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Single-Mother Families, Mother's Educational Level, Children's School Outcomes *A Study of Twenty-One Countries*

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INTRODUCTION

The increase of single motherhood and parental divorce has become of the most important social transformations experienced by Western societies in the last half-century. This change has not been even across these societies; it has started later and moved slower in some places (Härkönen 2017). Hence, there are substantial cross-national differences in the percentage of nontraditional living arrangements (Pong, Dronkers, and Hampden-Thompson 2003). It has been demonstrated that parental divorce and growing up in a single-mother family have negative effects on children's well-being (McLanahan, Tach, and Schneider 2013), and several studies have tested to what extent these effects diverge between countries and over time (see Bernardi et al. 2013 for a review). It was expected that these negative associations would be lower in countries and time periods where nontraditional family forms are more common, where there is a greater acceptance of new family forms, and where there are generous policies for single-mother families (Gähler and Garriga 2013). Surprisingly, most studies that address the variation across countries and over time show that the effects of parental divorce and family structure on children's well-being have been relatively constant (see Bernardi et al. 2013). Some studies have even found that the impact of parental divorce has increased over time, contradicting most expectations that a reduction in stigma and an increase in father involvement might mitigate the effects (Bernardi et al. 2013).

A possible explanation for why the consequences associated with single parenthood have not decreased is that over time, the prevalence of single

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motherhood has increased faster among those with lower levels of education (Gähler and Garriga 2013). Research documenting this has mainly focused on the United States and has not considered whether or not the increasing polarization of family structure by educational level diverges between countries in different time periods (Garriga, Sarasa, and Berta 2015; McLanahan and Jacobsen 2015). McLanahan (2004) showed that in Canada, Finland, Germany, the Netherlands, Sweden, and the United Kingdom, less-educated women were more likely to be single mothers, while in Italy it was more educated women who were more likely to be single mothers. However, to our knowledge, only four studies have focused on the changes in trends in the educational differences of single motherhood from multiple causes in European countries. Kennedy and Thomson (2010) show that the probability that a Swedish child spent time in a single-mother family during her childhood increased between the 1970s and 1990s. Garriga and Cortina (2017) showed that between 1991 and 2011, the educational gradient of single motherhood reversed from positive to negative in Spain. Garriga, Sarasa, and Berta (2015) have also found that in Italy the relationship between mother's education and single motherhood was positive in 2005 and became insignificant by 2011. Härkönen (2017) is the only study that has observed the educational gradient of single motherhood in different time periods in multiple countries. Using data from the Luxembourg Income Study (LIS) Database, Härkönen showed that "diverging destinies" are not confined only to the United States, but there are nonetheless major cross-national variations. The main limitation of this study, however, is that the educational gradient of single motherhood is not adjusted for mother's immigration status. Taking this variable into account might substantially affect the results since the percentage of foreign born mothers has increased in most Western countries and, on average, they have a lower educational level than native born mothers (Garriga and Cortina, 2017; OECD, 2012).

Several researchers have argued that marked increases in the prevalence of single motherhood among the low-educated together with the well-documented negative effects of parental divorce and growing up in a single-mother family on child outcomes have exacerbated the inequality between children from different socioeconomic backgrounds and different family structures (Augustine 2014; Cherlin 2005; Härkönen 2017; Härkönen 2018; McLanahan and Percheski 2008). However, Bernardi and Boertien (2016) and Bernardi, Boertien, and Popova (2014) have argued that this conclusion is only true if a third premise is also true; namely that the consequences of parental divorce and family structure are greater among children of lower socioeconomic background, or that the consequences are the same regardless

of socioeconomic background. If instead growing up in a nonintact family entails more negative consequences for children from higher socioeconomic backgrounds, they have claimed that this might actually counterbalance the increase of nonintact families among children from disadvantaged backgrounds. In other words, the increase of parental divorce and single-mother families may reduce inequality in children's outcomes and life chances between children from different socioeconomic backgrounds if these single-motherhood costs relatively advantaged children more (Leopold and Leopold 2016).

Despite the importance of the issue of varying costs of divorce and family structure by family socioeconomic background, it has not received much attention until recently. To date, the research has obtained mixed findings. Some studies have found that higher socioeconomic background can compensate for the negative effects of family structure and parental divorce, but other studies have found that larger negative effects at higher socioeconomic status. Alongside methodological reasons, two other possible explanations for why these studies may not produce consistent results are that they focus on different children's outcomes and on different countries: The conditioning role of family socioeconomic background may depend on the outcome and country studied.

Overall, this chapter aims to address these gaps in the literature by using data from twenty-one Western countries from the Programme for International Student Assessment (PISA) of 2012. First, we explore to what extent there is a general pattern in Western countries of single motherhood being common among women with less education. Second, we analyze the effects on children of being in a single-mother family on three school outcomes: Standardized math test scores, grade repetition, and truancy. Most cross-national studies on the effect of family structure on school outcomes have only focused on achievement tests, despite evidence of stronger effects of family structure on educational attainment and school behavior outcomes than on test scores (McNeal 1999). In addition, truancy or repeating a grade has negative consequences for children's educational attainment, plus both are also strongly associated with labor market and socio-emotional outcomes and risk behaviors such as drug abuse or crime (Garry 1996; Jones, Lovrich, and Lovrich 2011; Range, Yonke, and Young 2011). Third, we look at the heterogeneity of family structure effects by focusing on a specific dimension of family socioeconomic background: Mother's education.

We use this analytical approach based on the study of different outcomes and countries to address the question of whether the growing number of single mothers in Western countries generally increases or

decreases inequality in children's outcomes and life chances between those from different socioeconomic backgrounds. Answering this question requires knowing: (1) whether single motherhood is generally concentrated among women of lower education in most Western countries; (2) if the effects of single motherhood matter across a range of children's important educational outcomes; and (3) whether the impact associated with single motherhood depends upon the mother's education. We argue that even if children of lower socioeconomic status are generally more likely to be in single-mother homes, the retreat from traditional family structures would increase children's inequality only if there were a consistent pattern across countries and outcomes of single motherhood having consistent negative effects on children's outcomes and life chances regardless of mothers' education, or if children with less-educated mothers have greater disadvantages associated with single motherhood. In contrast, if living with a single mother were associated with deeper disadvantage among children of more educated mothers across countries and outcomes, then the retreat from traditional family structures could decrease children's inequality.

