four theoretical perspectives-economic deprivation, parental involvement, family conflict, and parental absence-that attempt to explain the educational differences between the two family structures. I highlighted family policymaking, a less researched macro-level perspective to explain why children from single-mother homes fare worse than their counterparts in two-parent families. In this study I focus on two of the four explanations-economic deprivation and parental involvement-as illustrated in my conceptual model diagram, and the macro-level explanation, which suggests that family policies moderate the relationship between single-motherhood and the educational achievement gap.

Figure 2.

Conceptual model illustrating the relationships between family policy and the educational achievement of children from mother-only families.



I have chosen to focus upon the economic deprivation and parental involvement explanations because for this study these two perspectives appear the most salient in explaining the effects of educational achievement of children from single-mother homes. Abundant research on the effects of economic status on child outcomes enhances the

economic deprivation explanation. Single mothers find themselves economically disadvantaged, with nearly 60 percent of these families, in the United States, living in poverty. Money buys books, computers, and other educational resources. Families with high levels of income can live in wealthy neighborhoods with good schools and can afford to let their children participate in extracurricular activities. A family's economic resources have been shown empirically to influence many educational outcomes.

Parental involvement appears to be the second prominent explanation as to why children in single-mother families fare worse educationally than their counterparts from two-parent households. Again, there has been significant research interest in determining the effect of parental involvement, whether home- or school-based, on children's educational outcomes. Research has shown that different forms of parental involvement, such as helping a child with their homework and meeting with school personnel, are positively related to academic achievement. Single mothers tend to exhibit lower levels of parental involvement both at home and at school. For this research, my two parental involvement measures are home-based and are concerned with social and cultural interactions between parent and child.

I expect that the macro-level family policy explanation will complement the economic deprivation and parental involvement perspectives in explaining the literacy achievement gap between children from single-mother and two-parent families. Family policies such as child and family allowances, and other benefit entitlements, are expected to increase a single-mother family's disposable income relative to the disposable income of a two-parent family. An increase in disposable income can lead to more educational

resources in the home (e.g., books and computers) and money for participation in extracurricular activities (e.g., summer camp programs), both of which are associated with higher educational achievement. Similarly, I expect that family policy environments that positively effect single mother's time with their children will lead to an increase in parental involvement which in turn has positive implications for the achievement of children who reside in these families.

As highlighted in chapter three, the nature and level of family policies vary across the three welfare regimes of social democratic, conservative, and liberal. I anticipate that the relationship between a country's family policy environment and the literacy achievement gap will vary across these three welfare clusters. I expect, therefore, that the literacy achievement gap between students from single-mother and two-parent households is influenced by family policies that affect the economic and/or time resources of these two family structures. The expected relationship between the policy environment of a country and the literacy gap between children from mother-only and two-parent homes form the basis of the my research questions.

Research Questions

The research questions for this study are as follows.

1. Is there a gap in reading, mathematics, and science literacy between children from two-parent families and those from single-mother families? If so, does this gap vary across nations?

2. Do children who reside in single-mother families have fewer economic resources than those who reside with two-parents?
3. Do children who reside in single-mother have fewer social and cultural interactions (parental time inputs) with their parent than those who reside with two-parents?
4. What is the relationship between family's economic inputs and parental time inputs and student's literacy achievement?
5. Does a nation's family policy environment influence the relationship between single-motherhood and children's literacy achievement through changing the family's economic inputs and parental time inputs?

CHAPTER FIVE

DATA & METHODS

Data

In this study, I use the newly released data from the Program for International Student Assessment (PISA). Sponsored by the Organization for Economic Cooperation and Development (OECD), PISA 2000 is a unique international study conducted in 32 countries. PISA measured the reading, mathematics, and science literacy of 15-year-olds, using multi-step reasoning and real-world situational test items. Reading literacy was the main focus of PISA 2000 and, as such, all sampled students sat the reading literacy tests. The sample sizes for reading compared to mathematics and science are presented later in this chapter.

PISA was concerned with assessing the knowledge and skills a child would need to function in an ever-changing world, rather than how well they had mastered a specific country's curriculum. The nationally representative samples range from 300 to 10,000 students per country, resulting in a total of 265,000 across all 32 countries. PISA employed

a stratified random sampling method to select the schools within each country and then the students within each of these schools.

The country-level family policy variables are drawn from the Social Policy Research Unit's (SPRU) database at the University of York, England. This database, compiled by Jonathan Bradshaw and his colleagues at York, provides detailed information on child benefit packages for each of the countries chosen for this study. It is possible to compare the level and structure of aspects of the child benefit packages across different family types, levels of earnings, and across countries by converting the local currency into a common currency, in this case purchasing power parities (ppp's).

Additional family policy, demographic, and contextual data was collected from a variety of national and international sources, including the OECD, the United Nations, and the Clearinghouse on International Developments in Child, Youth and Family Policies at Columbia University.

Selection of Countries

In this study, I compare countries with similar Western cultural traditions in an attempt to “control” for cultural influence. Along with the United States, 17 other industrialized countries are selected for comparison: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Greece, Ireland, Italy, New Zealand, Norway, Portugal, Spain, Sweden, and the United Kingdom. All 18 industrialized nations share many commonalities and similar Western cultural traditions. PISA is sponsored by the Organization for Economic Co-operation and Development (OECD), and as such, all 18 countries in this study are members of this organization whose principles are based upon

democratic government and the market economy. These countries, as previously discussed, can be grouped according to their approach to social policy and the welfare state. There are three distinct regime categories: Liberal regimes (Australia, Canada, Ireland, New Zealand, the United Kingdom, and the United States), Conservative regimes (Austria, Belgium, France, Germany, Greece, Italy, Portugal, and Spain), and finally, the Social Democratic regimes (Denmark, Finland, Norway, and Sweden).

Variables and Measures

Dependent Variables

Reading, Mathematics, and Science Literacy

Reading, mathematics, and science literacy achievement scores are the dependent variables for this study. Due to the extensive nature of the material within the literacy tests, no student completed all the test items. Therefore, PISA utilized Item Response Theory (IRT) to generate five plausible values for each subject. Plausible values are provided for each of the three domains of reading, mathematics, and science literacy. In addition, the three reading subscale measures of retrieving information, interpreting, and reflecting and evaluating are also provided in the database. For this study, only the plausible values for the domains will be utilized and not the three reading subscales.

The PISA literacy assessments for reading, mathematics, and science were designed to cover a broad range of content across each of the domains. Therefore, there is a conflict between the amount of material to be assessed and the time constraints of administering the

tests. There was in total seven hours of assessment items, however, each student only sat for two hours' worth of these paper and pencil tests. To accomplish this, PISA created nine different versions of the test, through which the test items were rotated. Because each student was only given a fraction of the entire test multiple imputation methodology had to be employed. Using IRT, plausible values were generated for each student based upon the student's responses to the test items they were given and the performance of students with similar characteristics. See the PISA technical report for more information on the scaling of the domains. Due to the random component of the plausible values, multiple values are drawn for each student. As a consequence, five plausible values are assigned to each student and are included in the PISA dataset.

Analysis in this study combines all five plausible values. According to the PISA (Organisation for Economic Co-operation and Development, 2000) manual, "for the final estimates, it is recommended that all five plausible values be used, otherwise the standard error estimated from one plausible value will only contain the sampling variance component while it should also contain the measurement error" (p. 24).

Table 9 contains the sample sizes for the reading, mathematics, and science datasets. At first glance two things become obvious. First, Canada's large sample sizes and second, the difference between the sample sizes for reading literacy compared to mathematics and science literacy. It is interesting to note that Canada was keen to secure representative samples of not only the country but also of the 10 provinces, hence the large overall sample size when compared to the other 17 countries. As previously discussed, reading literacy was the main focus of PISA 2000, and therefore, greater numbers of

children were included in the reading literacy assessments. The sample design of PISA resulted in all the students in the sample completing the reading literacy test, with two-ninths of this sample sitting both the mathematics and science literacy tests. This resulted in seven-ninths of the sample sitting the reading literacy test and either the mathematics or science literacy tests. The implications of this sample design means that three different data files are used in analysis. It should be noted that exploratory analysis has revealed only minute variation between the overall mean descriptive statistics for students' background information across datasets (reading, mathematics, science) and countries.

Table 9.

Total sample sizes by country for reading, mathematics, and science literacy.

Country	Reading	Mathematics	Science
Australia	5176	2859	2860
Austria	4745	2640	2669
Belgium	6670	3784	3722
Canada	29687	16489	16488
Denmark	4235	2382	2346
Finland	4864	2703	2710
France	4673	2597	2592
Germany	5073	2830	2855
Greece	4672	2605	2593
Ireland	3854	2128	2134
Italy	4984	2765	2766
New Zealand	3667	2048	2029
Norway	4147	2307	2308
Portugal	4585	2545	2552
Spain	6214	3428	3457
Sweden	4416	2464	2444
United Kingdom	9340	5195	5179
United States	3846	2135	2129
Total (<i>N</i>)	114848	63904	63833

Independent Variables

Family Structure

The major independent variables of interest are single motherhood, economic inputs, and parental time at the student level, and family policies at the country level. The single mother variable is constructed from the child's response to the questionnaire item that asks them to indicate who they live with. The child was asked "Who usually lives at

home with you?” The child could answer yes or no to the following list, mother, other female guardian (e.g., stepmother or foster mother), father, other male guardian (e.g., stepfather or foster father), brother(s) (including stepbrothers), sisters(s) (including stepsisters), grandparents(s), and others. From this information, four family structure variables were created, single-mother family (child said they lived with their mother only and no other stepparent/guardian), two-parent family (child said they live with both their mother and father), mixed family (child responded that they lived with a stepparent or guardian, and their mother or father). The final category is labeled as “other.” This group consists of households headed by single fathers, guardians only, such as step/foster parent and no biological parent, or headed by only grandparents, or siblings only. For the multivariate analysis, I combine families headed by fathers only in this “other” category, in order to separate mother-only families from father-only households.

For the purposes of this study, the two-parent and mother-only family variables are independent variables of interest, while the mixed and other family variables are used as controls. Mixed (including step families) and other (including guardian and father-only families) are significantly different from both mother-only and two-parent families, therefore it is both important and necessary to distinguish between those children from these family structures and those who reside in mother-only and two-parent families.

Economic Inputs

Parents’ occupation. In the student questionnaire, the 15-year-old is asked to report both their father’s and mother’s occupations and to state whether their parents are working in full-time or part-time paid work, not working but looking for a paid job, or other. The

occupation questions were open-ended and were coded in accordance with the International Standard Classification of Occupations (ISCO-1988) (International Labor Office, 1990). The ISCO (1988) and its predecessor, the ISCO-1968 (International Labor Office, 1969), have been widely used in comparative and stratification research (Ganzeboom & Treiman, 1996). This classification has nine major groups (see Table 10), 28 sub-major groups, 116 minor groups, and 390 unit groups.

Table 10.

The nine major groups of the International Standard Classification of Occupations 1988.

Digits	Major Occupational Groups
1000	Legislators, Senior Officials and Managers
2000	Professionals
3000	Technicians and Associate Professionals
4000	Clerks
5000	Service Workers, Shop and Market Sales
6000	Skilled Agricultural and Fishery Workers
7000	Craft and Related Trades Workers
8000	Plant and Machine Operators and Assemblers
9000	Elementary Occupations

Source: ILO (1990)

The ISCO codes were then transformed into the International Socio-Economic Index of Occupational Status (ISEI). According to Ganzeboom and Treiman (1996), “we conceive of the ISEI as measuring the attributes of occupations that convert a person’s education into income” (p. 212). They go on to explain that “the ISEI index is generated by the optimal scaling of occupation unit groups to maximize the direct effect of education on income, net of occupation (with both effects net of age)” (p. 212). Ganzeboom,

DeGraaf, and Treiman (1992) consider occupation to be an intermediate step that converts education into income.

The ISEI scale is constructed in a similar manner to other national socio-economic indices (SEI), such as Duncan (1961). ISEI scales are similar to occupational prestige scales however, there are a number of small differences. These differences, with the most significant difference concerned with the relative placement of farmers, are highlighted by Ganzeboom, DeGraaf, and Treiman (1992). They suggest that ISEI measures are more representative of intergenerational status attainment processes.

This study will utilize the variable HISEI (provide by PISA), which is based on either the mother's or father's occupations, whichever is higher. The index ranges from 16 through to 90, with a low score representing low economic status and a high score representing high economic status. By way of an example, Table 11 contains a number of occupations and their corresponding ISEI index numbers.

Table 11.

Examples of occupations and their corresponding ISEI codes.

ISEI Code	Occupation
90	Judges
88	Medical Doctors
77	University Professor
74	Chemists
71	Computer systems designers and analysis
66	Primary education teaching professionals
54	Sculptors, painters, and artists
51	Social work professionals
45	Civil engineering technicians
38	Nursing associate professionals
30	Cooks
25	Childcare workers
23	Dairy and livestock producers
16	Farmhands and laborers

Source: Ganzeboom & Treiman (1996)

Parental education. Human capital theory suggests that higher investments in human capital, particularly education, yield higher returns in terms of earned income (Schultz, 1963). Therefore, I include parental education as a proxy for a family's economic inputs.

In the student questionnaire, the child was asked to indicate how much education their parent/parents completed. The children's responses were then coded in accordance with the International Standard Classification of Education (ISCED) in order to obtain internationally comparable categories for the parents' educational attainment level. For both mothers' and fathers' educational attainment there was a range from one (did not go to school) to six (completed tertiary education). Table 12 contains the ISCED levels and, for illustrative purposes, the United States equivalent. For the purposes of this study, I created

a new variable that represents the highest level of attainment, irrespective of whether the highest is the mother's or fathers. The variable has three levels, no more than lower secondary educated, upper secondary educated, and tertiary educated. My recoding of the parental education variable can also be viewed in Table 12.

Table 12.

International Standard Classification of Education (ISCED) levels and their U.S. equivalent, and the parental education recodes.

ISCED Level	United States Equivalent	Recode of Parental Education Variable
Level 1	Primary Education (1 st -6 th grades)	Lower Secondary and Below Educated
Level 2	Lower Secondary (7 th -9 th grades)	Lower Secondary and Below Educated
Levels 3A, 3B or 3C	Upper Secondary (10 th -12 th grades)	Upper Secondary Educated
Levels 5A, 5B, or 6	Higher Education	Tertiary Educated

Source: OECD (2000)

Books in the home. The availability of educational resources, such as books, has long been positively associated with various educational outcomes (see Lareau, 1989; Teachman, 1987). Many surveys include a question that asks the student to indicate how many books are in their home. The response categories in PISA to this question are *none*, *1-10 books*, *11-50 books*, *51-100 books*, *101-250 books*, *251-500 books*, and *more than 500 books*. For the purposes of this research, I collapsed the categories to create four levels, *10 books or less*, *11-100 books*, *101-250 books*, and *more than 250 books*.

Parental time inputs. The parental time variables are derived from the child's response to how frequently their parent/parents do the following activities with them: eat a main meal together, spend time talking, discuss political and social issues, and discuss books, films or television programs. The response categories for all four variables include *never, a few times a year, about once a month, several times a month, and several times a week*. The two variables *frequency of eating meals together* and *frequency of spending time talking* were combined to form an index, which I will refer to as *parental social involvement*. Factor analysis was used to construct the two parental involvement indices. The factor loadings for each of the indices were in excess of .80, which is considered excellent (Comrey & Lee, 1992). I applied the same strategy to the two discussion variables (discuss political and social issues, and discuss books, films or television programs) and named this index *parental cultural involvement*. The reliability alpha scores for the indices were .62 for the parental cultural involvement index and .50 for the parental social involvement index. The internal consistency for these indices is moderate, but satisfactory.

Family Policy Variables

This study is focused on two distinct types of family policies. First, those policies that determine the disposable income of single-mother families (economic policy environment). Second, those policies that provide leave from work and a balance between paid work and unpaid care (parental time policy environment). The country-level family policy variables are drawn from the Social Policy Research Unit's (SPRU) database at the University of York, England. This database, compiled by Jonathan Bradshaw and his

colleagues at York, provides detailed information on each country's package of tax benefits, cash benefits, exemptions, subsidies, and services in kind that are aimed at helping in the cost of raising a child. It is possible to compare the level and the structural aspects of these child benefit packages across different family types, levels of earnings, and across countries by converting the local currency into a common currency, in this case purchasing power parities (ppp's) converted into US dollars (US\$). Data for the family policy variables concerned with parental time (parental time policy environment) this data are from the SSRU at York.

During 2003 I spent one month at the University of York constructing the economic policy variable used in this study. The parental time data used in this study is from the same data source. However, the construction of the parental time policy indices used in this analysis were constructed by Majella Kilkey, formerly of SSRU. During my visit to the University of York I also spent time with Majella Kilkey, who is now based at Hull University, reviewing the suitability of her previously constructed parental time policy indices for use in my analysis. In the following section I provide a description of the two family policy variables.

Economic policy environment. Using the *model families approach*, national informants from each country calculated the gross earnings, income tax payable, employee social security contributions, income-related child benefits, non-means-tested child benefit, gross and net local taxes, net childcare costs, health charges/benefits, guaranteed child support, and, finally, other taxes and benefits unique to that particular country. The *model families approach* was pioneered by Kamerman and Kahn (see Kahn

& Kamerman, 1983; Kamerman & Kahn, 1989, 1978) in their research that examined the impact of family policy on single parents. This method has also been widely used by the researchers at the University of York (see Bradshaw et al., 1993; Bradshaw et al., 1996; Ditch et al., 1996; Ditch et al., 1995; Ditch et al., 1998; Kilkey, 2000) and by the OECD (see Organisation for Economic Co-operation and Development, 2001b). This approach establishes a framework from which comparisons between countries can be made. This framework defines family types and earning levels. Based on each family type and earnings level, calculations can be made that determine what income tax and social security contributions are payable, as well as what other taxes and benefits are either received or paid by the family. From this information comparisons can be made, not only across family types and earning levels, but also across countries. By converting the local currency into a common currency, these comparisons become even more lucid. For the purposes of this study I converted the local currencies of each of the 18 countries into US\$ using purchasing power parities (ppp's). Purchasing power parities are less susceptible to rapid fluctuations, and are representative of the prices of identical bundles of traded goods and services within a country.

For this analysis I utilize the data for two model families, a two-parent family with two children aged 14 and 7 years, and a single parent with two children aged 14 and 7 years. I chose this particular family structure because the 14-year-old child is similar in age to the 15-year-olds sampled in the PISA study. For these two family types I use six different income types: no earner, receiving social assistance; one earner working 16 hours per week for the minimum wage of each country; one earner, half national male earnings;

one earner, half national female earnings; one earner, average national male earnings; and, one earner, average national female earnings. These earnings levels are then combined into two groups: low-income families (social assistance, minimum wage, half national male, and half national female) and average-income families (average national male and average national female). I divide the earnings levels into two distinct groups (low-income family and average-income family) because single mothers, due to both their gender and family structure, often find themselves in low paid employment or social assistance. This strategy allows me to determine if the relationship between achievement and family structure is influenced by the level of family's monthly earnings.

The economic policy environment variables are the disposable income "gap" between single- and two-parent families after taxes, benefits, housing costs, and services have been adjusted for. For the economic policy variable, it is not possible to distinguish between mother- and father-only families because this set of policies are not gender specific. This is in contrast to the parental time variables in which some policies are gender specific such as, maternity and paternity leave. Therefore, when I refer to the economic policy variable the comparison is between two-parent and single-parent families.

For each of the 18 countries, the national gross earnings levels are calculated. For example, in 2000 an average female earner in the United States had a gross monthly income of \$2370.33. Depending on the number of children in the family, various benefits, taxes, and services are added or deducted. The following policies determine the net disposable income of both family structures: income tax benefits (e.g., Child Tax Credit and Earned Income Tax Credit); social security contributions; income related child benefits

(e.g., Temporary Assistance for Needy Families); non income-tested child cash benefits; rent benefits; local taxes; childcare costs (e.g., Dependent Care Tax Credit); school/costs/benefits (e.g., National School Lunch Program); health costs; and guaranteed child support.

The net disposable income, per month, for both single- and two-parent households is calculated for all six income types (social assistance, minimum wage, half average national male, half average national female, average national male, and average national female) after all taxes, benefits, housing costs, and services are adjusted for. In addition, the currency for each country is converted into United States purchasing power parities (ppp's). The low-income family's net disposable incomes for both the single- and two-parent families are calculated by taking the mean disposable income of the four earnings levels (social assistance, minimum wage, half average female earnings, and half average male earnings). The conversion into to ppp's is to allow cross-national comparisons. The same process is followed for the average-income families, with the disposable incomes for each family structure being averaged across two earnings levels (average national male and average national female).

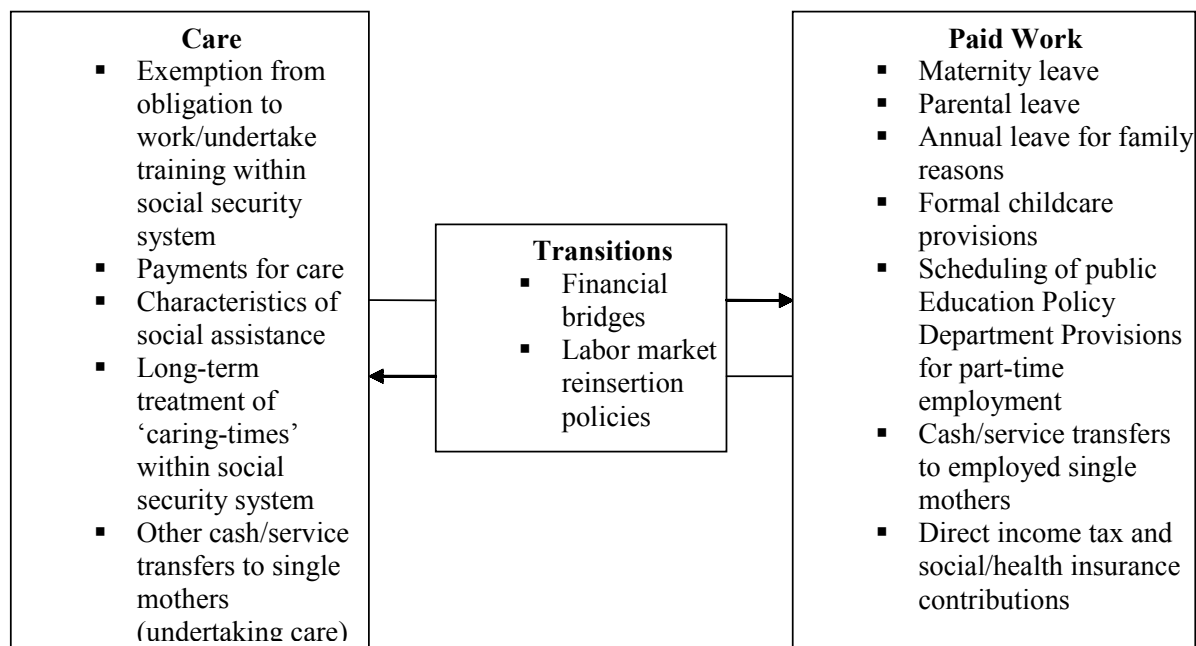
The final step in preparing the economic policy variables was to calculate the gap in the net disposable incomes between two- and single-parent families. For this I subtracted the two-parent disposable income from the single-parent disposable income. A positive \$ amount indicates that after all taxes, benefits, and services are adjusted for, a single-parent is better off at the end of the month than their two-parent family counterpart. By contrast, a negative amount indicates that the single-parent family fares worst financially.

Parental time policy environment. According to Bradshaw and Finch (2002), “leave from paid work encourages a balance between paid employment and unpaid care” (p. 103). For single-mother families, policies that allow the parent to spend time with their child and help reconcile the dual role of worker and caretaker may enhance a parent’s time inputs. There are three variables that capture the policies concerned with parental time. These are care-giving policy environments, paid-work policy environment, and transitional policy environment. The transitional policy environment refers to the policy environment for a single mother who is transitioning from the role of a paid-worker to the role as a care-giver. Each of these variables are indices constructed by Kilkey (2000) and a fuller explanation of the construction of these indices can be found in her book *Lone mother between paid work and care*. Kilkey constructed the policy indices based upon her analysis of the policy environments for single mothers across 20 countries.

The three indices of caregiving, paid worker, and transitional are constructed from a whole array of policy components. The index components were derived from Kilkey’s policy analysis of how welfare states structure women’s relationship to paid work and care. The following figure (Figure 3), which was adapted from Kilkey (2000), contains the specific policy areas that she analyzed in order to identify the policy components that form the basis of her three indices (caregiving, paid worker, transition from paid-worker to care-giver).

Figure 3.

Policy areas analyzed by Kilkey (2000).



The care-giving standardized index for a single-mother with school-aged children is calculated based on six policy components (see Table 13): the duration of the right to time to care (A1), the value of payments for care (A2), the net value of other cash transfers (A3), and the availability of caring credits or non-contributory and non-means-tested benefits within the social security system (A4). In addition to these four, two weighting components are included; an absolute right to time to care (A5) and resource unit in 'care benefit' (A6).

Table 13.

Policy components for the parental time policy environment indices of caregiving, paid work, and transitional. Adapted from Kilkey (2000).

Code	Index Components
A1	Duration of right to time to care
A2	Value of payments for care
A3	Net value of other cash transfers
A4	Availability of caring credits or non-contributory, non-means-tested benefits
A5	An absolute right to time to care*
A6	Resource unit in 'care benefit'*
B1	Qualifying conditions attached to maternity leave
B2	Duration of maternity leave
B3	Wage replacement rate of maternity leave payments
B4	Qualifying conditions attached to parental leave
B5	Duration of parental leave
B6	Wage replacement rate of parental leave payments
B7	Qualifying conditions attached to annual leave
B8	Duration of annual leave
B9	Wage replacement rate of annual leave payments
B10	Childcare guarantee
B11	Priority to single mothers in accessing childcare facilities
B12	Enrollment rate in formal childcare services
B13	Public or private is dominant childcare sector
B14	Income-related fees is dominant childcare sector
B15	Cash benefit or tax allowance in dominant childcare sector
B16	Net cost of most prevalent pattern of full-time childcare
B17	Dominant position is full-time*
B18	Full-time public or private/subsidized term-time childcare facilities
B19	Full-time public or private/subsidized vacation childcare facilities
B20	School hours per week
B21	School days per year
B22	Continuous/regular school opening-regime
B23	Parental leave facilitates part-time employment
B24	Parental leave reduced working hours
B25	Wage supplement scheme
B26	Value of cash/tax transfers
C1	Replacement rate of benefit income
D1	Receipt of social assistance is not affected by full-time education
D2	Single mothers are eligible for training programs
D3	Participants retain benefits or receive equivalents
D4	Participants receive a benefit 'top-up'
D5	Childcare is provided for participants
D6	Participants receive assistance with childcare costs
D7	Participants receive other financial assistance
E1	0-3 years as a proportion of the total childrearing cycle*
E2	3 to school-age as a proportion of the total childrearing cycle*
E3	School-age to 16 as a proportion of the total childrearing cycle*

Note: * Weighting component

The paid-work index for a single mother with school aged children is based on twenty components. Policies found in this index include maternity leave provision (B1-B3), parental leave schemes (B4-B6), annual leave arrangements (B7-B9), non-maternal childcare provision (B10-B17), support for part-time working (B23 & B25), and the provision of financial transfers (B26). The transitional index consists of three components: replacement rate of benefit income (C1), the duration of the right to time to care (A1), and whether the right to time to care is absolute (A5).

In a similar manner to the economic policy environment variables used in this research, these three variables capture a whole array of policies and not just one or two individual policies that would fail to capture the true context of the policy environment of the individual countries in this study. The policy indices for each country will be presented and discussed in the descriptive results section of Chapter Six.

Additional Independent Variables

Student-Level Data

Gender. Research indicates that patterns of gender differences in academic achievement are often dependent upon subject matter. Girls tend to do academically better than boys, except in the areas of mathematics and science (Braswell et al., 2001; Donahue, Finnegan, Lutkus, Allen, & Campbell, 2001; Gonzales et al., 2001; Hedges & Nowell, 1995; Mullis, Martin, Fierros, Goldberg, & Stemler, 2000). Similar gender differences have also been reported in international studies, such as the Third International

Mathematics and Science Study (Mullis et al., 2000). The initial analysis of PISA 2000 shows that, on average, in every country, girls demonstrate higher levels of reading literacy than boys. In mathematics, boys outperform girls in about half of the countries, while in science literacy the differences are small with no statistically significant differences between the sexes in 24 of the OECD countries (Organisation for Economic Co-operation and Development, 2001a).

Due to this variation in subject performance, gender will be used as a control variable in this study. The questionnaire asked the respondent to indicate whether they were male or female. In this study male will be coded “0” and female will be coded “1.”

Grade level. PISA 2000 was sampled based on age and not grade, therefore, in some countries there is a broad range of grade levels for the 15-year-olds in those countries. For example, in Ireland 3% of the sample are in eighth grade or below, 62% in ninth grade, 16% in tenth grade, and 19% in eleventh grade and above. In contrast, in New Zealand 7% are in tenth grade, and a substantial 93% are in grade eleven and above. Clearly, the majority of the students in New Zealand have received significantly more years of schooling than many of the children in Ireland. Therefore, it is of no surprise that in the initial analysis of the data, grade level was shown to be a significant predictor of literary achievement. As a consequence, any analysis of the PISA data has to include the student’s grade level as a control variable.

Language spoken at home. In the questionnaire, the students were asked what language they spoke most of the time at home. Their choice was either the language of the assessment, which was the country’s “official” language, or a language other than the

official language. Given the nature of the literacy assessment it is necessary to recognize that non-native speakers may be at a disadvantage and lack the tools to be successful in these assessments. This variable is coded as a dummy variable with native language speakers assigned a one and non-native speakers a zero.

Academic risk. For each of the three literacy measures, I created a dummy variable that indicates whether the student scored below 400 in the literacy tests. As previously outlined, the three literacy measures have a mean of 500 and a standard deviation of 100, therefore a child scoring below 400 falls into the bottom 16 percent. I define that a student who scores below 400 is at academic risk and is coded with a *1*, indicating at-risk status. A score above 400 is coded *0* (not at risk).

Academic track. The conceptual model for this proposed study indicates causal relationships between family policies, resources allocation, and the educational achievement of children from single-mother families. However, the nature of the cross-sectional PISA data is such that cause and effect cannot be identified definitively. With the help of the academic track variable, which can be used as a measure of prior learning, this study can provide evidence that supports the causal relationships as outlined in this study's theoretical framework.

The students were asked what program are you in at school. The response choices were based upon the International Standard Classification of Education (ISCED) levels, as previously discussed for the parental education variable. The variable was recoded to form two levels, labor market track and tertiary track. It should be noted that the school track information is only available for 15 of the 18 countries. In two of these 15 countries

(Germany and the United States), all students indicated that they were in the same track (tertiary track). This variable was used only in countries where track information is available. The coding of the student-level variables and country-level variables are presented in Appendix A (Table A.1), and the unweighted means and standard deviations for each variable are presented also presented in Appendix A (Table A.2).

Analytical Strategy

I employed a three-stage strategy to determine the relationship between family policy and the literacy gap between children from single-mother and two-parent families. First, I use descriptive analysis, the first portion of which is unweighted and is aimed at describing both the total sample, as well as the individual country samples. In the weighted portion of the descriptive analysis, I use both the student weights, the replicate weights, and combine the five plausible values in order that the results are representative of the entire population of 15-years-olds who attend school in each of the 18 countries.⁹

In the second stage of the analysis, I built ordinary least squares (OLS) regression models for each individual country in order to determine the relationships between literacy achievement and the independent variables of interest; these being the economic and parent time input variables. In the final analysis, four OLS regression models were built; baseline, economic, parental involvement, and combined. The variables included in each of these four models are described in Chapter Six. During this stage of the analysis, t-tests were

⁹ See following section for a description of weights and plausible values.

also conducted to determine the significance in the change in the single-mother coefficients between the five models. The results of these t-tests are also reported in my results.

The third and final stage of my analysis attempts to determine whether a nation's family policy environment influences the relationship between single-motherhood and children's literacy achievement. This multilevel analysis uses a two-level hierarchical linear model with the three measures of literacy achievement as the dependent variables.¹⁰ Multilevel modeling is appropriate for such an analysis due to the nested structure of the data. The students in this study are part of a hierarchical social structure in which these 15-years-olds are nested within countries. People within hierarchies tend to be more similar to each other than if the entire population were randomly sampled. This homogeneity violates the assumption of most analytic techniques in that observations should be fully independent. In ordinary least squares regression (OLS), for example, this violation results in small standard errors that result in the reporting of significance where none exists. Therefore, due to the hierarchical nested structure of the PISA data, this stage of the analysis uses HLM (see Bryk & Raudenbush, 1992; Raudenbush & Bryk, 2002).

The HLM model will contain two levels; at the first level is the student-level equation and at the second level is the country-level equation. Independent variables in the student-level model include family structure, parents' economic inputs, parental time inputs, and the control variables. At the second level, the economic policy environment and

¹⁰ For all HLM analysis the HLM 5.05 software is used.

parental time policy environment variables are entered as independent variables.

The general model is specified below.

Student-level equation:

$$\begin{aligned} (\text{Achievement})_{ij} = & \beta_{j0} + \beta_{j1}(\text{Family structure})_{ij} + \beta_{j2}(\text{Economic Inputs})_{ij} + \\ & \beta_{j3}(\text{Parental Time Inputs})_{ij} + \beta_{j4}(\text{Controls})_{ij} + R_{ij} \end{aligned}$$

Country-level equation:

$$\begin{aligned} \beta_{j0} = & \gamma_{00} + \gamma_{01}(\text{Economic policy environment})_j + \gamma_{02}(\text{Parental time policy} \\ & \text{environment})_j + U_{j0}, \\ \beta_{j1} = & \gamma_{10} + \gamma_{11}(\text{Economic policy environment})_j + \gamma_{12}(\text{Parental time policy} \\ & \text{environment})_j + U_{j1}. \end{aligned}$$

Student i is nested within country j . The β 's are the level one coefficients (student level), the γ 's are the level two coefficients (country level), and R_{ij} , U_{j0} , and U_{j1} represent the residuals. In the student-level equation, β_{j1} represents the principal variable of interest in this study, family structure. β_{j2} and β_{j3} represent the family resource variables of economic inputs and parental time inputs and β_{j4} represents the coefficients for the control variables.

At the country level, β_{j0} represents the slope of the intercept and β_{j1} represents the slope for family structure. The economic policy environment and the parental time policy environment variables are entered at the country level as independent variables and are specified as having random effects (U_{j1}). The coefficients γ_{11} and γ_{12} are my primary interest at the country level.

The student-level variables are all group mean centered with the country-level economic policy environment variables left uncentered. The student-level variables vary

across countries and are none are aggregated and used at the country-level.

Therefore, I group mean centered these variables in order to produce within-country slope estimates. The parental time policy environment variables are grand mean centered. In addition, I specify as random the slopes for single motherhood, parent's education, parent's occupation, books in the home, parental cultural involvement, and parental social involvement.

I employ the same missing data strategy as used with the OLS regression analysis. Therefore, missing data dummy variables are included at the student level for language spoken at home, parents' education, parents' occupation, books in the home, and cultural and social parental involvement. It should also be noted that all of the independent variables of interest (i.e., single motherhood, parents' education parents' occupation, books in the home, and cultural and social parental involvement) are specified as having random slopes. All other variables are specified as fixed.

Database Characteristics

Missing data. Missing data is clearly an issue for many researches in the social and behavioral sciences. In the PISA study, the students were asked to fill out questionnaires pertaining to their backgrounds and experiences in school, among other things. As with all such questionnaires subjects may fail to answer all the items for a whole multitude of reasons. The PISA data sets are no exception, with data missing for a number of different items. Fortunately, the amount of missing data for the variables used in this study, with the exception of school track, was not excessive and fell well within acceptable parameters. Table 14 contains the percentage of missing data for the student-level variables for the

entire sample. It should be noted that this is the average missing data across all 18 countries and that the missing data for some countries was higher for some variables. The number of missing data by variable for each country can be viewed in Appendix A (Table A.3-A.20).

Table 14.

The percentage of missing data for all 18 countries.

Variables	%
Family structure	1.19
Parents' Occupation	4.12
Parents' Education	4.10
Books	2.84
Cultural Involvement Index	2.04
Social Involvement Index	1.83
Gender (being a girl)	0.91
Grade (upper grade)	1.38
"Official" Language Speaker at Home	3.60

Even though the per-item rates of missing data were low, listwise deletion would have resulted in a higher percentage of loss of data because a number of subjects were missing one or more data points. Although exploratory analysis demonstrated that listwise deletion would not have resulted in an excessive loss of data, it seemed prudent to retain as much data as reasonably possible. To accomplish this, a strategy of mean imputation and dummy variable adjustment was used to create a dataset for the multivariate stage of the analysis.

