

**PARENTAL SEPARATION AND DEPRESSIVE SYMPTOMS IN  
LATE ADOLESCENCE AND EARLY ADULTHOOD**

**The moderating role of parents' socioeconomic resources**

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Master's thesis  
March 2019

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## 1. Introduction

The divorce rates have been increasing in many modern societies in the second half of 20<sup>th</sup> century and in the beginning of 21<sup>st</sup> century. In the United States and in England where the rates have been the highest, the crude divorce rate has been increasing since the 1960s until 1990s and slightly decreasing in the 2000s (Amato, 2010). The divorce trend has been somewhat similar in many European countries (Amato, 2010). Especially in the Scandinavian and Baltic countries the crude divorce rate has been relatively high during the 1990s and 2000s (Eurostat, 2019).

In Finland, the divorce rate has increased during the 1960s and 1970s, and it has been one of the highest in Europe during the 1980s, 1990s and 2000s (Saari 1995, as cited in Tulisalo 1999; Eurostat, 2019). Between the years 2005 and 2015 the crude divorce rate in Finland varied between 2.4 and 2.6 per 1000, whereas in Europe on average (EU28) the crude divorce rate was 1.8–2.1 during the same years (Eurostat, 2019). The divorces and other union dissolutions in Finland have also concerned many children. For instance, in 2005 around 31,000 children aged 0–17 experienced their parents' divorce or break-up of a cohabitation. Considering the share of all children, in 2005, 13.4 percent of all 10-year-olds and 16.9 percent of all 17-year-olds had experienced their parents' separation. (Statistics Finland, 2007.)

For the majority of children the parental separation is a stressful event regardless of the child's age (Kelly & Emery, 2003; Amato, 2000). Thus, the high prevalence of divorces raises the question of how separation influences child well-being. In social sciences, research on the consequences of parental separation on child outcomes has been conducted since the mid-1960s (Anthony & Amato, 2014). Many results show that compared with children from intact families, children with divorced parents score lower on average on several measures of achievement, adjustment and well-being (Amato, 2001; Amato & Keith, 1991; Kelly & Emery, 2003). According to studies conducted in recent decades, parental separation is associated with mental health problems such as depression and conduct problems experienced in childhood and later life (e.g. Amato, 2010). Moreover, lower self-esteem, problems with social relations

and alcohol use in adolescence and young adulthood have been found to be more common in children from separated families (e.g. Amato, 2014; Huurre et al., 2005).

Studies of divorce effects have usually compared divorcing families with families remaining intact. More recent research has stressed that the study groups are likely to be highly selected, for instance, by their social, economic and mental health circumstances or parenting styles. Thus, the lower well-being of the children from dissolved families would be at least partly due to factors other than the separation. (Nunes-Costa et al., 2009.) However, though the selection effect is widely acknowledged in recent literature the magnitude of the selection has been less clear (Strohschein, 2012).

There is also evidence that the family dissolution itself has negative causal effects on child mental health, such as depressive symptoms (e.g. Anthony & Amato, 2014; Cherlin et al., 1998). Conflicts in the family, decreased parenting resources (Anthony & Amato, 2014) and poorer material and economic resources after separation (Gähler & Garriga, 2013) may explain why children are negatively affected by the separation of their parents. Additionally, parental absence and loss of emotional support after separation may cause stress and influence the child mental health (Amato, 2000).

Despite the negative mean effects, researchers have pointed out that there is a high variability in child health outcomes among children from separated families. Thereby, the decline in child well-being is not unavoidable. (Amato, 2010; Anthony & Amato, 2014). In some cases the well-being may even increase after parents' separation, for example in families with severe parental conflicts (Anthony & Amato, 2014; Arditti, 1999). It is also argued that the consequences for child well-being are likely to depend on many parental qualities, such as parental commitment and co-operation after separation (Nunes-Costa, et al., 2009), the extent of conflicts (Booth & Amato, 2001) and parents' socioeconomic resources (Grätz, 2015). These observations stress that the separating families are heterogeneous and that children's responses to separation vary significantly.