COMPENSATORY HYPOTHESIS AND FLOOR EFFECT HYPOTHESIS

The sociological literature has developed two general perspectives about the heterogeneity of parental divorce and family structure effects by mother's education: The "compensatory hypothesis" and the "floor effect hypothesis." These perspectives are based on diverging interpretations of how various mediators of the effects of family structure on children's well-being work according to different levels of mother's education. These mediators are financial constraints, quality of parenting, mother's psychological well-being, involvement of the noncustodial father, and social support and networks (Amato 1993; Sigler-Rushton and McLanahan 2004).

The compensatory hypothesis posits that mothers with a higher educational background are better equipped to buffer their children from the negative consequences of growing up in a single-parent family and, consequently, there are no – or few – differences in children's outcomes by family types among those that have a mother with a higher educational level. On the other hand, this hypothesis states that lower educated mothers are more vulnerable to factors that intensify the negative consequences of growing up in a single-mother family. Single mothers with a low educational level are in a worse position than single mothers with high educational level, and are less likely to mobilize resources to compensate for their children's disadvantages (Augustine 2014; Leopold and Leopold 2016).

With respect to financial constraints, it is well-known that women with more education are more likely to be in the labor market and to be better paid (Pettit and Hook 2005). Highly educated women may, therefore, already have jobs before becoming single mothers. They also have better opportunities to re-enter the labor market after a period of nonemployment than women with a lower educational level (Drobnič, Blossfeld, and Rohwer, 1999). Further, research has found high levels of educational homogeneity within couples in Western countries (Blossfeld and Timm 2003). Consequently, children with a mother with a high educational level have a higher probability of having a father with a high educational level. Couples with high educational levels tend to be wealthier and, even when family income and wealth have to be divided after parental separation, mothers may retain more financial resources than their less-educated counterparts. Finally, resources may also increase mothers' ability to navigate the legal system on behalf of herself and her child to obtain child support payments. Case, Lin, and McLanahan (2003) show that mothers with a higher level of education have a greater chance of receiving child support payments in high amounts than mothers with a lower education, who often do not receive any child support.

With respect to quality of parenting, Augustine (2014) argued, that better-educated single mothers are better placed to overcome many family-structure-related barriers to maintaining higher levels of parenting quality. The first barrier is financial resources. Single mothers have less time and energy than mothers in two-parent families, and this is mainly due to task overload since they have to obtain financial resources and take care of their children alone (Astone and McLanahan 1991). Mothers with a high educational level have greater financial resources to pay for hiring domestic workers or good quality child care. These mothers also have larger and wealthier social networks that may help by taking care of the children directly or providing them with financial support. Economic resources and the related social networks of highly educated single mothers can help them to minimize their stress and task overload and hence, they may have more time and energy to provide better quality parenting to their children.

A second barrier that affects quality of parenting of single mothers is psychological well-being, and this barrier may be more consequential for less-educated mothers. In fact, research shows that mothers with lower socio-economic resources experience more psychological problems after dissolution of their unions than those with greater resources (Liu and Chen 2006; Mandemakers and Monden 2010). Better-educated mothers may also be more conscious of the negative effects of divorce and single motherhood since they may be more familiar with psychological and sociological research

that has been popularized on this topic (Mandemakers and Kalmijn 2014). Therefore, despite the psychological problems that these mothers may experience, they may be more aware of the importance of providing high quality of parenting to counterbalance these effects.

In addition, several studies show that mothers with higher education are more likely to enroll their children in academically stimulating preschool programs and are more likely to sign their children up for extracurricular activities or summer programs (see Augustine and Crosnoe 2010 for a review). These pro-academic experiences provide children with learning opportunities that may not be available at home due to the task overload or psychological problems that single mothers often face. For these reasons, highly educated mothers who cannot give these learning opportunities to their children directly may plan so that children receive them indirectly. They may also monitor the results in ways that enhance outcomes.

A third impact on children's well-being is the quality of the father-child relationship (Amato and Gilbreth 1999). As mentioned, mother's education is correlated with father's education; this, in turn, is associated positively with fathers' involvement (King, Harris, and Heard 2004). Cheadle, Amato, and King (2010) show that children whose mothers have a high educational level also have a greater probability of maintaining a consistently high level of contact with their fathers over time – a precondition of having a good relationship with them. In addition, mothers who share joint physical custody have a higher educational level than those who are awarded sole custody (Juby, Le Bourdais, and Marcil-Gratton 2005), and joint physical custody may be somewhat beneficial for children when compared to sole custody (see Baude, Pearson, and Drapeau 2016 for a review). In addition to parental relationships, several studies show that the amount of social support children receive outside the home is positively related to their adjustment after divorce (Zartler and Grillenberger 2017 for review), and affluent children receive more social support (Putnam 2015).

On the other hand, in direct opposition to the compensation hypothesis, the "floor effect hypothesis" posits that the family structure penalty is smaller for children with less-educated mothers (Bernardi and Radl, 2014; Leopold and Leopold, 2016). This perspective maintains that children with less-educated mothers are less vulnerable to the negative effects of family structure given that their mothers are poor, have low psychological well-being, provide poor quality parenting, and their fathers have little involvement – regardless of whether their parents are together (Bernardi and Boertien 2017b). In other words, women with a low educational level are (Bernardi and Boertien 2017b) already in a bad situation that cannot become much worse. In contrast,

children of highly educated mothers are better situated – have a higher level of family income, better maternal psychological well-being, a greater likelihood of good quality parenting, and are more likely to have an involved father – so those who become single mothers have more to lose; family structure matters more for their children.