Missing data was imputed for the following six variables; "official" language speaker at home, parents' occupation (ISEI scale), parents' education, number of books in

the home, and the cultural and social involvement indices. The group mean (by family structure) was imputed for all missing data points for each of the six variables. The imputed values were flagged by creating a dummy variable. In the multivariate analysis, the dummy variable for the imputed values was entered in each of the models and regressed on the dependent variable. The missing data coefficients are reported in the results chapter.

With one exception, there is no missing data at the country level. The time policy indices for care-giving, paid-work, and transitional for Canada are imputed. The imputed value is the mean for the other five liberal countries of Australia, Ireland, New Zealand, the United Kingdom, and the United States.

Sample weights. The data in PISA comes from country samples, which are not at the population level. In order to draw conclusions about each country's enrolled 15-year-old population, sample weights, which are provided by PISA, are used in the analysis. PISA used a complex two-stage sampling design in which schools were sampled first and then students were then selected from within these sampled schools. The same numbers of students were sampled from each of the selected schools. In this analysis, I use the final student weight, which tells us how many students each student represents in the whole population (i.e., 15-year-olds enrolled in school in a particular country).

For the purposes of decomposing the variance for the unconditional Hierarchical Linear Model, I normalized the weights by creating a new weight, which ensured that the sum of the weights was equal to the number of observations in the data file.

Variance estimation. Due to the complex sample design of PISA, it is necessary to estimate sampling variance. Failure to do this would result in an underestimation of the

standard error, which may result in obtaining statistical significance when in reality none exists. To deal with this issue, I conducted all of the OLS regression analysis, as well as the weighted descriptive analysis, by using the WesVar software developed by Westat.¹¹ The WesVar software estimates sampling variances for complex design (i.e., two-stage sampling designs) through replication methods. Fay's Balanced Repeated Replication method is used in the preparation of the PISA datasets, with the data files containing 80 replicates. I used these replicate weights to estimate the sampling variance for the computed statistics. For a complete description of the WesVar software and the Fay's Balanced Repeated Replication method, see the user's guide that accompanies the WesVar software (Westat, 2000).

Plausible values. As previously discussed, the dependent variables for this study are in the form of plausible values. As recommended, all five plausible values were combined for both the multivariate analysis and the weighted descriptive analysis. In the case of the weighted descriptive analysis and the OLS regression analysis the WesVar software was used, which has an option to deal with plausible values. For the multilevel analysis (HLM), I used the HLM 5.05, which also has an option which allows you to specify a dependent variable that has multiple plausible values. Therefore, all the analyses, with the exception of the unweighted descriptive statistics, utilize all five plausible values for the three dependent variables of reading, mathematics, and science literacy.

¹¹ It should be noted that WesVar was specifically developed to deal with such datasets as PISA, which used a complex two-stage sample design.

CHAPTER SIX

RESULTS

Descriptive Statistics

Comparing Individual Countries

In this first section, I present, for each country, the unweighted means for the three literacy measures, family structure, economic inputs, and the parental involvement variables. Not all variables are presented here, however, the means and standard deviations for all student-level variables for each country can be viewed in Appendix B (Table B.1).

Literacy achievement. For the three dependent variables (reading, mathematics, and science literacy), the unweighted means for each country and their rank compared to the other countries can be viewed in Table 15.

Table 15.

Mean reading, mathematics, and science literacy scores for all 18 countries and their relative rank.

Rank	Country	Reading	Rank	Country	Mathematics	Rank	Country	Science
1	Finland	548.52	1	Finland	537.99	1	Finland	538.49
2	Ireland	527.74	2	New Zealand	537.54	2	United Kingdom	528.65
3	New Zealand	527.29	3	Australia	530.85	3	New Zealand	526.46
4	Australia	526.23	4	United Kingdom	529.52	4	Australia	524.97
5	Canada	524.21	5	Canada	524.93	5	Canada	520.79
6	United Kingdom	523.98	6	Belgium	523.96	6	Ireland	514.28
7	Sweden	515.86	7	France	517.13	7	Sweden	511.48
8	Belgium	515.05	8	Denmark	515.01	8	Austria	509.31
9	Norway	505.37	9	Sweden	510.07	9	Belgium	500.65
10	France	502.81	10	Austria	506.78	10	France	500.46
11	Denmark	497.92	11	Ireland	502.75	11	Norway	498.81
12	Austria	497.72	12	Germany	500.10	12	Germany	495.55
13	Germany	497.68	13	Norway	497.97	13	Spain	490.79
14	United States	495.97	14	United States	482.57	14	United States	490.54
15	Spain	493.60	15	Spain	478.81	15	Denmark	481.09
16	Italy	488.87	16	Italy	459.83	16	Italy	478.90
17	Portugal	476.53	17	Portugal	458.50	17	Portugal	464.36
18	Greece	472.13	18	Greece	446.92	18	Greece	459.53

Note. All means are unweighted.

As Table 15 indicates, Finland has the highest unweighted means scores for all three literacy measures. By contrast, Greece, Portugal, and Italy are consistently the poorest performing countries. For reading literacy, the range is quite large in Finland. The Finnish students, on average, score 548 while the Greek students score some 76 points less. The difference between these two countries is almost the same for science literacy (78 points), and the difference is over 91 points in mathematics. The English speaking countries of Australia, Canada, New Zealand, and the United Kingdom all rank in the top six for each of the three literacy measures. The United States, in contrast, is ranked towards the bottom, 14th among these 18 countries for all three measures.¹²

Next, I compare the percentage of students who are at academic risk across the 18 countries (Table 16). As previously outlined, a student is labeled at academic risk if they scored below 400 on the literacy tests. Across the three measures, Finland has the least amount of students scoring below 400. The story is quite different in Greece, with nearly a third (32%) of all students at academic risk in mathematics literacy. In the United States, one fifth of the students in this sample scored below 400 in both the mathematics and science literacy tests. As shown in Table 16, the United States is ranked toward the top in all of the literacy

¹² Students in some of the countries in this study begin their formal education at a younger age than students from other countries. Therefore, 15-year-olds in some countries have received an additional year of schooling. As the multivariate analysis that follows will show, the effect of grade level is extremely large, thus, caution should be used when comparing the descriptive achievement scores.

measures for the percentage of students at academic risk (3rd in reading, 4th in mathematics, 5th in science).

Table 16.

Percentage of students at academic risk for all 18 countries and their relative rank.

Rank	Country	Reading	Rank	Country	Mathematics	Rank	Country	Science
1	Greece	0.23	1	Greece	0.32	1	Greece	0.27
2	Portugal	0.22	2	Portugal	0.26	2	Portugal	0.24
3	United States	0.18	3	Italy	0.24	3	Denmark	0.22
4	Germany	0.17	4	United States	0.20	4	Italy	0.21
5	Italy	0.17	5	Spain	0.19	5	United States	0.20
6	Austria	0.16	6	Germany	0.16	6	Belgium	0.18
7	Norway	0.16	7	Belgium	0.14	7	Germany	0.18
8	Denmark	0.16	8	Norway	0.13	8	Spain	0.18
9	Belgium	0.15	9	Austria	0.13	9	France	0.17
10	France	0.14	10	Sweden	0.12	10	Norway	0.15
11	Spain	0.14	11	Ireland	0.11	11	Austria	0.13
12	New Zealand	0.13	12	France	0.10	12	Sweden	0.12
13	Australia	0.12	13	Denmark	0.10	13	New Zealand	0.12
14	United Kingdom	0.12	14	New Zealand	0.09	14	Australia	0.11
15	Sweden	0.11	15	United Kingdom	0.09	15	Ireland	0.11
16	Canada	0.10	16	Australia	0.09	16	United Kingdom	0.10
17	Ireland	0.09	17	Canada	0.07	17	Canada	0.09
18	Finland	0.06	18	Finland	0.04	18	Finland	0.06

Note. All means are unweighted.

Family structure. The next table shows the percentage of students who indicated that they resided in a mother-only households compared to a two-parent family (Table 17). The achievement gap between these two family structures is the focus of this study, therefore I only present the unweighted percentages for these two family structures. The means and standard deviations for the other households can be found in Appendix B (Table B.1). According to student responses, Greece reported the largest prevalence of two-parent families (87%), followed by Ireland (83%), and Portugal (80%). In contrast, the United States has only 51% of the students indicating that they live with both their mother and father in the same house. Just over one fifth of the students in the United States sample reported that they live in a mixed household, which consists of a stepparent or other guardian (see Appendix B). In the United States sample, 18% indicated that they resided with just their mother, which is the highest prevalence of single-motherhood among the 18 countries in this study. Italy (17%), United Kingdom (16%), and New Zealand (16%), also reported high instances of students living in mother-only households. At the other end of the scale, only 7% of students in Greece said that they lived in a mother-only family.

Table 17.

The percentage of student's reporting that they reside in a two-parent or single-mother household.

Country	Two-Parent	Single-Mother
Greece	0.87	0.07
Ireland	0.83	0.10
Portugal	0.80	0.10
Austria	0.78	0.11
Spain	0.77	0.14
Belgium	0.77	0.10
Germany	0.75	0.12
France	0.75	0.13
Canada	0.73	0.11
Italy	0.73	0.17
Finland	0.72	0.15
Norway	0.71	0.13
Sweden	0.71	0.14
Australia	0.71	0.14
United Kingdom	0.70	0.16
Denmark	0.69	0.13
New Zealand	0.65	0.16
United States	0.51	0.18

Note. All means are unweighted.

Economic inputs. The following table contains the country means for parents' occupation and parents' education (Table 18). On the occupational scale, Norway (54.08), Australia (52.47), New Zealand (51.89), and the United States (51.28) have the highest scale scores. By means of a comparison to actual occupations, a score of 54 represents "technicians and associate professionals" (see (Ganzeboom & Treiman, 1996). In contrast, the southern European countries of Portugal (44.37), Spain (45.05), Italy (47.02), and Greece (47.38) reported the

lowest scale scores on average. A scale score of 45 represents occupations such as an office clerk or transport dispatcher. As previously outlined, the ISEI is a scale constructed so that occupations are comparable cross-nationally.

Table 18.

Mean parent's occupation ISEI scores and parental education in 18 countries.

Country	Parents' Occupation Mean ISEI scale	Parents' Education (%)		
		Lower Secondary & Below	Upper Secondary	Tertiary
Australia	52.47	0.17	0.39	0.44
Austria	48.95	0.19	0.54	0.27
Belgium	49.46	0.13	0.41	0.45
Canada	51.18	0.09	0.29	0.62
Denmark	49.78	0.13	0.36	0.51
Finland	50.07	0.22	0.42	0.36
France	48.25	0.19	0.36	0.44
Germany	49.65	0.11	0.49	0.41
Greece	47.38	0.30	0.28	0.42
Ireland	48.59	0.30	0.31	0.39
Italy	47.02	0.31	0.48	0.21
Norway	54.08	0.10	0.36	0.54
New Zealand	51.89	0.10	0.33	0.57
Portugal	44.37	0.63	0.15	0.22
Spain	45.05	0.45	0.27	0.28
Sweden	50.64	0.09	0.32	0.59
United Kingdom	50.31	0.12	0.37	0.51
United States	51.28	0.09	0.46	0.45

Note. All means are unweighted.

If we turn our attention to parents' education, we can see that the southern European countries have the highest number of parents who only received a lower secondary education or less. In Portugal, 63% of the students who reported their parents' educational attainment indicated that their parents did not attain an upper secondary or tertiary education. In five countries (Canada, Denmark, New Zealand,

Norway, and Sweden), over 50 percent of the parents attained some sort of tertiary education.

Parental involvement. Table 19 contains the means for the two parental involvement measures. The cultural and social involvement indices are constructed on identical scales, therefore they are comparable. For both these measures, the lowest is zero and the highest is eight. A student who has a score of zero on the cultural involvement index, for example, would have indicated that their parent never or hardly ever discussed political or social issues with them and never or hardly ever discussed books, films, or television programs with them. When we compare the indices to each other, we can clearly see that, on average, students reported that their parents more frequently were involved in eating a meal with their child and spending time talking to them, than discussing various cultural issues. In Italy, students reported extremely high frequencies (7.65) of social involvement with their parents. Italy also had the highest mean cultural involvement score (5.08), which is in contrast to Belgium (3.28) where the students indicated lower levels of cultural involvement with their parents. When we compare the United States to the other countries, it is interesting to note that the United States rank high (3rd) on the cultural involvement measure, but low (14th) on the social involvement measure.

Table 19.

Mean scores for the parental involvement measures in 18 countries.

Country	Cultural Involvement Index	Social Involvement Index
Australia	3.64	6.35
Austria	3.40	6.35
Belgium	3.28	6.87
Canada	3.86	6.42
Denmark	4.16	7.29
Finland	3.83	7.02
France	4.59	7.12
Germany	3.56	6.53
Greece	4.34	6.78
Ireland	3.69	6.82
Italy	5.08	7.65
Norway	3.39	7.11
New Zealand	4.00	6.18
Portugal	3.76	7.24
Spain	4.36	6.94
Sweden	3.50	6.86
United Kingdom	3.89	6.55
United States	4.42	6.48

Note. All means are unweighted.

Total Sample

Student-Level Data

Literacy achievement. The mean literacy scores and their standard deviations for all 18 countries combined can be viewed in Table 20. As the table shows, the average reading literacy score for students across 18 countries is 511.73 with scores of 509.12 for mathematics, and 506.92 for science literacy. As

previously discussed, PISA 2000 standardized the literacy scores with a mean of 500 and a standard deviation of 100. The academic risk variable, which can be seen toward the bottom of Table 20, is aimed at focusing on those students that scored less than 400, which represents the lowest scoring students in the sample. As this statistic indicates, approximately 14 percent of students, across the 18 countries in this study, are at academic risk.

Table 20.

Means and standard deviations for student-level variables for all 18 countries combined.

Variables	Mean	S. D.
Reading Literacy Score	511.73	98.79
Mathematics Literacy Score	509.12	94.44
Science Literacy Score	506.92	97.72
Background		
Gender (being a girl)	0.50	0.50
Grade	0.67	0.47
"Official" Language Speaker at Home	0.91	0.29
Family Structure		
Two-Parent Family	0.73	0.44
Single-Mother Family	0.13	0.33
Mixed Family	0.09	0.29
Other Family Structure	0.05	0.21
Economic Inputs		
Parents' Occupation (ISEI scale)	49.77	16.36
Family Wealth (index)	0.21	0.88
Parents' Education		
Lower Secondary & Below	0.18	0.39
Upper Secondary	0.35	0.48
Tertiary	0.47	0.50
Parental Involvement		
Cultural Involvement Index	3.91	2.31
Social Involvement Index	6.72	1.78
Educational Resources in the Home		
Number of Books in the Home	4.51	1.51
Academic Risk (>1 s.d. below mean)		
Academic Risk in Reading	0.14	0.34
Academic Risk in Mathematics	0.13	0.33
Academic Risk in Science	0.14	0.35

Note. Means are unweighted. Mathematic and science literacy scores and mathematic and science literacy academic risk variables are based upon smaller sample sizes. See Chapter 5 for sample sizes for reading, mathematics, and science literacy. (N=114,848)

Background and demographic indicators. Table 20 also contains the means and standard deviations for the student-level independent variables used in this study. These descriptive statistics provide some informative demographic and background information of the sample as a whole. For example, 91% of

students across the 18 countries speak the “official” or dominant language of their country. Of these 114, 848 students, 73% reside in a two-parent household, 13% live in a mother-only family, and 9% in a “mixed” household, which may, for example, consist of their biological parent and a stepparent. The highest level of education acquired by either parent indicates that 18% of the students indicated that their parent/s had received no more than a lower secondary education, 35% a upper secondary education, and 47% said that one or both parents had received some sort of further or tertiary education.

Comparing the Two Family Structures

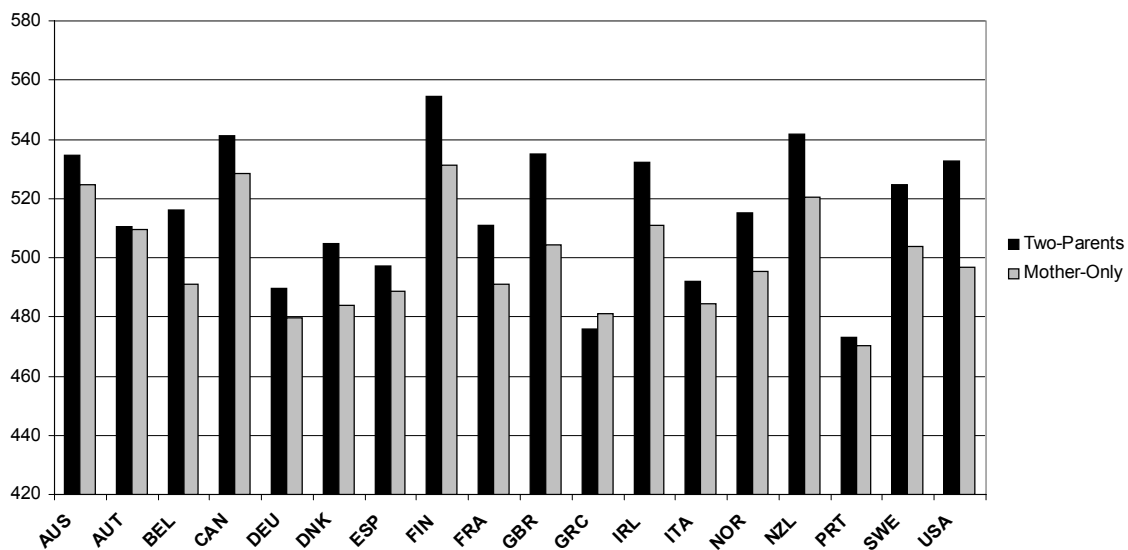
In this section of the descriptive results, I compare the literacy scores, the prevalence of academic risk, economic inputs, and parental involvement measures for students from mother-only families with their counterparts who reside in two-parent households. In the previous section, all means were unweighted and did not account for the complex sample design of the PISA data. Therefore, the means were representative of only the populations that were sampled and not the entire population of 15-year-olds who attend school in each of the 18 countries. In this set of analyses I make adjustments for design effects and I combine all five plausible values for the literacy measures, which is in contrast to the preceding analysis that utilized just the first plausible value.

Literacy achievement

Figure 4 compares the mean reading literacy scores for students from two-parent families with their counterparts who reside in mother-only households. With the exception of Greece, students from two-parent families, on average, outperformed those from mother-only families. In the case of the United States, the difference between the two family structures is over 35 points. In eight of the countries (Belgium, Denmark, Finland, Ireland, New Zealand, Sweden, the United Kingdom, and the United States) the difference between the two mean scores is over 20 points in favor of students who reside in two-parent homes.

Figure 4.

Mean reading literacy scores, by country, for students from two-parent and mother-only families.



Note: aus=Australia, aut=Austria, bel=Belgium, can=Canada, deu=Germany, dnk=Denmark, esp=Spain, fin=Finland, fra=France, gbr=United Kingdom, grc=Greece, iri=Ireland, ita=Italy, nor=Norway, nzl=New Zealand, prt=Portugal swe=Sweden, usa=United States

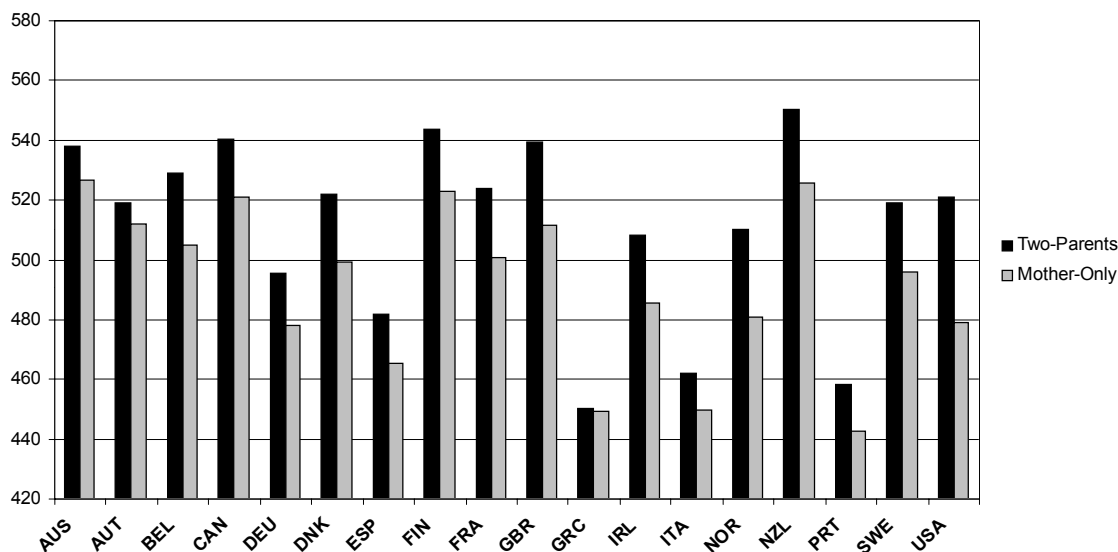
The significance of this difference was tested using a t-test.¹³ In 12 countries (Belgium, Canada, Denmark, Finland, France, Ireland, Norway, New Zealand, Spain, Sweden, the United Kingdom, and the United States) the difference in scores between the students from the two family structures was significant at the .05 level or better. In Australia and Germany, the difference was significant at .10. In the next graph, I compare the two family structures for mathematics literacy (Figure 5). With no exceptions, students from two-parent families outperform their

¹³ Independent group's t-test is used for these calculations.

mother-only counterparts. In 15 of the countries, the gap between the two family structures for mathematics literacy is greater than it is for reading literacy. In Norway, for example, the gap is nearly 10 points larger. The difference between the two family structures is statistically significant for all but three of the 18 countries, these being Australia, Austria, and Greece.

Figure 5.

Mean mathematics literacy scores, by country, for students from two-parent and mother-only families.

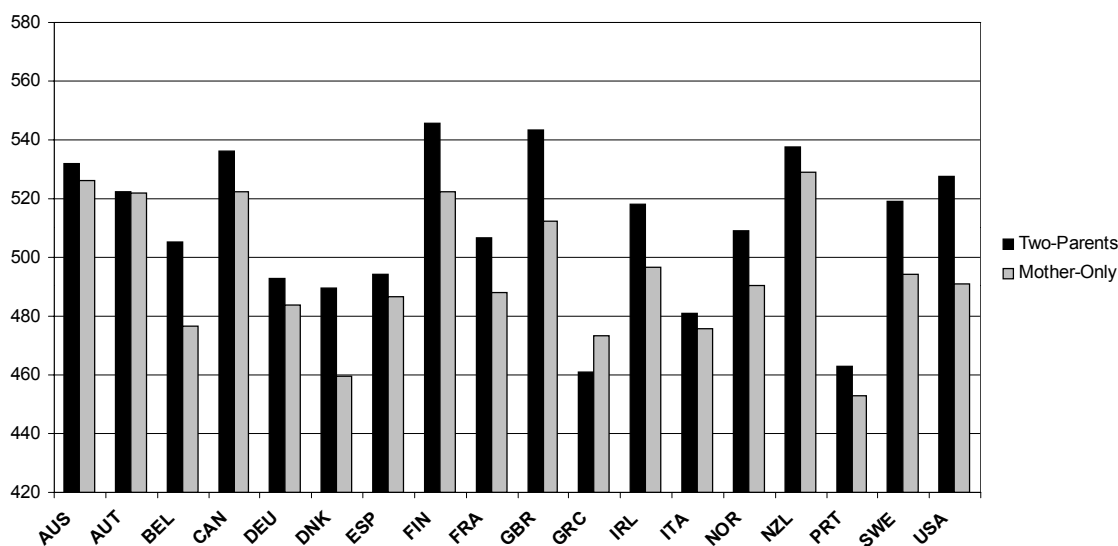


Note: aus=Australia, aut=Austria, bel=Belgium, can=Canada, deu=Germany, dnk=Denmark, esp=Spain, fin=Finland, fra=France, gbr=United Kingdom, grc=Greece, irl=Ireland, ita=Italy, nor=Norway, nzl=New Zealand, prt=Portugal swe=Sweden, usa=United States

The final graph of this set compares students from two-parent families with students from mother-only families for the science literacy measure. As Figure 6 illustrates, in all but one country (Greece) the students from two-parent households outperform their counterparts from mother-only families when it comes to science literacy. It is interesting to note that in Greece the students from the mother-only families, on average, score 12 points more on the science literacy measure than those from two-parent households. The largest gaps can be found in the United States (36.6), United Kingdom (31.08), and Denmark (30.05).

Figure 6.

Mean science literacy scores, by country, for students from two-parent and mother-only families.



Note: aus=Australia, aut=Austria, bel=Belgium, can=Canada, deu=Germany, dnk=Denmark, esp=Spain, fin=Finland, fra=France, gbr=United Kingdom, grc=Greece, irl=Ireland, ita=Italy, nor=Norway, nzl=New Zealand, prt=Portugal swe=Sweden, usa=United States

The t-tests for science literacy show that for eight countries, the differences between the mean scores for each family structure are not significant at the .05 level. Those countries in which the student from the two-parent family structure significantly outscores their mother-only counterparts are Belgium, Canada, Denmark, Finland, France, Ireland, Norway, Sweden, the United Kingdom, and the United States. For reading and mathematics literacy there was a significant and large difference in scores for New Zealand, however, for science literacy this is not

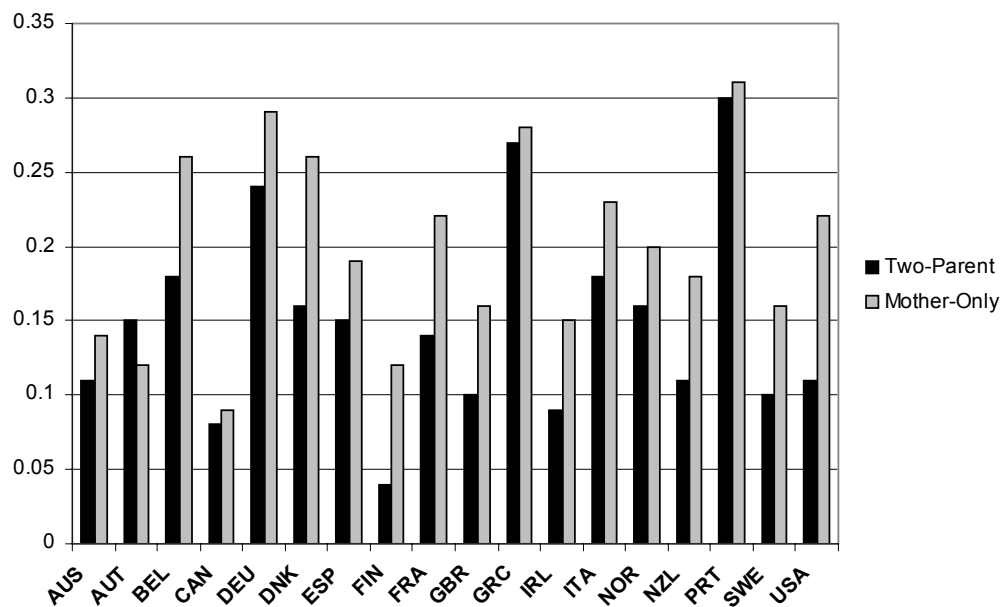
the case. For three countries, Australia, Austria, and Greece there was no statistically significant difference between the two family structures for any of the three measures.

These results begin to indicate a pattern of underachievement for children who live with their mother only. In order to investigate this further, I calculated the relative risk of a student from a mother-only family scoring below 400 on the reading literacy test.¹⁴ Figure 7 contains the percentage chance of academic risk (scoring below 400 on the reading literacy test) for each of the two family structures. In 17 of the 18 countries, there is a greater risk of being at academic risk in reading literacy if you reside in a mother-only family compared with a student from a two-parent household. The exception to this pattern is Austria, where 15% of students from two-parent families are at risk compared to only 12% of students from mother-only families. In Denmark (10%) and the United States (11%), the differential is quite substantial, while in other countries, such as Canada (1%) and Portugal (1%), the difference is minute.

¹⁴ A score less than 400 represents an literacy score greater than one standard deviation below the mean.

Figure 7.

The risk of scoring below 400 in the reading literacy test by family structure and country.



Note: aus=Australia, aut=Austria, bel=Belgium, can=Canada, deu=Germany, dnk=Denmark, esp=Spain, fin=Finland, fra=France, gbr=United Kingdom, grc=Greece, iri=Ireland, ita=Italy, nor=Norway, nzl=New Zealand, prt=Portugal swe=Sweden, usa=United States

If we consider the overall percentage of at-risk students across both family structures, we can see that in several countries over a quarter of the students scored below 400 on the reading literacy test (Germany, Greece, and Portugal). In Finland, only 4% of students from two-parent families are at academic risk, while in Portugal the same statistic is 30%. From this analysis of relative risk, it is possible not only to see variation between the two family structures, but also between countries.

From these results, children who reside in mother-only families appear to be at a distinct disadvantage in reading, mathematics, and science literacy tests when compared to those children who reside with both parents. With the exception of Greece, children from two-parent households outperform their mother-only counterparts. In the majority of these countries, the difference in scores is statistically significant and therefore warrants further investigation and analysis. In addition, my analysis of academic risk illustrates that the relative risk of scoring below 400 on the reading literacy tests is, on average, more substantial for children from mother-only families. In the next section of results I investigate whether children who reside in mother-only families do indeed have less economic and parental time inputs.

Economic inputs

The following table (Table 21) contains the differences between the two family structures for the three economic input measures of parents' occupation (ISEI scale), number of books at home, and parents' education (highest level achieved by either parent).¹⁵ For every country the mother-only mean is subtracted from the two-parent mean, therefore a positive number represents a higher mean for students from two-parent families. With three exceptions (Austria, Greece, Portugal), students from two-parent families report that their parents had

¹⁵ As previously discussed in the methods chapter, the sample design of PISA resulted in the entire students in the sample completing the reading literacy test, with two-ninths of this sample sitting both the mathematics and science literacy tests. Every student who is included in the mathematics

occupations that scored higher on the ISEI scale than their mother-only counterparts. In 10 of these countries, the difference in scale scores is statistically different at the .05 level.

Table 21.

The differences in three economic input measures between the two family structures by country.

Country	Parents' Occupation	Books in the Home	Parents' Education
Australia	2.26 **	0.25 **	0.11 **
Austria	-0.85	-0.02	-0.02
Belgium	1.56 *	0.16 **	0.11 **
Canada	1.86 **	0.21 **	0.08 **
Denmark	1.97 *	0.16 **	0.08 #
Finland	2.00 *	0.17 **	0.08 *
France	0.74	0.17 **	0.11 **
Germany	0.93	0.14 **	0.07 *
Greece	-1.19	-0.06	0.04
Ireland	3.52 **	0.22 **	0.12 **
Italy	0.06	0.05	0.11 **
New Zealand	1.36 #	0.30 **	0.11 **
Norway	3.35 **	0.19 **	0.06 #
Portugal	-0.09	0.06 #	-0.1 #
Spain	1.10	0.12 **	0.08 *
Sweden	2.19 **	0.17 **	0.09 **
United Kingdom	3.51 **	0.18 **	0.08 **
United States	4.14 **	0.37 **	0.15 **

Note: ** $p = .01$, * $p = .05$, # $p = .10$

Difference is calculated by subtracting single-mother from two-parent.

and science data files are in the reading literacy file, therefore the descriptive statistics that are discussed in the following section are taken from the reading literacy file.

For the second measure of number of books at home, students from two-parent families reside in homes that have more books, on average, than those from mother-only families. Austria and Greece are the only two exceptions. In 14 of these countries, the difference is statistically different at the 0.05 level. The final column contains the parental education differences for each country. In 13 countries, students from two-parent families have at least one better educated parent than their counterparts in mother-only families. In the cases of Austria and Portugal, it is interesting to note that students from mother-only families benefit from a parent that is better educated. Despite some variation cross-nationally, students who reside in two-parent households, on average, have parents that are better educated, have more books in the home, and enjoy better jobs than those students from mother-only families.

Parental Time Inputs

I conducted the same analysis on the two parental involvement measures as that used for the economic input measures. Table 22 contains the difference in means between students from two-parent and mother-only families for the two measures of cultural and social involvement. For the first measure of parental involvement, there is less difference between the two family structures when it comes to frequency of cultural involvement by the parent/s. In only seven countries did students from two-parent households report higher frequency of cultural involvement than their mother-only counterparts. For social involvement, there

appears less variation cross nationally. In every country, with one exception (Portugal), students from two-parent homes reported higher levels of social involvement with their parent/s than those students from mother-only families. The differences between the two family structures are highly significant for all of these countries.

Table 22.

The differences between the two family structures for the two parental involvement measures by country.

Country	Parental Involvement	
	Cultural	Social
Australia	0.17	0.39 **
Austria	0.06	0.42 **
Belgium	0.16 #	0.26 **
Canada	0.27 **	0.50 **
Denmark	0.04	0.43 **
Finland	0.05	0.44 **
France	0.28 **	0.24 **
Germany	0.06	0.30 **
Greece	0.08	0.63 **
Ireland	-0.07	0.31 **
Italy	0.25 **	0.23 **
New Zealand	0.35 **	0.61 **
Norway	0.00	0.28 **
Portugal	0.04	0.08
Spain	0.40 **	0.55 **
Sweden	0.18 #	0.28 **
United Kingdom	0.18 *	0.45 **
United States	0.45 **	0.61 **

** $p = .01$, * $p = .05$, # $p = .10$

Difference is calculated by subtracting single-mother from two-parent.

Country-Level Data

As described in Chapter Five, there are two distinct types of family policy variables: economic policy environment, and parental time policy environment. The economic family policy variables represent the disposable income “gap” between children who reside in single-mother households and their two-parent family counterparts. There are two categories for this variable, families who are low income and those who have average incomes. Table 23 contains the two categories for all 18 countries in this study. As previously outlined, I subtracted the two-parent disposable income from the single-parent disposable income. A positive \$ amount indicates that the single-parent family is better off at the end of the month than a two-parent family from the same income bracket (i.e., low income or average income). In contrast, a negative amount indicates that the single-parent family fare worse financially by the end of the month.

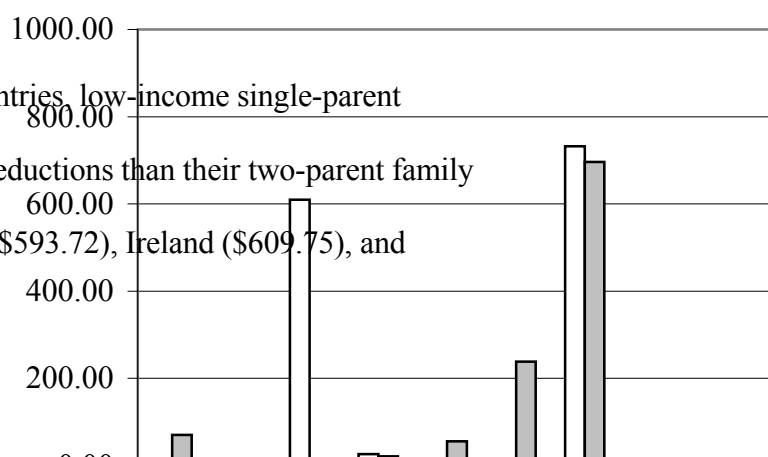
Table 23.

Monthly net disposable income gap (US\$ ppp's) between single- and two-parent families for two income brackets.

Country/Regime	Income Bracket	
	Low-Income	Average-Income
Liberal Regime		
Australia	-53.71	70.29
Canada	7.09	-79.44
Ireland	609.75	-20.89
New Zealand	25.89	21.28
United Kingdom	-98.49	55.17
United States	-752.78	238.02
Regime Average	-43.71	47.40
Conservative Regime		
Austria	731.91	696.16
Belgium	-132.72	-48.37
France	-180.34	-31.12
Germany	62.56	4.71
Greece	71.84	-77.43
Italy	-227.06	-97.53
Portugal	-300.68	-60.34
Spain	84.98	-16.48
Regime Average	13.81	46.20
Social Democratic Regime		
Denmark	593.72	231.18
Finland	-94.59	435.23
Norway	893.55	470.37
Sweden	-310.55	408.12
Regime Average	270.53	386.22

Note: Income gap calculated by subtracting two-parent

As Table 23 shows, in nine of the countries, low-income single-parent families have more disposable income after deductions than their two-parent family equivalents. In Austria (\$731.91), Denmark (\$593.72), Ireland (\$609.75), and



Norway (\$893.55) the income gaps strongly favor single-parent families. The opposite is true for the United States where low-income two-parent families are substantially better off. Child maintenance payments are guaranteed in three of these four countries (Austria, Denmark, and Norway). A low-income single mother in Austria can receive up to \$434.03 a month in guaranteed payments from the state if the absent parent is not meeting their financial obligations. A single mother with a child aged 14-19 can receive as much as \$325.58 in child maintenance payments per month. In Norway, the guaranteed child maintenance payment is \$108 a month. In all three cases, the guaranteed maintenance payment from the state is significant and results in higher net disposable incomes for low-income single-mother families. Other payments also contribute to higher incomes for low-income single mothers. These include generous non income related benefits in Norway and Ireland. In Ireland, 68 percent of all single-parent families qualify for a *one-parent family allowance*. Single parents who earn less than \$307.27 a week (low-income) receive a weekly allowance of between \$7.32 and \$113.84.