Using register-based longitudinal data with a large representative sample, this Master's thesis focuses on three questions. First, it studies the association between childhood experience of parental separation and adolescent depressive symptoms among Finnish cohorts born in 1990–1997. Second, the study aims to provide more accurate information on how strongly the families are selected into separation and in which magnitude the pre-separation circumstances affect the association of parental separation and adolescent depressive symptoms. Here, the large register panel data allows extensive analysis of the potential confounding effects of many socioeconomic, mental health and demographic factors of the family. Third, the study analyses whether the relationship between parental separation and adolescent antidepressant use is modified by parental education. Here, the hypothesis is that higher parental education, an indicator of the social and economic resources of the family, helps to prevent and compensate for the negative effects of family break-up.

Previous studies have shown that mental health problems are one of the most central health consequences of parental separation. As an indicator of mental health, this study focuses on depressive symptoms measured by antidepressant use. Firstly, adolescent and young adult mental health problems often appear in the form of depression. According to Korhonen et al. (2017), depression has been the most common mental disorder diagnosed at ages 17–23 in Finland. Because of the relatively high prevalence, depression is likely to be a good indicator of the potential mental health differences between children from intact and separated families.

Secondly, depression diagnoses and the use of antidepressants have strongly increased in the 1990s and 2000s among Finnish adolescents and young adults, especially among females (Markkula, 2015; THL, 2019). Between the years 1990 and 2010 the use of antidepressants had a ten-fold increase in Finland (THL, 2019). Suffering from mental health problems in a critical stage of life, such as adolescence, may have harmful consequences and even hamper one's educational and occupational achievements. Because of the significant human suffering and economic disadvantages, the potential reasons behind young age depression are important to study. Perhaps, the experiences of family disruption together with parental absence and other changes in family

relations after parental separation are one factor behind the experiences of depressive symptoms and other mental health problems.

This study focuses on union dissolutions in general, including both divorces and dissolutions of cohabitations. Because many previous studies have concentrated only on divorces, the concepts of divorce and parental separation are used variably in the following literature review (sections 2.1–2.4). However, in this study the concept of parental separation is used to refer to both parental divorces and dissolutions of cohabitations.

## 2. Background

### 2.1 Individuals with separated parents more likely to suffer from social and mental health problems?

Studies conducted in Europe and English-speaking countries in recent decades have mostly demonstrated that parental separation is associated with several child mental health outcomes (Amato, 2014). Compared to children from intact families, children with separated parents exhibit on average more psychological and social problems, such as depression, anxiety, conduct disorders, antisocial behavior, hyperactivity, problems with self-esteem and social relations. (Amato & Keith, 1991; Amato, 2000 2001 2014; Strohschein, 2012.) However, the associations between parental separation and child outcomes have mainly been modest in magnitude (Amato, 2014). In the study of Mandemakers and Kalmijn (2014), psychological well-being of British children was studied by measuring the level of restlessness, worry, solitude and tendency to bully other people. Here, children of divorced parents had moderately (about .15 standard deviation) lower psychological well-being at age 10 compared to children whose families remained intact. Congruent with this study, the relationship between parental separation and lower psychological well-being has been found for instance in Sweden (Gähler & Palmtag, 2014), Canada (Strohschein, 2012) and the United States (Anthony & Amato, 2014) . In general, findings regarding the consequences of parental separation on psychological well-being of children have been mainly similar in different European and English-speaking countries (Amato, 2014).

However, some studies have not found any significant differences in certain outcomes between children from intact and separated families. In the study of Huurre et al. (2006), significant differences in psychological well-being and problems in interpersonal relationships were not found among boys. Likewise, Strohschein (2005) and Li (2007) found no association between parental divorce and child's antisocial behavior. In his meta-analysis, Amato (2001) found contradictory results regarding differences in child well-being (e.g. psychological adjustment, self-concept and social

relations). Here, 88 percent of the total 177 effects sizes were negative, but only 42 percent were negative and significant ( $p < .05$ ).