PREVIOUS RESEARCH AND LIMITATIONS

As mentioned, the few studies that have focused on how parental divorce and family structure effects differ by mother's education have obtained mixed findings (Bernardi and Boertien 2017b). First, substantial research shows that children's educational attainment suffers less from parental divorce if they have more highly educated mothers (Albertini and Dronkers 2009; Fischer 2007; Grätz 2015). However, the two studies that used test scores rather than educational attainment obtained contradictory results. Augustine (2014), comparing children in the United States who live in intact married families to those who live in other family forms, found that the effect of family structure on math and reading achievement is greater for those whose mothers have a lower educational level. On the other hand, Mandemakers and Kalmijn (2014), using the British Cohort Study (1970), found that the effect of parental divorce on reading and math test scores did not vary by maternal education. These findings suggest that the choice of educational outcome affects the conclusions drawn from the research. In addition, outcomes such as mental health and behavior problems that have been extensively analyzed in the literature on family structure effects have not been tested for heterogeneous effects across maternal education levels (with the exception of Mandemakers and Kalmijn 2014). For these reasons, more research on other outcomes alongside educational attainment is needed in order to have a more complete picture of how mother's education conditions the effect of family structure.

An alternative explanation for the conflicting findings on test scores is that the two studies on this outcome are based on data from different countries. There are several reasons to argue that the role of mothers' education may vary by country (Bernardi and Boertien 2017b; Mandemakers and Kalmijn 2014). For example, less-educated mothers may be less vulnerable to separation-related declines in income when they live in generous welfare states where various social policies protect citizens against financial hardship (Leopold & Leopold, 2016). Mothers with a low educational level would have similar income levels regardless of whether they live in two-parent or single-mother families, since family income cannot be lower than a state-guaranteed

minimum. By contrast, children with highly educated mothers should suffer more from single motherhood because they are likely to experience lower income than in two-parent families.

A third reason for these conflicting findings is that there is substantial cross-national variation in the percentage of children living in joint physical custody (Bjarnason and Arnarsson 2011), and children with highly educated mothers have a higher likelihood of living in joint physical custody (Juby, Le Bourdais, and Marcil-Gratton 2005). The number of children with highly educated mothers in this living arrangement should, therefore, be greater in countries with a high proportion of children in joint physical custody. Taking into account that joint physical custody is beneficial for children (Baude, Pearson, and Drapeau 2016), mother's education may be associated with smaller negative effects of parental divorce and single motherhood in countries with a high percentage of joint physical custody. Additionally, societal characteristics related to the outcome studied may affect the interplay between family structure, mother's education, and children's well-being (Bernardi and Boertien, 2017b). Mare (1993) argues that in a society with a high level of inequality in educational opportunity, only very talented children from poorly educated families may obtain higher education. Following this argument, Bernardi and Radl (2014) argue that floor effects are exaggerated in the most unequal societies – children from disadvantaged socioeconomic background are so unlikely to succeed in the educational system that parental divorce or the experience of single motherhood does not reduce their odds substantially. In spite of these theoretical reasons for cross-national variation, previous research was based on single-country studies (with the exception of Bernardi and Radl 2014), and a cross-national approach is required to determine whether mothers' education conditions the effects of family structure differently across countries or whether there is a similar pattern in Western countries.

DATA AND VARIABLES

For the purposes of this study, we have used data from the 2012 Programme for International Student Assessment (PISA) organized by the Organisation for Economic Co-operation and Development (OECD). PISA data provide internationally comparable measurements on the socioeconomic background and cognitive and noncognitive educational performance of 15-year-old students from OECD countries. In this study, we focus on twenty-one countries that share similar Western cultural traditions and social institutions (Garib, Garcia, and Dronkers 2007). These countries follow the well-known welfare

state regime categories (e.g., Armingeon, 2001; Esping-Andersen, 1990; Ferrera, 1996). The Liberal countries are Australia, Canada, United Kingdom, Republic of Ireland, New Zealand, and the United States. The Nordic countries are Denmark, Finland, Norway, and Sweden. The Continental countries are Belgium, France, Netherlands, Austria, Germany, Switzerland, and Luxembourg. The southern Europe countries are Spain, Greece, Italy, and Portugal.

PISA data have some strengths and some weaknesses. The main strength of PISA is its cross-national comparability. The most significant weakness is the limited nature of the data collected. It is a snapshot of 15-year-old students: No information about either the children's further development or about their earlier experiences and outcomes is available (Garib, Garcia, and Dronkers 2007). For example, the causes of the current family structure are not known. Single-parent families may be due to divorce, cohabitants' separation, parental death, or the parents never having lived together. Furthermore, the most recent PISA survey, the PISA 2015, contains no information about family structures. For this reason, PISA 2012 is used in this chapter.

There are several outcome variables that measure cognitive and noncognitive performance. Cognitive performance is measured using math tests developed by PISA since *mathematical* literacy was the focus of the *PISA 2012* survey. The grade repetition variable takes into account students who repeated a grade in primary school or in secondary school (value "1") and students who never repeated a grade (value "0"). Truancy is used as a measure of noncognitive performance. Students were asked if, in the last two weeks, they had played truant for a whole day or just from some classes. Students who reported that they had played truant from classes or for days of school at least once in the two weeks leading up to the PISA test have lower scores than students who did not (OECD 2013b). The truancy variable takes value "1" when they played truant all day or from some classes one or more times during the last two weeks and "0" when the student did not.