For the average income category, single parents are financially better off in 10 of the 18 countries, the most noticeable of these countries being Austria (\$696.16). For the same reason as the low-income single parents, the child maintenance payments appear to result in higher disposable incomes when compared to two-parent families. It is interesting to note that in some countries the “gap” favors one family structure for the low-income category, but then the other family structure for the average-income category. This is the case in nine of the 18

countries. In the United States this swing is quite significant, with single-parent families being better off compared to two-parent families providing that they earn the equivalent of a national average male or female wage (see Figure 8).¹⁶ In the case of the United States, income tax and health costs for average income two-parent families are greater than those for a family headed by one parent. Health insurance for a family with two adults is more than for a family with just one parent. These two factors contribute to the policy environment favoring average-income single-parent families over their two-parent counterparts. The policy environment in Ireland for average-income families favors two-parent families over their single-parent counterparts. Many single-parents in Ireland are low-income and qualify for the one-parent family allowance. However, this allowance is mean-tested so average earning single-parents qualify for less, if any, additional monies because of their family structure.

¹⁶ An average national male wage per month for the United States is set at \$3102.67. For the average national female wage the amount is \$2370.33 per month.

Figure 8.

A graph illustrating the monthly disposable income gap (US\$ ppp's) between single- and two-parent families for two income brackets.

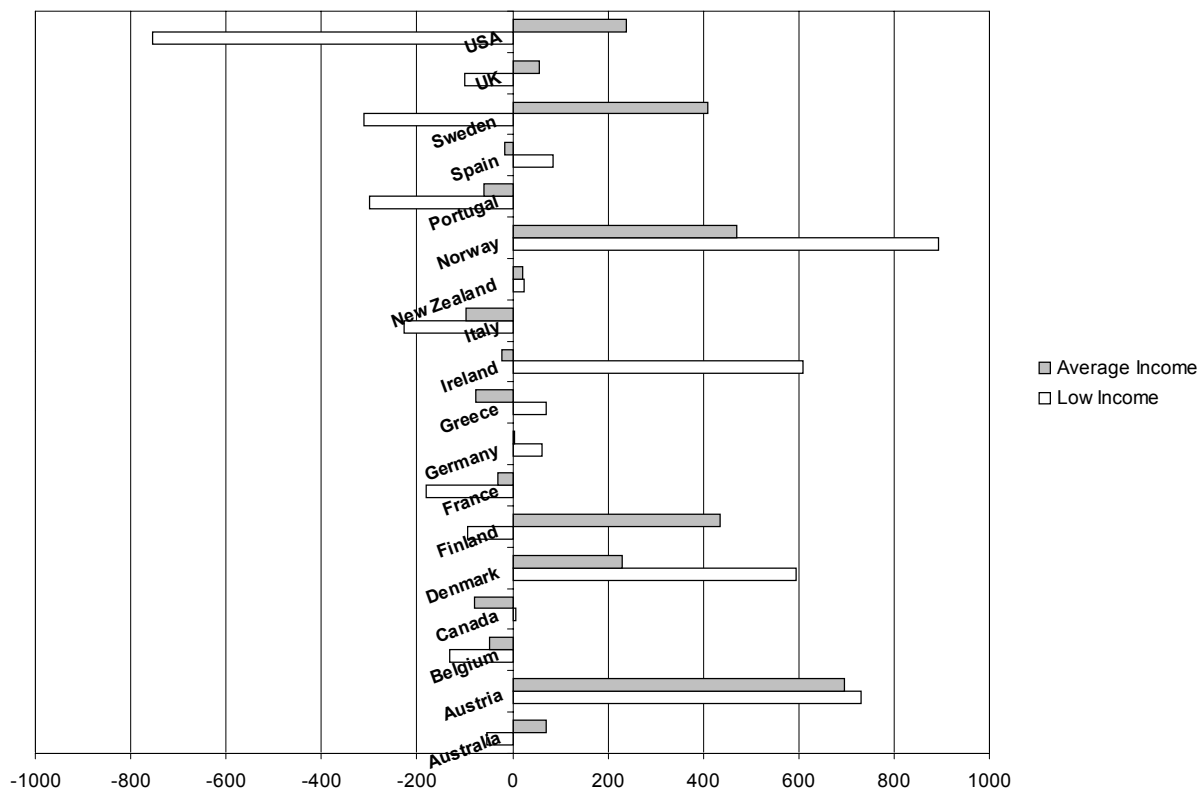
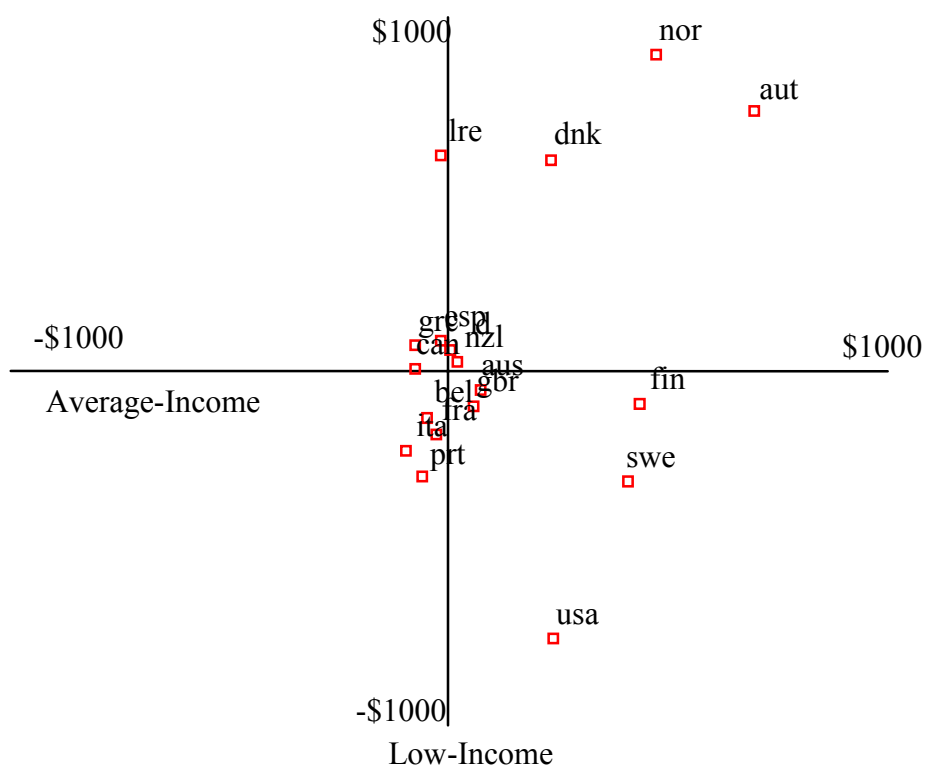


Table 23 also contains the average net disposable income gaps for each regime. With one exception (low-income single-parents in the liberal regime), the policy environment favors single-parent over two-parent families. In the liberal and conservative regime countries the difference between the two family structures is small. However, the generous policies of the social democratic regimes result in large income gaps that overwhelmingly favor single-parent families across both income brackets.

Figure 9 clusters the countries by their economic policy environments. The countries in the upper right quadrant are those countries in which the disposable income gap favors single-parent families at both earnings levels. This set of countries includes Austria, Norway, and Denmark, where single-parent families enjoy a more favorable policy environment than their two-parent counterparts. The lower left quadrant contains such countries as Portugal and Italy where the policy environment favors two-parent families. The bottom right quadrant contains the United States, Sweden, and Finland, which indicates that these particular countries favor a different family structure depending upon the level of earnings. In the case of Sweden, average-income single-parents fare better than their two-parent counterparts, however, the opposite is true for low-income single-parent families. The most notable characteristic of this graph is the way in which most countries cluster around the center, which indicates that approximately nine of the 18 countries do not appear to significantly favor one family structure over the other.

Figure 9.

A scatter graph illustrating the position of a country's economic policy environment for the disposable gap between low- and average-income two- and single-parent families.



Note: aus=Australia, aut=Austria, bel=Belgium, can=Canada, deu=Germany, dnk=Denmark, esp=Spain, fin=Finland, fra=France, gbr=United Kingdom, grc=Greece, irl=Ireland, ita=Italy, nor=Norway, nzl=New Zealand, prt=Portugal swe=Sweden, usa=United States

The parental time policy environment variables can be viewed in Table 24.

As previously described, the three indices represent the policy environments for

each of the 18 countries in this study for single-mother families who have school-aged children. The caregiving index is based upon policies that are concerned with whether a mother is exempt from an obligation to work or that the mother is required to participate in some sort of training program. Other caregiving policies include whether the state provides payments or services for mothers who choose to care for their children. The paid work index represents such policies as the duration of maternity leave, the wage replacement rate of the maternity leave payments, and the duration of annual leave from work. The transitional index is concerned with policies that facilitate a single mother to transition from paid worker to caregiver. The policies that contribute to the construction of this index include the replacement rate of benefit income. For example, if a mother chooses to care for her newborn child and give up her job, how generous is the state in helping her transition from the role of paid worker to that of caregiver? As previously discussed in Chapter Three, the replacement rate is the income when receiving benefits over income while employed. So, in a country with high replacement rates, staying at home and caring for your child is a viable option. In contrast, in countries such as Greece, social assistance programs do not support the mother who wants to transition from a paid worker to the role of a caregiver.

Table 24.

Caregiving, paid work, and transition from paid worker to caregiving indices for 18 countries.

Country/Regime	Policy Environment Supporting Single-Mother Families		
	Caregiving	Paid worker	Transition from Paid worker to Caregiving
<u>Liberal Regime</u>			
Australia	83	44	67
Canada	51	50	50
Ireland	83	43	75
New Zealand	48	62	57
United Kingdom	100	58	57
United States	-60	44	-7
Regime Average	51	50	50
<u>Conservative Regime</u>			
Austria	76	60	19
Belgium	-15	73	19
France	-6	54	0
Germany	76	62	14
Greece	-19	48	-32
Italy	-32	57	0
Portugal	-41	41	0
Spain	-91	69	0
Regime Average	-7	58	3
<u>Social Democratic Regime</u>			
Denmark	87	70	23
Finland	91	73	100
Norway	99	76	26
Sweden	70	100	0
Regime Average	87	80	37

Note: adapted from Kilkey (2000)

The indices range from a low of -100 to a high of 100, therefore, a score of 100 indicates that a country scored high on a particular index (e.g., the United Kingdom for the caregiving index). This can be interpreted by saying that the policy environment in the United Kingdom is more orientated towards supporting single mothers as caregivers rather than paid workers. In contrast, Spain has a caregiving index score of -91, which suggests that the support of single mothers as caregivers is weak in this particular country. At this point it is important to reiterate that these indices are based on the policy orientations towards single mothers. The southern European countries, as previously described in Chapter Three, have weak family policies that do little to support single mothers as caregivers. The index scores for this cluster of countries across the two indices of caregiving and paid work support this finding.

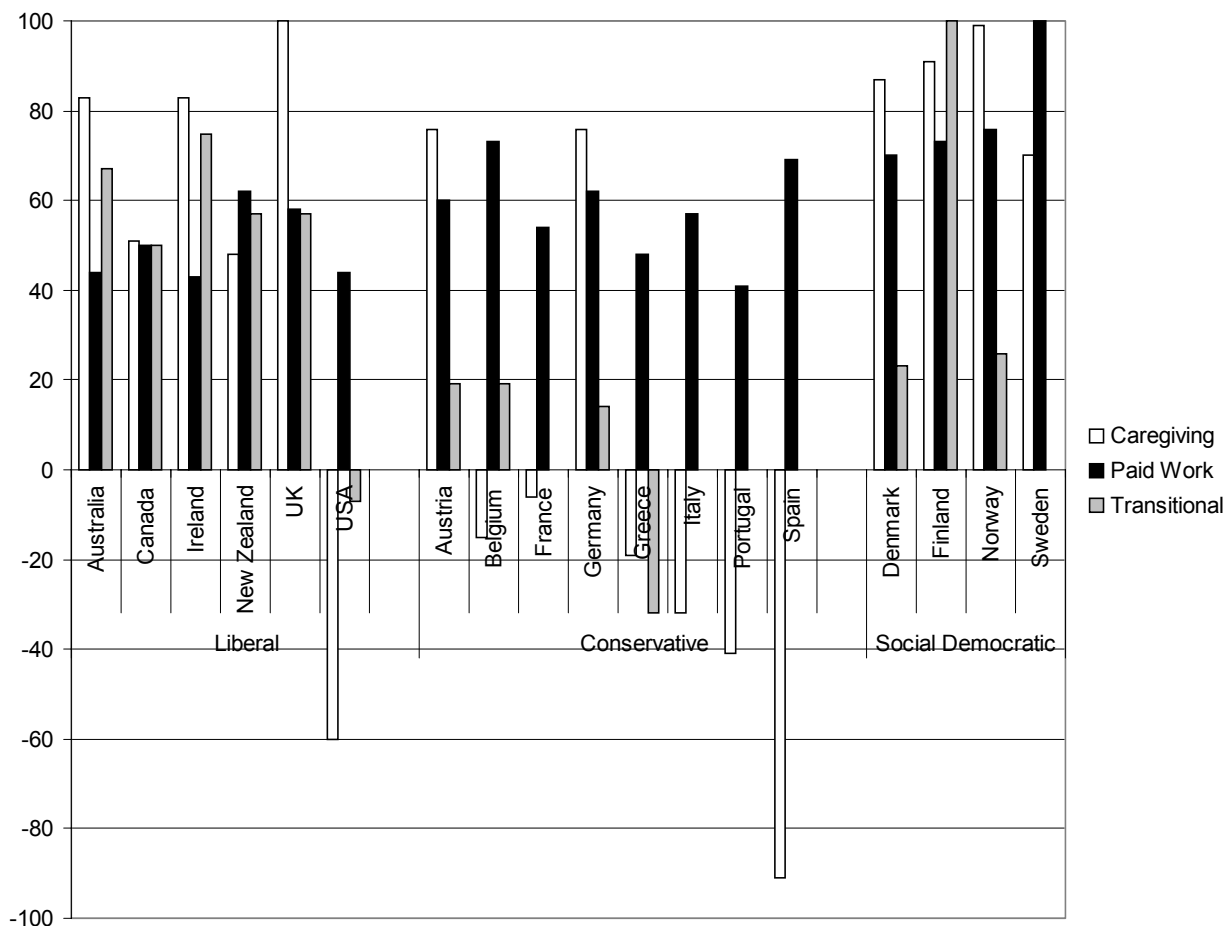
The four social democratic countries of Denmark, Finland, Norway, and Sweden have similar policy orientations towards supporting single mothers as caregivers and paid workers. Consistent with the ideology of full employment, Sweden's policy environment is orientated towards supporting single mothers as paid workers (i.e., index score of 100). In the United States, it is apparent that the family policy environment is weak when it comes to supporting single mothers as caregivers. There is also a weak policy environment for single mothers who work.

In Figure 10, I have graphed the three policy indices and clustered the 18 countries by welfare state regime. There are very definite patterns between the social democratic countries and the liberal countries, with the exception of the

United States. In Australia, Ireland, and the United Kingdom the policy environment appears to be structured towards supporting single mothers as caregivers. Across all the liberal countries, when compared to the social democratic regime countries, the policy environments do little to support single mothers as paid workers. In the case of the United States, the policy environment in this country is very similar to the southern European countries of Greece, Italy, Portugal, and Spain. These four countries plus the United States have a greater policy orientation towards supporting single mothers as paid workers rather than caregivers.

Figure 10.

A graph illustrating the three policy environment indices for each country by regime.



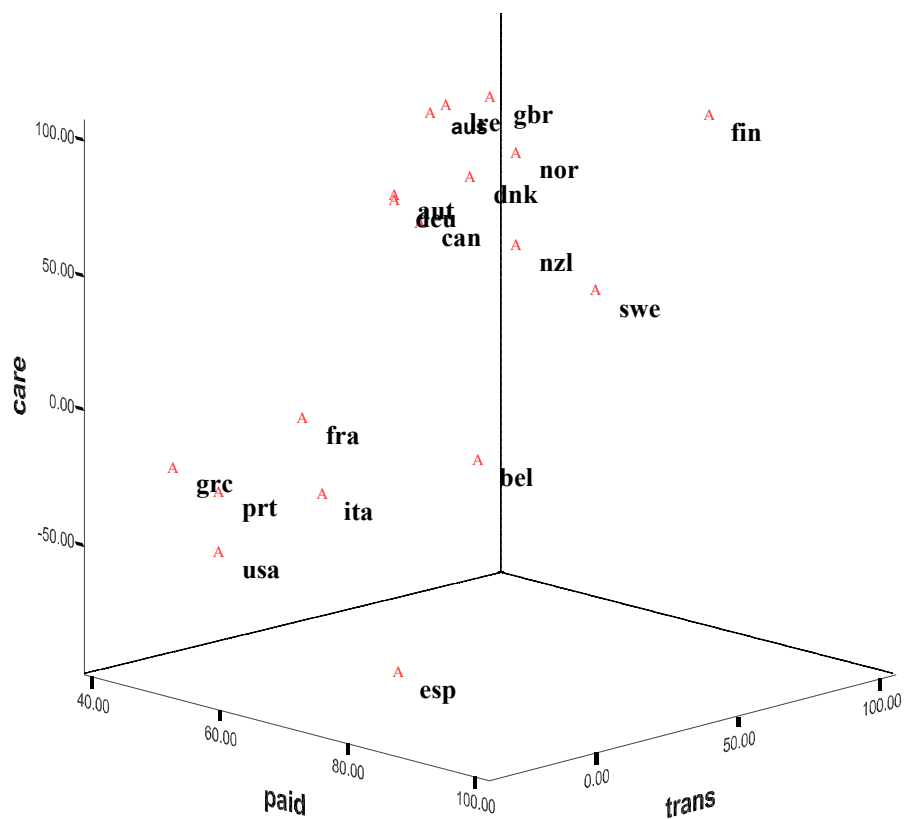
Austria and Germany both have a strong orientation toward supporting single mothers as caregivers, and this is consistent with the “housewife” model approach to family policymaking used by such archetypal conservative regime countries (Esping-Andersen, 1990). The high index scores for both caregiving and paid work for all of the social democratic countries indicate the strong family

polycymaking in this region of the world. Single mothers are supported as both paid workers and as caregivers. Finland distinguishes itself as supporting single mothers who wish to transition from paid worker to caregiver, with an index score of 100. This, however, is not a consistent pattern across the other social democratic countries and Finland appears unique in its policy environment in this particular area.

The final graph (Figure 11) in this set provides a three-dimensional view of the three policy indices. This plot illustrates the clustering of certain countries, indicating similarities between countries in policy environment as it pertains to supporting single mothers as either caregivers, paid workers, or supporting them as they transition from worker to caregiver. As Figure 11 shows, the United States is clustered with the southern European countries. This group of countries appears to support single mothers as paid workers and not in the caregiving role. When it comes to supporting single mothers, the United States appears to have a similar policy environment to the southern European countries (i.e., weak and underdeveloped), rather than an environment similar to the other liberal regime countries. The liberal regime countries of United Kingdom, Australia, and Ireland all occupy a similar area of the graph, in which single mothers are supported primarily as caregivers.

Figure 11.

A three-dimensional scatter plot illustrating the relationship between countries' parental time policy environments.



Note:

Care = policy environment supports single mothers as *caregivers*. Paid = policy environment supports single mothers as *paid workers*. Trans = policy environment supports single mothers as they *transition from paid worker to caregiver*.

aus=Australia, aut=Austria, bel=Belgium, can=Canada, deu=Germany, dnk=Denmark, esp=Spain, fin=Finland, fra=France, gbr=United Kingdom, grc=Greece, irl=Ireland, ita=Italy, nor=Norway, nzl=New Zealand, prt=Portugal swe=Sweden, usa=United States

This three-dimensional plot is particularly useful because it highlights Finland, Sweden, Belgium, and Spain as outliers. As previously discussed, Finland is particularly unique in that its policies toward supporting single mothers appears strong across all three indices. Finnish single mothers are supported strongly as both caregivers and paid workers and also supported as they transition from paid worker to caregiver. As the figure illustrates, Spain is an outlier due to a policy environment that does little to support single mothers in the caregiving role. Kilkey characterizes Spain as a country in which single mothers are *poorly supported as workers*.

Sweden is an outlier because of its policies focused upon transitioning women from paid workers to caregivers. Sweden's commitment to full employment results in an expectation that mothers will return to work after the birth of their child. Single mothers in Sweden are viewed by the welfare state as paid workers who do not have the right to be full-time caregivers. However, legal, service, and cash provisions support the single mother in the role of a paid worker who cares. As Kilkey explains, "Sweden diverges from the other Nordic countries in more or less prohibiting the right to opt out of the labor market to undertake full-time caregiving" (p.268). In respect to the policy environments for single mothers, Kilkey suggests that Sweden and Belgium form their own category, in which single mothers in these two countries are supported by the welfare state as *paid workers who care*. This is in contrast to Esping-Andersen's framework in which the Nordic countries are clustered together to form one group. It should be pointed out

however, that Kilkey's framework is based upon the policy environment for single mothers in respect to their role as paid worker or caregiver. Esping-Andersen's framework is based upon the principles of de-familialization and de-commodification.

Summary of Descriptive Results

On average, with the exception of Greece, children from two-parent families outperform their single-mother counterparts. In 15 of the 18 countries, the mathematics literacy gap between the two family structures is statistically significant. In 17 countries, children from single-mother homes were more likely to score below 400 (more than one standard deviation below the mean) on the reading literacy test when compared to children from two-parent families.

Children who reside in two-parent households have parents who are educated to a higher level, have higher status occupations, and have more educational resources in the home as measured by the number of books in the home. In the case of parental involvement, children from single-mother homes reported less social interaction with their parent compared to those who reside with two parents.

Analysis of the family policy environment variables indicates that there is significant variation cross-nationally. In nine of the 18 countries, the economic policy environment favors low-income single mothers when compared to low-income two-parent families. For the average-income earnings levels, the policy environment favors single mothers in 10 of the 18 countries in this study. The three parental time policy indices capture the orientation of a country's policy

environment towards supporting single mothers as caregivers, paid workers, or supporting them during the transition from worker to caregiver. The southern European countries appear to be weak in supporting single mothers as caregivers, while the social democratic countries have policy orientations towards supporting single mothers as either a paid worker or as a caregiver.

In the following section, I present the results of the multivariate analysis that includes both the single-country Ordinary Least Squares analysis results and the Hierarchical Linear Modeling results.

OLS Regression Analysis

In the final ordinary least squares (OLS) analysis, four models were specified. The baseline model includes the family structure variables in which two-parent family is the reference group, as well as the students' gender, grade level, and whether they speak the "official" language of their country at home. All subsequent models are compared to this model. For the second model (economic model), the economic input variables of parents' occupation, parents' education, and the number of books in the home are added to the baseline model. The third model (parental time model) contains the baseline model with the addition of the parental involvement variables. For the fourth model (combined model), I entered the economic input and parental involvement variables simultaneously to determine the effect of both measures on the achievement gap between children from two-parent and mother-only families.

It should be noted that in exploratory analysis, the variable that captured prior achievement (school track) was included in all five models for 13 of the 18 countries. The school track variable was not available for Canada, Finland, and Norway. For Germany and United States all students were coded as being in the same track. The results of this exploratory analysis indicated that school track had no real effect on the relationship between the achievement of children who reside in mother-only families and those who reside in two-parent households. In addition, the variable had no noticeable effect on the other variables. Therefore, in the

models described below, school track has been omitted for the individual country OLS regressions. The exploratory regression models for reading literacy can be viewed in Appendix B (Tables B.56-B.68)

Reading literacy. The single-mother coefficients for each of the four models for reading literacy can be viewed in Table 25. The combined model (model four) for each of all three literacy measures across all 18 countries can be viewed in Appendix B (Tables B.2-B.19). As previously stated, the single-mother coefficient is in reference to a student who resides in a two-parent family. As we can see in the baseline model, in 15 of the 18 countries students who reside in single-mother families perform worse in reading literacy than their two-parent family counterparts. This can be seen by the negative coefficients. In contrast, in Austria, Greece and Portugal the coefficients are positive. In 10 of the 18 countries, the difference is statistically significant at .05 level or lower. So, in these 10 countries, children from single-mother homes performed significantly worse in the reading literacy tests than their two-parent counterparts. As model one indicates, the largest negative coefficients, which represent the largest gaps between the two family structures, can be found in the United Kingdom (-31.07) and the United States (-33.56).

Table 25.

Single-mother OLS regression coefficients for each of the four models for reading literacy, including the percentage change in the single-mother coefficient between models.

Country/Regime	Models				Models		
	Baseline	Economic	Parental Inv.	Combined	1→2	1→3	1→4
<u>Liberal Regime</u>							
Australia	-12.85 *	0.02	-8.7 #	0.31	100% #	32%	102% #
Canada	-11.96 **	-4.63 **	-7.68 **	-2.5	61% **	36%	79% **
Ireland	-18.92 **	-5.44	-17.49 **	-5.95	71% #	8%	69% #
New Zealand	-21.06 **	-6.98	-16.21 **	-5.66	67% **	23%	73% **
United Kingdom	-31.07 **	-14.63 **	-26.49 **	-13.89 **	53% **	15%	55% **
United States	-33.56 **	-15.56 **	-28.25 **	-14.44 **	54% **	16%	57% **
<u>Conservative Regime</u>							
Austria ^a	2.98	4.53	4.24	5.24			
Belgium ^a	-3.38	2.2	-2.29	2.42			
France	-7.38 #	-5.72 #	-6.31 #	-5.31	22%	14%	28%
Germany	-9.22 #	0.28	-8.1 #	-1.55	103%	12%	83%
Greece ^a	7.19	5.89	8.09	6.47			
Italy ^a	-3.71	-2.65	-1.69	-1.1			
Portugal ^b	3.89	8.74 **	3.95	8.27 **	55%	2%	53%
Spain ^a	-2.11	1.50	1.74	3.64			
<u>Social Democratic Regime</u>							
Denmark	-18.79 **	-11.12 *	-13.39 **	-8.94 *	41%	29%	52%
Finland	-21.94 **	-16.55 *	-20.73 **	-16.18 *	25%	6%	26%
Norway	-18.59 **	-8.87 #	-16.37 **	-9.2 #	52%	12%	51%
Sweden	-19.61 **	-12.27 **	-17.94 **	-12.54 **	37%	9%	36%

Note. ** $p = .01$, * $p = .05$, # $p = .10$.

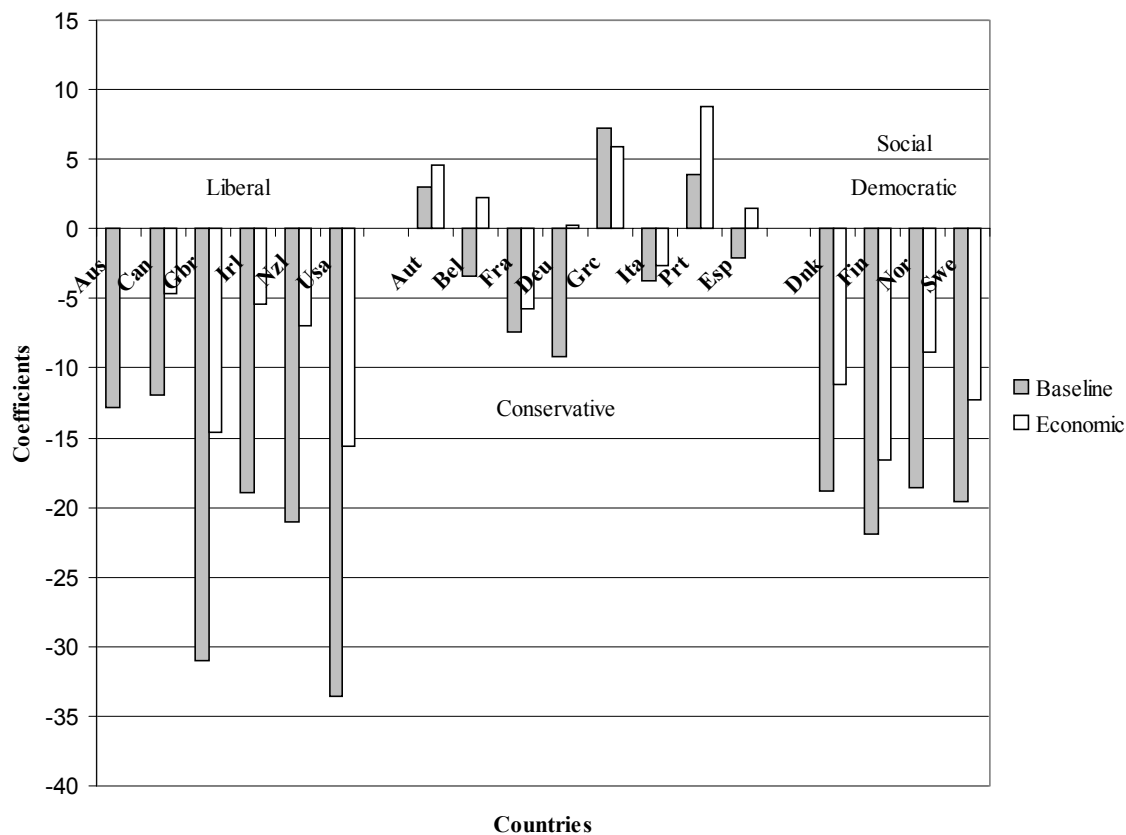
^a Non significant coefficients, therefore the percentage change in the single-mother coefficient has not been calculated.

^b The percentage change in the single-mother coefficients for Portugal represent the percentage increase in the coefficient. This is in contrast to the other countries where the percentages represent a reduction in the coefficient.

The single-mother coefficient for the economic model illustrates the student achievement gap between the two family structures after economic factors have been taken into account. In the case of New Zealand, for example, the coefficient has reduced in size by 67%, from -21.06 to -6.98. This result demonstrates that a substantial amount of the reading literacy achievement gap between the two family structures can be accounted for by a family's economic inputs. I also conducted t-tests on the coefficients in order to determine if they were statistically different. As Table 25 shows, in the case of New Zealand, the two coefficients are statistically different from each other at the .01 level. If we continue to compare the baseline model to the economic model, which includes the economic input variables, a pattern emerges in which all the liberal countries of Australia, Canada, Ireland, New Zealand, the United Kingdom, and the United States experience a statistically significant reduction in the single-mother coefficient because of the inclusion of this set of variables. Therefore, in these countries, economic inputs such as parents' occupation, parents' education, and the number of books in the home, account for a significant amount of the reading literacy gap between students who reside in mother-only families compared to students who live with both of their parents. Figure 12 graphically illustrates not only the similarities among the liberal countries, but also the patterns that emerge between the two other regimes.

Figure 12.

Graph comparing the change in the reading literacy single-mother coefficient between the baseline and economic models by regime.



Note: aus=Australia, aut=Austria, bel=Belgium, can=Canada, deu=Germany, dnk=Denmark, esp=Spain, fin=Finland, fra=France, gbr=United Kingdom, grc=Greece, iri=Ireland, ita=Italy, nor=Norway, nzl=New Zealand, prt=Portugal swe=Sweden, usa=United States

In the southern European (conservative regime) countries of Greece, Italy, Portugal, and Spain, the single-mother coefficients are not statistically significant in the baseline model. This continues to be the case for all five models, with the exception of Portugal. Portugal is unique in that the positive single-mother coefficient increases in size. In the

economic model, for example, the coefficient becomes positive and significant.

In the case of Portugal, the gap between the two family structures favors students from single-mother families. In other words, when we take into account economic inputs, it could be viewed as an advantage to reside in a Portuguese mother-only family compared to a two-parent one. This result is somewhat expected because Portuguese children who reside in single-mother homes reported that their mothers were better educated and had higher status occupations than their two-parent equivalents. The differences between the two family structures, as previously reported, were not statistically significant at the 0.05 level. However, the slightly higher levels of parents' education and occupational levels give some indications as to why the achievement gap favors children from single-mother families in Portugal.

The inclusion of the parental involvement variables as seen in the third model results in a small reduction in the single-mother coefficients. This is the case for Australia, Canada, Denmark, Finland, France, Germany, Ireland, New Zealand, Norway, Sweden, the United Kingdom, and the United States. However, as Table 25 indicates, none of the coefficients is statistically different from the baseline model (one). The combined model contains both the economic input and parental involvement variables. In Canada, for example, the inclusion of these two sets of variables results in a 79% reduction in the single-mother coefficient. This statistically significant reduction in the reading literacy gap between students from single-mother families and their two-parent counterparts indicates that economic inputs and parental involvement account for a significant amount of this

educational gap. Similar results can also be seen in the liberal countries of Ireland, New Zealand, the United Kingdom, and the United States.

The social democratic countries of Denmark, Finland, Norway, and Sweden provide an interesting and uniform set of results. In all these countries, the addition of the economic input and parental involvement variables results in a reduction of the reading literacy gap between the two family structures. However, in none of these countries are the coefficients statistically different from the baseline model. So while parents' economic inputs and parental involvement measures account for some of the difference between the two family structures, it is not to the same extent as in the liberal countries.

Mathematics literacy. Table 26 contains the mathematics literacy single-mother coefficients for all four models. The results for the full models for each country can be viewed in Appendix B (Tables B.20-B.37). The coefficients for the baseline model indicate that students from mother-only families perform worse in the mathematics literacy tests in 17 out of the 18 countries (exception is Greece) when compared to their two-parent counterparts. This difference is statistically significant at the 0.05 level in 10 of these countries. Consistent with reading literacy, the largest gaps between the two family structures can be found in the United Kingdom (-29.18) and the United States (-36.51).

Table 26.

Single-mother OLS regression coefficients for each of the four models for mathematics literacy, including the percentage change in the single-mother coefficient between models.

Country/Regime	Models				Models		
	Baseline	Economic	Parental Inv.	Combined	1→2	1→3	1→4
<u>Liberal Regime</u>							
Australia ^a	-9.36	0.88	-6.86	0.93			
Canada	-15.41 **	-9.67 **	-12.70 **	-8.40 **	37%	18%	45% #
Ireland	-21.72 **	-10.25 #	-20.34 **	-10.72 #	53%	6%	51%
New Zealand	-22.16 **	-7.08	-18.38 **	-6.58	68% #	17%	70% #
United Kingdom	-29.18 **	-16.15 **	-24.27 **	-14.92 **	45% *	17%	49% **
United States	-36.51 **	-20.95 **	-31.59 **	-19.75 **	43% #	13%	46% *
<u>Conservative Regime</u>							
Austria ^a	-1.94	-3.63	-1.68	-2.94			
Belgium ^a	-3.22	4.23	-1.39	4.54			
France	-8.30 #	-6.40	-7.36	-5.98	23%	11%	28%
Germany	-14.80 *	-8.81 #	-14.88 *	-9.91 #	40%	0%	33%
Greece ^a	4.52	-0.98	4.14	-1.42			
Italy	-7.03 #	-7.63 #	-6.32	-7.35 #	8%	-11%	4%
Portugal ^a	-5.89	0.14	-5.47	-0.06			
Spain	-8.95 #	-5.57	-7.17	-5.19	38%	20%	42%
<u>Social Democratic Regime</u>							
Denmark	-20.50 **	-15.57 **	-16.94 **	-13.73 **	24%	17%	33%
Finland	-18.14 **	-13.89 **	-15.77 **	-12.14 *	23%	13%	33%
Norway	-27.77 **	-20.72 **	-27.12 **	-21.34 **	25%	2%	23%
Sweden	-19.23 **	-10.55 #	-19.06 **	-11.94 *	45%	1%	38%

Note. ** $p=.01$, * $p=.05$, # $p=.10$.

^a Non significant coefficients, therefore the percentage change in the single-mother coefficient has not been calculated.