Because of the varying results regarding the association between parental separation and child mental health, reviews have reached quite different conclusions about the effects of family dissolution (Amato & Keith, 1991a 1991b). I find two possible explanations for the diverse results. Firstly, although parental divorce is associated with many negative outcomes, children with serious problems are not remarkably overrepresented among separated families (Emery, 1988). Because the associations between parental separation and measures of child well-being have usually been modest in magnitude (e.g. Amato, 2001 2014), studies using small samples or inadequate measures of well-being have not been able to detect the differences in well-being. Many studies have used crude outcome variables, prone to measurement errors (Amato & Keith, 1991b). To detect smaller differences in child well-being, research should use large samples and valid measures of psychological well-being.

Secondly, it is possible that parental separation has an impact only on certain parts of the child well-being and the non-significant effect sizes would only be for certain outcomes that are less relevant in the context of child adjustment. For example, Amato and Keith (1991b) have pointed that researchers may have been searching differences from a number of outcomes in the hope of significant results, even though the outcomes would have only theoretical connections to parental separation.

Despite the varying results some scholars have assessed how strongly the parental separation is linked to the different child outcomes. According to a meta-analysis of 67 studies published in the 1990s (Amato, 2001), the strongest negative mean effect sizes were found in outcomes of psychological adjustment and conduct (between -0.22 and -0.21). By contrast, weaker effect sizes were found in social relations, self-concept and academic achievement (between -0.16 and -0.12). According to this result, the parental separation appears to have a moderate impact especially on child's later psychological well-being. Additionally, I estimate that the studies from the 1990s, 2000s and 2010s focusing on outcomes of child psychological well-being appear to be rather consistent and well-replicated compared to studies investigating other elements

of child well-being. This notion motivated the current study to focus on adolescent depressive symptoms.

### *2.1.1 Parental separation and the risk of depressive symptoms*

The studies from recent decades have mainly showed that parental separation increases the risk of depression in adolescence and young adulthood (e.g. Feldhaus & Timm 2015; Amato 2014; Strohschein 2005; Cherlin, 1998). In the Canadian study of Strohschein (2005), the level of depression and anxiety (measured by parental reports) increased significantly in children who experienced parental divorce during the follow-up years. In the study of Feldhaus and Timm (2015) conducted in Germany, parental divorce or separation experienced in childhood increased depressive symptoms significantly during ages 16–19. Furthermore, Chun et al. (2016) found long-term impacts of parental separation on adulthood depression among Koreans. People who experienced parental divorce in childhood or adolescence (ages 0–17) exhibited higher scores in the 11-items of Center for Epidemiologic Scale for Depression (CES-D-11) in early adulthood.

However, some studies examining parental separation and the risk of depression show contradictory results. Robbers et al. (2011) did not find any differences in teacher-reported internalizing problems (anxiety and depressive symptoms) between children from divorced and non-divorced families. The results have also been somewhat inconsistent in Finnish studies. For instance, measuring depression with Beck Depression Inventory, Huurre et al. (2006) did not find any significant differences in adolescence and young adulthood depression between males from intact and separated families. By contrast, in the study of Tulisalo (1999) the prevalence of depressive symptoms, measured by a modified version of Beck Depression Inventory, was significantly ( $p < .05$ ) higher among individuals with an experience of parental separation. At the age of 22, depression was moderately more common among adult children whose parents had divorced by the age of 16 years, compared to adult children whose families had remained intact at least the first 16 years (females: 17.4% vs. 11.5%, males: 14.0% vs. 7.8%).