The family structure variable is based on the child's response to the questionnaire item asking them with whom they live. This is made up of two categories: single-mother family referring to children who said that they live with only with their mother, and two-parent family referring to children who said that they live with their two biological parents or stepparents.¹

¹ Unfortunately, the PISA 2012 data do not distinguish whether the parents are natural parents or stepparents. For this reason, we include stepparent and biological two-parent families in the same category in our analysis. As Dronkers, Veerman, and Pong (2016, p. 4) suggest, "any bias resulting from this problem only makes our estimations more conservative, which means that

Mother's education is measured using the International Standard Classification of Education (ISCED) scale. Four categories are created: Lower secondary education or below (None education, ISCED levels 1 and 2), upper secondary education and non-tertiary postsecondary (ISCED levels 3 and 4), tertiary education (ISCED levels 5 and 6). The control variables are gender of the child ("1" female and "0" male), immigrant statuses of the mother and the child, and age of the child (measured continuously). The immigrant status of the child, used when predicting child outcomes, has three categories: (1) native student; (2) first-generation student; and (3) second-generation student. Mother's immigrant status, used when estimating how much education affects the probability of single motherhood, takes value "1" if she is foreign-born and "0" if she is native-born.

RESULTS

THE RELATIONSHIP BETWEEN SINGLE MOTHERHOOD AND EDUCATION

Table 6.1 shows the percentages of different family types across the twenty-one countries in 2012. As previous studies have found, there is a substantial variation in the percentage of single-mother families. In 2012, the United States had the highest percentage and Greece the lowest.

We tested whether less-educated mothers were more likely to be single using logistic regression with family structure as the dependent variable. Separate models were done for each country, and the effect of mother education was estimated controlling for whether the mother was foreign-born. Table 6.2 only presents the coefficients for mother's educational level.

In Anglo-Saxon and Nordic countries, single mothers are significantly more likely to have less education, while mothers in two-parent families are more likely to have higher educational levels. There are only two exceptions to this generalization. In the United Kingdom, the effect of tertiary education is not significant. In Denmark, lower education does predict single motherhood, but not significantly.

The Continental countries have two different patterns. In France, the Netherlands, and Belgium, less-educated mothers are more likely to be single, but the relationship is not statistically significant in Belgium. In contrast, in

we are likely to underestimate the difference between two parent families and the single mother families." Additionally, we have excluded children that live in single-father families or apart from both biological parents from my sample, since in some countries there are not enough cases to perform the analyses.

TABLE 6.1 Percentages of children by family types, PISA 2012

	Two Parents	Single Mother	Single Father	Not Living with Parents		N
Australia	85.7	11.6	1.8	0.9	100	13.15
Canada	86.3	10.4	2.3	1	100	9.672
United Kingdom	82.8	15	1.6	0.6	100	11.341
Ireland	88.7	10	1	0.3	100	4594
New Zealand	77	16.1	3.6	3.3	100	4.16
United States	77.9	17	3.3	1.8	100	4.466
Denmark	84.2	12.7	2.4	0.7	100	6.976
Finland	83.4	13.4	2.6	0.6	100	8.081
Norway	88.9	9	1.7	0.4	100	4.322
Sweden	89.7	7.6	1.9	0.8	100	4.289
Belgium	85.7	11.7	1.9	0.7	100	8.012
France	84.3	13.3	1.7	0.7	100	4.226
Netherlands	88.3	9.8	1.5	0.4	100	4.227
Austria	86	12.2	1.3	0.5	100	4.438
Germany	85.8	11.6	2	0.6	100	3.974
Switzerland	86	12.2	1.4	0.4	100	10.583
Luxembourg	87.1	10.7	1.6	0.6	100	4.912
Spain	89.2	8.9	1.3	0.6	100	24.797
Greece	90.2	7.5	1.3	1	100	4.834
Italy	89.9	8.5	1	0.6	100	29.719
Portugal	85.8	11	1.3	1.9	100	5.193

countries where German is spoken – Germany, Switzerland, and Austria – more educated mothers are more likely to be single, though the relationship is only significant in Switzerland. In Luxembourg, single motherhood is distributed almost evenly across the educational spectrum. There is no clear pattern in Mediterranean countries where more educated mothers are more likely to be single in Portugal, Italy, and Greece (not significantly in Greece), but in Spain, like Denmark, less-educated mothers are insignificantly more likely to be single mothers.

Overall, these findings indicate that in spite of the fact that there are still substantial cross-national differences in the relationship between mother's education and single motherhood, there is a general pattern toward a negative relationship between mother's education and single motherhood in most Western countries. Higher education significantly predicted greater odds of single motherhood only in Switzerland, Portugal, and Italy among the twenty-one countries analyzed, although in a few other countries, there was no significant effect. Because single

TABLE 6.2 *Logistic regression coefficients of mother's education on the probability of being a single mother*

		Lower Secondary or Below	Upper Secondary	Tertiary
Australia	Ref	-0.26**		-0.20*
Canada	Ref	-0.06		-0.33*
United Kingdom	Ref	-0.26		-0.26
Ireland	Ref	-0.38*		-0.50**
New Zealand	Ref	-0.41**		-0.31*
United States	Ref	-0.21		-0.59***
Denmark	Ref	-0.01		-0.17
Finland	Ref	-0.37*		-0.71***
Norway	Ref	-0.36		-0.47*
Sweden	Ref	-0.58**		-0.55**
Belgium	Ref	0.03		-0.19
France	Ref	-0.25 ⁺		-0.39**
Netherlands	Ref	-0.48**		-0.40*
Austria	Ref	-0.01		0.14
Germany	Ref	-0.06		0.12
Switzerland	Ref	0.06		0.25 ⁺
Luxembourg	Ref	-0.14		-0.03
Spain	Ref	-0.09		-0.07
Greece	Ref	-0.06		0.09
Italy	Ref	0.12		0.24**
Portugal	Ref	0.29*		0.22 ⁺

Note: These models control for whether the mother was foreign-born. ⁺p < 0.10; *p < 0.05; **p < 0.01; *** p < 0.001

motherhood is commonly concentrated at the bottom end of the educational spectrum, it makes sense to continue considering whether trends away from traditional family structure are contributing to an increase of inequality in children's outcomes and life chances between those from different socioeconomic backgrounds. To answer this question, as mentioned, we need to know if single motherhood matters across several educational outcomes, and if its effects vary by maternal education.