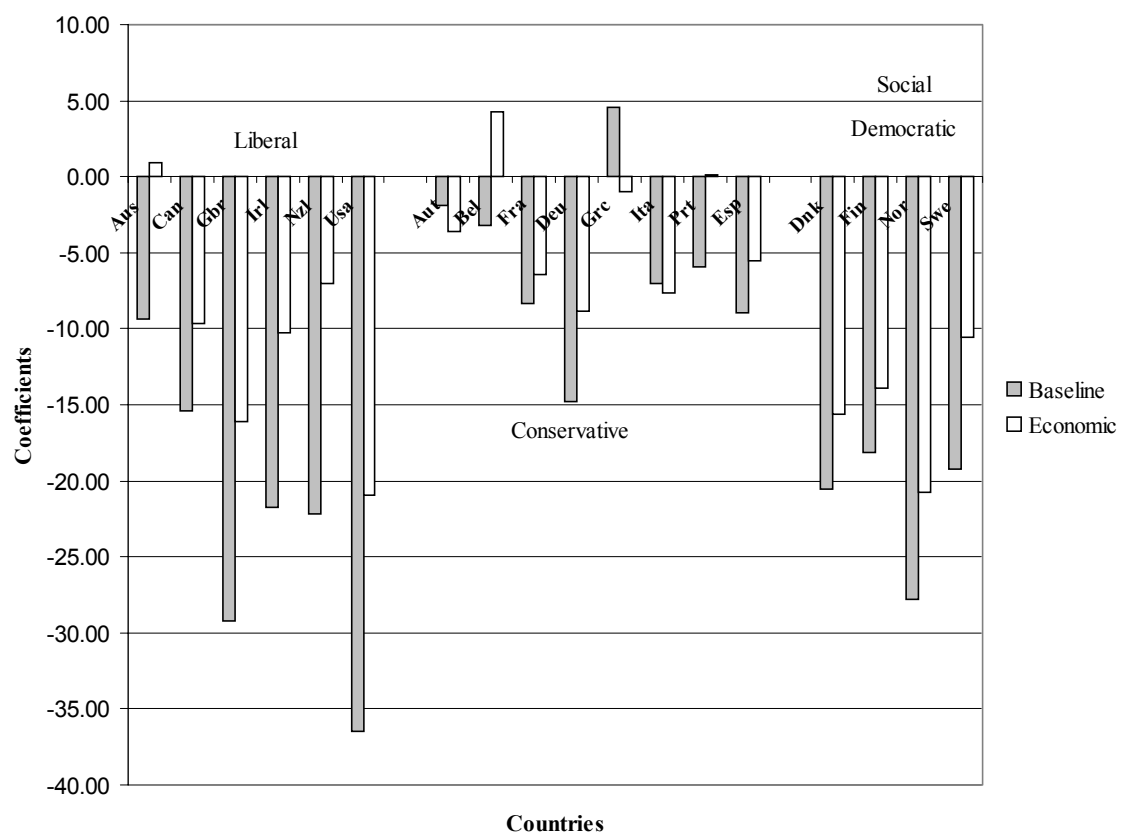
The inclusion of the economic variables in the second model results in a reduction in the single-mother coefficients for the liberal and social democratic regime countries. Consistent with the reading literacy results, the effect on literacy achievement of the inclusion of this set of variables for the conservative countries is mixed. In Italy, for example, the inclusion of the economic variables does not change the single-mother coefficient.

Figure 13 graphically illustrates the single-mother coefficients for the baseline and economic models. When you compare this graph (Figure 13) with the graph for reading literacy (Figure 12) a very similar pattern emerges. The coefficients of the baseline model for the liberal and social democratic countries are negative, which means that children who reside in mother-only families perform worse in reading and mathematics literacy than their two-parent counterparts. Economic resources can account for a significant amount of the difference between these two family structures in the liberal countries (economic model). The same can be said for the social democratic countries, but to a lesser extent. When we compare the graphs for the conservative countries it is clear to see that the coefficients are not only small, but also vary in direction. In Greece, for example, the coefficients of the baseline model for reading and mathematics literacy are positive, which indicates that students in mother-only families do better than their counterparts who reside in two-parent homes. After controlling for economic inputs, the coefficient for Greece becomes negative but it is not statistically significant. In the case of Portugal and Belgium, the opposite occurs with the coefficients becoming positive after the economic input

variables are included in the model. Similarly to Greece, while the coefficients for Portugal and Belgium change their direction, they are not statistically significant.

Figure 13.

Graph comparing the change in the mathematics literacy single-mother coefficient between the baseline and economic models by regime.



Note: aus=Australia, aut=Austria, bel=Belgium, can=Canada, deu=Germany, dnk=Denmark, esp=Spain, fin=Finland, fra=France, gbr=United Kingdom, grc=Greece, iri=Ireland, ita=Italy, nor=Norway, nzl=New Zealand, prt=Portugal swe=Sweden, usa=United States

If we turn our attention to the third model, we can see that the inclusion of these parental involvement variables does not change the single-mother coefficients when compared to the baseline models. The largest reduction can be found in Spain (20%) and Canada (18%). However, when we compare the percentage change in the coefficients of models three (parental involvement) to model two (economic), the reduction is small.

Science literacy. Table 27 contains the single-mother coefficients for each of the four regression models for science literacy. The combined models for each country can be found in Appendix B (Tables B.38-B.55). Consistent with the results for reading and mathematics, students who reside in mother-only families perform worse in science literacy tests in all the liberal and social democratic regime countries. In the case of the conservative regime countries, the results are mixed. In Greece, the coefficients have been positive but non-significant for reading and mathematics literacy. For science literacy, the coefficient is now both positive and significant at the 0.01 level. Therefore, students who reside in Greek single-mother families, on average, outperform their two-parent counterparts in science literacy. Even after controlling for economic and parental time resources (combined model), these same students fare better academically.

Table 27.

Single-mother OLS regression coefficients for each of the four models for science literacy, including the percentage change in the single-mother coefficient between models.

Country/Regime	Models				Models		
	Baseline	Economic	Parental Inv.	Combined	1→2	1→3	1→4
<u>Liberal Regime</u>							
Australia	-6.27 **	5.86 **	-3.10 *	5.66 **	193% **	50%	190% **
Canada	-11.29 **	-4.65 **	-7.10 **	-2.65 **	58% **	37%	77% **
Ireland	-19.76 **	-6.43 **	-18.35 **	-6.79 **	67% **	7%	66% **
New Zealand	-9.77 **	1.42	-6.03 **	2.62 *	114% **	38%	127% **
United Kingdom	-30.69 **	-13.10 **	-28.35 **	-13.58 **	57% **	7%	56% **
United States	-35.92 **	-16.36 **	-32.50 **	-16.05 **	54% **	9%	55% **
<u>Conservative Regime</u>							
Austria ^b	2.39	3.97 **	2.06	3.56 **	39%	16%	33%
Belgium	-6.20 **	-2.84 *	-6.18 **	-2.89 *	54% **	0%	53% #
France	-3.00 *	0.29	-1.11	0.88	109% *	63%	129% *
Germany	-11.87 **	-2.55 *	-10.35 **	-3.34 **	78% **	12%	72% **
Greece	10.06 **	7.12 **	9.53 **	6.86 **	29%	5%	32%
Italy ^b	0.40	2.10 #	1.13	2.57 **	80%	64%	84%
Portugal	-3.77 **	-0.43	-4.16 **	-1.09	88%	10%	71%
Spain ^b	1.52	4.77 **	4.49 **	6.36 **	68%	66%	76%
<u>Social Democratic Regime</u>							
Denmark	-29.30 **	-18.40 *	-24.75 **	-17.75 **	37%	15%	39%
Finland	-20.46 **	-14.35 **	-19.10 **	-13.71 **	29%	6%	33%
Norway	-15.61 **	-7.28 **	-13.03 **	-7.05 **	53%	16%	55%
Sweden	-24.15 **	-21.29 **	-23.95 **	-21.83 **	11%	1%	10%

Note. ** $p=.01$, * $p=.05$, # $p=.10$.

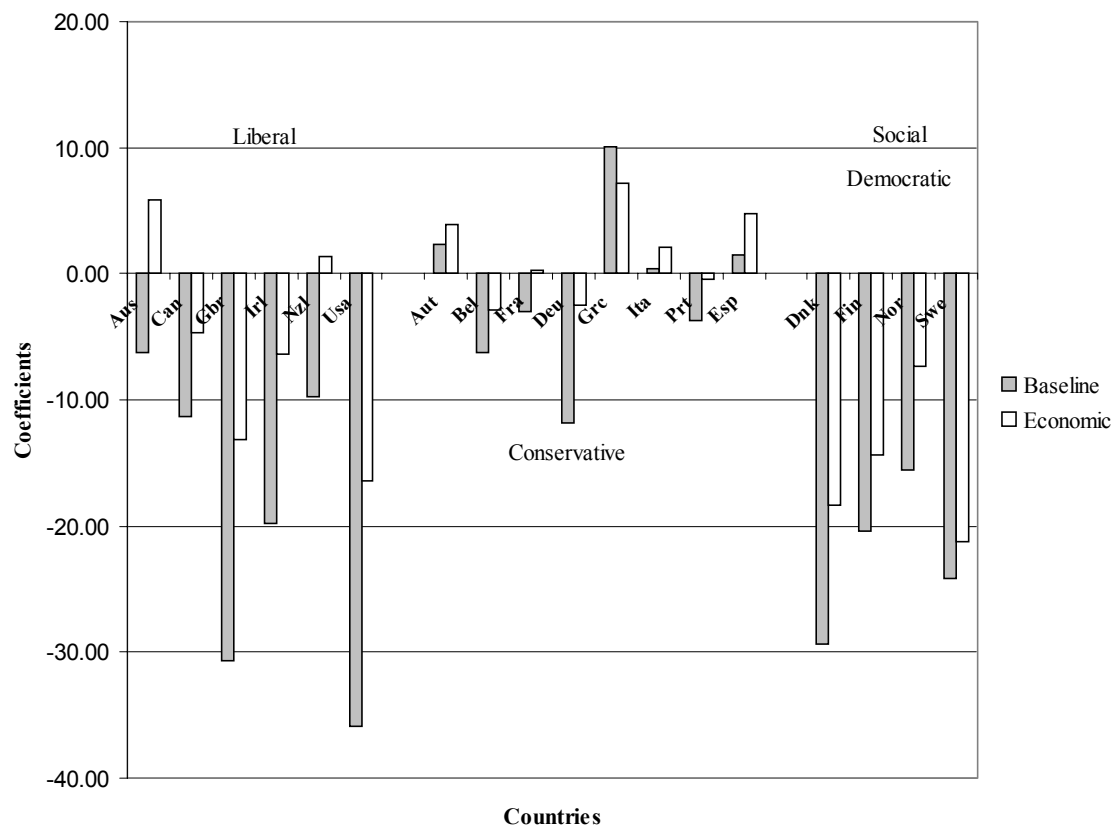
^b The percentage change in the single-mother coefficients for these countries represents the percentage increase in the coefficient. This is in contrast to the other countries where the percentages represent a reduction in the coefficient.

The inclusion of the economic variables results in a large reduction in the single-mother coefficients for the liberal countries and to a lesser extent in the social democratic countries. In the case of Australia, a country in the liberal regime, the addition of the economic variables results in a change from -6.27 to 5.86. When economic resources are controlled for, students who reside in mother-only families in Australia go from scoring significantly less in science literacy tests to outperforming their two-parent counterparts.

In the interest of consistency, Figure 14 compares the single-mother coefficients for the baseline and economic regression models across the three regimes. At a glance, it is possible to see the distinct pattern that emerges across the 18 countries and their regimes. The figure shows a pattern in which the largest science literacy gaps can be found in the liberal and social democratic regime countries. As was the case for reading and mathematics literacy, the United Kingdom and the United States have the largest gaps between the two family structures. In addition, there is a considerable reduction in the literacy gap for the liberal countries after economic resources have been controlled for. The reduction is to a uniform lesser extent in the social democratic countries.

Figure 14.

Graph comparing the change in the science literacy single-mother coefficient between the baseline and economic models by regime.



Note: aus=Australia, aut=Austria, bel=Belgium, can=Canada, deu=Germany, dnk=Denmark, esp=Spain, fin=Finland, fra=France, gbr=United Kingdom, grc=Greece, irl=Ireland, ita=Italy, nor=Norway, nzl=New Zealand, prt=Portugal swe=Sweden, usa=United States

Summary of OLS Regression Results

For all three measures of literacy achievement, the largest gaps between the two family structures were found in the United Kingdom and the United States. Approximately

one-third of a standard deviation separates those students who reside in single-mother families from those who reside with two parents. In many of the conservative regime countries, there was very little or no significant difference in literacy achievement scores between the two family structures.

In the liberal countries, economic resources appear to set students from single-mother families academically apart from their two-parent counterparts. The inclusion of parental economic resource variables dramatically reduced the single-mother coefficients. While economic resources account for some of the literacy achievement gap in the social democratic countries, it was not to the same extent as in the liberal countries nor statistically significant. The inclusion of both the economic inputs and parental involvement variables resulted in a further reduction in the literacy gap, particularly across the liberal and social democratic countries. These results indicate that my two identified micro-level mechanisms (economic deprivation and parental involvement) vary systematically with the relationship between literacy achievement and family structure. When we look at the results of the regression analysis across the three measures of literacy achievement there are some notable observations. In the case of the social democratic regime countries, the results are consistent across all three literacy measures. Science literacy appears to set itself apart from reading and mathematics literacy in the case of two conservative regime countries and two liberal regime countries. The relationship between science literacy and single-motherhood is different, when compared to reading and mathematics literacy, for Australia, Austria, New Zealand, and Spain. In all four cases, the science literacy gap significantly favors children from single-mother families after

controlling for economic and parental time resources. This was not the case for the reading and mathematics outcome measures. It remains unclear why science literacy achievement would set itself apart from reading and mathematics literacy in these four countries. Clearly, this result would require further investigation. In the next section, I present the results of my multi-level analysis.

Multi-level Analysis

The final stage of my analysis is aimed at a macro perspective of the relationship between the policy environment of a country and the literacy achievement gap between children from mother-only and two-parent homes. Using multilevel analysis the 18 countries are combined by using a two-level model in which students are nested within countries. The results of the HLM analysis are divided into three parts. First, I present the economic policy environment HLM results, followed by the results of the parental time policy environment analyses. Lastly, I present my results for the welfare state regime analyses.

The unconditional model was the first to be estimated. As we can see from Table 28, the overall mean reading literacy score is 508.86 with a standard error of 5.00. The table also contains the within country ($\sigma^2=10108.37$) and the between country ($\tau=443.63$) variances. The decomposition of this variance allows the intra-class correlation ($\tau_0^2 / (\tau_0^2 + \sigma^2)$) to be calculated, which is an indicator of the relative importance of context, in this case, the country in which the student lives and goes to school. The intra-class correlation for reading literacy is a modest .04 (mathematics=0.08, science=0.06), which indicates that there is some between country differences. However, it is important to note that a significant amount of the variance is within each country and not between.

Table 28.

HLM coefficients and variance components for the economic policy environment models for reading literacy (N=112,404 students in 18 countries).

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	508.86 **	508.86 **	508.89 **	509.37 **	504.67 **
Student Level					
Family Structure (ref. two parent)					
Single-Mother Family		-15.94 **	-6.84 **	-6.39 **	-5.40 **
Mixed Family		-31.68 **	-18.11 **	-18.15 **	-18.12 **
Other Family Structure		-62.30 **	-37.56 **	-37.60 **	-37.57 **
Background Characteristics					
Gender (being a girl)		22.49 **	18.86 **	18.63 **	18.86 **
Grade		58.79 **	47.42 **	47.42 **	47.41 **
"Official" Language Speaker at Home		48.42 **	24.33 **	24.34 **	24.34 **
Economic Inputs					
Parents' Occupation (ISEI scale)			26.88 **	27.10 **	26.60 **
Parents' Education (ref. secondary & below)					
Tertiary			6.85 **	6.67 **	7.04 **
Number of Books in the Home			12.24 **	12.29 **	12.24 **
Parental Involvement					
Cultural Involvement Index			6.43 **	6.42 **	6.46 **
Social Involvement Index			0.99 **	1.00 **	0.90 **
Country Level					
<u>Intercept</u>					
Economic policy environment favoring low-income single-parent families				-0.88	
Economic policy environment favoring average-income single-parent families					3.47 #
<u>Single-mother slope</u>					
Economic policy environment favoring low-income single-parent families				1.11 **	
Economic policy environment favoring average-income single-parent families					-1.16 *
<u>Variance Components</u>					
Intercept τ_0^2	443.63 **	444.82 **	443.50 **	485.94 **	431.40 **
Single-Mother Family τ_2^2		81.30 **	50.96 **	43.04 **	46.27 **
σ^2	10108.37	7926.34	6297.65	6297.55	6297.75

Note. #= $p = 0.10$, * $p = 0.05$, ** $p = 0.01$. Missing data dummies were included in models 2, 3, 4, and 5.

Model 2 contains a number of student-level covariates. Consistent with the OLS regression models, I include a number of control variables and missing data dummy

variables. This model also includes the three family structure dummies, gender, grade level, and language spoken at home variables. The student-level variables are all group mean-centered in order to produce within-country slope estimates. The parental time policy environment variables are grand mean-centered and the country-level economic policy environment variables are left uncentered.

As the coefficient for single-mother family (model 2) indicates, students who reside in mother-only homes fare worst in reading literacy when compared to their two-parent counterparts. This can be seen by the -15.94 (SE=2.50) coefficient for single mother, which is statistically significant at the 0.01 level. The coefficient for mathematics literacy is somewhat larger at -22.24 (see Table 29) and for science literacy the coefficient is almost identical to the one for reading literacy (-14.32, see Table 30).

Table 29.

HLM coefficients and variance components for the economic policy environment models for mathematics literacy (N=62,458 students in 18 countries).

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	504.99 **	505.00 **	505.03 **	504.35 **	500.50 **
Student Level					
Family Structure (ref. two parent)					
Single-Mother Family		-22.24 **	-12.55 **	-10.28 **	-10.74 **
Mixed Family		-27.29 **	-16.07 **	-16.29 **	-16.27 **
Other Family Structure		-55.63 **	-33.69 **	-33.95 **	-33.87 **
Background Characteristics					
Gender (being a girl)		-17.80 **	-20.54 **	-20.54 **	-20.55 **
Grade		51.89 **	42.49 **	42.48 **	42.49 **
"Official" Language Speaker at Home		44.58 **	21.90 **	21.96 **	21.93 **
Economic Inputs					
Parents' Occupation (ISEI scale)			24.33 **	24.01 **	24.09 **
Parents' Education (ref. secondary & below)					
Tertiary			7.43 **	7.51 **	7.49 **
Number of Books in the Home			12.24 **	12.31 **	12.30 **
Parental Involvement					
Cultural Involvement Index			4.02 **	4.03 **	4.03 **
Social Involvement Index			0.61 **	0.60 **	0.62 **
Country Level					
<u>Intercept</u>					
Economic policy environment favoring low-income single-parent families				1.36	
Economic policy environment favoring average-income single-parent families					3.73 #
<u>Single-mother slope</u>					
Economic policy environment favoring low-income single-parent families				0.66 **	
Economic policy environment favoring average-income single-parent families					-1.62 **
<u>Variance Components</u>					
Intercept τ_0^2	825.28 **	826.52 **	825.51 **	841.12 **	776.08 **
Single-Mother Family τ_2^2		55.24 **	24.24 **	23.17 **	23.63 **
σ^2	8940.86	7328.47	5995.54	5958.88	5958.84

Note. #= $p=0.10$, * $p=0.05$, ** $p=0.01$. Missing data dummies were included in models 2, 3, 4, and 5.

Table 30.

HLM coefficients and variance components for the economic policy environment models for science literacy (N=62,458 students in 18 countries).

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Intercept	503.90 **	503.91 **	503.96 **	504.09 **	498.62 **
Student Level					
Family Structure (ref. two parent)					
Single-Mother Family		-14.32 **	-4.58 *	-4.32 **	-3.52 *
Mixed Family		-28.63 **	-14.11 **	-14.13 **	-14.14 **
Other Family Structure		-56.19 **	-32.45 **	-32.46 **	-32.47 **
Background Characteristics					
Gender (being a girl)		-5.51 **	-9.21 **	-9.21 **	-9.21 **
Grade		52.64 **	41.72 **	41.72 **	41.70 **
"Official" Language Speaker at Home		49.14 **	24.27 **	24.27 **	24.27 **
Economic Inputs					
Parents' Occupation (ISEI scale)			27.36 **	27.56 **	26.93 **
Parents' Education (ref. secondary & below)					
Tertiary			7.45 **	7.45 **	7.38 *
Number of Books in the Home			13.35 **	13.33 **	13.39 **
Parental Involvement					
Cultural Involvement Index			5.29 **	5.30 **	5.27 **
Social Involvement Index			0.52 #	0.59 #	0.40 **
Country Level					
<u>Intercept</u>					
Economic policy environment favoring low-income single-parent families				-0.26	
Economic policy environment favoring average-income single-parent families					4.42 *
<u>Single-mother slope</u>					
Economic policy environment favoring low-income single-parent families				0.59 #	
Economic policy environment favoring average-income single-parent families					-1.56 #
<u>Variance Components</u>					
Intercept τ_0^2	573.65 **	564.78 **	563.46 **	594.27 **	513.58 **
Single-Mother Family τ_2^2		79.55 **	37.02 **	33.48 **	32.65 **
σ^2	9805.45	8171.71	6594.38	6594.21	6593.96

Note. #= p =0.10, * p =0.05, ** p =0.01. Missing data dummies were included in models 2, 3, 4, and 5.

The third model for all three literacy measures includes the addition of the economic input variables (parents' education, parents' occupation, and number of books in the home) and the parental input measures of cultural and social involvement. The

inclusion of these variables results in a reduction of the single-mother family coefficient from -15.94 to -6.84 for reading literacy, -22.24 to -12.55 for mathematics, and -14.32 to -4.58 for science. This result indicates that a significant amount of the reading literacy achievement gap between the two family structures can be accounted for by a family's economic inputs and the parental involvement measures. These results are consistent with the individual country OLS regression analyses.

Economic Policy Environment

For model 4, the economic policy environment variable favoring low-income families is included as a contextual variable. In this model, a cross-level interaction between the policy variable and single-mother family is also specified. For reading the coefficient indicating the economic environment that favors low-income single-parent families (-0.88) is not statistically significant. The cross-level interaction between the single-mother variable and the economic policy environment variable favoring low-income families is my primary interest in this analysis. The interaction between single motherhood and the economic policy variable favoring low-income single-parent families is significant (1.11). A positive coefficient on the single-mother slope indicates that the reading literacy gap between children who reside in two-parent and mother-only families will become smaller in those countries where the economic policy environment favors single-parent families. In other words, residing in a country that has an economic policy environment that favors low-income single-parent families, is an educational benefit to children who reside in single-mother households. For example, a unit change in the economic policy

variable, which would be an increase of \$100 in the net disposable income gap in favor of single-parents, would result in a 1.11 point reduction in the reading literacy gap. Put differently, in a country that increased the disposable income gap making low-income single-parents better off by \$100 a month than two-parent families, the achievement gap would be just over a point smaller. Similar results can be found for mathematics and science literacy. It should be noted that despite the significance of the coefficients, the effect sizes are small.

Model 5 contains the economic policy environment variable favoring average-income single-parent families. Again, the results for all three measures of literacy achievement are similar. In the case of the policy environment variable favoring average-income single-parent families, the main effect is both positive and significant, indicating that both family structures benefit academically when the environment favors single-parent families. This can be seen by the positive coefficients for average-income families (i.e., reading=3.47, mathematics=3.73, and science=4.42). For example, a one unit increase in the net disposable income gap in favor of average income single-parent families would result in a four and a half point increase in the science literacy scores for all students. The reading and mathematics coefficients are only significant at the 0.10 level. In contrast, the coefficient for science literacy is statistically significant at 0.05. These results are surprising because I expected the coefficient to be non-significant in the same way that the low-income policy environment variable was not statistically significant. This result may be driven by the small numbers of average-income single-parent families. A significant

number of single-parents are low-income earners. Therefore, this policy variable may be more representative of the generosity of the family policy environment towards all families.

The cross-level interaction between single mother and the policy variable indicates a negative relationship between residing in a mother-only household and a policy environment that favors single-parent families. This result is in contrast with the results for the low-income policy environment. Again, this result is somewhat of a surprising one, with children from single-mother families not benefiting from a policy environment that favors average-income single parents. In fact, the opposite relationship is true. The literacy achievement gap is greater in countries where the economic policy environment favors average-income single-parent families. This result is in contrast to the results for the low-income policy environment. Again, I believe this result is influenced by the large number of average-income two-parent families and the small number of single-parent families that fall into this category. As previously shown, many single-mother families live in poverty and are low-income earners.

In summation, the relationship between the literacy gap between students from single-mother and two-parent families is influenced by a country's economic policy environment. In those countries that favor low-income single-parent families, the literacy gap between the two family structures decreases in size. When the policy environment for average-income families favors single-parent families literacy achievement for students

from both family structures improves significantly, however the gap between the two family structures begins to increase in size.

Parental Time Policy Environment

In this section I present the HLM results for the parental time policy environment analysis. In contrast to the economic policy environment variables, the parental time policy variables do not compare whether the policy environment favors one family structure over the other. Instead, the three indices are constructed based upon how favorable the policies are towards single-mother families. Therefore, some policies that are beneficial to single mothers are equally as beneficial to married couples, particularly mothers. The implications of this overlap may lead to non-significant results for children from single-mother families. Therefore, I believe the results presented here are conservative estimates of the possible relationship between the policy environments and the literacy achievement gap between children from single-mother and two-parent homes.

Table 31 contains the results for the parental time policy environment indices for reading literacy. The contextual variables of *caregiving*, *paid work*, and *transition from paid worker to caregiver* were all centered at their grand means. A positive coefficient indicates an increase in the student's reading literacy score for every point above the grand mean of all 18 countries. This centering strategy was adopted in order to have a meaningful point for interpreting the results of the country-level intercepts, which represents countries with average policy environments for single-mother families in regards to their roles as caregivers, paid workers or as they transition from paid work to a

caregiving role. Countries that fall above this grand mean are countries that have above average policy environments are favorable towards single mothers.

Table 31.

HLM coefficients and variance components for the parental time policy environment models for reading literacy (N=112,404 students in 18 countries).

Variables	Caregiving	Paid Work	Transition from paid worker to caregiver
Intercept	508.92 **	508.90 **	508.93 **
Student Level			
Family Structure (ref. two parent)			
Single-Mother Family	-6.60 **	-6.64 **	-6.81 **
Mixed Family	-18.11 **	-18.11 **	-18.12 **
Other Family Structure	-37.57 **	-37.56 **	-37.55 **
Background Characteristics			
Gender (being a girl)	18.86 **	18.86 **	18.86 **
Grade	47.41 **	47.41 **	47.41 **
"Official" Language Speaker at Home	24.33 **	24.34 **	24.33 **
Economic Inputs			
Parents' Occupation (ISEI scale)	26.86 **	26.94 **	26.86 **
Parents' Education (ref. secondary & below)			
Tertiary	6.85 **	6.83 **	6.88 **
Number of Books in the Home	12.25 **	12.25 **	12.24 **
Parental Involvement			
Cultural Involvement Index	6.43 **	6.43 **	6.43 **
Social Involvement Index	1.02 **	0.97 **	1.02 **
Country Level			
<u>Intercept</u>			
Parental Time Policy Environment			
Caregiving	0.22 **		
Paid Work		0.28	
Transition from paid worker to caregiver			0.54 **
<u>Single-mother slope</u>			
Parental Time Policy Environment			
Care-giving	-0.03		
Paid-work		0.03	
Transition from paid-worker to care-giver			-0.08 #
<u>Variance Components</u>			
Intercept τ_0^2	315.71 **	451.28 **	126.05 **
Single-Mother Family τ_2^2	48.27 **	49.60 **	40.11 **
σ^2	6297.73	6297.74	6297.71

Note. #=p =0.10, *p =0.05, **p =0.01. Missing data dummies were also included in all models.

As the table indicates, students who reside in single-mother homes score approximately seven points less than students from two-parent families. The first model is concerned with the relationship between the caregiving policy environment for single mothers and the reading literacy gap. The significant coefficient 0.22 for caregiving indicates that in countries that have an above average caregiving policy environment, that environment is beneficial to the reading literacy achievement of all children. For example, a 10-point increase in a country's policy index for caregiving would result in a two-point increase in reading literacy scores for all children.

The cross-level interaction between single motherhood and the policy environment is my main interest because the relationship between these two variables has implications for the achievement gap between the two family structures. As the table indicates, the interaction between the contextual variable of *caregiving* and *single-mother family* (see single-mother slope) is not significant (coefficient=-0.03). Therefore, a one-unit change in the caregiving policy environment index for single-mother families benefits children from both two-parent and single-mother families. The reading literacy gap between the two family structures remains unaffected by the policy environment for caregiving.

The second model in Table 31 contains the results for the *paid worker* policy environment analysis. As the two country-level coefficients indicate, there is no significant relationship between the paid worker policy environment for single mothers and reading literacy. The third model, which is concerned with the policy environment for single

mothers as they transition from paid workers to caregivers, indicates significant contextual effects and cross-level interaction between policy environment and single motherhood. It should be noted however, that the cross-level interaction of -0.08 is only significant at the 0.10 level. These results show that in countries where there are policies that help single mothers transition from the role of worker to caregiver, there is a positive relationship between this policy context and reading literacy achievement for all children. This can be seen by the positive coefficient of 0.54 , which is significant at the 0.01 level. This cross-level interaction is also significant and indicates a negative relationship between policy environments that help transition single mothers from workers to caregivers. These results indicate that in countries with above average policy environments that help transition single mothers from paid workers to caregivers, predicted reading literacy scores are higher for all students. However, while the achievement scores improve for all children, the reading literacy gap between the two family structures becomes slightly larger in favor of children who reside in two-parent households.

Policy environments that support single mothers in the role of caregiver or as they transition from paid worker to caregiver appear to be beneficial, in terms of reading literacy achievement, to all children. So, in the case of Finland where the policy environment seems to support single mothers in both these roles (caregiving index score= 91 and transitional index score= 100), children appear to benefit academically from such a favorable policy environment. As previously highlighted, it is of little surprise that policy environments that are favorable to single mothers also benefit two-parent families. This is

because policies that are beneficial to single mothers are also helpful for married mothers. Such policies include the availability of daycare and after school programs.

Table 32 and Table 33 contain the results of the mathematics and science literacy analyses. The result of the caregiving model for mathematics achievement is similar to the results for both reading literacy and science literacy achievement. In all three cases the caregiving policy environment is positively related to literacy achievement. However, there are no cross-level interactions between the caregiving policy variable and single motherhood. This can be seen by the non-significant coefficients for the single-mother slope in Table 31, Table 32, and Table .

Table 32.

HLM coefficients and variance components for the parental time policy environment models for mathematics literacy (N=62,459 students in 18 countries).

Variables	Caregiving	Paid Work	Transition from paid worker to caregiver
Intercept	505.07 **	505.05 **	505.07 **
Student Level			
Family Structure (ref. two parent)			
Single-Mother Family	-11.99 **	-11.27 **	-12.15 **
Mixed Family	-16.1 **	-16.19 **	-16.08 **
Other Family Structure	-33.77 **	-33.83 **	-33.74 **
Background Characteristics			
Gender (being a girl)	-20.54 **	-20.54 **	-20.54 **
Grade	42.49 **	42.48 **	42.48 **
"Official" Language Speaker at Home	21.92 **	21.92 **	21.92 **
Economic Inputs			
Parents' Occupation (ISEI scale)	24.35 **	24.16 **	24.09 **
Parents' Education (ref. secondary & below)			
Tertiary	7.44 **	7.38 **	7.54 **
Number of Books in the Home	12.27 **	12.3 **	12.29 **
Parental Involvement			
Cultural Involvement Index	4.01 **	4.04 **	4.03 **
Social Involvement Index	0.59	0.57	0.64
Country Level			
<u>Intercept</u>			
Parental Time Policy Environment			
Caregiving	0.20 *		
Paid Work		0.76 *	
Transition from paid worker to caregiver			0.51 **
<u>Single-mother slope</u>			
Parental Time Policy Environment			
Care-giving	0.01		
Paid-work		0.17 *	
Transition from paid-worker to care-giver			0.03
<u>Variance Components</u>			
Intercept τ_0^2	557.77 **	826.69 **	412.03 **
Single-Mother Family τ_2^2	33.69 **	23.00 **	30.05 **
σ^2	5959.55	5959.47	5959.57

Note. #=p=0.10, *p=0.05, **p=0.01. Missing data dummies were also included in all models.

Table 33.

HLM coefficients and variance components for the parental time policy environment models for science literacy (N=62,459 students in 18 countries).

Variables	Caregiving	Paid Work	Transition from paid worker to caregiver
Intercept	504.01 **	503.97 **	504.04 **
Student Level			
Family Structure (ref. two parent)			
Single-Mother Family	-5.05 *	-5.27 *	-4.61 *
Mixed Family	-14.11 **	-14.11 **	-14.13 **
Other Family Structure	-32.42 **	-32.45 **	-32.45 **
Background Characteristics			
Gender (being a girl)	-9.21 **	-9.21 **	-9.21 **
Grade	41.71 **	41.71 **	41.71 **
"Official" Language Speaker at Home	24.28 **	24.27 **	24.27 **
Economic Inputs			
Parents' Occupation (ISEI scale)	27.07 **	27.14 **	27.51 **
Parents' Education (ref. secondary & below)			
Tertiary	7.59 **	7.41 **	7.55 **
Number of Books in the Home	13.33 **	13.35 **	13.28 **
Parental Involvement			
Cultural Involvement Index	5.3 **	5.30 **	5.29 **
Social Involvement Index	0.74 *	0.51 #	0.66 #
Country Level			
<u>Intercept</u>			
Parental Time Policy Environment			
Caregiving	0.27 **		
Paid Work		0.28	
Transition from paid worker to caregiver			0.55 **
<u>Single-mother slope</u>			
Parental Time Policy Environment			
Care-giving	-0.01		
Paid-work		-0.22 #	
Transition from paid-worker to care-giver			0.00
<u>Variance Components</u>			
Intercept τ_0^2	389.41 **	572.64 **	219.11 **
Single-Mother Family τ_2^2	43.57 **	37.99 **	40.07 **
σ^2	6593.93	6593.93	6593.82

Note. #=p=0.10, *p=0.05, **p=0.01. Missing data dummies were also included in all models.

In contrast to the results for reading literacy, there is a significant and positive relationship between the paid worker policy environment for single mothers and the mathematics literacy achievement gap. The significantly negative interaction coefficient between single motherhood and the paid worker policy environment variables indicates that a one-unit change in a country's policy environment index will result in a reduction in the mathematics achievement gap. The gap between the two family structures decreases in countries where the policy environment index for paid workers is greater than the average for all 18 countries. Sweden falls into this category, in which the index score of 100 points for this country is more than one standard deviation above the mean (60 points). These countries are renowned for supporting both married and single mothers in the role of paid worker. As previously discussed, single mothers in Sweden are supported in the role of *paid workers who care*. Generous childcare provisions and an expectation and support system that encourage single mothers to return to the workplace are all policies that characterize Sweden as having a policy environment that supports single mothers as paid workers. The results for mathematics literacy indicate that a policy environment that supports single mothers in the role of a paid worker (i.e., Sweden) is beneficial in closing the mathematics literacy scores between children from two-parent and mother-only homes. In contrast, in countries, such as Australia, Ireland, Portugal, and the United States, where their index scores fall one standard deviation below the average, the mathematics literacy gap becomes more pronounced. In these countries, single mothers are supported more strongly as caregivers rather than as paid workers. So, in countries where the policy

environment fails to support single mothers as paid workers, the mathematics literacy gap is larger than in those countries that a favorably policy environment.

The results for the relationship between the policy environments for a single mother transitioning from paid worker to caregiver and mathematics and science literacy are similar. In both cases the policy environment is positively related to increase mathematics and science literacy scores for all children. In both cases there are no cross-level interactions between the policy environment and single motherhood. So, in the case of Finland where the policy index score is over one standard deviation above the average for all 18 countries, children from both family structures benefit by approximately 40 points in science literacy and 37 points in mathematics because they reside in a country that has a policy environment which is favorable to single mothers who are transitioning from paid worker to caregiver. As previously stated, the mathematics and science literacy gaps between the two family structures remain unaffected by the policy environment. This analysis of the relationship between the literacy gap and the parental time policy environment produced some interesting results. Policy environments that affect single mothers' ability to manage the work-family conflict also affect the lives of married mothers. It should be noted that in many countries the policies do not target single mothers instead they are aimed at all mothers. Parental and maternity leave policies, the duration of the school day, and availability of quality childcare are some of the many policies that impact the lives of mothers and their ability to effectively manage the role of worker and caregiver. The overlapping of these policies, despite the strategies employed by Kilkey

(2000) in the construction of the indices, has implications for these results.

Across all three measures of literacy, residing in a country that has an above average policy environment that supports single mothers as either caregivers or as they transition from paid worker to caregiver, is educationally beneficial to all students.