### *2.1.2 Temporary crisis or chronic strain?*

Previous studies have examined how longstanding the impacts of parental separation on child well-being are. Two theoretical approaches have been taken. In the crisis model, parental separation is seen as a disturbance to which most children adjust over time with few enduring consequences (Amato, 2000; Edwards, 1987). This approach has gotten support from some longitudinal studies showing that most children's functioning improves with the passage of time (a meta-analysis of Amato & Keith, 1991b). Improvements in child well-being have been found in studies, which have focused on child's conduct problems. According to the meta-analysis, the association of parental separation and conduct problems have been strongest for studies measuring the child outcome shortly after the time of family disruption. This finding suggests that the conduct problems become less pronounced after a couple of years.

On the contrary, the chronic strain model states that the consequences of parental separation for the individual are long-standing (Amato, 2000). The model assumes that experiencing a separation involves persistent stress in the family such as economic decline, loneliness, parental absence and sole parenting. Since these problems do not disappear, the decline in well-being might continue for a long period of time. According to the review of Amato (2010), many studies indicate that, for some individuals, the impact of separation appear to persist well into adulthood. Besides, Amato and Keith (1991b) have noted that the impacts of parental separation on adult attainment and quality of life may even be more serious than the short-term emotional and social problems observed in childhood.

The chronic strain model has also gotten support from empirical studies. In the study of Cherlin et al. (1998), parental divorce continued to have negative effects on mental health when the person was in his or her twenties and early thirties. In the study of Sigle-Rushton et al. (2005), individuals at age 30 or 33 were 1.6–1.71 times more likely to have high malaise if their parents had divorced in childhood. This association remained significant even after adjusting for many child and parent characteristics from the pre-separation time. It is possible that the welfare differences continue to

exist still in middle age. For instance, Thomas and Högnäs (2015) found an association between parental divorce experienced before age 7 and adult health, measured at age 50. Although some health differences have been found in later adulthood, it is not clear to what extent these differences are caused by the early parental separation. Presumably, many other factors are partly causing these differences and the parental separation is likely to have only an implicit impact on later adult well-being. To get more precise understanding, some scholars have called for more research on what mediating factors bring about the association between childhood parental separation and mental health differences in later adulthood (e.g. Sigle-Rushton et al., 2005).

## 2.2 The problem of selection

Studies published since the 1990s have often examined the consequences of parental separation on child well-being by analyzing the statistical associations between parental separation and child outcomes without any systematic investigation of pre-separation differences (Strohschein, 2012). Yet drawing causal conclusions in this topic is problematic, because many unobserved factors are likely to confound the observed associations (Bhrolcháin, 2001; Amato, 2010). One possibility is that people with less resources are selected out of unions. According to the selection perspective, the differences between children from separated and intact families are largely due to other factors than union dissolution, such as parental personality characteristics, inept parenting, pre-divorce marital discord, or genetic influences. (Amato, 2000.) These type of pre-separation family qualities may both increase the risk of parental separation and affect children's well-being (Anthony & Amato 2014).

The selection effect has been problematic especially in the early divorce studies, which have mainly used cross-sectional data to compare children in intact two-parent families with children whose parents divorced (Strohschein, 2005). According to Strohschein, these comparisons have yielded too pessimistic a view and overstated the effects of divorce on child well-being, because they have failed to take into account the quality of family life before parental separation. Later studies using longitudinal datasets have been able to control for the pre-separation family circumstances to

some extent. These studies have showed that many of the problems in the family occur already before the parental separation. (Sun, 2001; Anthony & Amato, 2014.)

In divorce studies, the problem of selection has been widely acknowledged. However, because only a limited number of studies have statistically analyzed the question, there has been little knowledge of the magnitude of the selection. (Strohschein, 2012.) Moreover, many of these studies have used only a couple of confounders in a certain analysis. To get more precise information on the magnitude of the selection, many confounders should be included in the same analysis. Next, I sum up relevant factors associated both with parental separation and child mental health. These factors will also be used in the analysis of this study.