THE RELATIONSHIP BETWEEN SINGLE MOTHERHOOD, MATERNAL EDUCATION, AND VARIOUS CHILDHOOD OUTCOMES

Table 6.3 shows the main effects of growing up in a single-mother family and mother's education on math test scores, grade repetition, and truancy

TABLE 6.3 OLS and logistic regression coefficients of effects of children's family structure and mother's education on math test scores, grade repetition, and truancy

	Math Test Scores						Grade Repetition						Truancy					
	Lower		Upper		Lower		Upper		Lower		Upper		Lower		Upper			
	Single Mother	Secondary or Below	Secondary	Upper	Single Mother	Secondary or Below	Secondary	Upper	Single Mother	Secondary or Below	Secondary	Upper	Single Mother	Secondary or Below	Secondary	Upper		
Australia	-18.55***	Ref	18.05***	49.47***	0.58***	Ref	-0.05	-0.05	0.44***	Ref	-0.17**	-0.30***						
Canada	-11.79***	Ref	27.41***	52.52***	0.52***	Ref	-0.87***	-1.43***	0.43***	Ref	-0.33*	-0.46***						
United Kingdom	-24.93***	Ref	33.22***	46.79***	0.54***	Ref	-0.62 ⁺	-0.44	0.21*	Ref	-0.31	-0.33*						
Ireland	-22.39***	Ref	19.22***	45.76***	0.54**	Ref	0.09	-0.03	0.43**	Ref	0.12	0.08						
New Zealand	-16.45***	Ref	25.56***	59.58***	0.56**	Ref	0.03	-0.03	0.46***	Ref	-0.49***	-0.64***						
United States	-22.46***	Ref	28.65***	57.91***	0.37**	Ref	-0.42	-0.68***	0.26**	Ref	-0.38**	-0.69***						
Denmark	-17.01***	Ref	18.16***	43.84***	0.51*	Ref	0.1	-0.51*	0.50***	Ref	-0.22	-0.24 ⁺						
Finland	-14.59***	Ref	17.41***	43.22***	0.89***	Ref	-0.51 ⁺	-1.00***	0.48***	Ref	-0.44**	-0.53***						
Norway	-8.88*	Ref	18.40***	38.88***		Ref			0.56***	Ref	-0.54**	-0.36 ⁺						
Sweden	-11.14*	Ref	33.22***	46.79***	0.47	Ref	-0.57**	-0.47 ⁺	0.63***	Ref	-0.15	-0.42**						
Belgium	-24.83***	Ref	24.62***	63.21***	0.73***	Ref	-0.60***	-1.10***	0.69***	Ref	-0.11	-0.20						
France	-16.96***	Ref	31.84***	66.52***	0.37**	Ref	-0.69***	-1.32***	0.43**	Ref	-0.37*	-0.11						
Netherlands	-23.62***	Ref	1.05	19.96***	0.21 ⁺	Ref	-0.21	-0.35**	0.33*	Ref	-0.19	0.2						
Austria	-9.37*	Ref	37.70***	61.65***	0.71***	Ref	-0.49**	-0.42*	0.28*	Ref	-0.43*	-0.05						
Germany	-2.93	Ref	35.51***	47.10***	0.29	Ref	-0.59***	-0.65***	0.56***	Ref	-0.16	0.15						
Switzerland	-15.60***	Ref	34.70***	63.54***	0.53***	Ref	-0.46***	-0.45***	0.30*	Ref	-0.24 ⁺	0.27*						
Luxembourg	-9.00*	Ref	34.86***	61.94***	0.40***	Ref	-0.54***	-0.97***	0.45**	Ref	-0.21	-0.11						
Spain	-4.80	Ref	27.26***	48.99***	0.50***	Ref	-0.61**	-1.15***	0.38***	Ref	-0.21***	-0.30***						
Greece	-7.60	Ref	32.17***	60.56***	0.72*	Ref	-1.17***	-1.76***	0.17	Ref	0.1	0.05						
Italy	-5.37*	Ref	37.50***	37.47***	0.78***	Ref	-0.65***	-0.70***	0.22**	Ref	-0.17***	-0.14**						
Portugal	-0.82	Ref	43.27***	70.13***	0.29*	Ref	-0.95***	-1.47***	0.49***	Ref	-0.01	-0.11						

Note: There are no cases of grade repetition in Norway. Background control variables (children's immigration status, age, and sex) were included in all models. * p < 0.05; ** p < 0.01; *** p < 0.001

controlling for sex, age, and immigration status of the child. We have performed three separate models for each of the twenty-one countries; OLS regressions for math test scores, and logistic regressions for the other two outcomes. The effect of being in a single-mother family is significant for math test scores in all countries except Germany, Spain, Greece, and Portugal. As previous research has shown, there is substantial variation in the magnitude of this effect across countries; the largest negative effects are observed in United Kingdom, the United States, Republic of Ireland, Belgium, and the Netherlands. In all countries, the effect of having a mother with tertiary education is significant and, with the exception of the Netherlands, tertiary education has a substantially greater positive effect on math ability than the negative effect of being in a single-mother family. That is, the magnitude of the effect of tertiary education is greater than the magnitude of the effect of single-mother family. For test scores, it seems that mother's education is more important than family structure.

Turning to grade repetition, the effect of being in a single-mother family is significant across nineteen of the twenty of the nations studied (there is no grade repetition data for Norway). The estimated effect in Sweden is in line with the other countries, but not significant ($b = 0.47$, $p = 0.125$). Finland, Belgium, Austria, Greece, and Italy all show very large effects associated with single motherhood. Unlike math test scores for which the positive effect of mother's tertiary education outweighed the negative effects of single motherhood in virtually all of the countries, this is only true in slightly more than half (12) of the countries when considering grade repetition. In fact, having a mother with tertiary education did not significantly affect grade repetition in Australia, New Zealand, United Kingdom, and Republic of Ireland, and the estimated family structure effect is larger than the estimated effect of tertiary education in Sweden, Austria, Switzerland, and Italy. In all eight of these countries, family structure seems more relevant in predicting grade repetition than mother's tertiary education.