The analysis did produce a cross-level interaction, which indicates a relationship between the policy environment for supporting single mothers as paid workers and mathematics literacy. In countries with policy environments that are above average in supporting single mothers as paid workers (i.e., Sweden), the literacy gap between children from two-parent and single-mother families is significantly reduced. Given that Sweden is the prime example of a country that supports single mothers as *paid workers who care*, it is important to highlight some of the Swedish policies that may have contributed to this cross-level relationship. First, a number of statutory provisions exist in order that a parent can take time away from work to spend with their children. Parental leave of up to one-and-a-half years can be taken by an employed worker. More importantly, the leave is paid at a rate of 90 percent of earnings for the first 360 days. If a child is sick or a parent has to be away from work for another child-related reason, an additional 122 days of leave per child can be taken at 80 percent of their current earnings. Single mothers who work are often heavily reliant on the availability of childcare. In Sweden, childcare is guaranteed by the state and priority is given to single-parent families. For school-aged children, the main type of provision is out-of-school clubs, which are publicly run and typically open Monday to Friday from 7am to 6pm. These policies may help single mothers resolve the work-

family conflict and allow these women more time to spend with their children or at least have their time substituted by a childcare professional.

Welfare Regime Policy Environments

The final set of HLM results are concerned with the overall policy environment of three clusters of countries. The following table (Table) contains the results for the welfare regime analyses in which the 18 countries in this study are clustered into three regime types (i.e., liberal, social democratic, and conservative) based upon the characteristics of their welfare state. To recap, the liberal regime countries consist of Australia, Canada, Ireland, New Zealand, the United Kingdom, and the United States. The social democratic countries include Denmark, Finland, Norway, and Sweden. The conservative welfare regime countries consist of Austria, Belgium, France, Germany, Greece, Italy, Portugal, and Spain. As Table indicates, the liberal regime is the reference category.

Table 34.

HLM coefficients and variance components for the welfare regime policy environment models for reading, mathematics and science literacy (Reading N=112,404, mathematics and science N=62,459 students in 18 countries).

Variables	Reading	Mathematics	Science
Intercept	530.54 **	526.51 **	535.03 **
Student Level			
Family Structure (ref. two parent)			
Single-Mother Family	-12.76 **	-14.86 **	-6.98 **
Mixed Family	-18.15 **	-16.36 **	-14.13 **
Other Family Structure	-37.62 **	-33.93 **	-32.48 **
Background Characteristics			
Gender (being a girl)	18.85 **	-20.57 **	-9.22 **
Grade	47.41 **	42.47 **	41.70 **
"Official" Language Speaker at Home	24.32 **	21.98 **	24.24 **
Economic Inputs			
Parent's Occupation (ISEI scale)	26.79 **	24.66 **	27.36 **
Parent's Education (ref. secondary & below)			
Tertiary	7.01 **	7.38 **	7.65 **
Number of Books in the Home	12.22 **	12.15 **	13.21 **
Parental Involvement			
Cultural Involvement Index	6.44 **	4.02 **	5.32 **
Social Involvement Index	1.04 *	0.64	0.54 #
Country Level			
<u>Intercept</u>			
Regime Dummies			
(ref: Liberal)			
Social Democratic	-16.43 #	-15.11	-27.41 **
Conservative	-40.47 **	-40.79 **	-56.11 **
<u>Single-mother slope</u>			
(ref: Liberal)			
Social Democratic	-0.52	1.27	-11.20 #
Conservative	12.29 **	8.19 **	6.58 *
<u>Variance Components</u>			
τ	233.97 **	577.65 **	414.14 **
σ^2	6297.38	5958.16	6592.94

Note. #=p=0.10, *p=0.05, **p=0.01. Missing data dummies were included in all models.

The most striking aspect of these results is clearly the relationship between residing in a conservative country and literacy achievement. Irrespective of family structure, the negative association between living in a conservative regime country and literacy achievement is sizeable. As the coefficients indicate (reading=-33.09, mathematics=-36.53, and science=-56.11), students from the southern and continental European (conservative regime) countries are expected to fare worse than their counterparts from the liberal regime countries. This result is driven somewhat by the southern European countries of Greece, Italy, Portugal, and Spain where the mean literacy scores for all students were particularly low compared to the other countries in this study. It is also interesting to note that after controlling for student and family characteristics, the students who reside in the social democratic countries scored significantly lower in science literacy (-27.41) than those from the liberal regime countries.

When we consider the cross-level interaction between single-mother families and the welfare regimes, it is interesting to note the results for the conservative regime countries. For all three literacy measures there is a positive relationship between single-mother families in a conservative regime country and student literacy achievement when compared to those from liberal regime countries. This result is consistent with the OLS regression analysis. In reading literacy, for example, the regression analysis found no statistical difference between the achievement scores for children from two-parent and single-mother households for all of the conservative regime countries. It is important to note that students from the conservative regime countries still fare worst overall than their

counterparts from the liberal and social democratic regime countries, however some of this disadvantage is wiped out by living in a mother-only household.

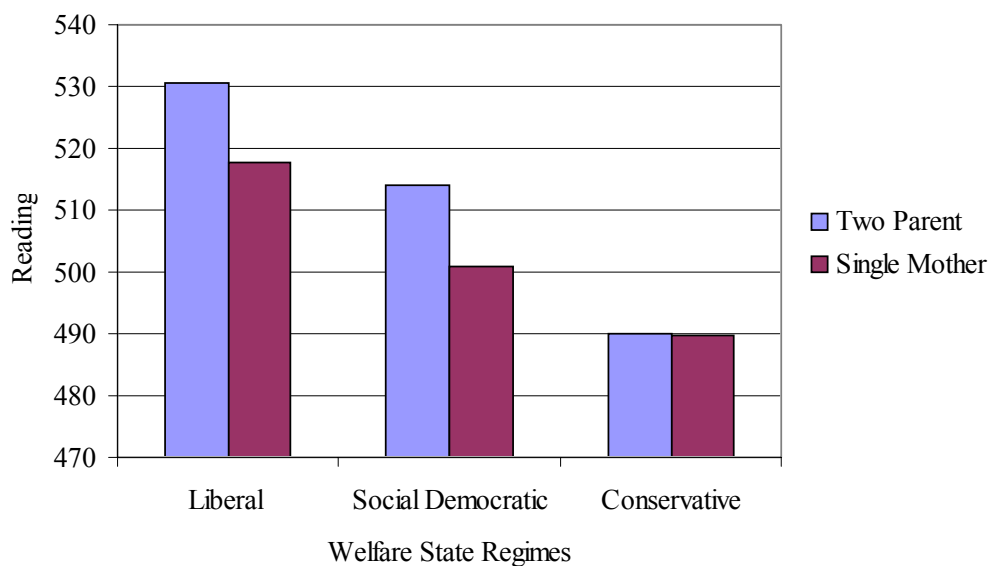
When we compare the social democratic regime with the liberal regime the results are mixed across the three outcome measures. For mathematics, the social democratic regime coefficient is negative (-15.11), suggesting that students who reside in the four social democratic regime countries fare worse than their counterparts in the liberal regime countries. However, the coefficient is not statistically significant. In the case of reading literacy, the coefficient is negative and significant at the 0.10 level. For science literacy the coefficient is both negative and significant. This result suggests that students in liberal countries score better in science literacy tests than those from social democratic welfare regime countries.

This research is primarily concerned with the gap between the family structures and as these results show, the literacy gap between students from mother-only families and two-parent families is smaller in the conservative regime countries when compared to the liberal and social democratic countries. For illustrative purposes, I have calculated the predicted outcome scores, holding all student-level variables at their group means for each of the three measures and for each welfare regime. As Figure illustrates for reading literacy, the gap between the two family structures is smallest in the conservative regime countries. This result is consistent with the individual country regression analysis that indicated very little or no relationship between literacy achievement and residing in a mother-only family. As discussed previously, the overall reading literacy achievement of

students from the conservative regime countries is far lower than those who reside in liberal or social democratic countries. While the graph indicates that, overall, students from liberal countries outperform their social democratic counterparts, the difference is not statistically significant.

Figure 15.

Predicted reading scores for students from two-parent families and single-mother families by welfare regime.



The next graph (Figure) contains the predicted mathematics literacy scores for two-parent and single-mother families for each regime. As one can see, there is very little difference between the results for reading and mathematics literacy achievement.

However, when we turn our attention to the models for science literacy (Figure), the gap between the two family structures in the social democratic regime countries becomes larger while the gap in the liberal countries reduces in size. Students who reside in the social democratic and conservative regime countries, irrespective of their family structure, perform worse in science literacy tests than their equivalents from the liberal countries. When we factor in family structure, students from conservative single- only families eradicate the negative relationship between single motherhood and science literacy achievement. This can be seen in Figure where the points for two-parent families and single-mother families meet almost at the same data point. Interestingly, residing in a social democratic country appears to exacerbate the negative relationship between single motherhood and science literacy achievement.

Figure 16.

Predicted mathematics scores for students from two-parent families and single-mother families by welfare regime.

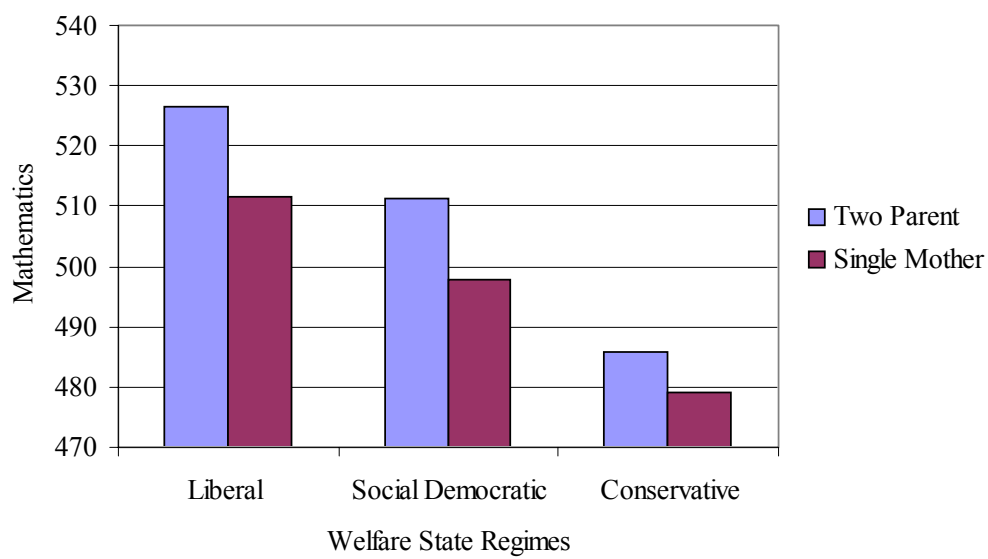
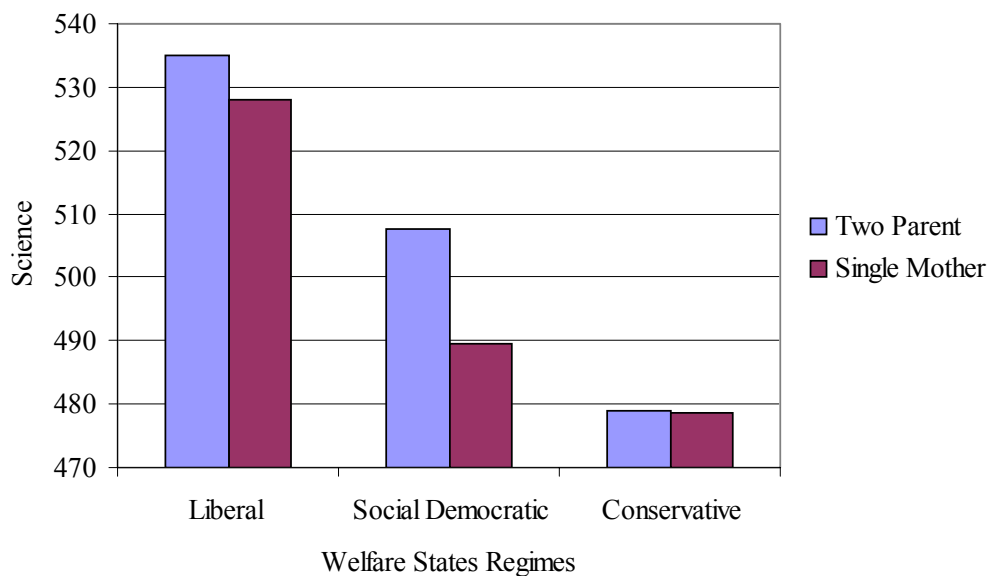


Figure 17.

Predicted science scores for students from two-parent families and single-mother families by welfare regime.



Finally, for part of my analysis I included the economic policy variables and the welfare regime dummies. This strategy was employed in order to see if the economic policy variables explained any of the differences between the regimes. The results of this analysis indicated that the regimes absorbed the economic policy differences. Therefore, this analysis strategy was unhelpful in explaining the differences between the three welfare regimes and, as such, is not reported in this final set of results.

Summary of HLM Results

In summation, the results of the multi-level analysis indicate that there is a negative relationship between single motherhood and students' literacy for all 18 countries. The gap between the two family structures decreases as a result of the inclusion of the economic resource and parental time input variables.

The economic policy environment of a country was found to influence the literacy achievement of students from both mother-only and two-parent families. In addition, in countries where the policy environment favored low-income single-parent families, the literacy gap between the two family structures decreased. In the case of average-income families, the literacy achievement of students from both mother-only and two-parent homes increased in countries where average-income single-parent families were favored. However, the gap between the two family structures increased due to a negative cross-level interaction between single motherhood and the contextual variable for the average-income economic policy variable.

The three parental time policy indices indicated a positive relationship between literacy achievement and countries that supported single mothers as either caregiver, paid worker, or in a transitional role from paid worker to caregiver. In the case of mathematics literacy, the results indicate that in countries with policy environments that are above average in supporting single mothers as paid workers, the mathematics literacy gap between children from two-parent and single-mother families is significantly reduced.

In the final analyses, the countries were clustered according to their welfare regime classification. Students from the conservative countries scored lower across all three measures of literacy achievement than those students from the liberal and social democratic regime countries. However, the literacy gap between students from mother-only and two-parent families was smallest among these conservative regime countries.

CHAPTER SEVEN

DISCUSSION

Summary of Key Findings

Research Question One

Is there a gap in reading, mathematics, and science literacy between children from two-parent families and those from single-mother families? If so, does this gap vary across nations?

The United States reported the highest prevalence of students residing in mother-only families, while Greece reported the lowest at only seven percent. When the reading literacy scores for the two family structures were compared, the children who resided in two-parent families outperformed their mother-only counterparts in 17 of the 18 countries. In 12 of these countries the difference was statistically significant. Similar results were found for the other two literacy measures. With one exception (Greece), students who

reside in mother-only families were also more likely to be at academic risk than their two-parent equivalents.

Research Questions Two and Three

Do children who reside in single-mother families have fewer economic resources than those who reside with two parents? Do children who reside in a single-mother family have fewer social and cultural interactions (parental time inputs) with their parent than those who reside with two parents?

When the economic inputs of each family structure were compared, the results indicated that, on average, children who come from two-parent homes have parents that are better educated, have enjoy higher status jobs, and have more educational resources in the home. In the case of parental involvement, with one exception (Portugal), children from two-parent homes indicated that their parents were significantly more socially involved with them when compared to those children from mother-only households. Although children from two-parent families reported higher levels of cultural involvement (one exception being Ireland), the difference between the two family structures was only significant in seven of the 18 countries.

Research Question Four

What is the relationship between a family's economic inputs and parental time inputs and student's literacy achievement?

Across all three literacy measures, the individual country regression analysis indicated that the largest gaps between the two family structures were found in the United Kingdom and the United States. In these two countries, approximately one-third of a standard deviation separated the two family structures when it came to literacy achievement. In the other liberal and social democratic regime countries, significant differences were found with students from mother-only households scoring lower on all three literacy tests. In many of the conservative regime countries, however, there was very little or no significant differences in the literacy scores between students who resided with their mother only versus those who live with both parents.

Across the liberal regime countries, economic resources appear to set students from single-mother families academically apart from those who reside with two parents. The literacy achievement gap was reduced by the inclusion of both the economic resource and parental time variables in many of the liberal and social democratic countries. In the liberal and social democratic welfare regime countries, the two mechanisms of economic resources and parental time inputs influenced the relationship between family structure and literacy achievement.

Research Question Five

Does a nation's family policy environment influence the relationship between single motherhood and children's literacy achievement through changing the family's economic inputs and parental time inputs?

The multi-level analysis provides a macro picture of the relationship between policy environments, family structure, and literacy achievement for all 18 countries combined. Across all three measures there is a negative association between residing in a single-mother household and literacy achievement. This association remains stable even after controlling for student background characteristics. In addition, a significant amount of the literacy gap between the two family structures can be accounted for by a family's economic resources and parental time inputs.

The results of the economic policy environment analysis indicated that residing in a country that has an environment that favors low-income single-parent families is an educational benefit to students who reside in mother-only households. In the case of the policy environment for average-income families, both family structures benefit from an economic policy environment that favors single-parent families. However, while students from both family structures benefit from this policy environment, the gap between the two widens.

The results from the parental time policy environment analyses indicate that policy environments that are supportive of single mothers in whichever role they choose (i.e., caregiver, paid worker, or transitional) are beneficial to children's literacy achievement. In addition, a policy environment that is favorable to single-mother families also benefits those children who reside in two-parent families. In the case of mathematics literacy the findings indicated a cross-level interaction between single motherhood and the policy environment for supporting mothers as paid workers. In countries with policy

environments that are above average in supporting single mothers as paid workers, the mathematics literacy gap between children from two-parent and single-mother families is significantly reduced.

Residing in a conservative regime country has a negative relationship to literacy achievement when compared to students who live in the liberal welfare state countries. Despite these low scores, children from mother-only families do not fare worse in relation to their two-parent counterparts when compared to those mother-only families in the liberal and social democratic countries. In other words, the literacy gap is smallest among the conservative countries despite the overall low levels of reading, mathematics, and science achievement in this cluster of nations. In contrast, students from the liberal and social democratic countries enjoy higher achievement scores, however, the gap between the two family structures is considerably larger than the gap found in the conservative countries.

Interpretation of Findings

Despite the sophisticated nature of some of the analytic techniques employed in this study (i.e., HLM), it is important to reiterate that the results of this study remain fundamentally associative in nature, thus causal inferences cannot be supported by these results. Having said this, consistent patterns have emerged as a result of my analysis and warrant both exploration and interpretation.

A number of broad conclusions can be drawn from my results. First, although the two-parent family is the dominant family type across all 18 countries, the single-mother family structure is both a significant and sizeable population. Second, the academic performance gap between the two family types varies across countries, with the greatest gap existing in the United States. Third, children who reside in single-mother families are more likely to be at academic risk than their two-parent counterparts. Fourth, children who reside in two-parent households have more economic resources. Fifth, children from two-parent families report higher levels of social and cultural involvement with their parents. Sixth, the economic resources of a family account for some of the literacy achievement gap between the two family structures. Seventh, parent involvement accounts for a small portion of the literacy gap but not to the same extent as a family's economic resources. Eighth, policy environments are related to students' literacy achievement. Ninth, economic policy environments that favor low-income single-mother families decrease the literacy achievement gap between the two family structures. Tenth, policy environments that are

favorable to supporting single mothers as paid workers result in a narrowing of the mathematics literacy gap. Lastly, there is an association between the size of the literacy achievement gap and the type of welfare state regime.

I expected that students from mother-only families would fare worse in student literacy tests and that the students from these families would have fewer economic and parental time inputs. This was the case in virtually all of the 18 countries. The multivariate analysis indicated an association between these two findings. As previously discussed, students who reside in mother-only households are more likely to live in poverty resulting in less money for educational resources such as books, computers, and the ability to participate in extra-curricular activities. In addition, schools in deprived communities lack key resources and are often poor in quality. The association between economic resources and literacy achievement found in this study is consistent with prior research and reinforces the economic deprivation explanation.

The individual country analysis highlighted the extent to which the economic resources of the family in the liberal regime countries accounted for much of the difference in the literacy scores for children from single-mother and two-parent homes. In the case of reading literacy, between 53 – 100 percent of the difference in the literacy scores between the two family structures is related to the economic resources of the family. In these liberal countries, a high percentage of single-mother families live in poverty. This study has underscored the strong relationship between achievement and socio-economic status not only in the United States, but in the other liberal regime countries. Clearly, the economic

position that these single-mother families face has educational consequences for their children.

It should be noted that much research on the relationship between economic resources and achievement of students from single-parent families has been conducted in the United States. This research tested the economic deprivation explanation in 17 other countries. In some cases there was a similar relationship between the two, however, this was not found to be the case in every country. Economic resources significantly influenced the literacy gap between mother-only and two-parent families in the liberal regime countries such as the United Kingdom. However, the influence was to a lesser extent in the Nordic countries of Denmark, Finland, Norway, and Sweden. The economic deprivation explanation or indeed any other theory that may explain the under performance of students from single-mother families becomes somewhat redundant in countries such as Greece, where no such gap exists between the two family structures.

The achievement gaps between the two family structures are either very small or non-existent in the southern European countries. The relationship between economic resources, both in this study and prior research, indicates that much of the difference in achievement scores between the two family structures can be accounted for by a family's economic resources. The descriptive analysis indicated that there was no difference in the economic resources between the two family structures for Greece, Italy, and Portugal. In addition, there was no difference in parents' occupational status in Spain. There are three possible explanations for the economic resource equality in this cluster of countries. First,

the male breadwinner model is dominant in these conservative regime countries. The policy environment supports and encourages the husband to work and for the mother to stay at home and care for their children. Paradoxically, this traditional ideology can result in a smaller resource differential between the two-parent and mother-only families. The male breadwinner model results in many two-parent families having just the one earner, which is in contrast to the abundant two-earner families found in countries such as the United States. If a single mother in these southern European countries is in employment, then the number of earners per each family structure is the same. Obviously, the earning potential of the male is greater than the female, however, the difference in economic resources is potentially less than in a country where the two-earner family is the norm. Similar results can also be found in Austria, where there is no difference in the educational resources of single-mother families and their two-parent counterparts nor is there any statistical difference in the literacy achievement scores. Austria is considered one of the archetypal conservative regime countries, therefore, this result is somewhat expected.

The second possible explanation for the lack of achievement gap in the southern European countries is the role of the extended family. As previously discussed, the family is responsible for the welfare of its members and the Mediterranean families are known for their solidarity. It is normal for multiple generations of these families to co-reside, which results in a tight network of support. This support may be in the form of financial help or assistance in raising a child. Such a network of family members could be extremely

helpful to a single mother and could explain why children who reside in these homes do not seem economically or educationally disadvantaged.

In the conservative regime countries, the state will only intervene when the family has exhausted its capacity to service its members. The extended families in these countries appear extremely successful in providing support to single mothers to the extent that the state is rarely called upon to provide social assistance to these mother-only families. Moreover, if the families do fail in some way to provide welfare to its members, then charities and the large informal sector found in this cluster of countries appear to provide a reasonable safety net for family members in need. The underdevelopment and subsidiary nature of social assistance programs may not, therefore, significantly affect the lives of children who reside in mother-only families. It is possible that the negative consequences of single-motherhood are, to a certain extent, neutralized by the close kinship network and the role of charities and the sizeable informal sector.

The third possible explanation is concerned with the overall number of single-mother families in this group of countries. Generally, there are fewer families headed by single mothers in these southern European countries. In the case of Greece, only three percent of families with children are headed by females only. The number of single mothers in the other three countries is higher and is more representative of the conservative regime countries. However, compared to countries like the United States, the number of these families is small. Coupled with this, very few mother-only families in these countries are the result of out-of-wedlock births. Instead, many single mothers are divorcees and

potentially financially better off than their unmarried counterparts. In many of the conservative regime countries the percentage of births to women under the age of 20 is low. The majority of young mothers are often unmarried. In Belgium, only 2.9 percent of births are born to women under 20, with only 1.8 percent in France, Germany 2.6 percent, and Italy 2.3 percent. In the liberal countries of Canada, the United Kingdom, and the United States, the percentage of births to mothers under 20 years of age is 6.3 percent, 7.3 percent, and 12.8 percent respectively (United Nations Development Programme, 2000).

The lack of single mothers and the low number of unmarried mothers in the southern European countries may result in these families being better protected by both the family and the state. This explanation is consistent with the prior research by Pong, Dronkers, and Hampden-Thompson (2003), which found that the achievement gap between the two family structures was greater in those countries that had a higher prevalence of single-parent families.

Parental involvement is related to student literacy achievement in the same way that economic resources are. However, while economic resources explained some of the literacy achievement gap between two family structures, parental involvement was not such a prominent explanation. On average, students from two-parent homes reported that their parents were more socially involved than those from single-mother families. In addition, both social and cultural involvement was found to have a positive association to increased literacy scores for all children. This result is consistent with previous research. However, the higher levels of social involvement did not significantly account for the literacy

differentials between the two family structures. Parental involvement accounted for some of the literacy gap but not a significant amount. So, while parental involvement is associated with the literacy achievement of all students, it does not adequately explain the literacy gap between children from mother-only and two-parent families.

In Australia, Canada, and Denmark, parental involvement accounted for approximately 30 percent of the difference in reading literacy between the two family structures, however, in Ireland it was as little as eight percent. In the United States these measures accounted for approximately 16 percent in reading literacy, 13 percent in mathematics, and eight percent in science. McLanahan and Sandefur (1994) found that their parental practice measures accounted for nearly 50 percent of the difference between the two family structures in high school drop out rates. There are a number of explanations for these different results. First, McLanahan and Sandefur used more measures of parental involvement, which included measures for parental supervision and parental aspirations. In addition, the outcome variable was educational attainment and not educational achievement. It is possible that there is a greater association between home-based parental involvement measures and educational attainment than there is between home-based measures and educational achievement. For single-mother families there may be a stronger positive association between high levels of school-based parental involvement (i.e., attending PTA meetings) and educational achievement than home-based involvement and educational achievement. For future research it may be important to include the two sets of

parental involvement measures, those that are home-based measures and those that are school-based measures, as well as measures of both educational achievement and educational attainment.

The hierarchical models allowed me to test the hypothesis that family policy environments have a moderating effect on the academic achievement of children from single-mother families. In countries where the economic policy environment favored low-income single parents the literacy gap between the two family structures decreased. Countries that have favorable economic policy environments for low-income single-parent families include Austria and Norway. The positive association between student literacy achievement and high levels of child benefit support for low-income single-mother families is particularly evident in Austria where the individual country analysis indicated no achievement gap between the two family structures. Austria is renowned for its generous child benefit packages and when compared to the other 17 countries, Austria was ranked first for the generosity of its packages (Bradshaw & Finch, 2002). Non-means-tested universal benefits and guaranteed child maintenance payments ensure that children from single-mother homes are not at an economic disadvantage compared to children who reside in two-parent families. Moreover, as previously discussed, the male breadwinner model contributes to the favorable financial position of single-mother families in Austria relative to two-parent households.

In contrast, in the United States where the policy environment for single-mother families is the least favorable, the literacy achievement gap is the largest out of all the 18

countries in this study. Social assistance in the United States is means-tested, meager, and ineffective at moving single-mother families out of the poverty trap. The educational consequences of the United States economic policy environment for low-income single-mother families appear authentic. The neo-conservative approach to family policymaking in the latter part of the 20th century resulted in a significant retrenchment of the welfare state. The rolling back of social welfare provisions in both the United Kingdom under the Thatcher government and in the United States during the Reagan years has resulted in many welfare services being supplied by the private sector.

Increasingly, in the liberal countries, the market is the primary provider of welfare. In these countries children from single-mother households do not appear to benefit from welfare provided by the family or social networks (conservative regimes) or from the generous provisions of the state (social democratic regimes). Instead, the assumption that the market will pick up where the family and state are absent leaves those at risk in a tenuous position. Reliance on the market instead of the state to provide welfare to society's neediest is a treacherous approach to social welfare. As Esping-Andersen (1999) warns, "there is no guarantee that markets thrive where states are absent" (p. 63).

Society's neediest will always require some sort of social assistance; how this support is provided is what really separates the countries within each of the three welfare regime categories. The state is the primary provider of welfare provision in the social democratic countries, with de-familialization policies that are aimed at dissolving the family of two of its key responsibilities; the support of children and the elderly. In the

conservative regime countries of Western Europe (i.e., Austria, Belgium, France, and Germany) the state and the family are responsible for welfare provision. In these countries the role of the state is to support not replace social institutions such as the family. The principle of subsidiary is pursued in these countries, in which the state will only intervene when the family can no longer help its own family members. In the southern European countries of Greece, Italy, Portugal, and Spain, the family is the primary provider of welfare. The role of the state is minimal due to the underdevelopment of family policies within these four countries. Instead, the burden is placed on faith-based charities and other branches of the informal sector to provide social assistance when the family and its extended social networks are unable to provide help.

The role of the state and the social networks of the family in the conservative regime countries appear to neutralize the negative educational consequences of single motherhood for children who reside in these households. The social democratic regime countries have, as a whole, a more generous program of social assistance. However, the combination of welfare provision by both the state and the family, as found in the conservative regime countries, appears successful in reducing the achievement gap between children from single-mother and two-parent homes to non-significant levels.

Summary

This study clearly demonstrates that cross-national differences do exist in the relationship between single motherhood and educational achievement. In the countries where there is a significant achievement gap between the two family structures, economic

deprivation appears to be the dominant explanation as to why children in single-mother homes fare worse educationally when compared to their two-parent counterparts. Possible explanations for these cross-national differences formed the basis of this research. Why is it that children who reside in single-mother homes are not at an educational disadvantage compared to their two-parent counterparts in a countries such as Austria, but they are in countries such as the United States? School effects may have some role to play, however, how much of these school-based reasons are due to poverty? Children who reside in single-mother homes in the United States are much more likely to live in poverty. Many of their mothers are not only poor, but they have never been married. As a consequence, these children live in poor neighborhoods, which unfortunately often have poor schools. So, to a small degree, school effects probably account for some of the achievement gap between the two family structures. However, extra familial resources continue to eclipse school effects in explaining many different child outcomes, including educational achievement. As such, this research moves beyond looking at school effects by seeing if children who reside in single-mother homes are indeed poorer and if poverty is the reason why they fare worse educationally. Moreover, I was interested to see if the achievement gap was a robust finding cross-nationally and more importantly, if poverty was also a determining factor in explaining the underachievement of children from single-mother families.

In 10 of the 18 countries, children from single-mother families consistently fared worse in the three literacy tests when compared to their two-parent counterparts. In

addition, I found that not all children in single-mother homes had less economic and parental time resources. In countries such as Austria and Greece, children from these homes did not experience less economic and parental time resource. Furthermore, there was no achievement gap in these countries between the two family structures. The question arises, what is different about these countries compared to countries like the United States? Why don't these single-mother families have less economic and parent time resources for their children? Clearly, lack of economic and parental time resources is independent of any school-related reasons as to why children from single-mother homes fare worse than those from two-parent households. As such, I was interested in expanding previous research that indicated a relationship between family policies and the achievement gap of children from single-parent and two-parent families.

As previously discussed, the family policy explanation is distinct from others because it focuses on a macro-level reason as to why children from these homes fare worse. As this study indicates, family policies and family policy environment vary considerably cross-nationally. State intervention is paramount in some countries, while the state plays a more subsidiary role in others. Moreover, while some countries do not provide additional social assistance to single-mother families, others purposely single out these families in order to provide extra resources. Overall, my analysis did show a relationship between the family policy environments and the literacy achievement gap between children from single-mother and their counterparts from two-parent households. For example, in countries where the policy environment favors low-income single-parent families, the achievement

gap between two-parent and single-mother families is significantly reduced.

Also, in countries that have policy environments that support single mothers as paid workers, the mathematics literacy gap between the family structures was reduced.

In a somewhat broader analysis, I looked at the relationship between a general classification of welfare states and its relationship to educational achievement. Using Esping-Andersen's classification of welfare state regimes, I found that the achievement gap was smaller in the conservative regime countries, even though the overall achievement scores were considerably lower than the liberal and social democratic regime countries. Despite the generosity of social assistance programs in the social democratic countries, the conservative regime countries offer a combination of generous child benefits packages (i.e., Austria) and a culture of kinship support (i.e., Greece, Italy, Portugal, and Spain). In addition, the emphasis on the male breadwinner model has a probable role to play in closing the economic resource gap of the two family structures.

This research has made a number of contributions to the literature concerning the relationship between family structure and educational outcomes. First, very little comparative research has been conducted in this area, with the majority of studies carried out in the United States or single country case studies. This study also considers both micro-level explanations for the educational gap between the two family structures as well as a complementary macro-level explanation. Few studies have considered the role of national-level family policies on children's educational outcomes and even fewer have

looked at the role of family policymaking on the achievement gap between children from two-parent and single-mother households.

In addition to the theoretical contributions, the findings of the study have a number of policy implications. First and foremost, this research highlights the need for educational researchers to look beyond the field of education to discover factors that may influence the educational consequences of family structure and other such family background characteristics. Family policies appear to intersect education through the context of the family and this research underscores the need for future studies to take a more holistic perspective when considering the relationship between family structure and educational outcomes. The multilevel analysis highlighted the intricate relationship between policy and the family. As demonstrated in previous research, the family effects on educational achievement is significantly large, while other factors such as country-level policy effects remain small. Having said this, it is important to note that there appears to be a trickle down effect of national-level policies to student achievement. This permeation of family policies appears to have real implications for the educational achievement for children who reside in single-mother families. As such, the policy significance of this research, given the ever-changing structure of the family, is noteworthy.

Limitations of Study

Invariably all research involves benefits and limitations, and this research is no exception. The cross-sectional design of the PISA data results in the most significant limitation to this study. As such, the results of this study are fundamentally associative in nature and cannot support causal inferences. Even though some prior learning variables were available in the PISA dataset, a number of countries did not collect the data for these particular variables.

I would like to highlight a number of other significant limitations to this study. First, the effect sizes for the results are small. Having said this, the small effect sizes are consistent with prior research on the relationship between family structure and child outcomes (Amato & Keith, 1991a, 1991b). Second, although I distinguished between single-mother families and single-father families, single-mother families are a heterogeneous group. The PISA data prevented me from distinguishing between children who lived with divorced single mothers, never married single mothers, or widowed single mothers.

In a number of countries, never-married mothers dominate the single-mother category, however, in other countries many children reside in single-mother homes as the result of divorce. Economically, never-married single-mother households tend to be significantly worse off than divorced single-mother families. Therefore, the results for the United Kingdom and the United States may be influenced by the large number of never married single-mother families. It should be noted, however, that during exploratory

analysis I did include a number of demographic controls including divorce rates and births to women under 20 years of age. None of these demographic control variables were significant.

For some countries, particularly the United States, race is highly related to educational achievement. The PISA dataset did not include race data cross-nationally. In the United States, many children who reside in mother-only households are African-American, therefore, data concerning a child's race would be particularly useful when determining the educational achievement gap between the two family structures. Other countries are racially homogeneous, therefore, race is not necessarily a significant factor that influences educational achievement.

This research highlighted economic deprivation and parental time inputs as the two mechanisms through which children from single-mother homes fare worse than their two-parent counterparts. The economic input and parental time input measures used in this study had a number of limitations. First, parents' education, parents' occupational status, and the number of books in the home were used as proxy variables for family income. Unfortunately, PISA did not collect family income data. Clearly, family income data would significantly improve the economic input measures.

The parental input measures used in this study were focused on activities that took place in the home and not at school. These home-based measures are only able to capture one particular type of parental involvement. Previous research has shown that school-based parental involvement can have a positive effect on children's educational outcomes.

Therefore, this study would have benefited from parental involvement measures that were both home-based and school-based. In addition, it is possible that the relationship between educational outcomes and parental involvement varies by the type of involvement and the type of outcome. For example, home-based involvement measures such as those used in this research may be more highly correlated to educational attainment and not educational achievement. Equally, school-based parental involvement measures (i.e., attending parent-teacher conferences) could be more highly correlated to educational achievement.

The country-level data also had some limitations. First, there was only family policy data for 18 of the 32 PISA countries. For the multilevel analysis, the lack of countries resulted in a small number of level two units. According to some researchers, 18 level two units does fall within an acceptable range (see Snijders & Bosker, 1993), however, it is important to recognize that the statistical power is greatly reduced when the number of units is small. The lack of family policy data for the other 14 PISA countries did restrict the HLM analysis.

The second country data limitation is concerned with the parental time policy environment variables. The overlap between the family structures when it came to policies that supported single mothers as caregivers, paid workers, and as they transitioned from paid work to caregiving, probably resulted in a number of non-significant results. It is difficult to untangle those policies that are aimed at single mothers from those that are

aimed at married mothers. For the most part, policies that are beneficial to single mothers are equally as advantageous to married mothers, and vice versa.

Directions for Future Research

A natural extension of this study would be to include education policy variables and determine which branch of social policy is the more salient in influencing the achievement gap between children from two-parent and single-mother families. The inclusion of national-level education policy data would allow for a comparison between the influence of family policy and education policy on educational achievement. The potential findings of such a study could highlight further the need to approach social policymaking from a holistic perspective and not by considering the different branches separately.