### *2.2.1 Factors confounding the association of parental separation and child mental health*

The links between socioeconomic position and separation risk have received great attention in divorce studies (Lyngstad & Jalovaara, 2010). Generally, the risk of divorce is found to be higher among couples who are socioeconomically disadvantaged (Hanson et al., 1998; Amato, 2010). The level of education, employment status and financial circumstances all appear to be essential factors. Many register-based studies in Scandinavia show that lower education increases the risk of separation (Jalovaara, 2001; Hoem, 1997). Regarding this tendency from child's point of view, it is found that children with low educated parents experience more often their parents' separation (Jalovaara & Andersson, 2017). Some evidence also shows that economic hardship and instability, together with unemployment increases the risk of union dissolution (Lewin, 2005; Poortman, 2005; Jalovaara, 2001; Hansen, 2005). These links may occur because unemployment and financial hardship cause distress and uncertainty about the future and reduce marital stability (Strohschein, 2012). Additionally, couples' income level has been found to be associated with separation risk, though some of the results are somewhat contradictory (Lyngstad & Jalovaara, 2010). In the Canadian study of Strohschein (2012), couples with lower income separated more often, but in the study of Jalovaara (2003) only husband's high income decreased the relative divorce risk in

Finland. Here, wife's high income had a reverse effect, increasing the divorce risk especially when husband's income was low.

Socioeconomic circumstances of the family also seem to be associated with child mental health. For example, economic hardship and parental unemployment have been found to increase the risk of mental health problems in children (McLoyd, et al., 1994) ; (Korhonen, et al., 2017). In the study of Korhonen et al., low parental income increased the risk of depression in late adolescence and young adulthood. The impact of economic hardship on mental health may not be limited to adolescence. Laaksonen et al. (2007) found that from childhood socioeconomic circumstances, especially economic difficulties experienced in childhood were strongly associated with common mental disorders at middle age among Finnish and British public sector employees. By contrast, there seems to be less evidence that parents' education would be associated with child mental health. For example, in the study of Laaksonen et al. (2007), parental education was not significantly associated with middle-age mental disorders. In the study of Korhonen et al. the differences in child depression by parents' education declined, though not disappeared, after adjusting for prior psychiatric history among family members.

In addition to socioeconomic factors, other parental qualities have also shown to be associated with separation risk and child mental health. First, couples' marital status has been found to contribute to the risk of separation. According the review of Lyngstad and Jalovaara (2010) several studies have shown that cohabitants have a higher risk for separation than married couples. Second, the separation risk also seems to depend on the age at getting married or forming cohabiting unions. According to Heaton (1991) and Teachman (2002), couples who get married at a young age have a higher risk of separation. Furthermore, couples' age at getting married and having children may also be associated with child mental health. For example, Strohschein (2012) found a significant difference in child mental health according to parents' age. Children whose parents were younger on average had higher levels of depression, antisocial behavior and hyperactivity. Because young parental age seems to increase both the risk of separation and child mental health problems, it is also likely to

confound the association between parental separation and child depressive symptoms.

Furthermore, parents' mental health problems are likely to contribute both to the risk of separation and child depressive symptoms (Laaksonen & Silventoinen, 2001; Cherlin et al., 1998). It has been found that lower levels of psychological well-being in couples increase the risk of divorce (Mastekaasa, 1994). In the study of Metsä-Simola et al. (2018), psychiatric morbidity in one spouse increased the risk of divorce approximately two-fold, and the risk was almost threefold when both spouses experienced psychiatric morbidity. Parents suffering from mental health problems also seem to have an impact on child well-being. Several studies show that parental depression is a considerable risk factor of child emotional problems, antisocial behavior and depressive symptoms (Mikkonen et al. 2016; Sarigiani et al., 2003; Strohschein, 2012). In the study of Mikkonen et al., exposure to maternal depressive symptoms caused for both boys and girls over a two-fold risk of getting depressive symptoms at ages 15–20. In sum, parents' mental health is likely to confound the association between parental separation and child depression. By not taking this into account, the correlation between parental separation and child mental health would probably give a misleading impression of the divorce effects (Cherlin et al., 1998).