The effect of living in a single-mother family on truancy is significant in all countries with the exception of Greece ($p = 0.140$). The largest effects of family structure on truancy are found in Sweden, Belgium, Germany, and Norway. Unlike math test and grade repetition, the estimated effect of having a mother with tertiary education is not significant in eight of the twenty-one countries, and it is greater than the estimated effect of family structure in ten other countries. Only in the United Kingdom, New Zealand, and United States does the estimated positive effect of mother's tertiary education exceed the estimated negative effect of being in a single-mother family.

Overall, our analysis reveals substantial differences in the importance of family structure depending on the outcome studied. Growing up in a single-

mother family has negative effects on math test scores in only seventeen of the twenty-one countries analyzed, while children of single mothers are more likely to repeat a grade or play truant practically everywhere. In addition, the magnitude of the coefficient of having a mother with tertiary education is clearly more important than family structure on cognitive performance in all countries analyzed, while this is only true in about half for grade repetition and around a fifth for truancy.

TO WHAT EXTENT DOES THE EFFECT OF FAMILY STRUCTURE ON
EDUCATIONAL OUTCOMES DIVERGE BY MOTHER'S EDUCATION?

We now turn to investigate whether the impact of being in a single-mother family depends on the mother's educational level. We show the main and interaction effects between family structure and mothers' education for each outcome (math test scores in Table 6.4; grade repetition in Table 6.5; truancy in Table 6.6) in every country.

Our results show important cross-country differences. The interaction between family structure and having a mother with a tertiary education is negative and significant in six countries, specifically in Republic of Ireland, United States, Belgium, France, the Netherlands, and Italy. This means that the negative effect of growing up in a single-mother family in these countries is larger when the mother is highly educated. In the United Kingdom, this interaction is also negative but nonsignificant ($b = -17.55$, $p > 0.10$). We cannot rule out the possibility that the interaction would be significant if United Kingdom had a larger sample size. In contrast, having a mother with tertiary education positively interacts with family structure in Germany and New Zealand, showing that the negative effect of growing up in a single-mother family in these countries is smaller when the mother is highly educated. In the other twelve countries, the penalty associated with being in a single-mother family does not significantly vary by mother's education. Unlike tertiary education, upper secondary education conditions the effect of family structure in only three countries. In the United States and the Netherlands, the negative effect of growing up in a single-mother family is greater for children who have a mother with upper secondary education than one with lower secondary education. The opposite is true in Australia.

Turning to grade repetition, being in a single-mother home increases the odds of grade repetition more for children of highly educated mothers in the Republic of Ireland, the United States, Belgium, Spain, and Greece (shown by the positive coefficient on the interaction term in Table 6.5). In other words,

TABLE 6.4 OLS regression coefficients of main effects and interaction terms of children's family structure and mother's education on math test scores for each country

	Lower Secondary			Upper Secondary			Lower Secondary or			Upper Secondary		
	Single Mother	or Below	Tertiary	Upper Secondary	Tertiary	Below	* Single Mother	Upper Secondary	* Single Mother	Tertiary	* Single Mother	
Australia	-27.02***	Ref	48.18***	16.41***	Ref	Ref	12.5 ⁺	Ref	9.44	Ref	Ref	
Canada	-6.62	Ref	53.03***	28.64***	Ref	Ref	-9.52	Ref	-3.18	Ref	Ref	
United Kingdom	-17.55	Ref	50.5***	32.5***	Ref	Ref	7.6	Ref	-22.15	Ref	Ref	
Ireland	-9.10	Ref	48.24***	20.92***	Ref	Ref	-12.14	Ref	-20.46 ⁺	Ref	Ref	
New Zealand	-29.62	Ref	55.18***	23.28***	Ref	Ref	8.78	Ref	21.69 ⁺	Ref	Ref	
United States	2.89	Ref	65.29***	-3.15***	Ref	Ref	-20.41 ⁺	Ref	-36.95**	Ref	Ref	
Denmark	-22.63***	Ref	42.89***	17.30***	Ref	Ref	5.73	Ref	6.59	Ref	Ref	
Finland	-8.13	Ref	44.60***	19.65***	Ref	Ref	-11.02	Ref	-5.60	Ref	Ref	
Norway	5.65	Ref	41.02***	20.88***	Ref	Ref	-18.13	Ref	-14.39	Ref	Ref	
Sweden	-10.25	Ref	37.63***	27.69***	Ref	Ref	-1.53	Ref	-6.69	Ref	Ref	
Belgium	-6.17	Ref	66.47***	27.23***	Ref	Ref	-17.72	Ref	-23.31*	Ref	Ref	
France	-3.42	Ref	70.33***	33.69***	Ref	Ref	-8.90	Ref	-23.78*	Ref	Ref	
Netherlands	0.68	Ref	24.68***	4.65	Ref	Ref	-22.53 ⁺	Ref	-34.52*	Ref	Ref	
Austria	3.82	Ref	62.95***	39.51***	Ref	Ref	-15.59	Ref	-11.32	Ref	Ref	
Germany	-14.65 ⁺	Ref	43.48***	34.67***	Ref	Ref	6.95	Ref	29.66**	Ref	Ref	
Switzerland	-7.00	Ref	44.42***	36.12***	Ref	Ref	-12.48	Ref	-8.16	Ref	Ref	
Luxembourg	-7.93	Ref	62.19***	34.95***	Ref	Ref	-0.75	Ref	-2.15	Ref	Ref	
Spain	-5.03	Ref	49.31***	26.65***	Ref	Ref	6.12	Ref	-4.82	Ref	Ref	
Greece	-9.69	Ref	60.07***	32.27***	Ref	Ref	-1.5	Ref	6.15	Ref	Ref	
Italy	2.68	Ref	38.71***	38.15***	Ref	Ref	-8.39	Ref	-14.61*	Ref	Ref	
Portugal	3.01	Ref	70.15***	45.04***	Ref	Ref	-14.42	Ref	-1.05	Ref	Ref	

Note: Background control variables (children's immigration status, age, and sex) were included in all models. ⁺p < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001