I would expect that in developing nations, the effect of educational policies would be far greater than the effects of family policies. Therefore, similar research could be conducted using data from developing nations. It is important to note that family policies in these countries are concerned primarily with fertility rates and child mortality. Therefore, it would be difficult to conduct a comparative study that included both industrialized nations alongside developing nations. The 2003 cycle of PISA includes a number of developing nations such as China and South Africa. Hence, it would be possible to conduct this research using the PISA data. In addition, TIMSS-R (Third International Mathematics and Science Study-Repeat) also includes a number of developing nations, therefore, there is an availability of data that would support such an analysis.

This study has highlighted the need to conduct further research on the role of kinship groups and extended family networks. Clearly, there needs to be more analysis on why the children from single-mother homes in the southern European countries were not at an educational disadvantage compared to children from two-parent families despite the weak state intervention. Previous research has indicated that there is a relationship between the role of the extended family and educational outcomes, however, very little research has been comparative in nature. Therefore, the importance of cross-national research is imperative if we are to learn more about the role of extended family networks in supporting children in single-mother households.

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APPENDIX A

Table A.1

Description of variables.

Variables	PISA Variable Code	Recode
Achievement Scores		
Reading Literacy	PV1READ—PV5READ	Reading literacy score (plausible value)
Mathematics Literacy	PV1MATH—PV5MATH	Mathematics literacy score (plausible value)
Science Literacy	PV1SCIE—PV5 SCIE	Science literacy score (plausible value)
Academic Risk		
Reading Literacy	PV1READ—PV5READ	(1=score under 400, 0=score above 400)
Mathematics Literacy	PV1MATH—PV5MATH	(1=score under 400, 0=score above 400)
Science Literacy	PV1SCIE—PV5 SCIE	(1=score under 400, 0=score above 400)
Family structure		
Two parent	ST04Q01—ST04Q08	Lives in a two-parent family (1=two-parent family, 0=other)
Single mother	ST04Q01—ST04Q08	Lives in a single-mother family (1=single-parent family, 0=other)
Mixed	ST04Q01—ST04Q08	Lives in a mixed (e.g. step) family (1=step-parent family, 0=other)
Other	ST04Q01—ST04Q08	Lives in an other (e.g. grandparents) family structure (1=guardian family, 0=other)
Economic Inputs		
Parents' Occupation		HISEI Index (16 (low) – 90 (high))
Parents' Education	MISCED & FISCED	Highest level of education achieved by either parent (1=did not attend school, 2=completed primary school, 3=completed lower secondary school, 4=completed upper secondary (labor market track), 5=completed upper secondary (tertiary track), 6=tertiary educated)
Lower secondary & below	MISCED & FISCED	(1=Lower secondary and below, 0=other)

Upper secondary	MISCED & FISCED	(1=Upper secondary, 0=other)
Tertiary	MISCED & FISCED	(1=Tertiary educated, 0=other)
Books	ST37Q01	(1=11-100, 2=101-250, 3=250+)
Parental Time Inputs		
Cultural Involvement Index	ST19Q01-ST19Q02	(0=never or hardly ever, 1=a few times a year, 2=about once a month, 3=several times a month, 4=several times a week)
Social Involvement Index	ST19Q05-ST19Q06	(0=never or hardly ever, 1=a few times a year, 2=about once a month, 3=several times a month, 4=several times a week)
Student Characteristics		
Gender (being a girl)	ST03Q01	Student is a girl (1=girl, 0=boy)
Grade (upper grade)	ST02Q01	Student is in the upper grade (1=10th grade and above, 0=9th grade and below)
“Official” Language Speaker at Home	ST17Q01	Student speaks "official" language at home (1="official" language speaker, 0=other language)
Family Policy		
Economic Policies		
Net Disposable Income Gap favoring single-parent families (low-income family)		Difference between low-income single- and two-parent families in the mean value (monthly disposable income in US\$ ppp's) of the after child support package after taxes, benefits, housing costs, and services have been adjusted for. (Single-parent family minus two-parent family). HLM analysis presented in \$100s.
Net Disposable Income Gap favoring single-parent families (average-income family)		Difference between average-income single- and two-parent families in the mean value (monthly disposable income in US\$ ppp's) of the after child support package after taxes, benefits, housing costs, and services have been adjusted for. (Single-parent family minus two-parent family). HLM analysis presented in \$100s.
Time Policies		
Caregiving Policy Index		Standardized index score for a single-mother with school-aged child/children.
Paid work Policy Index		Standardized index score for a single-mother with school-aged child/children.

Transition from paid work to
caregiving Policy Index

Standardized index score for a
single-mother with school-aged
child/children.

Table A.2

Means and standard deviations of variables.

Variables	Mean	Standard Deviation
Achievement Scores		
Reading Literacy	511.73	98.79
Mathematics Literacy	509.12	94.44
Science Literacy	506.92	97.72
Academic Risk		
Reading Literacy	0.14	.34
Mathematics Literacy	0.13	0.33
Science Literacy	0.14	0.35
Family structure		
Two parent	.73	.44
Single mother	.13	.33
Mixed	.09	.29
Other	.05	.21
Economic Inputs		
Parents' Occupation	49.77	16.36
Parents' Education		
Lower secondary & below	.18	.39
Upper secondary	.35	.48
Tertiary	.47	.50
Books	4.51	1.51
Parental Time Inputs		
Cultural Involvement Index	3.91	2.31
Social Involvement Index	6.72	1.78
Student Characteristics		
Gender (being a girl)	0.50	0.50
Grade (upper grade)	0.67	0.47
"Official" Language Speaker at Home	0.91	0.29
Family Policy		
Economic Policy	314.09	202.93
Net Disposable Income Gap favoring single-parent families (low-income family)	51.68	413.31
Net Disposable Income Gap favoring single-parent families (average-income family)	122.16	235.31
Time Policies		
Care-giving Policy Index	33.33	62.31
Paid-work Policy Index	60.22	15.02
Transitional Policy Index	26.00	34.42

Note. Means are unweighted.

Table A.3

Missing data for key variables for Australia.

N	Variable	n	n Missing
5176	Parents' Occupation	4939	237
	Gender (being a girl)	5140	36
	Grade (upper grade)	5140	36
	"Official" Language Speaker at Home	5104	72
	Family structure	5131	45
	Parents' Education	5007	169
	Books	5072	104
	Cultural Involvement Index	5072	104
	Social Involvement Index	5079	97

Table A.4

Missing data for key variables for Austria.

N	Variable	n	n Missing
4745	Parents' Occupation	4635	110
	Gender (being a girl)	4683	62
	Grade (upper grade)	4565	180
	"Official" Language Speaker at Home	4575	170
	Family structure	4719	26
	Parents' Education	4463	282
	Books	4580	165
	Cultural Involvement Index	4679	66
	Social Involvement Index	4694	51

Table A.5

Missing data for key variables for Belgium.

<i>N</i>	Variable	<i>n</i>	<i>n</i> Missing
6670	Parents' Occupation	6371	299
	Gender (being a girl)	6618	52
	Grade (upper grade)	6609	61
	"Official" Language Speaker at Home	6222	448
	Family structure	6624	46
	Parents' Education	6380	290
	Books	6372	298
	Cultural Involvement Index	6509	161
	Social Involvement Index	6524	146

Table A.6

Missing data for key variables for Canada.

<i>N</i>	Variable	<i>n</i>	<i>n</i> Missing
29687	Parents' Occupation	28751	936
	Gender (being a girl)	29377	310
	Grade (upper grade)	29026	661
	"Official" Language Speaker at Home	28749	938
	Family structure	29308	379
	Parents' Education	28999	688
	Books	29187	500
	Cultural Involvement Index	29044	643
	Social Involvement Index	29090	597

Table A.7

Missing data for key variables for Denmark.

<i>N</i>	Variable	<i>n</i>	<i>n</i> Missing
4235	Parents' Occupation	3953	282
	Gender (being a girl)	4212	23
	Grade (upper grade)	4120	115
	"Official" Language Speaker at Home	4209	26
	Family structure	4188	47
	Parents' Education	4085	150
	Books	4099	136
	Cultural Involvement Index	4141	94
	Social Involvement Index	4147	88

Table A.8

Missing data for key variables for Finland.

<i>N</i>	Variable	<i>n</i>	<i>n</i> Missing
4864	Parents' Occupation	4770	94
	Gender (being a girl)	4864	0
	Grade (upper grade)	4864	0
	"Official" Language Speaker at Home	4847	17
	Family structure	4817	47
	Parents' Education	4627	237
	Books	4796	68
	Cultural Involvement Index	4825	39
	Social Involvement Index	4825	39

Table A.9

Missing data for key variables for France.

<i>N</i>	Variable	<i>n</i>	<i>n</i> Missing
4673	Parents' Occupation	4389	284
	Gender (being a girl)	4649	24
	Grade (upper grade)	4648	25
	"Official" Language Speaker at Home	4493	180
	Family structure	4640	33
	Parents' Education	4462	211
	Books	4394	279
	Cultural Involvement Index	4587	86
	Social Involvement Index	4610	63

Table A.10

Missing data for key variables for Germany.

<i>N</i>	Variable	<i>n</i>	<i>n</i> Missing
5073	Parents' Occupation	4934	139
	Gender (being a girl)	5012	61
	Grade (upper grade)	4997	76
	"Official" Language Speaker at Home	4617	456
	Family structure	5053	20
	Parents' Education	4644	429
	Books	4959	114
	Cultural Involvement Index	4957	116
	Social Involvement Index	4977	96

Table A.11

Missing data for key variables for Greece.

<i>N</i>	Variable	<i>n</i>	<i>n</i> Missing
4672	Parents' Occupation	4468	204
	Gender (being a girl)	4639	33
	Grade (upper grade)	4586	86
	"Official" Language Speaker at Home	4588	84
	Family structure	4602	70
	Parents' Education	4600	72
	Books	4491	181
	Cultural Involvement Index	4588	84
	Social Involvement Index	4591	81

Table A.12

Missing data for key variables for Ireland.

<i>N</i>	Variable	<i>n</i>	<i>n</i> Missing
3854	Parents' Occupation	3737	117
	Gender (being a girl)	3829	25
	Grade (upper grade)	3829	25
	"Official" Language Speaker at Home	3825	29
	Family structure	3827	27
	Parents' Education	3786	68
	Books	3805	49
	Cultural Involvement Index	3802	52
	Social Involvement Index	3814	40

Table A.13

Missing data for key variables for Italy.

<i>N</i>	Variable	<i>n</i>	<i>n</i> Missing
4984	Parents' Occupation	4864	120
	Gender (being a girl)	4956	28
	Grade (upper grade)	4952	32
	"Official" Language Speaker at Home	4705	279
	Family structure	4957	27
	Parents' Education	4931	53
	Books	4916	68
	Cultural Involvement Index	4945	39
	Social Involvement Index	4941	43

Table A.14

Missing data for key variables for New Zealand.

<i>N</i>	Variable	<i>n</i>	<i>n</i> Missing
3667	Parents' Occupation	3523	144
	Gender (being a girl)	3650	17
	Grade (upper grade)	3633	34
	"Official" Language Speaker at Home	3483	184
	Family structure	3619	48
	Parents' Education	3238	429
	Books	3577	90
	Cultural Involvement Index	3612	55
	Social Involvement Index	3619	48

Table A.15

Missing data for key variables for Norway.

N	Variable	n	n Missing
4147	Parents' Occupation	4037	110
	Gender (being a girl)	4082	65
	Grade (upper grade)	4099	48
	"Official" Language Speaker at Home	3826	321
	Family structure	4087	60
	Parents' Education	3943	204
	Books	3998	149
	Cultural Involvement Index	4075	72
	Social Involvement Index	4091	56

Table A.16

Missing data for key variables for Portugal.

N	Variable	n	n Missing
4585	Parents' Occupation	4426	159
	Gender (being a girl)	4550	35
	Grade (upper grade)	4504	81
	"Official" Language Speaker at Home	4535	50
	Family structure	4552	33
	Parents' Education	4512	73
	Books	4488	97
	Cultural Involvement Index	4508	77
	Social Involvement Index	4528	57

Table A.17

Missing data for key variables for Spain.

N	Variable	n	n Missing
6214	Parents' Occupation	5923	291
	Gender (being a girl)	6079	135
	Grade (upper grade)	6160	54
	"Official" Language Speaker at Home	5894	320
	Family structure	6135	79
	Parents' Education	6017	197
	Books	5972	242
	Cultural Involvement Index	6077	137
	Social Involvement Index	6099	115

Table A.18

Missing data for key variables for Sweden.

N	Variable	n	n Missing
4416	Parents' Occupation	4313	103
	Gender (being a girl)	4383	33
	Grade (upper grade)	4376	40
	"Official" Language Speaker at Home	4272	144
	Family structure	4382	34
	Parents' Education	4260	156
	Books	4356	60
	Cultural Involvement Index	4368	48
	Social Involvement Index	4375	41

Table A.19

Missing data for key variables for the United Kingdom.

N	Variable	n	n Missing
9340	Parents' Occupation	8843	497
	Gender (being a girl)	9232	108
	Grade (upper grade)	9305	35
	"Official" Language Speaker at Home	9149	191
	Family structure	9212	128
	Parents' Education	8697	643
	Books	9056	284
	Cultural Involvement Index	9095	245
	Social Involvement Index	9138	202

Table A.20

Missing data for key variables for the United States.

N	Variable	n	n Missing
3846	Parents' Occupation	3242	604
	Gender (being a girl)	3845	1
	Grade (upper grade)	3845	1
	"Official" Language Speaker at Home	3622	224
	Family structure	3632	214
	Parents' Education	3493	353
	Books	3466	380
	Cultural Involvement Index	3616	230
	Social Involvement Index	3609	237

APPENDIX B

Descriptive Statistics

Table B.1

Descriptive statistics for student-level data by country.

Variables	Australia		Austria		Belgium	
	<i>n</i> =5176		<i>n</i> =4745		<i>n</i> =6670	
	Mean	S. D.	Mean	S. D.	Mean	S. D.
Reading Literacy Score	526.23	105.14	497.72	94.94	515.05	104.14
Mathematics Literacy Score	530.85	93.39	506.78	94.41	523.96	104.11
Science Literacy Score	524.97	98.31	509.31	92.34	500.65	109.76
Background						
Gender (being a girl)	0.48	0.50	0.50	0.50	0.49	0.50
Grade	0.94	0.24	0.53	0.50	0.69	0.46
"Official" Language Speaker at Home	0.85	0.36	0.93	0.25	0.77	0.42
Family Structure						
Two-Parent Family	0.71	0.46	0.78	0.42	0.77	0.42
Single-Mother Family	0.14	0.34	0.11	0.32	0.10	0.30
Mixed Family	0.11	0.31	0.08	0.27	0.09	0.29
Other Family Structure	0.05	0.21	0.03	0.17	0.04	0.18
Economic Inputs						
Parent's Occupation (ISEI scale)	52.47	16.44	48.95	13.99	49.46	16.62
Number of Books in the Home	4.88	1.51	4.40	1.45	4.19	1.60
Parent's Education						
Lower Secondary & Below	0.17	0.38	0.19	0.39	0.13	0.34
Upper Secondary	0.39	0.49	0.54	0.50	0.41	0.49
Tertiary	0.44	0.50	0.27	0.44	0.45	0.50
Parental Involvement						
Cultural Involvement Index	3.64	2.38	3.40	2.25	3.28	2.36
Social Involvement Index	6.35	2.02	6.35	1.97	6.87	1.67
Academic Risk (>1 s.d. below mean)						
Academic Risk in Reading	0.12	0.33	0.16	0.37	0.15	0.36
Academic Risk in Mathematics	0.09	0.28	0.13	0.34	0.14	0.34
Academic Risk in Science	0.11	0.31	0.13	0.33	0.18	0.39

Note. Means are unweighted. Mathematic and science literacy scores and mathematic and science literacy academic risk variables are based upon smaller sample sizes.

Table B.1 cont.

Variables	Canada		Denmark		Finland	
	<i>n</i> =29687		<i>n</i> =4235		<i>n</i> =4864	
	Mean	S. D.	Mean	S. D.	Mean	S. D.
Reading Literacy Score	524.21	96.19	497.92	96.20	548.52	87.51
Mathematics Literacy Score	524.93	84.52	515.01	84.12	537.99	79.29
Science Literacy Score	520.79	88.84	481.09	102.25	538.49	86.36
Background						
Gender (being a girl)	0.50	0.50	0.50	0.50	0.52	0.50
Grade	0.82	0.39	0.02	0.15	0.00	0.00
"Official" Language Speaker at Home	0.90	0.29	0.94	0.24	0.94	0.23
Family Structure						
Two-Parent Family	0.73	0.44	0.69	0.46	0.72	0.45
Single-Mother Family	0.11	0.32	0.13	0.33	0.15	0.35
Mixed Family	0.11	0.31	0.12	0.33	0.08	0.27
Other Family Structure	0.05	0.21	0.06	0.24	0.05	0.22
Economic Inputs						
Parent's Occupation (ISEI scale)	51.18	16.37	49.78	16.03	50.07	16.23
Number of Books in the Home	4.69	1.46	4.57	1.56	4.34	1.36
Parent's Education						
Lower Secondary & Below	0.09	0.29	0.13	0.34	0.22	0.41
Upper Secondary	0.29	0.45	0.36	0.48	0.42	0.49
Tertiary	0.62	0.49	0.51	0.50	0.36	0.48
Parental Involvement						
Cultural Involvement Index	3.86	2.25	4.16	2.35	3.83	2.02
Social Involvement Index	6.42	1.87	7.29	1.37	7.02	1.38
Academic Risk (>1 s.d. below mean)						
Academic Risk in Reading	0.10	0.31	0.16	0.36	0.06	0.23
Academic Risk in Mathematics	0.07	0.26	0.10	0.30	0.04	0.20
Academic Risk in Science	0.09	0.29	0.22	0.41	0.06	0.23

Note. Means are unweighted. Mathematic and science literacy scores and mathematic and science literacy academic risk variables are based upon smaller sample sizes.

Table B.1 cont.

Variables	France		Germany		Great Britain	
	<i>n=4673</i>		<i>n=5073</i>		<i>n=9340</i>	
	Mean	S. D.	Mean	S. D.	Mean	S. D.
Reading Literacy Score	502.81	91.85	497.68	103.69	523.98	101.32
Mathematics Literacy Score	517.13	89.33	500.10	99.70	529.52	92.23
Science Literacy Score	500.46	103.56	495.55	101.68	528.65	100.25
Background						
Gender (being a girl)	0.51	0.50	0.51	0.50	0.50	0.50
Grade	0.54	0.50	0.22	0.42	1.00	0.02
"Official" Language Speaker at Home	0.95	0.22	0.93	0.26	0.98	0.15
Family Structure						
Two-Parent Family	0.75	0.44	0.75	0.43	0.70	0.46
Single-Mother Family	0.13	0.33	0.12	0.33	0.16	0.37
Mixed Family	0.09	0.29	0.09	0.29	0.10	0.29
Other Family Structure	0.03	0.18	0.03	0.18	0.04	0.20
Economic Inputs						
Parent's Occupation (ISEI scale)	48.25	16.86	49.65	15.53	50.31	16.04
Number of Books in the Home	4.26	1.51	4.62	1.49	4.39	1.53
Parent's Education						
Lower Secondary & Below	0.19	0.40	0.11	0.31	0.12	0.32
Upper Secondary	0.36	0.48	0.49	0.50	0.37	0.48
Tertiary	0.44	0.50	0.41	0.49	0.51	0.50
Parental Involvement						
Cultural Involvement Index	4.59	2.29	3.56	2.24	3.89	2.24
Social Involvement Index	7.12	1.50	6.53	1.76	6.55	1.90
Academic Risk (>1 s.d. below mean)						
Academic Risk in Reading	0.14	0.35	0.17	0.38	0.12	0.32
Academic Risk in Mathematics	0.10	0.30	0.16	0.37	0.09	0.28
Academic Risk in Science	0.17	0.38	0.18	0.38	0.10	0.31

Note. Means are unweighted. Mathematic and science literacy scores and mathematic and science literacy academic risk variables are based upon smaller sample sizes.

Table B.1 cont.

Variables	Greece		Ireland		Italy	
	<i>n=4672</i>		<i>n=3854</i>		<i>n=4984</i>	
	Mean	S. D.	Mean	S. D.	Mean	S. D.
Reading Literacy Score	472.13	97.31	527.74	93.66	488.87	90.68
Mathematics Literacy Score	446.92	105.79	502.75	83.76	459.83	89.29
Science Literacy Score	459.53	96.00	514.28	91.59	478.90	97.36
Background						
Gender (being a girl)	0.49	0.50	0.52	0.50	0.51	0.50
Grade	0.97	0.17	0.35	0.48	0.83	0.38
"Official" Language Speaker at Home	0.98	0.14	0.98	0.13	0.82	0.39
Family Structure						
Two-Parent Family	0.87	0.33	0.83	0.37	0.73	0.44
Single-Mother Family	0.07	0.26	0.10	0.30	0.17	0.38
Mixed Family	0.02	0.15	0.03	0.18	0.03	0.18
Other Family Structure	0.03	0.18	0.03	0.18	0.07	0.25
Economic Inputs						
Parent's Occupation (ISEI scale)	47.38	17.84	48.59	15.60	47.02	15.92
Number of Books in the Home	4.06	1.44	4.38	1.50	4.44	1.48
Parent's Education						
Lower Secondary & Below	0.30	0.46	0.30	0.46	0.31	0.46
Upper Secondary	0.28	0.45	0.31	0.46	0.48	0.50
Tertiary	0.42	0.49	0.39	0.49	0.21	0.41
Parental Involvement						
Cultural Involvement Index	4.34	2.21	3.69	2.28	5.08	2.38
Social Involvement Index	6.78	1.67	6.82	1.75	7.65	1.04
Academic Risk (>1 s.d. below mean)						
Academic Risk in Reading	0.23	0.42	0.09	0.29	0.17	0.37
Academic Risk in Mathematics	0.32	0.47	0.11	0.31	0.24	0.43
Academic Risk in Science	0.27	0.44	0.11	0.31	0.21	0.41

Note. Means are unweighted. Mathematic and science literacy scores and mathematic and science literacy academic risk variables are based upon smaller sample sizes.

Table B.1 cont.

Variables	Norway		New Zealand		Portugal	
	<i>n=4147</i>		<i>n=3667</i>		<i>n=4585</i>	
	Mean	S. D.	Mean	S. D.	Mean	S. D.
Reading Literacy Score	505.37	103.10	527.29	106.90	476.53	95.95
Mathematics Literacy Score	497.97	91.22	537.54	98.57	458.50	89.18
Science Literacy Score	498.81	96.29	526.46	100.10	464.36	88.80
Background						
Gender (being a girl)	0.49	0.50	0.49	0.50	0.53	0.50
Grade	0.99	0.09	1.00	0.00	0.57	0.50
"Official" Language Speaker at Home	0.93	0.25	0.90	0.30	0.99	0.12
Family Structure						
Two-Parent Family	0.71	0.45	0.65	0.48	0.80	0.40
Single-Mother Family	0.13	0.34	0.16	0.36	0.10	0.30
Mixed Family	0.11	0.31	0.11	0.32	0.05	0.22
Other Family Structure	0.05	0.22	0.08	0.26	0.05	0.22
Economic Inputs						
Parent's Occupation (ISEI scale)	54.08	15.43	51.89	16.69	44.37	16.02
Number of Books in the Home	4.88	1.52	4.69	1.47	3.92	1.48
Parent's Education						
Lower Secondary & Below	0.10	0.30	0.10	0.30	0.63	0.48
Upper Secondary	0.36	0.48	0.33	0.47	0.15	0.36
Tertiary	0.54	0.50	0.57	0.49	0.22	0.41
Parental Involvement						
Cultural Involvement Index	3.39	2.27	4.00	2.32	3.76	2.36
Social Involvement Index	7.11	1.53	6.18	2.09	7.24	1.44
Academic Risk (>1 s.d. below mean)						
Academic Risk in Reading	0.16	0.36	0.13	0.34	0.22	0.41
Academic Risk in Mathematics	0.13	0.34	0.09	0.29	0.26	0.44
Academic Risk in Science	0.15	0.36	0.12	0.32	0.24	0.43

Note. Means are unweighted. Mathematic and science literacy scores and mathematic and science literacy academic risk variables are based upon smaller sample sizes.

Table B.1 cont.

Variables	Spain		Sweden		United States	
	<i>n=6214</i>		<i>n=4416</i>		<i>n=3846</i>	
	Mean	S. D.	Mean	S. D.	Mean	S. D.
Reading Literacy Score	493.60	84.37	515.86	91.80	495.97	103.89
Mathematics Literacy Score	478.81	89.88	510.07	92.94	482.57	97.53
Science Literacy Score	490.79	95.06	511.48	93.54	490.54	99.56
Background						
Gender (being a girl)	0.51	0.50	0.49	0.50	0.53	0.50
Grade	0.73	0.44	0.00	0.05	0.58	0.49
"Official" Language Speaker at Home	0.85	0.36	0.93	0.26	0.88	0.33
Family Structure						
Two-Parent Family	0.77	0.42	0.71	0.45	0.51	0.50
Single-Mother Family	0.14	0.35	0.14	0.34	0.18	0.38
Mixed Family	0.03	0.16	0.11	0.31	0.21	0.40
Other Family Structure	0.06	0.23	0.05	0.21	0.11	0.31
Economic Inputs						
Parent's Occupation (ISEI scale)	45.05	16.38	50.64	16.12	51.28	16.47
Number of Books in the Home	4.65	1.46	4.88	1.46	4.19	1.57
Parent's Education						
Lower Secondary & Below	0.45	0.50	0.09	0.29	0.09	0.29
Upper Secondary	0.27	0.44	0.32	0.47	0.46	0.50
Tertiary	0.28	0.45	0.59	0.49	0.45	0.50
Parental Involvement						
Cultural Involvement Index	4.36	2.19	3.50	2.17	4.42	2.56
Social Involvement Index	6.94	1.67	6.86	1.49	6.48	2.12
Academic Risk (>1 s.d. below mean)						
Academic Risk in Reading	0.14	0.35	0.11	0.32	0.18	0.39
Academic Risk in Mathematics	0.19	0.39	0.12	0.32	0.20	0.40
Academic Risk in Science	0.18	0.38	0.12	0.33	0.20	0.40

Note. Means are unweighted. Mathematic and science literacy scores and mathematic and science literacy academic risk variables are based upon smaller sample sizes.

OLS Reading Literacy Models

Table B.2

Combined OLS reading literacy model
for Australia.

Australia		
Variables	Coefficient	SE
Intercept	264.24	(12.61)
Family Structure (ref. two parent)		
Single-Mother Family	0.31	(5.23)
Mixed Family	-15.53	(5.77)
Other Family Structure	-10.61	(9.11)
Background Characteristics		
Gender (being a girl)	26.43	(3.89)
Grade	41.27	(3.21)
"Official" Language Speaker at Home	19.75	(6.02)
Economic Inputs		
Parent's Occupation (ISEI scale)	1.02	(0.12)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	17.17	(5.42)
Tertiary	31.59	(6.12)
Number of Books in the Home	7.54	(1.16)
Parental Involvement		
Cultural Involvement Index	9.59	(0.81)
Social Involvement Index	1.37	(0.90)
Missing Data		
"Official" Language Speaker at Home	-31.22	(29.96)
Parent's Occupation (ISEI scale)	-60.43	(7.76)
Parent's Education	-8.74	(11.57)
Number of Books in the Home	-69.48	(17.72)
Cultural Involvement Index	-57.68	(22.31)
Social Involvement Index	1.57	(25.46)
R ²	0.32	
N	5130	

Table B.3

Combined OLS reading literacy model
for Austria.

Austria		
Variables	Coefficient	SE
Intercept	283.36	(11.72)
Family Structure (ref. two parent)		
Single-Mother Family	5.24	(4.93)
Mixed Family	-14.01	(5.04)
Other Family Structure	-15.91	(8.36)
Background Characteristics		
Gender (being a girl)	18.36	(3.79)
Grade	34.06	(2.74)
"Official" Language Speaker at Home	30.22	(6.01)
Economic Inputs		
Parent's Occupation (ISEI scale)	0.88	(0.12)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	11.91	(3.19)
Tertiary	12.15	(4.35)
Number of Books in the Home	14.02	(1.46)
Parental Involvement		
Cultural Involvement Index	6.09	(0.67)
Social Involvement Index	0.99	(0.86)
Missing Data		
"Official" Language Speaker at Home	-39.32	(7.94)
Parent's Occupation (ISEI scale)	-26.26	(10.61)
Parent's Education	-32.06	(6.38)
Number of Books in the Home	-50.18	(9.76)
Cultural Involvement Index	-55.55	(23.25)
Social Involvement Index	-8.18	(32.69)
R ²	0.33	
N	4520	

Table B.4

Combined OLS reading literacy model
for Belgium.

Belgium		
Variables	Coefficient	SE
Intercept	237.80	(9.87)
Family Structure (ref. two parent)		
Single-Mother Family	2.42	(4.12)
Mixed Family	-4.11	(3.88)
Other Family Structure	-6.20	(5.77)
Background Characteristics		
Gender (being a girl)	18.39	(3.30)
Grade	81.85	(3.30)
"Official" Language Speaker at Home	-8.16	(3.68)
Economic Inputs		
Parent's Occupation (ISEI scale)	1.11	(0.12)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	39.64	(4.38)
Tertiary	19.31	(4.33)
Number of Books in the Home	9.23	(0.85)
Parental Involvement		
Cultural Involvement Index	3.42	(0.50)
Social Involvement Index	1.91	(0.65)
Missing Data		
"Official" Language Speaker at Home	-12.40	(5.08)
Parent's Occupation (ISEI scale)	-29.40	(5.78)
Parent's Education	-39.95	(6.08)
Number of Books in the Home	-40.39	(7.73)
Cultural Involvement Index	-17.97	(13.26)
Social Involvement Index	-34.29	(13.06)
R ²	0.50	
N	6555	

Table B.5

Combined OLS reading literacy model
for Canada.

Canada		
Variables	Coefficient	SE
Intercept	280.50	(6.05)
Family Structure (ref. two parent)		
Single-Mother Family	-2.50	(1.91)
Mixed Family	-16.61	(2.79)
Other Family Structure	-7.01	(3.78)
Background Characteristics		
Gender (being a girl)	27.07	(1.40)
Grade	42.38	(2.05)
"Official" Language Speaker at Home	25.88	(2.88)
Economic Inputs		
Parent's Occupation (ISEI scale)	0.93	(0.06)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	13.05	(2.49)
Tertiary	20.34	(2.81)
Number of Books in the Home	7.54	(0.64)
Parental Involvement		
Cultural Involvement Index	6.02	(0.33)
Social Involvement Index	3.30	(0.45)
Missing Data		
"Official" Language Speaker at Home	-55.15	(5.90)
Parent's Occupation (ISEI scale)	-56.89	(7.88)
Parent's Education	-33.04	(6.60)
Number of Books in the Home	-19.39	(9.04)
Cultural Involvement Index	-9.86	(14.09)
Social Involvement Index	28.19	(17.51)
R ²	0.26	
N	28965	

Table B.6

Combined OLS reading literacy model
for Denmark.

Denmark			
Variables	Coefficient	SE	
Intercept	227.76	(12.96)	
Family Structure (ref. two parent)			
Single-Mother Family	-8.94	(4.44)	
Mixed Family	-4.99	(4.59)	
Other Family Structure	-2.77	(6.41)	
Background Characteristics			
Gender (being a girl)	19.72	(2.75)	
Grade	37.19	(5.44)	
"Official" Language Speaker at Home	49.90	(5.50)	
Economic Inputs			
Parent's Occupation (ISEI scale)	0.64	(0.12)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	29.35	(5.68)	
Tertiary	45.91	(5.50)	
Number of Books in the Home	9.61	(1.23)	
Parental Involvement			
Cultural Involvement Index	8.68	(0.66)	
Social Involvement Index	5.44	(1.16)	
Missing Data			
"Official" Language Speaker at Home	15.15	(33.40)	
Parent's Occupation (ISEI scale)	-37.63	(8.80)	
Parent's Education	-17.82	(10.99)	
Number of Books in the Home	-24.72	(11.18)	
Cultural Involvement Index	1.37	(17.02)	
Social Involvement Index	-73.23	(21.70)	
R ²	0.33		
N	4105		

Table B.7

Combined OLS reading literacy model
for Finland.

Finland			
Variables	Coefficient	SE	
Intercept	315.27	(16.68)	
Family Structure (ref. two parent)			
Single-Mother Family	-16.18	(6.65)	
Mixed Family	-14.72	(5.22)	
Other Family Structure	-19.15	(6.68)	
Background Characteristics			
Gender (being a girl)	44.86	(2.29)	
Grade	46.88	(6.75)	
"Official" Language Speaker at Home	48.83	(10.96)	
Economic Inputs			
Parent's Occupation (ISEI scale)	0.73	(0.11)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	16.68	(2.98)	
Tertiary	17.80	(3.82)	
Number of Books in the Home	8.41	(0.99)	
Parental Involvement			
Cultural Involvement Index	7.32	(0.81)	
Social Involvement Index	1.72	(1.26)	
Missing Data			
"Official" Language Speaker at Home	68.71	(30.00)	
Parent's Occupation (ISEI scale)	-27.53	(10.14)	
Parent's Education	1.13	(5.43)	
Number of Books in the Home	-43.37	(10.88)	
Cultural Involvement Index	-76.77	(51.08)	
Social Involvement Index	6.05	(48.09)	
R ²	0.27		
N	4815		

Table B.8

Combined OLS reading literacy model
for France.

France			
Variables	Coefficient	SE	
Intercept	283.39	(9.94)	
Family Structure (ref. two parent)			
Single-Mother Family	-5.31	(3.75)	
Mixed Family	2.66	(3.34)	
Other Family Structure	-4.81	(6.13)	
Background Characteristics			
Gender (being a girl)	15.95	(2.33)	
Grade	67.26	(2.40)	
"Official" Language Speaker at Home	19.97	(5.39)	
Economic Inputs			
Parent's Occupation (ISEI scale)	0.64	(0.10)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	5.98	(3.45)	
Tertiary	-0.29	(3.44)	
Number of Books in the Home	10.29	(0.79)	
Parental Involvement			
Cultural Involvement Index	3.31	(0.56)	
Social Involvement Index	0.99	(0.90)	
Missing Data			
"Official" Language Speaker at Home	-24.01	(6.09)	
Parent's Occupation (ISEI scale)	-36.52	(6.41)	
Parent's Education	-15.11	(5.76)	
Number of Books in the Home	-34.66	(5.84)	
Cultural Involvement Index	-35.31	(14.52)	
Social Involvement Index	-2.27	(22.99)	
R ²	0.52		
N	4635		

Table B.9

Combined OLS reading literacy model
for Germany.

Germany			
Variables	Coefficient	SE	
Intercept	250.23	(9.79)	
Family Structure (ref. two parent)			
Single-Mother Family	-1.55	(3.84)	
Mixed Family	-15.60	(4.76)	
Other Family Structure	-10.26	(6.00)	
Background Characteristics			
Gender (being a girl)	20.72	(3.31)	
Grade	37.87	(3.14)	
"Official" Language Speaker at Home	38.63	(6.74)	
Economic Inputs			
Parent's Occupation (ISEI scale)	1.01	(0.12)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	31.43	(5.28)	
Tertiary	39.32	(5.59)	
Number of Books in the Home	14.30	(1.25)	
Parental Involvement			
Cultural Involvement Index	4.47	(0.68)	
Social Involvement Index	0.70	(0.73)	
Missing Data			
"Official" Language Speaker at Home	-39.85	(5.68)	
Parent's Occupation (ISEI scale)	-43.38	(9.77)	
Parent's Education	-20.98	(5.67)	
Number of Books in the Home	2.64	(10.67)	
Cultural Involvement Index	-75.43	(24.03)	
Social Involvement Index	-96.87	(27.11)	
R ²	0.52		
N	4985		

Table B.10

Combined OLS reading literacy model
for Great Britain.

Great Britain			
Variables	Coefficient	SE	
Intercept	284.01	(14.85)	
Family Structure (ref. two parent)			
Single-Mother Family	-13.89	(2.94)	
Mixed Family	-15.01	(4.39)	
Other Family Structure	-25.23	(5.68)	
Background Characteristics			
Gender (being a girl)	22.76	(3.14)	
Grade	8.84	(2.45)	
"Official" Language Speaker at Home	27.12	(10.48)	
Economic Inputs			
Parent's Occupation (ISEI scale)	1.53	(0.09)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	16.66	(4.52)	
Tertiary	13.36	(5.13)	
Number of Books in the Home	13.5	(0.92)	
Parental Involvement			
Cultural Involvement Index	7.13	(0.63)	
Social Involvement Index	1.66	(0.63)	
Missing Data			
"Official" Language Speaker at Home	-45.58	(13.73)	
Parent's Occupation (ISEI scale)	-68.47	(7.09)	
Parent's Education	-33.03	(6.78)	
Number of Books in the Home	-77.02	(10.43)	
Cultural Involvement Index	-74.66	(17.74)	
Social Involvement Index	8.47	(22.30)	
R ²	0.33		
N	9205		

Table B.11

Combined OLS reading literacy model
for Greece.