In addition to parental characteristics, childhood mental health may confound the association between parental separation and adolescent mental health. Some studies show that families with children suffering from mental health problems in childhood separate more often than families with healthier children. For example, Strohschein (2005 2012) found that depression, anxiety and emotional problems, such as antisocial behavior and hyperactivity, were more common in children whose parents subsequently separated. Individuals who suffer from mental health problems in childhood may also have a higher risk of mental disorders in adolescence and young adulthood. In the study of Korhonen et al. (2017) the prevalence of depression at ages 17–23 was especially high among individuals who had depressive symptoms in early adolescence. Based on these studies, it is possible that individuals with an experience

of parental separation suffer more often from mental health problems partly because of earlier psychiatric morbidity in childhood.

Additionally, child's sex may partly explain the association. Some scholars have tested a hypothesis claiming that parents of girls have a higher risk of divorce compared to parents of boys, possibly due to greater father involvement. Morgan et al. (1988) found that the relative risk of divorce was about 9 percent greater for couples with daughters compared to couples with sons. However, in a later study Diekmann and Schmidheiny (2004) studied the association in several populations, including 18 European and North American countries. The results showed a significant association between child's sex and parents' risk of divorce only in one country. It seems that child's sex is more strongly associated with the risk of adolescence mental disorders. For instance, in the 2000s and 2010s the prevalence of antidepressant use in adolescence and early adulthood has been considerably higher among teenage girls and young women in Finland (THL, 2019).

Finally, place of residence may partly explain the association between parental separation and child well-being. Some studies have found regional differences in the risk of separation and mental disorders, mainly between residents of rural and urban areas. For example, in Norway, divorces have been more common in urban than in rural areas (Lyngstad, 2006). Rural-urban differences have also been found in the prevalence of depression, though with somewhat contradictory results, some studies showing a higher prevalence of depression in urban areas (e.g. Li Wang, 2004) and some in rural areas (e.g. Probst et al., 2006). In Finland the intention to separate and the prevalence of separation have been found to be higher in urban areas (Kontula, 2013).

### 2.3 Separation and its aftermath causing depression and other mental health problems

Despite the many factors contributing to selection into separation, the higher risk of depression and other mental health problems in children from separated families

cannot be fully explained by selection (Cherlin et al., 1998). In contrast to the selection perspective, causality hypothesis states that parental separation is a critical event that affects child's later well-being. With more advanced methodologies, researchers have found relatively strong evidence showing that parental separation has an impact on child well-being net of selection (reviews of Amato, 2001 2010).

Some longitudinal studies have shown that the association between parental separation and child well-being remains significant after adjusting for the family qualities from the pre-separation time. Simons et al. (1996) and Demo and Acock (1996) found significant associations between parental divorce and adolescent well-being after controlling for parents' antisocial personality traits and depression. In addition, Hanson (1999) found significant differences in psychological well-being (i.e. quality of life, self-esteem and behavior problems) between divorced and non-divorced families after adjusting for parental conflicts and children's behavior problems from pre-divorce time. In the study of Sigle-Rushton et al. (2005), the risk for high malaise among individuals with an experience of parental divorce remained 1.5-fold even after adjusting for several relevant pre-disruption characteristics.

The longitudinal studies controlling for pre-separation family circumstances show that the measured confounding effects explain only a part of the association between parental separation and child mental health. Thereby, it is possible that the remaining association is at least partly causal. However, it is noted that the significant associations after controlling for covariates do not provide strong support for the causal hypothesis, because one cannot measure and control for all relevant variables (Amato, 2010).