TABLE 6.5 Logistic regression coefficients of main effects and interaction terms of children's family structure and mother's education on grade repetition for each country

	Single Mother	Lower Secondary or Below	Upper Secondary	Tertiary	Lower Secondary or Below * Single Mother	Upper Secondary * Single Mother	Tertiary * Single Mother
Australia	0.67**	Ref	-0.03	-0.2	Ref	-0.7	-0.17
Canada	0.5	Ref	-0.88***	-1.44***	Ref	0.05	0.03
United Kingdom	0.39	Ref	-0.60	-0.55	Ref	-0.15	0.4
Ireland	-0.13	Ref	0.02	-0.18	Ref	0.62	0.94 ⁺
New Zealand	0.5	Ref	-0.04	-0.2	Ref	0.25	-0.11
United States	-0.18	Ref	-0.53**	-0.86***	Ref	0.52	0.79*
Denmark	0.11	Ref	-0.6	-0.52	Ref	0.8	0.1
Finland	1.48	Ref	-0.54	-0.62 ⁺	Ref	0.12	-1.36*
Norway							
Sweden	-0.00	Ref	-0.61	-0.60	Ref	0.16	0.82
Belgium	0.3	-0.31	-0.32	-0.33	-0.34	-0.35	0.61*
France	0.37	Ref	0.67	-1.35	Ref	-0.16	0.17
Netherlands	-0.13	Ref	-0.27 ⁺	-0.42**	Ref	0.37	0.45
Austria	1.37	Ref	-0.38 ⁺	-0.25	Ref	-0.65	-0.92 ⁺
Germany	0.53	Ref	-0.54***	-0.58***	Ref	-0.41	-0.49
Switzerland	0.45*	Ref	-0.48***	-0.46***	Ref	0.17	0.05
Luxembourg	0.69	Ref	-0.51***	-0.90***	Ref	-0.26	-0.57*
Spain	0.35	Ref	-0.62***	-1.19***	Ref	0.11	0.35 ⁺
Greece	-0.53	Ref	-1.28***	-2.12***	Ref	1.26	2.46**
Italy	0.79	Ref	-0.63***	-0.73***	Ref	-0.21	0.2
Portugal	0.26	Ref	-0.97***	-1.47***	Ref	0.09	0.08

Note: Background control variables (children's immigration status, age, and sex) were included in all models. ⁺p < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001.

TABLE 6.6 *Logistic regression coefficients of main effects and interaction terms of children's family structure and mother's education on truancy for each country*

	Single Mother	Lower Secondary or Below	Upper Secondary	Tertiary	Lower Secondary or Below * Mother	Upper Secondary * Single Mother	Tertiary * Single Mother
Australia	0.59***	Ref	-0.15*	-0.26***	Ref	-0.13	-0.23
Canada	0	Ref	-0.40***	-0.51***	Ref	0.55 ⁺	0.39
United Kingdom	0.52	Ref	-0.23	-0.26	Ref	-0.34	-0.33
Ireland	0.56	Ref	0.15	0.1	Ref	-0.17	-0.15
New Zealand	0.44	Ref	-0.52	-0.61	Ref	0.15	-0.10
United States	0.16	Ref	-0.42**	-0.71***	Ref	0.17	0
Denmark	0.51 ⁺	Ref	-0.23	-0.22	Ref	0.09	-0.07
Finland	0.3	Ref	-0.49**	0.58***	Ref	0.16	0.22
Norway	0.78	Ref	-0.51*	-0.30	Ref	-0.08	-0.36
Sweden	0.95	Ref	-0.07	-0.37*	Ref	-0.70	-0.21
Belgium	0.93*	Ref	-0.08	-0.10	Ref	-0.10	-0.43
France	0.14	Ref	-0.44	-0.17	Ref	0.41	0.31
Netherlands	0.2	Ref	-0.20	0.17	Ref	0.04	0.22
Austria	0.57	Ref	-0.39 ⁺	-0.00	Ref	-0.28	-0.38
Germany	0.75	Ref	-0.17	0.24	Ref	-0.01	-0.57
Switzerland	0.14	Ref	-0.23 ⁺	0.22	Ref	-0.02	0.34
Luxembourg	0.51	Ref	-0.24***	-0.06***	Ref	0.23	-0.37
Spain	0.32	Ref	-0.23***	-0.30***	Ref	0.21	-0.03
Greece	-0.02	Ref	0.08	0.03	Ref	0.23	0.23
Italy	-0.03	Ref	-0.19***	-0.17***	Ref	0.28 ⁺	0.46**
Portugal	0.52	Ref	-0.04	-0.06	Ref	0.22	-0.37

Note: Background control variables (children's immigration status, age, and sex) were included in all models. ⁺p < 0.10; *p < 0.05; **p < 0.01; ***p < 0.001

the cost associated with single motherhood is greater among children of the more highly educated. The opposite is true in Finland, Austria, and Luxembourg where children of less-educated mothers have a greater cost associated with being in a single-mother family. Germany shows the same pattern ($b = -0.49$, $p = 0.16$). In the remaining eleven countries, the effect of being in a single-mother family does not differ significantly between children with tertiary and lower educated mothers. In addition to that, in every country the effect of being in a single-mother family did not differ significantly between mothers with an upper secondary education and mothers with less education.

In most countries, the probability of truancy does not differ by mother's education. There are only few exceptions. In Italy, the probability of truancy among children of single mothers is higher if the mother has upper secondary or tertiary education, and the same is true among those having a single mother with upper secondary education in Canada.

DISCUSSION

The goal of this study was to determine to what extent the increase of single-mother families, especially among the less educated, is associated with an increase in children's inequality in twenty-one Western countries. To do so, we first analyzed to what extent there is a negative relationship between single-mother families and mother's education in these countries. This is important because most previous evidence on "diverging destinies" has come from the United States. We also investigated the effect of being in a single-mother family, and how this effect differs by mother's education. To do so we tested the two main hypotheses developed by the literature: The "compensatory hypothesis," which posits that mothers with a high educational level are better equipped to protect their children from the negative consequences of growing up in a single-parent family; and the "floor effect hypothesis," which maintains that children with less-educated mothers are less vulnerable to single motherhood given that their mothers are already in a bad situation than cannot become much worse. We used multiple children's outcomes and countries in order to overcome the limitations of previous research on how mother's education conditions the effects of being in a single-mother family.