Greece			
Variables	Coefficient	SE	
Intercept	232.4	(21.90)	
Family Structure (ref. two parent)			
Single-Mother Family	6.47	(6.41)	
Mixed Family	-16.34	(8.35)	
Other Family Structure	-31.5	(9.13)	
Background Characteristics			
Gender (being a girl)	30.93	(3.71)	
Grade	36.06	(4.76)	
"Official" Language Speaker at Home	28.07	(10.92)	
Economic Inputs			
Parent's Occupation (ISEI scale)	1	(0.11)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	18.94	(5.00)	
Tertiary	19.17	(5.32)	
Number of Books in the Home	9.66	(1.66)	
Parental Involvement			
Cultural Involvement Index	5.89	(0.70)	
Social Involvement Index	0.57	(1.01)	
Missing Data			
"Official" Language Speaker at Home	-43.14	(19.22)	
Parent's Occupation (ISEI scale)	-32.21	(10.45)	
Parent's Education	-43.69	(18.32)	
Number of Books in the Home	-50.54	(10.30)	
Cultural Involvement Index	-30.83	(30.05)	
Social Involvement Index	15.84	(24.88)	
R ²	0.28		
N	4550		

Table B.12

Combined OLS reading literacy model
for Ireland.

Ireland		
Variables	Coefficient	SE
Intercept	338.31	(20.16)
Family Structure (ref. two parent)		
Single-Mother Family	-5.95	(5.17)
Mixed Family	-38.32	(8.12)
Other Family Structure	-22.41	(8.69)
Background Characteristics		
Gender (being a girl)	20.36	(3.71)
Grade	23.67	(1.69)
"Official" Language Speaker at Home	-7.96	(15.36)
Economic Inputs		
Parent's Occupation (ISEI scale)	1.28	(0.11)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	7.47	(3.89)
Tertiary	2.06	(4.43)
Number of Books in the Home	13.03	(1.12)
Parental Involvement		
Cultural Involvement Index	5.47	(0.65)
Social Involvement Index	2.02	(0.89)
Missing Data		
"Official" Language Speaker at Home	38.29	(43.53)
Parent's Occupation (ISEI scale)	-33.38	(10.16)
Parent's Education	-17.12	(20.86)
Number of Books in the Home	-73.16	(22.92)
Cultural Involvement Index	-109.82	(22.85)
Social Involvement Index	-39.87	(34.41)
R ²	0.28	
N	3825	

Table B.13

Combined OLS reading literacy model
for Italy.

Italy		
Variables	Coefficient	SE
Intercept	253.66	(18.65)
Family Structure (ref. two parent)		
Single-Mother Family	-1.10	(3.21)
Mixed Family	-20.62	(7.34)
Other Family Structure	-3.97	(5.17)
Background Characteristics		
Gender (being a girl)	25.82	(5.12)
Grade	46.43	(4.91)
"Official" Language Speaker at Home	23.35	(5.75)
Economic Inputs		
Parent's Occupation (ISEI scale)	0.81	(0.12)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	14.08	(2.94)
Tertiary	3.47	(4.71)
Number of Books in the Home	8.12	(1.05)
Parental Involvement		
Cultural Involvement Index	4.43	(0.65)
Social Involvement Index	2.29	(1.79)
Missing Data		
"Official" Language Speaker at Home	-32.70	(6.71)
Parent's Occupation (ISEI scale)	-30.65	(8.85)
Parent's Education	-28.44	(13.16)
Number of Books in the Home	-88.22	(13.22)
Cultural Involvement Index	-16.13	(34.54)
Social Involvement Index	-20.19	(30.49)
R ²	0.30	
N	4920	

Table B.14

Combined OLS reading literacy model
for New Zealand.

New Zealand		
Variables	Coefficient	SE
Intercept	96.11	(22.97)
Family Structure (ref. two parent)		
Single-Mother Family	-5.66	(4.95)
Mixed Family	-18.83	(4.94)
Other Family Structure	-28.66	(5.97)
Background Characteristics		
Gender (being a girl)	36.84	(4.16)
Grade	73.36	(6.67)
"Official" Language Speaker at Home	49.86	(6.52)
Economic Inputs		
Parent's Occupation (ISEI scale)	1.29	(0.11)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	17.49	(5.52)
Tertiary	13.69	(6.15)
Number of Books in the Home	13.83	(1.29)
Parental Involvement		
Cultural Involvement Index	5.27	(0.77)
Social Involvement Index	0.65	(0.88)
Missing Data		
"Official" Language Speaker at Home	-72.79	(7.95)
Parent's Occupation (ISEI scale)	-56.01	(8.78)
Parent's Education	-24.66	(5.74)
Number of Books in the Home	-83.76	(14.00)
Cultural Involvement Index	-30.00	(18.56)
Social Involvement Index	-36.25	(19.09)
R ²	0.36	
N	3600	

Table B.15

Combined OLS reading literacy model
for Norway.

Norway		
Variables	Coefficient	SE
Intercept	234.52	51.51
Family Structure (ref. two parent)		
Single-Mother Family	-9.2	4.928
Mixed Family	-16.61	4.817
Other Family Structure	-29.51	9.017
Background Characteristics		
Gender (being a girl)	35.35	3.69
Grade	31.41	27.592
"Official" Language Speaker at Home	41.09	6.765
Economic Inputs		
Parent's Occupation (ISEI scale)	1.08	0.122
Parent's Education (ref. lower secondary & below)		
Upper Secondary	13.23	6.857
Tertiary	7.43	6.587
Number of Books in the Home	10.79	1.444
Parental Involvement		
Cultural Involvement Index	8.54	0.862
Social Involvement Index	2.12	1.267
Missing Data		
"Official" Language Speaker at Home	-6.67	6.463
Parent's Occupation (ISEI scale)	-64.41	11.985
Parent's Education	-24.66	9.042
Number of Books in the Home	-66.85	11.212
Cultural Involvement Index	-66.63	17.947
Social Involvement Index	-33.61	29.636
R ²	0.26	
N	4055	

Table B.16

Combined OLS reading literacy model
for Portugal.

Portugal			
Variables	Coefficient	SE	
Intercept	282.73	(15.41)	
Family Structure (ref. two parent)			
Single-Mother Family	8.27	(3.11)	
Mixed Family	4.55	(5.58)	
Other Family Structure	-0.81	(5.10)	
Background Characteristics			
Gender (being a girl)	8.25	(2.42)	
Grade	70.16	(2.06)	
"Official" Language Speaker at Home	4.26	(14.00)	
Economic Inputs			
Parent's Occupation (ISEI scale)	0.66	(0.09)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	-4.39	(3.99)	
Tertiary	-3.23	(4.38)	
Number of Books in the Home	6.70	(1.11)	
Parental Involvement			
Cultural Involvement Index	6.04	(0.44)	
Social Involvement Index	1.75	(0.77)	
Missing Data			
"Official" Language Speaker at Home	-6.55	(10.91)	
Parent's Occupation (ISEI scale)	-38.03	(6.89)	
Parent's Education	-14.77	(11.58)	
Number of Books in the Home	-44.55	(10.63)	
Cultural Involvement Index	-20.25	(12.41)	
Social Involvement Index	6.94	(16.89)	
R ²	0.59		
N	4485		

Table B.17

Combined OLS reading literacy model
for Spain.

Spain			
Variables	Coefficient	SE	
Intercept	255.61	(10.61)	
Family Structure (ref. two parent)			
Single-Mother Family	3.64	(3.24)	
Mixed Family	-6.61	(6.68)	
Other Family Structure	-1.76	(4.30)	
Background Characteristics			
Gender (being a girl)	14.04	(2.04)	
Grade	71.2	(2.74)	
"Official" Language Speaker at Home	8.43	(3.53)	
Economic Inputs			
Parent's Occupation (ISEI scale)	0.53	(0.09)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	12.47	(2.50)	
Tertiary	10.65	(3.22)	
Number of Books in the Home	9.5	(0.90)	
Parental Involvement			
Cultural Involvement Index	6.3	(0.65)	
Social Involvement Index	0.59	(0.86)	
Missing Data			
"Official" Language Speaker at Home	-21.88	(5.91)	
Parent's Occupation (ISEI scale)	-19.11	(7.69)	
Parent's Education	-31.28	(7.90)	
Number of Books in the Home	-33.75	(6.90)	
Cultural Involvement Index	-24.33	(11.53)	
Social Involvement Index	-6.97	(16.54)	
R ²	0.44		
N	6055		

Table B.18

Combined OLS reading literacy model
for Sweden.

Sweden		
Variables	Coefficient	SE
Intercept	274.38	(12.56)
Family Structure (ref. two parent)		
Single-Mother Family	-12.54	(3.68)
Mixed Family	-15.46	(3.72)
Other Family Structure	-28.49	(5.30)
Background Characteristics		
Gender (being a girl)	32.34	(2.44)
Grade	66.56	(10.73)
"Official" Language Speaker at Home	38.65	(6.93)
Economic Inputs		
Parent's Occupation (ISEI scale)	1.16	(0.10)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	8.56	(4.79)
Tertiary	-4.44	(5.12)
Number of Books in the Home	11.55	(1.06)
Parental Involvement		
Cultural Involvement Index	8.01	(0.63)
Social Involvement Index	-1.44	(0.93)
Missing Data		
"Official" Language Speaker at Home	-36.96	(8.26)
Parent's Occupation (ISEI scale)	-43.12	(12.33)
Parent's Education	-31.72	(9.76)
Number of Books in the Home	-12.55	(15.35)
Cultural Involvement Index	-86.79	(22.97)
Social Involvement Index	89.72	(34.31)
R ²	0.28	
N	4355	

Table B.19

Combined OLS reading literacy model
for United States.

United States		
Variables	Coefficient	SE
Intercept	305.27	11.389
Family Structure (ref. two parent)		
Single-Mother Family	-14.44	(4.94)
Mixed Family	-24.20	(4.68)
Other Family Structure	-57.17	(6.03)
Background Characteristics		
Gender (being a girl)	15.05	(2.78)
Grade	42.87	(3.42)
"Official" Language Speaker at Home	20.60	(7.13)
Economic Inputs		
Parent's Occupation (ISEI scale)	0.94	(0.13)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	-3.80	(8.52)
Tertiary	6.64	(8.62)
Number of Books in the Home	14.45	(1.18)
Parental Involvement		
Cultural Involvement Index	4.12	(0.93)
Social Involvement Index	-0.19	(0.88)
Missing Data		
"Official" Language Speaker at Home	-50.89	(19.62)
Parent's Occupation (ISEI scale)	-39.26	(5.92)
Parent's Education	-9.57	(10.93)
Number of Books in the Home	-51.72	(9.42)
Cultural Involvement Index	-49.68	(20.28)
Social Involvement Index	-19.27	(18.50)
R ²	0.40	
N	3630	

OLS Mathematics Literacy Models

Table B.20

Combined OLS mathematics literacy
model for Australia.

Australia			
Variables	Coefficient	SE	
Intercept	319.95	(14.18)	
Family Structure (ref. two parent)			
Single-Mother Family	0.93	(6.47)	
Mixed Family	-3.98	(7.20)	
Other Family Structure	-3.87	(10.13)	
Background Characteristics			
Gender (being a girl)	-16.62	(4.89)	
Grade	41.47	(4.37)	
"Official" Language Speaker at Home	5.36	(6.73)	
Economic Inputs			
Parent's Occupation (ISEI scale)	0.99	(0.13)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	15.23	(6.34)	
Tertiary	34.87	(6.71)	
Number of Books in the Home	5.73	(1.42)	
Parental Involvement			
Cultural Involvement Index	5.56	(1.06)	
Social Involvement Index	1.90	(0.93)	
Missing Data			
"Official" Language Speaker at Home	-11.96	(23.93)	
Parent's Occupation (ISEI scale)	-54.10	(10.40)	
Parent's Education	0.19	(12.39)	
Number of Books in the Home	-47.75	(19.16)	
Cultural Involvement Index	-27.01	(31.23)	
Social Involvement Index	-3.68	(30.57)	
R ²	0.27		
N	2830		

Table B.21

Combined OLS mathematics literacy
model for Austria.

Australia			
Variables	Coefficient	SE	
Intercept	319.95	(14.18)	
Family Structure (ref. two parent)			
Single-Mother Family	0.93	(6.47)	
Mixed Family	-3.98	(7.20)	
Other Family Structure	-3.87	(10.13)	
Background Characteristics			
Gender (being a girl)	-16.62	(4.89)	
Grade	41.47	(4.37)	
"Official" Language Speaker at Home	5.36	(6.73)	
Economic Inputs			
Parent's Occupation (ISEI scale)	0.99	(0.13)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	15.23	(6.34)	
Tertiary	34.87	(6.71)	
Number of Books in the Home	5.73	(1.42)	
Parental Involvement			
Cultural Involvement Index	5.56	(1.06)	
Social Involvement Index	1.90	(0.93)	
Missing Data			
"Official" Language Speaker at Home	-11.96	(23.93)	
Parent's Occupation (ISEI scale)	-54.10	(10.40)	
Parent's Education	0.19	(12.39)	
Number of Books in the Home	-47.75	(19.16)	
Cultural Involvement Index	-27.01	(31.23)	
Social Involvement Index	-3.68	(30.57)	
R ²	0.27		
N	2830		

Table B.22

Combined OLS mathematics literacy
model for Belgium.

Australia		
Variables	Coefficient	SE
Intercept	319.95	(14.18)
Family Structure (ref. two parent)		
Single-Mother Family	0.93	(6.47)
Mixed Family	-3.98	(7.20)
Other Family Structure	-3.87	(10.13)
Background Characteristics		
Gender (being a girl)	-16.62	(4.89)
Grade	41.47	(4.37)
"Official" Language Speaker at Home	5.36	(6.73)
Economic Inputs		
Parent's Occupation (ISEI scale)	0.99	(0.13)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	15.23	(6.34)
Tertiary	34.87	(6.71)
Number of Books in the Home	5.73	(1.42)
Parental Involvement		
Cultural Involvement Index	5.56	(1.06)
Social Involvement Index	1.90	(0.93)
Missing Data		
"Official" Language Speaker at Home	-11.96	(23.93)
Parent's Occupation (ISEI scale)	-54.10	(10.40)
Parent's Education	0.19	(12.39)
Number of Books in the Home	-47.75	(19.16)
Cultural Involvement Index	-27.01	(31.23)
Social Involvement Index	-3.68	(30.57)
R ²	0.27	
N	2830	

Table B.23

Combined OLS mathematics literacy
model for Canada.

Canada		
Variables	Coefficient	SE
Intercept	363.62	(7.02)
Family Structure (ref. two parent)		
Single-Mother Family	-8.40	(2.66)
Mixed Family	-15.94	(3.04)
Other Family Structure	-15.47	(4.32)
Background Characteristics		
Gender (being a girl)	-14.58	(1.85)
Grade	34.18	(2.16)
"Official" Language Speaker at Home	7.79	(3.54)
Economic Inputs		
Parent's Occupation (ISEI scale)	0.74	(0.06)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	13.95	(3.38)
Tertiary	21.85	(3.02)
Number of Books in the Home	5.61	(0.75)
Parental Involvement		
Cultural Involvement Index	4.42	(0.44)
Social Involvement Index	2.00	(0.54)
Missing Data		
"Official" Language Speaker at Home	-49.30	(8.32)
Parent's Occupation (ISEI scale)	-43.62	(9.34)
Parent's Education	-35.21	(9.82)
Number of Books in the Home	-26.04	(13.27)
Cultural Involvement Index	0.52	(15.20)
Social Involvement Index	10.19	(18.24)
R ²	0.18	
N	16070	

Table B.24

Combined OLS mathematics literacy
model for Denmark.

Denmark			
Variables	Coefficient	SE	
Intercept	309.40	(15.10)	
Family Structure (ref. two parent)			
Single-Mother Family	-13.73	(5.13)	
Mixed Family	-5.08	(5.76)	
Other Family Structure	-13.52	(7.97)	
Background Characteristics			
Gender (being a girl)	-19.05	(3.48)	
Grade	35.09	(7.35)	
"Official" Language Speaker at Home	48.80	(6.67)	
Economic Inputs			
Parent's Occupation (ISEI scale)	0.52	(0.13)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	26.67	(6.71)	
Tertiary	34.70	(6.74)	
Number of Books in the Home	8.67	(1.56)	
Parental Involvement			
Cultural Involvement Index	5.98	(0.76)	
Social Involvement Index	3.56	(1.59)	
Missing Data			
"Official" Language Speaker at Home	-2.74	(22.37)	
Parent's Occupation (ISEI scale)	-36.98	(10.40)	
Parent's Education	-14.96	(12.80)	
Number of Books in the Home	-20.40	(11.02)	
Cultural Involvement Index	-34.78	(28.96)	
Social Involvement Index	-48.51	(33.43)	
R ²	0.29		
N	2310		

Table B.25

Combined OLS mathematics literacy
model for Finland.

Finland			
Variables	Coefficient	SE	
Intercept	372.58	(15.55)	
Family Structure (ref. two parent)			
Single-Mother Family	-12.14	(5.17)	
Mixed Family	-18.43	(6.05)	
Other Family Structure	-20.41	(7.42)	
Background Characteristics			
Gender (being a girl)	-6.36	(2.95)	
Grade	46.60	(6.12)	
"Official" Language Speaker at Home	25.56	(8.93)	
Economic Inputs			
Parent's Occupation (ISEI scale)	0.72	(0.12)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	16.37	(3.67)	
Tertiary	18.09	(5.48)	
Number of Books in the Home	5.20	(1.19)	
Parental Involvement			
Cultural Involvement Index	4.32	(0.77)	
Social Involvement Index	2.74	(1.27)	
Missing Data			
"Official" Language Speaker at Home	59.56	(38.22)	
Parent's Occupation (ISEI scale)	-28.78	(11.30)	
Parent's Education	5.52	(6.92)	
Number of Books in the Home	-92.57	(20.18)	
Cultural Involvement Index	-118.69	(57.84)	
Social Involvement Index	75.02	(50.55)	
R ²	0.18		
N	2665		

Table B.26

Combined OLS mathematics literacy
model for France.

France			
Variables	Coefficient	SE	
Intercept	342.86	(12.33)	
Family Structure (ref. two parent)			
Single-Mother Family	-5.98	(5.21)	
Mixed Family	0.37	(5.52)	
Other Family Structure	4.02	(8.87)	
Background Characteristics			
Gender (being a girl)	-27.27	(3.02)	
Grade	66.15	(2.96)	
"Official" Language Speaker at Home	14.56	(6.65)	
Economic Inputs			
Parent's Occupation (ISEI scale)	0.50	(0.12)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	15.84	(4.62)	
Tertiary	7.48	(4.76)	
Number of Books in the Home	8.63	(1.09)	
Parental Involvement			
Cultural Involvement Index	0.91	(0.80)	
Social Involvement Index	1.04	(1.03)	
Missing Data			
"Official" Language Speaker at Home	-18.26	(9.52)	
Parent's Occupation (ISEI scale)	-40.00	(8.21)	
Parent's Education	-20.43	(9.56)	
Number of Books in the Home	-28.70	(7.68)	
Cultural Involvement Index	-53.61	(20.19)	
Social Involvement Index	-7.57	(34.95)	
R ²	0.46		
N	2575		

Table B.27

Combined OLS mathematics literacy
model for Germany.

Germany			
Variables	Coefficient	SE	
Intercept	283.76	(12.48)	
Family Structure (ref. two parent)			
Single-Mother Family	-9.91	(5.61)	
Mixed Family	-17.45	(6.62)	
Other Family Structure	-6.67	(9.06)	
Background Characteristics			
Gender (being a girl)	-23.67	(4.33)	
Grade	39.28	(3.44)	
"Official" Language Speaker at Home	46.14	(8.02)	
Economic Inputs			
Parent's Occupation (ISEI scale)	0.84	(0.16)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	30.51	(6.66)	
Tertiary	41.26	(7.04)	
Number of Books in the Home	15.87	(1.61)	
Parental Involvement			
Cultural Involvement Index	0.96	(0.97)	
Social Involvement Index	-0.02	(1.22)	
Missing Data			
"Official" Language Speaker at Home	-40.52	(5.55)	
Parent's Occupation (ISEI scale)	-35.14	(11.83)	
Parent's Education	-11.32	(7.39)	
Number of Books in the Home	35.32	(16.77)	
Cultural Involvement Index	-38.30	(40.47)	
Social Involvement Index	-59.05	(42.75)	
R ²	0.44		
N	2775		

Table B.28

Combined OLS mathematics literacy
model for Great Britain.

Great Britain			
Variables	Coefficient	SE	
Intercept	321.67	(15.80)	
Family Structure (ref. two parent)			
Single-Mother Family	-14.92	(3.50)	
Mixed Family	-13.08	(6.26)	
Other Family Structure	-20.00	(7.69)	
Background Characteristics			
Gender (being a girl)	-12.36	(3.62)	
Grade	11.63	(3.06)	
"Official" Language Speaker at Home	34.91	(10.32)	
Economic Inputs			
Parent's Occupation (ISEI scale)	1.32	(0.13)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	19.51	(5.63)	
Tertiary	17.65	(6.64)	
Number of Books in the Home	11.57	(1.13)	
Parental Involvement			
Cultural Involvement Index	4.74	(0.75)	
Social Involvement Index	1.01	(0.89)	
Missing Data			
"Official" Language Speaker at Home	-36.49	(20.72)	
Parent's Occupation (ISEI scale)	-60.22	(8.87)	
Parent's Education	-29.38	(8.72)	
Number of Books in the Home	-68.85	(14.29)	
Cultural Involvement Index	-67.41	(23.61)	
Social Involvement Index	11.86	(29.00)	
R ²	0.29		
N	5110		

Table B.29

Combined OLS mathematics literacy
model for Greece.

Greece			
Variables	Coefficient	SE	
Intercept	199.89	20.013	
Family Structure (ref. two parent)			
Single-Mother Family	-1.42	9.414	
Mixed Family	-23.44	16.531	
Other Family Structure	-29.49	13.076	
Background Characteristics			
Gender (being a girl)	-12.89	5.565	
Grade	52.94	5.461	
"Official" Language Speaker at Home	24.32	15.256	
Economic Inputs			
Parent's Occupation (ISEI scale)	0.96	0.182	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	21.45	9.52	
Tertiary	26.96	8.495	
Number of Books in the Home	12.45	2.13	
Parental Involvement			
Cultural Involvement Index	4.77	1.122	
Social Involvement Index	-1.38	1.674	
Missing Data			
"Official" Language Speaker at Home	-64.09	23.365	
Parent's Occupation (ISEI scale)	-18.14	11.735	
Parent's Education	-63.45	19.238	
Number of Books in the Home	-26.69	16.025	
Cultural Involvement Index	-46.91	46.361	
Social Involvement Index	17.32	42.874	
R ²	0.26		
N	2530		

Table B.30

Combined OLS mathematics literacy
model for Ireland.

Ireland		
Variables	Coefficient	SE
Intercept	376.97	(16.04)
Family Structure (ref. two parent)		
Single-Mother Family	-10.72	(6.65)
Mixed Family	-21.79	(9.43)
Other Family Structure	-24.10	(9.71)
Background Characteristics		
Gender (being a girl)	-19.87	(4.24)
Grade	20.29	(2.15)
"Official" Language Speaker at Home	-19.42	(12.64)
Economic Inputs		
Parent's Occupation (ISEI scale)	1.05	(0.15)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	15.65	(4.18)
Tertiary	10.44	(4.30)
Number of Books in the Home	13.10	(1.48)
Parental Involvement		
Cultural Involvement Index	2.27	(0.87)
Social Involvement Index	0.79	(0.95)
Missing Data		
"Official" Language Speaker at Home	163.89	(94.91)
Parent's Occupation (ISEI scale)	-13.17	(12.05)
Parent's Education	-27.18	(21.75)
Number of Books in the Home	-85.07	(37.15)
Cultural Involvement Index	-124.28	(33.99)
Social Involvement Index	-62.87	(69.10)
R ²	0.25	
N	2110	

Table B.31

Combined OLS mathematics literacy
model for Italy.

Italy		
Variables	Coefficient	SE
Intercept	266.45	(18.96)
Family Structure (ref. two parent)		
Single-Mother Family	-7.35	(4.27)
Mixed Family	-19.22	(9.69)
Other Family Structure	-7.40	(6.97)
Background Characteristics		
Gender (being a girl)	-18.69	(5.66)
Grade	47.30	(5.14)
"Official" Language Speaker at Home	14.65	(6.22)
Economic Inputs		
Parent's Occupation (ISEI scale)	0.62	(0.17)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	6.95	(5.46)
Tertiary	-3.25	(6.79)
Number of Books in the Home	10.94	(1.66)
Parental Involvement		
Cultural Involvement Index	0.58	(0.76)
Social Involvement Index	3.08	(2.32)
Missing Data		
"Official" Language Speaker at Home	-26.39	(8.73)
Parent's Occupation (ISEI scale)	-21.45	(11.65)
Parent's Education	-39.19	(15.53)
Number of Books in the Home	-41.06	(16.82)
Cultural Involvement Index	-66.61	(49.21)
Social Involvement Index	17.41	(39.43)
R ²	0.21	
N	2725	

Table B.32

Combined OLS mathematics literacy
model for New Zealand.

New Zealand			
Variables	Coefficient	SE	
Intercept	205.00	(28.64)	
Family Structure (ref. two parent)			
Single-Mother Family	-6.58	(6.36)	
Mixed Family	-23.85	(5.81)	
Other Family Structure	-21.47	(7.19)	
Background Characteristics			
Gender (being a girl)	-7.92	(4.79)	
Grade	59.39	(8.95)	
"Official" Language Speaker at Home	18.75	(6.92)	
Economic Inputs			
Parent's Occupation (ISEI scale)	1.27	(0.15)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	6.70	(7.55)	
Tertiary	6.53	(7.55)	
Number of Books in the Home	14.17	(1.73)	
Parental Involvement			
Cultural Involvement Index	4.19	(1.03)	
Social Involvement Index	0.62	(1.09)	
Missing Data			
"Official" Language Speaker at Home	-51.92	(10.24)	
Parent's Occupation (ISEI scale)	-61.55	(11.65)	
Parent's Education	-20.24	(7.49)	
Number of Books in the Home	-47.78	(17.40)	
Cultural Involvement Index	-19.85	(23.87)	
Social Involvement Index	-34.77	(20.26)	
R ²	0.29		
N	2015		

Table B.33

Combined OLS mathematics literacy
model for Norway.

Norway			
Variables	Coefficient	SE	
Intercept	266.45	(18.96)	
Family Structure (ref. two parent)			
Single-Mother Family	-7.35	(4.27)	
Mixed Family	-19.22	(9.69)	
Other Family Structure	-7.40	(6.97)	
Background Characteristics			
Gender (being a girl)	-18.69	(5.66)	
Grade	47.30	(5.14)	
"Official" Language Speaker at Home	14.65	(6.22)	
Economic Inputs			
Parent's Occupation (ISEI scale)	0.62	(0.17)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	6.95	(5.46)	
Tertiary	-3.25	(6.79)	
Number of Books in the Home	10.94	(1.66)	
Parental Involvement			
Cultural Involvement Index	0.58	(0.76)	
Social Involvement Index	3.08	(2.32)	
Missing Data			
"Official" Language Speaker at Home	-26.39	(8.73)	
Parent's Occupation (ISEI scale)	-21.45	(11.65)	
Parent's Education	-39.19	(15.53)	
Number of Books in the Home	-41.06	(16.82)	
Cultural Involvement Index	-66.61	(49.21)	
Social Involvement Index	17.41	(39.43)	
R ²	0.21		
N	2255		

Table B.34

Combined OLS mathematics literacy
model for Portugal.

Portugal			
Variables	Coefficient	SE	
Intercept	329.73	(21.27)	
Family Structure (ref. two parent)			
Single-Mother Family	-0.06	(4.43)	
Mixed Family	4.48	(7.24)	
Other Family Structure	-12.58	(6.96)	
Background Characteristics			
Gender (being a girl)	-31.03	(2.93)	
Grade	62.55	(2.13)	
"Official" Language Speaker at Home	-20.02	(17.30)	
Economic Inputs			
Parent's Occupation (ISEI scale)	0.61	(0.17)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	-9.23	(4.66)	
Tertiary	1.42	(6.45)	
Number of Books in the Home	6.60	(1.52)	
Parental Involvement			
Cultural Involvement Index	3.45	(0.70)	
Social Involvement Index	2.36	(1.24)	
Missing Data			
"Official" Language Speaker at Home	-9.32	(16.82)	
Parent's Occupation (ISEI scale)	-35.84	(8.00)	
Parent's Education	-13.27	(15.60)	
Number of Books in the Home	-29.41	(15.27)	
Cultural Involvement Index	-23.55	(20.17)	
Social Involvement Index	-4.31	(23.41)	
R ²	0.52		
N	2485		

Table B.35

Combined OLS mathematics literacy
model for Spain.

Spain			
Variables	Coefficient	SE	
Intercept	283.02	(13.51)	
Family Structure (ref. two parent)			
Single-Mother Family	-5.19	(5.58)	
Mixed Family	1.94	(11.60)	
Other Family Structure	-6.18	(6.57)	
Background Characteristics			
Gender (being a girl)	-23.80	(3.36)	
Grade	70.00	(3.65)	
"Official" Language Speaker at Home	-11.49	(4.70)	
Economic Inputs			
Parent's Occupation (ISEI scale)	0.54	(0.15)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	8.55	(4.44)	
Tertiary	5.15	(4.58)	
Number of Books in the Home	13.49	(1.46)	
Parental Involvement			
Cultural Involvement Index	4.38	(0.97)	
Social Involvement Index	-1.07	(1.32)	
Missing Data			
"Official" Language Speaker at Home	-16.83	(7.77)	
Parent's Occupation (ISEI scale)	-12.74	(9.60)	
Parent's Education	-26.57	(12.12)	
Number of Books in the Home	-37.17	(10.86)	
Cultural Involvement Index	-45.83	(25.21)	
Social Involvement Index	22.12	(33.69)	
R ²	0.37		
N	3335		

Table B.36

Combined OLS mathematics literacy
model for Sweden.

Sweden		
Variables	Coefficient	SE
Intercept	290.23	(20.33)
Family Structure (ref. two parent)		
Single-Mother Family	-11.94	(5.82)
Mixed Family	-13.44	(5.43)
Other Family Structure	-29.36	(8.22)
Background Characteristics		
Gender (being a girl)	-10.79	(3.89)
Grade	78.26	(15.63)
"Official" Language Speaker at Home	48.36	(10.25)
Economic Inputs		
Parent's Occupation (ISEI scale)	1.45	(0.13)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	6.92	(8.17)
Tertiary	-10.20	(8.29)
Number of Books in the Home	10.78	(1.44)
Parental Involvement		
Cultural Involvement Index	5.67	(1.06)
Social Involvement Index	-4.38	(1.37)
Missing Data		
"Official" Language Speaker at Home	-30.78	(12.31)
Parent's Occupation (ISEI scale)	-33.39	(18.01)
Parent's Education	-40.03	(13.75)
Number of Books in the Home	-51.53	(30.27)
Cultural Involvement Index	-85.56	(30.65)
Social Involvement Index	89.75	(55.50)
R ²	0.24	
N	2430	

Table B.37

Combined OLS mathematics literacy
model for United States.

United States		
Variables	Coefficient	SE
Intercept	316.35	(15.16)
Family Structure (ref. two parent)		
Single-Mother Family	-19.75	(6.06)
Mixed Family	-22.39	(5.61)
Other Family Structure	-52.18	(7.12)
Background Characteristics		
Gender (being a girl)	-20.66	(5.00)
Grade	35.93	(4.30)
"Official" Language Speaker at Home	20.25	(7.13)
Economic Inputs		
Parent's Occupation (ISEI scale)	1.07	(0.19)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	-2.48	(9.50)
Tertiary	10.80	(10.86)
Number of Books in the Home	13.32	(1.43)
Parental Involvement		
Cultural Involvement Index	2.80	(1.14)
Social Involvement Index	1.13	(1.18)
Missing Data		
"Official" Language Speaker at Home	-39.43	(24.20)
Parent's Occupation (ISEI scale)	-34.94	(7.08)
Parent's Education	-13.57	(11.63)
Number of Books in the Home	-54.68	(12.79)
Cultural Involvement Index	-53.14	(30.61)
Social Involvement Index	-10.50	(22.60)
R ²	0.40	
N	2010	

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Table B.38

Combined OLS science literacy model
for Australia.

Australia		
Variables	Coefficient	SE
Intercept	306.92	(3.56)
Family Structure (ref. two parent)		
Single-Mother Family	5.66	(1.23)
Mixed Family	-10.20	(1.52)
Other Family Structure	-10.89	(2.57)
Background Characteristics		
Gender (being a girl)	-3.97	(1.02)
Grade	37.85	(0.88)
"Official" Language Speaker at Home	25.26	(1.61)
Economic Inputs		
Parent's Occupation (ISEI scale)	0.82	(0.04)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	10.92	(1.52)
Tertiary	23.66	(1.61)
Number of Books in the Home	10.03	(0.35)
Parental Involvement		
Cultural Involvement Index	6.70	(0.22)
Social Involvement Index	-0.64	(0.24)
Missing Data		
"Official" Language Speaker at Home	-29.15	(9.29)
Parent's Occupation (ISEI scale)	-53.39	(2.76)
Parent's Education	-20.51	(3.47)
Number of Books in the Home	-51.87	(4.55)
Cultural Involvement Index	-66.69	(3.94)
Social Involvement Index	-12.73	(5.58)
R ²	0.25	
N	2835	

Table B.39

Combined OLS science literacy model
for Austria.

Austria		
Variables	Coefficient	SE
Intercept	321.97	(2.87)
Family Structure (ref. two parent)		
Single-Mother Family	3.56	(1.42)
Mixed Family	-21.04	(1.56)
Other Family Structure	-30.66	(2.52)
Background Characteristics		
Gender (being a girl)	-18.08	(1.08)
Grade	30.97	(0.76)
"Official" Language Speaker at Home	44.74	(2.02)
Economic Inputs		
Parent's Occupation (ISEI scale)	0.97	(0.04)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	4.97	(1.10)
Tertiary	2.14	(1.40)
Number of Books in the Home	14.32	(0.37)
Parental Involvement		
Cultural Involvement Index	4.26	(0.19)
Social Involvement Index	-0.40	(0.21)
Missing Data		
"Official" Language Speaker at Home	-38.37	(1.65)
Parent's Occupation (ISEI scale)	-30.32	(3.54)
Parent's Education	-20.43	(1.81)
Number of Books in the Home	-41.53	(3.39)
Cultural Involvement Index	-86.62	(9.31)
Social Involvement Index	46.12	(12.20)
R ²	0.29	
N	2535	

Table B.40

Combined OLS science literacy model
for Belgium.

Belgium		
Variables	Coefficient	SE
Intercept	231.33	(2.85)
Family Structure (ref. two parent)		
Single-Mother Family	-2.89	(1.34)
Mixed Family	-3.77	(1.46)
Other Family Structure	-9.79	(2.21)
Background Characteristics		
Gender (being a girl)	-10.06	(0.88)
Grade	82.21	(1.26)
"Official" Language Speaker at Home	-1.80	(1.15)
Economic Inputs		
Parent's Occupation (ISEI scale)	1.13	(0.03)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	31.96	(1.15)
Tertiary	18.28	(1.25)
Number of Books in the Home	10.51	(0.27)
Parental Involvement		
Cultural Involvement Index	3.82	(0.17)
Social Involvement Index	1.91	(0.22)
Missing Data		
"Official" Language Speaker at Home	-16.79	(1.88)
Parent's Occupation (ISEI scale)	-29.97	(1.64)
Parent's Education	-33.44	(2.60)
Number of Books in the Home	-52.93	(2.42)
Cultural Involvement Index	0.87	(3.51)
Social Involvement Index	-54.92	(4.49)
R ²	0.46	
N	3655	

Table B.41

Combined OLS science literacy model
for Canada.

Canada		
Variables	Coefficient	SE
Intercept	322.56	(1.73)
Family Structure (ref. two parent)		
Single-Mother Family	-2.65	(0.64)
Mixed Family	-15.97	(0.76)
Other Family Structure	-9.53	(1.12)
Background Characteristics		
Gender (being a girl)	-2.09	(0.41)
Grade	36.66	(0.55)
"Official" Language Speaker at Home	26.91	(0.80)
Economic Inputs		
Parent's Occupation (ISEI scale)	0.77	(0.02)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	10.81	(0.80)
Tertiary	21.64	(0.78)
Number of Books in the Home	6.60	(0.18)
Parental Involvement		
Cultural Involvement Index	5.44	(0.10)
Social Involvement Index	2.04	(0.13)
Missing Data		
"Official" Language Speaker at Home	-45.39	(1.44)
Parent's Occupation (ISEI scale)	-50.48	(1.84)
Parent's Education	-36.44	(1.73)
Number of Books in the Home	-20.63	(3.11)
Cultural Involvement Index	-26.22	(4.74)
Social Involvement Index	42.11	(5.64)
R ²	0.22	
N	16115	

Table B.42

Combined OLS science literacy model
for Denmark.