Our findings highlight substantial cross-national differences in the relationship between mother's education and single motherhood. However, less-educated mothers are generally more likely to be single mothers in most Western countries. In eleven of the twenty-one countries, there was a significant negative relationship between mother's education and the probability of being a single mother, and in four more this relationship is also

negative but insignificant. More educated mothers are significantly more likely to be single in only three countries – Portugal, Switzerland, and Italy – and previous research has demonstrated that the positive gradient observed in Italy is decreasing (Garriga, Sarasa, and Berta 2015). Overall these findings indicate that the negative educational gradient toward single motherhood is not only an American phenomenon. However, to what extent does concentration of single motherhood among mothers with less education increase inequality in children's outcomes between children from different socioeconomic backgrounds?

In all countries analyzed, living with a single mother has a negative effect on at least one of the three outcomes studied. However, we also found substantial differences in the importance of family structure depending on the outcome studied. Being in a single-mother family does not have negative effects on math performance in four of the twenty-one countries analyzed, while its effect on grade repetition and truancy is significant in practically all of them. In addition, mother's tertiary education is clearly more important than family structure on cognitive performance in all countries analyzed, while this is only true in about half of them for grade repetition, and around a fifth for truancy. Overall, our results highlight that the effect of family structure is more important and consistent across countries for grade repetition and truancy than on cognitive performance. This finding accords with several literature reviews that have concluded there is less consistent evidence on the effects of family structure on test scores than on educational attainment and behavioral outcomes (Amato and Keith 1991; McLanahan 1997; McLanahan, Tach, and Schneider 2013; Sigle-Rushton, Hobcraft, and Kiernan 2005). Most previous comparative work had used standardized test scores despite of the fact that grade repetition and truancy are both important outcomes since, as mentioned, they are strongly associated with labor market and socio-emotional outcomes and risk behaviors such as drug abuse or crime (Garry 1996; Jones, Lovrich, and Lovrich 2011; Range, Yonke, and Young 2011). In other words, these additional two outcomes tell us more about the likelihood that destinies will diverge than cognitive achievement alone does; they have strong behavioral components.

With respect to how the effect of family structure varies by mother's education, our results show substantial variation across countries and outcomes. Consistent with the "floor effect hypothesis," the negative impact of being in a single-mother family is greater among otherwise advantaged children on math performance in six countries, on grade repetition in four countries, and on truancy in one country. However, we also obtained a few results consistent with the "compensatory hypothesis": The negative effect

associated with being in a single-mother family is smaller among advantaged children on math performance and grade repetition in three countries.

When taking into account all three of the outcomes studied in each country, we can derive the extent to which the increase of single-mother families would increase inequality between those children from different socioeconomic backgrounds. According to Bernardi and his colleagues, the rise of nontraditional family forms will only increase inequality if single motherhood has a negative effect regardless of maternal education, or if these effects are greater among children with less-educated mothers (Bernardi and Boertien 2016; Bernardi, Boertien, and Popova 2014). One of these two possibilities is the case for all three outcomes in eleven of the twenty-one countries analyzed. For this reason, it is possible to argue that in countries such as Nordic countries, Australia, and New Zealand, there is evidence that an increase in single-mother families, especially among the less educated, implies an increase in inequality on children's outcomes. In addition, it is important also to remark that only in Germany, having a mother with tertiary education compensates for the harmful effects of being in a single-mother family on math performance; the same is true for the other two outcomes, though the interaction between family structure and education does not reach statistical significance. These findings accord with those obtained by Grätz (2015) for the probability of attending the upper track in secondary school (Gymnasium) and on school grades in German and Mathematics.

In contrast, it has been argued that if the costs associated with single motherhood are greater at higher maternal education levels, the growth of single-mother families may reduce inequality in children's outcomes and life chances between children from different socioeconomic backgrounds (Leopold and Leopold 2016). In no country are the negative effects of being in a single-mother family greater at higher maternal education levels across all of the outcomes studied. Therefore, we do not have any evidence that the growing number of single-mother family structures is consistently reducing inequality in societies. In fact, we obtained mixed findings in ten countries. For some outcomes, the negative effect of family structure is greater with higher maternal education (especially math performance) and for other outcomes, the conditioning effect of mother's education is insignificant. For example, in contrast to Augustine (2014) whose results supported the compensatory hypothesis, we found that in United States being in a single-mother family was associated with lower math test scores and more grade repetition only among children whose mothers had more education, and the odds of truancy among children in single-mother families did not depend at all on

maternal education. Overall, our findings reveal that in around the half of the countries studied, the growth of single-mother families increases inequality in some outcomes and reduces inequality in others.

Alongside these contributions, the study has limitations. Foremost, due to the cross-sectional nature of the PISA data, we were not able to control for selection into single-mother families on unobserved variables and therefore, the interaction effects reported in this study may be spurious due to differences between social origin groups on the probability of being in a single-mother family (Grätz 2015). The data also did not allow testing how mother's education mattered in different types of single-mother families – single mother at birth, single mother due to parental divorce, and single mother due to parental death – and between different types of two-parent families: Biological and stepfamilies.

The findings of this study demonstrate the importance of more cross-national research on how family structure effects differ by socioeconomic status. They also indicate the need for work across a broader range of outcomes than those analyzed here such as psychological well-being. Such research is essential in order to determine to what extent there is an increase of inequalities in children's outcomes due to the growing number of single-mother families. Future research should also analyze contextual mechanisms that may explain why maternal education seems to condition family structure effects differently across outcomes and countries, such as the cross-national variations on the percentage of children in joint physical custody.