Finland			
Variables	Coefficient	SE	
Intercept	348.78	(3.16)	
Family Structure (ref. two parent)			
Single-Mother Family	-13.71	(1.18)	
Mixed Family	-20.21	(1.60)	
Other Family Structure	-28.12	(1.76)	
Background Characteristics			
Gender (being a girl)	1.90	(0.78)	
Grade	48.00	(1.39)	
"Official" Language Speaker at Home	48.59	(2.07)	
Economic Inputs			
Parent's Occupation (ISEI scale)	0.54	(0.03)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	12.09	(0.91)	
Tertiary	19.75	(1.37)	
Number of Books in the Home	9.55	(0.27)	
Parental Involvement			
Cultural Involvement Index	5.01	(0.21)	
Social Involvement Index	0.94	(0.28)	
Missing Data			
"Official" Language Speaker at Home	121.17	(14.83)	
Parent's Occupation (ISEI scale)	-27.80	(3.59)	
Parent's Education	6.22	(1.97)	
Number of Books in the Home	-43.98	(3.89)	
Cultural Involvement Index	-127.62	(12.54)	
Social Involvement Index	37.74	(14.14)	
R ²	0.18		
N	2695		

Table B.43

Combined OLS science literacy model
for Finland.

Finland			
Variables	Coefficient	SE	
Intercept	348.78	(3.16)	
Family Structure (ref. two parent)			
Single-Mother Family	-13.71	(1.18)	
Mixed Family	-20.21	(1.60)	
Other Family Structure	-28.12	(1.76)	
Background Characteristics			
Gender (being a girl)	1.90	(0.78)	
Grade	48.00	(1.39)	
"Official" Language Speaker at Home	48.59	(2.07)	
Economic Inputs			
Parent's Occupation (ISEI scale)	0.54	(0.03)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	12.09	(0.91)	
Tertiary	19.75	(1.37)	
Number of Books in the Home	9.55	(0.27)	
Parental Involvement			
Cultural Involvement Index	5.01	(0.21)	
Social Involvement Index	0.94	(0.28)	
Missing Data			
"Official" Language Speaker at Home	121.17	(14.83)	
Parent's Occupation (ISEI scale)	-27.80	(3.59)	
Parent's Education	6.22	(1.97)	
Number of Books in the Home	-43.98	(3.89)	
Cultural Involvement Index	-127.62	(12.54)	
Social Involvement Index	37.74	(14.14)	
R ²	0.18		
N	2695		

Table B.44

Combined OLS science literacy model
for France.

France			
Variables	Coefficient	SE	
Intercept	269.48	(2.67)	
Family Structure (ref. two parent)			
Single-Mother Family	0.88	(1.16)	
Mixed Family	-1.08	(1.45)	
Other Family Structure	0.59	(1.99)	
Background Characteristics			
Gender (being a girl)	-17.76	(0.78)	
Grade	70.80	(0.77)	
"Official" Language Speaker at Home	27.98	(1.79)	
Economic Inputs			
Parent's Occupation (ISEI scale)	0.68	(0.03)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	8.49	(1.10)	
Tertiary	5.51	(1.24)	
Number of Books in the Home	10.59	(0.29)	
Parental Involvement			
Cultural Involvement Index	4.04	(0.20)	
Social Involvement Index	1.65	(0.29)	
Missing Data			
"Official" Language Speaker at Home	-31.21	(2.22)	
Parent's Occupation (ISEI scale)	-28.79	(2.31)	
Parent's Education	-9.12	(2.06)	
Number of Books in the Home	-57.15	(2.06)	
Cultural Involvement Index	-52.80	(4.25)	
Social Involvement Index	1.30	(6.97)	
R ²	0.48		
N	2565		

Table B.45

Combined OLS science literacy model
for Germany.

Germany			
Variables	Coefficient	SE	
Intercept	278.10	(3.01)	
Family Structure (ref. two parent)			
Single-Mother Family	-3.34	(1.18)	
Mixed Family	-17.68	(1.22)	
Other Family Structure	-13.71	(2.07)	
Background Characteristics			
Gender (being a girl)	-14.48	(0.76)	
Grade	36.78	(0.68)	
"Official" Language Speaker at Home	50.13	(1.81)	
Economic Inputs			
Parent's Occupation (ISEI scale)	0.81	(0.03)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	19.05	(1.52)	
Tertiary	32.16	(1.46)	
Number of Books in the Home	15.34	(0.33)	
Parental Involvement			
Cultural Involvement Index	3.61	(0.18)	
Social Involvement Index	0.40	(0.24)	
Missing Data			
"Official" Language Speaker at Home	-46.47	(1.72)	
Parent's Occupation (ISEI scale)	-24.17	(2.32)	
Parent's Education	-16.68	(1.82)	
Number of Books in the Home	-47.82	(3.47)	
Cultural Involvement Index	-75.54	(4.81)	
Social Involvement Index	5.22	(5.40)	
R ²	0.43		
N	2805		

Table B.46

Combined OLS science literacy model
for Great Britain.

Great Britain		
Variables	Coefficient	SE
Intercept	298.13	(4.44)
Family Structure (ref. two parent)		
Single-Mother Family	-13.58	(1.08)
Mixed Family	-15.98	(1.09)
Other Family Structure	-23.31	(1.95)
Background Characteristics		
Gender (being a girl)	-5.60	(0.94)
Grade	15.61	(0.80)
"Official" Language Speaker at Home	23.25	(3.12)
Economic Inputs		
Parent's Occupation (ISEI scale)	1.51	(0.03)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	18.68	(1.41)
Tertiary	9.91	(1.49)
Number of Books in the Home	14.91	(0.30)
Parental Involvement		
Cultural Involvement Index	5.83	(0.22)
Social Involvement Index	0.96	(0.21)
Missing Data		
"Official" Language Speaker at Home	-60.30	(4.48)
Parent's Occupation (ISEI scale)	-63.58	(2.24)
Parent's Education	-32.67	(1.87)
Number of Books in the Home	-84.32	(3.26)
Cultural Involvement Index	-47.59	(6.02)
Social Involvement Index	-5.35	(8.10)
R ²	0.31	
N	5115	

Table B.47

Combined OLS science literacy model
for Greece.

Greece		
Variables	Coefficient	SE
Intercept	230.23	(5.45)
Family Structure (ref. two parent)		
Single-Mother Family	6.86	(1.88)
Mixed Family	-12.57	(3.44)
Other Family Structure	-11.16	(3.06)
Background Characteristics		
Gender (being a girl)	-0.69	(1.07)
Grade	35.39	(1.36)
"Official" Language Speaker at Home	41.13	(3.77)
Economic Inputs		
Parent's Occupation (ISEI scale)	0.73	(0.04)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	15.98	(1.36)
Tertiary	23.12	(1.55)
Number of Books in the Home	11.42	(0.45)
Parental Involvement		
Cultural Involvement Index	5.07	(0.24)
Social Involvement Index	0.87	(0.36)
Missing Data		
"Official" Language Speaker at Home	-21.91	(5.52)
Parent's Occupation (ISEI scale)	-9.84	(2.97)
Parent's Education	-36.63	(3.94)
Number of Books in the Home	-56.57	(2.84)
Cultural Involvement Index	-19.91	(7.82)
Social Involvement Index	13.27	(6.24)
R ²	0.23	
N	2520	

Table B.48

Combined OLS science literacy model
for Ireland.

Ireland			
Variables	Coefficient	SE	
Intercept	315.43	(4.86)	
Family Structure (ref. two parent)			
Single-Mother Family	-6.79	(1.57)	
Mixed Family	-25.31	(2.36)	
Other Family Structure	-18.42	(2.46)	
Background Characteristics			
Gender (being a girl)	-1.06	(1.07)	
Grade	19.13	(0.49)	
"Official" Language Speaker at Home	24.23	(3.68)	
Economic Inputs			
Parent's Occupation (ISEI scale)	1.16	(0.03)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	4.18	(1.14)	
Tertiary	9.69	(1.50)	
Number of Books in the Home	11.97	(0.31)	
Parental Involvement			
Cultural Involvement Index	5.11	(0.20)	
Social Involvement Index	2.68	(0.27)	
Missing Data			
"Official" Language Speaker at Home	-61.41	(16.65)	
Parent's Occupation (ISEI scale)	-42.02	(3.17)	
Parent's Education	-2.50	(4.90)	
Number of Books in the Home	-58.92	(6.99)	
Cultural Involvement Index	-17.66	(7.71)	
Social Involvement Index	-77.11	(10.84)	
R ²	0.23		
N	2120		

Table B.49

Combined OLS science literacy model
for Italy.

Italy			
Variables	Coefficient	SE	
Intercept	271.00	(4.47)	
Family Structure (ref. two parent)			
Single-Mother Family	2.57	(1.15)	
Mixed Family	-5.77	(2.45)	
Other Family Structure	-3.83	(1.91)	
Background Characteristics			
Gender (being a girl)	-3.29	(1.28)	
Grade	40.17	(1.20)	
"Official" Language Speaker at Home	30.26	(1.44)	
Economic Inputs			
Parent's Occupation (ISEI scale)	0.68	(0.04)	
Parent's Education (ref. lower secondary & below)			
Upper Secondary	15.73	(1.13)	
Tertiary	1.50	(1.74)	
Number of Books in the Home	10.23	(0.34)	
Parental Involvement			
Cultural Involvement Index	3.82	(0.22)	
Social Involvement Index	1.21	(0.43)	
Missing Data			
"Official" Language Speaker at Home	-38.64	(1.84)	
Parent's Occupation (ISEI scale)	-35.19	(2.72)	
Parent's Education	-34.97	(4.23)	
Number of Books in the Home	-127.22	(4.43)	
Cultural Involvement Index	-30.46	(8.10)	
Social Involvement Index	1.60	(8.03)	
R ²	0.24		
N	2730		

Table B.50

Combined OLS science literacy model
for Norway.

Norway		
Variables	Coefficient	SE
Intercept	324.38	(10.76)
Family Structure (ref. two parent)		
Single-Mother Family	-7.05	(1.26)
Mixed Family	-11.24	(1.57)
Other Family Structure	-17.47	(2.11)
Background Characteristics		
Gender (being a girl)	-1.16	(1.05)
Grade	4.53	(5.57)
"Official" Language Speaker at Home	43.01	(1.99)
Economic Inputs		
Parent's Occupation (ISEI scale)	0.80	(0.04)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	13.51	(2.04)
Tertiary	13.56	(1.87)
Number of Books in the Home	11.86	(0.38)
Parental Involvement		
Cultural Involvement Index	7.39	(0.22)
Social Involvement Index	-0.12	(0.37)
Missing Data		
"Official" Language Speaker at Home	-4.69	(2.22)
Parent's Occupation (ISEI scale)	-56.43	(2.97)
Parent's Education	-17.86	(3.36)
Number of Books in the Home	-51.14	(3.14)
Cultural Involvement Index	-77.53	(5.60)
Social Involvement Index	-27.31	(7.46)
R ²	0.21	
N	2250	

Table B.51

Combined OLS science literacy model
for New Zealand.

New Zealand		
Variables	Coefficient	SE
Intercept	139.83	(6.10)
Family Structure (ref. two parent)		
Single-Mother Family	2.62	(1.33)
Mixed Family	-12.34	(1.35)
Other Family Structure	-28.20	(1.92)
Background Characteristics		
Gender (being a girl)	4.89	(1.12)
Grade	64.25	(1.63)
"Official" Language Speaker at Home	50.71	(1.75)
Economic Inputs		
Parent's Occupation (ISEI scale)	1.26	(0.04)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	16.02	(1.79)
Tertiary	17.42	(1.89)
Number of Books in the Home	12.26	(0.38)
Parental Involvement		
Cultural Involvement Index	5.66	(0.21)
Social Involvement Index	0.64	(0.23)
Missing Data		
"Official" Language Speaker at Home	-81.07	(2.25)
Parent's Occupation (ISEI scale)	-62.66	(2.45)
Parent's Education	-9.93	(1.58)
Number of Books in the Home	-71.01	(3.08)
Cultural Involvement Index	-42.23	(5.07)
Social Involvement Index	-19.50	(7.83)
R ²	0.33	
N	1985	

Table B.52

Combined OLS science literacy model
for Portugal.

Portugal		
Variables	Coefficient	SE
Intercept	291.11	(3.47)
Family Structure (ref. two parent)		
Single-Mother Family	-1.09	(1.48)
Mixed Family	-2.14	(1.37)
Other Family Structure	5.72	(1.73)
Background Characteristics		
Gender (being a girl)	-7.37	(0.73)
Grade	58.33	(0.50)
"Official" Language Speaker at Home	28.48	(2.78)
Economic Inputs		
Parent's Occupation (ISEI scale)	0.49	(0.03)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	3.85	(1.09)
Tertiary	-3.79	(1.48)
Number of Books in the Home	7.53	(0.35)
Parental Involvement		
Cultural Involvement Index	4.51	(0.17)
Social Involvement Index	0.43	(0.28)
Missing Data		
"Official" Language Speaker at Home	-1.22	(3.27)
Parent's Occupation (ISEI scale)	-44.87	(2.19)
Parent's Education	-26.29	(3.13)
Number of Books in the Home	-36.63	(2.16)
Cultural Involvement Index	-15.31	(3.42)
Social Involvement Index	20.43	(4.27)
R ²	0.50	
N	2490	

Table B.53

Combined OLS science literacy model
for Spain.

Spain		
Variables	Coefficient	SE
Intercept	267.57	(3.11)
Family Structure (ref. two parent)		
Single-Mother Family	6.36	(1.31)
Mixed Family	10.64	(2.35)
Other Family Structure	11.67	(1.58)
Background Characteristics		
Gender (being a girl)	-8.11	(0.70)
Grade	72.92	(0.89)
"Official" Language Speaker at Home	-0.14	(1.19)
Economic Inputs		
Parent's Occupation (ISEI scale)	0.62	(0.04)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	17.54	(1.07)
Tertiary	10.65	(1.36)
Number of Books in the Home	11.94	(0.27)
Parental Involvement		
Cultural Involvement Index	3.99	(0.21)
Social Involvement Index	-0.12	(0.23)
Missing Data		
"Official" Language Speaker at Home	-17.80	(1.98)
Parent's Occupation (ISEI scale)	-19.37	(2.09)
Parent's Education	-31.95	(2.85)
Number of Books in the Home	-39.31	(2.18)
Cultural Involvement Index	-38.21	(4.23)
Social Involvement Index	-4.17	(6.48)
R ²	0.36	
N	3365	

Table B.54

Combined OLS science literacy model
for Sweden.

Sweden		
Variables	Coefficient	SE
Intercept	309.03	(4.45)
Family Structure (ref. two parent)		
Single-Mother Family	-21.83	(1.26)
Mixed Family	-12.22	(1.34)
Other Family Structure	-22.03	(2.41)
Background Characteristics		
Gender (being a girl)	-3.30	(0.82)
Grade	53.06	(3.20)
"Official" Language Speaker at Home	47.47	(1.83)
Economic Inputs		
Parent's Occupation (ISEI scale)	0.99	(0.03)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	-1.18	(1.47)
Tertiary	-6.53	(1.50)
Number of Books in the Home	10.39	(0.37)
Parental Involvement		
Cultural Involvement Index	7.72	(0.18)
Social Involvement Index	-0.94	(0.32)
Missing Data		
"Official" Language Speaker at Home	-49.94	(2.91)
Parent's Occupation (ISEI scale)	-30.69	(3.58)
Parent's Education	-23.04	(2.58)
Number of Books in the Home	-5.36	(4.06)
Cultural Involvement Index	-82.68	(10.23)
Social Involvement Index	87.71	(13.49)
R ²	0.20	
N	2410	

Table B.55

Combined OLS science literacy model
for United States.

United States		
Variables	Coefficient	SE
Intercept	340.63	(2.85)
Family Structure (ref. two parent)		
Single-Mother Family	-16.05	(1.32)
Mixed Family	-18.82	(1.34)
Other Family Structure	-51.21	(1.99)
Background Characteristics		
Gender (being a girl)	-10.17	(1.01)
Grade	32.08	(1.07)
"Official" Language Speaker at Home	13.23	(1.67)
Economic Inputs		
Parent's Occupation (ISEI scale)	0.93	(0.03)
Parent's Education (ref. lower secondary & below)		
Upper Secondary	-3.45	(1.99)
Tertiary	12.46	(1.88)
Number of Books in the Home	14.09	(0.38)
Parental Involvement		
Cultural Involvement Index	3.60	(0.24)
Social Involvement Index	-0.67	(0.25)
Missing Data		
"Official" Language Speaker at Home	-26.62	(4.51)
Parent's Occupation (ISEI scale)	-47.92	(2.14)
Parent's Education	-9.49	(3.24)
Number of Books in the Home	-61.30	(2.90)
Cultural Involvement Index	-63.32	(6.53)
Social Involvement Index	-0.71	(7.34)
R ²	0.35	
N	2010	

OLS Exploratory Reading Literacy Models

Table B.56

OLS exploratory reading literacy model (inc. prior achievement) for Australia.

Australia		
Variables	Coefficient	SE
Intercept	345.48	20.20
Family Structure (ref. two parent)		
Single-Mother Family	1.27	5.06
Mixed Family	-10.71	5.74
Other Family Structure	-8.31	9.09
Background Characteristics		
Gender (being a girl)	24.41	3.93
Grade	26.27	4.99
"Official" Language Speaker at Home	21.28	6.11
Economic Inputs		
Parent's Occupation (ISEI scale)	0.96	0.11
Parent's Education (ref. lower secondary & below)		
Upper Secondary	17.08	5.78
Tertiary	30.58	6.35
Number of Books in the Home	7.52	1.14
Parental Involvement		
Cultural Involvement Index	9.06	0.83
Social Involvement Index	1.06	0.88
Maternal Employment (ref. home duties)		
Mother Works Full-Time	-4.46	4.24
Mother Works Part-Time	6.45	4.48
Mother Seeking Work	-24.09	7.17
Family Size		
Sibship size	-6.32	1.62
Prior Achievement (ref. college prep track)		
Lower Track	-30.95	6.62
Missing Data		
"Official" Language Speaker at Home	-36.25	36.79
Parent's Occupation (ISEI scale)	-51.32	8.71
Parent's Education	-22.77	12.69
Number of Books in the Home	-75.15	19.29
Cultural Involvement Index	-68.93	21.93
Social Involvement Index	-4.29	25.77
N	4855	

Note. ** $p = .01$, * $p = .05$, # $p = .10$.

Table B.57

OLS exploratory reading literacy model (inc. prior achievement) for Austria.

Austria		
Variables	Coefficient	SE
Intercept	395.47	11.06
Family Structure (ref. two parent)		
Single-Mother Family	6.66	4.74
Mixed Family	-2.75	4.71
Other Family Structure	9.03	7.98
Background Characteristics		
Gender (being a girl)	10.42	3.07
Grade	25.19	2.23
"Official" Language Speaker at Home	29.57	5.07
Economic Inputs		
Parent's Occupation (ISEI scale)	0.37	0.13
Parent's Education (ref. lower secondary & below)		
Upper Secondary	5.55	3.02
Tertiary	0.17	4.45
Number of Books in the Home	9.83	1.25
Parental Involvement		
Cultural Involvement Index	4.38	0.61
Social Involvement Index	0.39	0.78
Maternal Employment (ref. home duties)		
Mother Works Full-Time	-6.44	3.23
Mother Works Part-Time	1.77	2.93
Mother Seeking Work	-7.25	8.20
Family Size		
Sibship size	0.46	1.26
Prior Achievement (ref. college prep track)		
Lower Track	-80.17	3.74
Missing Data		
"Official" Language Speaker at Home	-37.94	8.44
Parent's Occupation (ISEI scale)	-36.80	10.32
Parent's Education	-19.60	4.97
Number of Books in the Home	-37.01	8.49
Cultural Involvement Index	-44.77	23.39
Social Involvement Index	-26.98	27.82
N	4340	

Note. ** p = .01, * p = .05, # p = .10.

Table B.58

OLS exploratory reading literacy model (inc. prior achievement) for Belgium.

Belgium		
Variables	Coefficient	SE
Intercept	356.99	8.68
Family Structure (ref. two parent)		
Single-Mother Family	2.11	3.76
Mixed Family	-0.69	3.38
Other Family Structure	-7.70	5.59
Background Characteristics		
Gender (being a girl)	15.23	2.96
Grade	56.34	2.85
"Official" Language Speaker at Home	-7.78	2.99
Economic Inputs		
Parent's Occupation (ISEI scale)	0.65	0.10
Parent's Education (ref. lower secondary & below)		
Upper Secondary	27.38	4.03
Tertiary	11.37	4.15
Number of Books in the Home	7.57	0.79
Parental Involvement		
Cultural Involvement Index	2.60	0.49
Social Involvement Index	0.90	0.69
Maternal Employment (ref. home duties)		
Mother Works Full-Time	2.18	2.52
Mother Works Part-Time	7.84	3.09
Mother Seeking Work	-8.23	4.16
Family Size		
Sibship size	-6.10	1.16
Prior Achievement (ref. college prep track)		
Lower Track	-82.53	3.83
Missing Data		
"Official" Language Speaker at Home	-14.46	4.85
Parent's Occupation (ISEI scale)	-17.23	5.24
Parent's Education	-32.10	6.99
Number of Books in the Home	-39.59	7.75
Cultural Involvement Index	-17.81	15.11
Social Involvement Index	-34.31	11.74
N	6160	

Note . ** p =.01, * p =.05, # p =.10.

Table B.59

OLS exploratory reading literacy model (inc. prior achievement) for Denmark.

Denmark		
Variables	Coefficient	SE
Intercept	255.64	21.02
Family Structure (ref. two parent)		
Single-Mother Family	-6.57	4.54
Mixed Family	-2.60	4.86
Other Family Structure	0.03	6.95
Background Characteristics		
Gender (being a girl)	19.53	2.81
Grade	34.31	5.41
"Official" Language Speaker at Home	47.33	5.58
Economic Inputs		
Parent's Occupation (ISEI scale)	0.66	0.11
Parent's Education (ref. lower secondary & below)		
Upper Secondary	29.44	5.98
Tertiary	45.06	5.77
Number of Books in the Home	9.50	1.21
Parental Involvement		
Cultural Involvement Index	8.69	0.65
Social Involvement Index	5.34	1.21
Maternal Employment (ref. home duties)		
Mother Works Full-Time	-7.93	4.38
Mother Works Part-Time	1.15	5.43
Mother Seeking Work	-23.78	7.74
Family Size		
Sibship size	-1.65	1.33
Prior Achievement (ref. college prep track)		
Lower Track	-12.58	13.31
Missing Data		
"Official" Language Speaker at Home	6.47	32.30
Parent's Occupation (ISEI scale)	-35.46	8.38
Parent's Education	-17.66	11.11
Number of Books in the Home	-19.02	11.45
Cultural Involvement Index	0.88	19.90
Social Involvement Index	-73.91	22.83
N	3955	

Note . ** p = .01, * p = .05, # p = .10.

Table B.60

OLS exploratory reading literacy model (inc. prior achievement) for France.

France		
Variables	Coefficient	SE
Intercept	357.89	10.76
Family Structure (ref. two parent)		
Single-Mother Family	-4.01	3.58
Mixed Family	4.41	3.26
Other Family Structure	-2.82	6.79
Background Characteristics		
Gender (being a girl)	14.44	2.34
Grade	46.77	3.38
"Official" Language Speaker at Home	19.02	4.99
Economic Inputs		
Parent's Occupation (ISEI scale)	0.52	0.09
Parent's Education (ref. lower secondary & below)		
Upper Secondary	5.20	3.29
Tertiary	-1.21	3.38
Number of Books in the Home	9.51	0.72
Parental Involvement		
Cultural Involvement Index	2.97	0.58
Social Involvement Index	0.23	0.76
Maternal Employment (ref. home duties)		
Mother Works Full-Time	0.44	2.91
Mother Works Part-Time	0.83	4.01
Mother Seeking Work	-5.28	4.98
Family Size		
Sibship size	-3.18	1.11
Prior Achievement (ref. college prep track)		
Lower Track	-38.74	4.66
Missing Data		
"Official" Language Speaker at Home	-20.19	6.17
Parent's Occupation (ISEI scale)	-29.68	6.35
Parent's Education	-13.60	6.34
Number of Books in the Home	-29.40	6.70
Cultural Involvement Index	-18.93	11.54
Social Involvement Index	-24.06	20.88
N	4425	

Note . ** p = .01, * p = .05, # p = .10.

Table B.61

OLS exploratory reading literacy model (inc. prior achievement) for Great Britain.

Great Britain		
Variables	Coefficient	SE
Intercept	312.66	20.00
Family Structure (ref. two parent)		
Single-Mother Family	-12.98	3.59
Mixed Family	-12.60	5.20
Other Family Structure	-25.87	6.96
Background Characteristics		
Gender (being a girl)	21.92	3.34
Grade	7.15	2.50
"Official" Language Speaker at Home	16.26	11.38
Economic Inputs		
Parent's Occupation (ISEI scale)	1.41	0.11
Parent's Education (ref. lower secondary & below)		
Upper Secondary	16.34	4.51
Tertiary	13.70	5.32
Number of Books in the Home	13.02	1.03
Parental Involvement		
Cultural Involvement Index	7.11	0.70
Social Involvement Index	1.18	0.68
Maternal Employment (ref. home duties)		
Mother Works Full-Time	2.94	3.64
Mother Works Part-Time	10.77	4.26
Mother Seeking Work	-3.65	7.54
Family Size		
Sibship size	-6.92	1.20
Prior Achievement (ref. college prep track)		
Lower Track	7.78	14.03
Missing Data		
"Official" Language Speaker at Home	-29.35	10.44
Parent's Occupation (ISEI scale)	-63.03	9.44
Parent's Education	-33.67	7.66
Number of Books in the Home	-74.52	13.32
Cultural Involvement Index	-72.01	21.78
Social Involvement Index	-2.35	30.27
N	6485	

Note . ** p = .01, * p = .05, # p = .10.

Table B.62

OLS exploratory reading literacy model (inc. prior achievement) for Greece.

Greece		
Variables	Coefficient	SE
Intercept	367.74	19.96
Family Structure (ref. two parent)		
Single-Mother Family	7.93	5.97
Mixed Family	-5.69	8.86
Other Family Structure	-32.22	9.17
Background Characteristics		
Gender (being a girl)	22.44	2.72
Grade	15.84	4.32
"Official" Language Speaker at Home	16.48	11.14
Economic Inputs		
Parent's Occupation (ISEI scale)	0.57	0.10
Parent's Education (ref. lower secondary & below)		
Upper Secondary	11.20	3.82
Tertiary	9.52	4.17
Number of Books in the Home	6.41	1.30
Parental Involvement		
Cultural Involvement Index	3.72	0.63
Social Involvement Index	1.01	0.84
Maternal Employment (ref. home duties)		
Mother Works Full-Time	5.80	2.81
Mother Works Part-Time	-5.20	5.17
Mother Seeking Work	-4.91	6.00
Family Size		
Sibship size	-3.79	1.49
Prior Achievement (ref. college prep track)		
Lower Track	-87.79	5.53
Missing Data		
"Official" Language Speaker at Home	-36.67	22.68
Parent's Occupation (ISEI scale)	-21.51	11.95
Parent's Education	-38.91	18.08
Number of Books in the Home	-46.62	8.60
Cultural Involvement Index	-22.81	30.27
Social Involvement Index	-20.20	29.04
N	4320	

Note . ** p = .01, * p = .05, # p = .10.

Table B.63

OLS exploratory reading literacy model (inc. prior achievement) for Ireland.

Ireland		
Variables	Coefficient	SE
Intercept	404.32	21.96
Family Structure (ref. two parent)		
Single-Mother Family	-4.45	5.17
Mixed Family	-33.23	7.92
Other Family Structure	-31.89	9.06
Background Characteristics		
Gender (being a girl)	20.77	3.58
Grade	8.77	3.70
"Official" Language Speaker at Home	-9.80	15.84
Economic Inputs		
Parent's Occupation (ISEI scale)	1.23	0.11
Parent's Education (ref. lower secondary & below)		
Upper Secondary	6.43	3.91
Tertiary	1.47	4.74
Number of Books in the Home	13.10	1.10
Parental Involvement		
Cultural Involvement Index	5.20	0.65
Social Involvement Index	1.73	0.86
Maternal Employment (ref. home duties)		
Mother Works Full-Time	-8.22	3.01
Mother Works Part-Time	1.56	3.79
Mother Seeking Work	-37.43	8.31
Family Size		
Sibship size	-5.40	1.16
Prior Achievement (ref. college prep track)		
Lower Track	-28.42	7.14
Missing Data		
"Official" Language Speaker at Home	48.85	37.30
Parent's Occupation (ISEI scale)	-32.29	10.61
Parent's Education	-30.08	20.71
Number of Books in the Home	-69.74	23.07
Cultural Involvement Index	-121.44	23.51
Social Involvement Index	-18.12	39.76
N	3750	

Note . ** p = .01, * p = .05, # p = .10.

Table B.64

OLS exploratory reading literacy model (inc. prior achievement) for Italy.

Italy		
Variables	Coefficient	SE
Intercept	284.30	15.74
Family Structure (ref. two parent)		
Single-Mother Family	0.90	3.09
Mixed Family	-13.97	6.80
Other Family Structure	-5.13	5.47
Background Characteristics		
Gender (being a girl)	24.67	4.87
Grade	39.72	3.54
"Official" Language Speaker at Home	22.30	5.50
Economic Inputs		
Parent's Occupation (ISEI scale)	0.78	0.12
Parent's Education (ref. lower secondary & below)		
Upper Secondary	10.09	3.19
Tertiary	-2.31	5.05
Number of Books in the Home	8.58	1.03
Parental Involvement		
Cultural Involvement Index	4.35	0.66
Social Involvement Index	2.10	1.70
Maternal Employment (ref. home duties)		
Mother Works Full-Time	6.93	2.97
Mother Works Part-Time	5.29	3.39
Mother Seeking Work	-24.46	9.64
Family Size		
Sibship size	-10.81	1.59
Prior Achievement (ref. college prep track)		
Lower Track	-57.19	22.67
Missing Data		
"Official" Language Speaker at Home	-32.03	6.39
Parent's Occupation (ISEI scale)	-17.56	9.40
Parent's Education	-27.93	12.65
Number of Books in the Home	-82.85	12.42
Cultural Involvement Index	-9.15	25.44
Social Involvement Index	-17.80	25.65
N	4725	

Note . ** p = .01, * p = .05, # p = .10.

Table B.65

OLS exploratory reading literacy model (inc. prior achievement) for New Zealand.

New Zealand		
Variables	Coefficient	SE
Intercept	235.72	116.31
Family Structure (ref. two parent)		
Single-Mother Family	-4.61	5.00
Mixed Family	-13.55	4.90
Other Family Structure	-24.73	6.31
Background Characteristics		
Gender (being a girl)	37.29	4.18
Grade	37.83	38.06
"Official" Language Speaker at Home	51.27	6.87
Economic Inputs		
Parent's Occupation (ISEI scale)	1.23	0.11
Parent's Education (ref. lower secondary & below)		
Upper Secondary	14.11	5.89
Tertiary	10.84	6.33
Number of Books in the Home	13.62	1.27
Parental Involvement		
Cultural Involvement Index	5.44	0.75
Social Involvement Index	0.29	0.88
Maternal Employment (ref. home duties)		
Mother Works Full-Time	-13.37	3.98
Mother Works Part-Time	-5.86	5.12
Mother Seeking Work	-13.89	6.12
Family Size		
Sibship size	-8.12	1.41
Prior Achievement (ref. college prep track)		
Lower Track	-34.24	37.04
Missing Data		
"Official" Language Speaker at Home	-75.89	8.09
Parent's Occupation (ISEI scale)	-54.24	9.01
Parent's Education	-25.94	5.97
Number of Books in the Home	-80.82	14.51
Cultural Involvement Index	-31.09	18.32
Social Involvement Index	-35.49	24.39
N	3455	

Note . ** p =.01, * p =.05, # p =.10.

Table B.66

OLS exploratory reading literacy model (inc. prior achievement) for Portugal.

Portugal		
Variables	Coefficient	SE
Intercept	308.84	16.81
Family Structure (ref. two parent)		
Single-Mother Family	8.96	3.12
Mixed Family	8.46	5.89
Other Family Structure	-1.26	5.96
Background Characteristics		
Gender (being a girl)	7.57	2.57
Grade	63.15	2.68
"Official" Language Speaker at Home	7.74	14.37
Economic Inputs		
Parent's Occupation (ISEI scale)	0.57	0.09
Parent's Education (ref. lower secondary & below)		
Upper Secondary	-3.81	4.15
Tertiary	-1.77	4.34
Number of Books in the Home	6.53	1.05
Parental Involvement		
Cultural Involvement Index	5.98	0.44
Social Involvement Index	1.51	0.82
Maternal Employment (ref. home duties)		
Mother Works Full-Time	-0.37	2.88
Mother Works Part-Time	-7.50	3.46
Mother Seeking Work	-0.55	5.66
Family Size		
Sibship size	-4.21	1.26
Prior Achievement (ref. college prep track)		
Lower Track	-12.51	3.77
Missing Data		
"Official" Language Speaker at Home	-0.71	12.10
Parent's Occupation (ISEI scale)	-37.86	6.84
Parent's Education	-3.42	11.94
Number of Books in the Home	-45.60	10.25
Cultural Involvement Index	-14.85	12.54
Social Involvement Index	2.37	17.15
N	4305	

Note . ** p = .01, * p = .05, # p = .10.

Table B.67

OLS exploratory reading literacy model (inc. prior achievement) for Spain.

Spain		
Variables	Coefficient	SE
Intercept	246.22	18.85
Family Structure (ref. two parent)		
Single-Mother Family	3.50	3.40
Mixed Family	-5.73	6.62
Other Family Structure	-3.42	4.78
Background Characteristics		
Gender (being a girl)	14.23	2.07
Grade	69.53	2.80
"Official" Language Speaker at Home	9.69	3.55
Economic Inputs		
Parent's Occupation (ISEI scale)	0.54	0.09
Parent's Education (ref. lower secondary & below)		
Upper Secondary	10.69	2.57
Tertiary	9.77	3.19
Number of Books in the Home	9.77	0.91
Parental Involvement		
Cultural Involvement Index	6.10	0.68
Social Involvement Index	0.20	0.88
Maternal Employment (ref. home duties)		
Mother Works Full-Time	-3.07	2.34
Mother Works Part-Time	-12.88	3.18
Mother Seeking Work	-0.54	4.47
Family Size		
Sibship size	-4.36	1.44
Prior Achievement (ref. college prep track)		
Lower Track	23.77	17.34
Missing Data		
"Official" Language Speaker at Home	-21.93	6.12
Parent's Occupation (ISEI scale)	-21.50	8.58
Parent's Education	-33.34	8.75
Number of Books in the Home	-29.60	6.70
Cultural Involvement Index	-21.30	12.69
Social Involvement Index	-1.63	17.44
N	5820	

Note . ** p = .01, * p = .05, # p = .10.

Table B.68

OLS exploratory reading literacy model (inc. prior achievement) for Sweden.

Sweden		
Variables	Coefficient	SE
Intercept	236.42	22.85
Family Structure (ref. two parent)		
Single-Mother Family	-10.84	3.67
Mixed Family	-11.24	3.68
Other Family Structure	-28.51	5.44
Background Characteristics		
Gender (being a girl)	32.35	2.40
Grade	73.05	11.10
"Official" Language Speaker at Home	36.19	6.23
Economic Inputs		
Parent's Occupation (ISEI scale)	1.11	0.10
Parent's Education (ref. lower secondary & below)		
Upper Secondary	6.15	4.77
Tertiary	-6.72	4.99
Number of Books in the Home	11.70	1.07
Parental Involvement		
Cultural Involvement Index	7.73	0.65
Social Involvement Index	-1.33	0.95
Maternal Employment (ref. home duties)		
Mother Works Full-Time	0.37	4.48
Mother Works Part-Time	-0.73	4.71
Mother Seeking Work	1.73	7.39
Family Size		
Sibship size	-3.79	1.09
Prior Achievement (ref. college prep track)		
Lower Track	46.28	15.18
Missing Data		
"Official" Language Speaker at Home	-37.72	8.43
Parent's Occupation (ISEI scale)	-43.19	13.50
Parent's Education	-34.75	10.15
Number of Books in the Home	-30.33	18.25
Cultural Involvement Index	-98.44	21.21
Social Involvement Index	46.67	30.38
N	4225	

Note . ** p = .01, * p = .05, # p = .10.

Vita

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