Other studies have used more sophisticated methods such as fixed effects models and linear growth curve models to deal with the limitations of control variables. By controlling for the time-invariant unmeasured confounders, these methods have provided stronger support for causal conclusions (Cherlin, 1988; Amato, 2010; Anthony & Amato, 2014). For instance, Feldhaus and Timm (2015) found significant effects of parental separation on depressive symptoms in adolescents when using panel regression models, such as fixed effects models and so-called hybrid models. Using

fixed effects and growth curve models, Cherlin et al. (1988) found significant effects of parental divorce on emotional problems including depression, anxiety, phobias and obsessions experienced in early adulthood (ages 23–33), though part of the association was due to factors that existed already before the divorce. Furthermore, Anthony and Amato (2014) used fixed effects models to estimate the effects of parental divorce on several outcomes, such as self-esteem, self-control, behavior problems, anxiety and sadness. By adjusting for time-invariant and also time-variant confounders, the researchers found rather strong support for the causal hypothesis. For instance, in the outcomes of interpersonal skills, internalizing and externalizing problems and self-control the effect of divorce was significant and negative, though moderate, for 15–26 percent of the study individuals.

By controlling for the time-invariant unmeasured factors by which intact and separate families differ from each other, the fixed effects analyses have provided relatively strong evidence showing that parental separation affects child mental health. However, it is noted that when reaching causal conclusions the plausible explanatory mechanisms should be specified (Bhrolcháin, 2001). When considering the mechanisms, parental separation can be defined as a longstanding process that covers changes in child's everyday life for many years (Amato, 2000). The first signs of separation, for instance growing dissatisfaction with the relationship, often start long before the legal divorce. Furthermore, many challenges, like initiating the divorce and adapting to the new economic circumstances, often continue long after the day of moving apart. Following this definition, it is likely that many shifts in the process have direct or indirect impacts on child well-being.

Previous reviews of the divorce effects have compiled diverse explanations for how parental separation and single parenthood affects child well-being (e.g. Anthony & Amato, 2014; Amato, 2000 2010; Kelly & Emery, 2003). These mechanisms can be divided into three perspectives: family conflict, parental absence and economic disadvantage.

Inter-parental conflicts have shown to be negatively associated with child psychological well-being (Kelly and Emery, 2003) and depression (Kelly, 2000).

Thereby, the lower psychological well-being of children of divorce may be due to family conflicts that often appear in conjunction with the separation (Gähler & Palmtag, 2014). For instance due to custodial disagreements, the parents may drift into conflicts and the child may be caught in the middle of them (Anthony & Amato, 2014). When parents fight, children may react with fear, helplessness and anxiety. They may also be forced to take sides and, especially young children, may blame themselves for the strife. (Amato, 1993.)

In family break-up, the child often loses important social resources (Grätz, 2015). According to the parental absence perspective family is a key social institution for providing nurturant socialization of young children. Because parents are important resources for child development, then two parents should be better than one. This perspective is supported by the consistent finding that the quantity and quality of contact between children and noncustodial parent usually decreases after separation. (Amato & Keith, 1991b.) Also, contact with the noncustodial parent's relatives, such as grandparents, may decrease (Amato, 2000). Additionally, the single custodial parent may not have the same amount of time and energy for raising the child due to increased responsibilities, for example working overtime. The caregiving can become impaired and the parental supervision may decrease. (Anthony & Amato, 2014; Nunes-Costa et al., 2009.) In these circumstances, the parent-child relationships may disrupt and the child may experience a loss of emotional support (Amato, 2000).

Parental separation may also reduce economic resources (Grätz, 2015). The deterioration of material and economic conditions has found to have negative impacts on child psychological well-being (Gähler & Garriga, 2013; Nunes-Costa et al., 2009). First, the economic hardship and residential relocation after the separation may exacerbate or prolong the process of adjustment (Strohschein, 2005), probably because moving to a new neighborhood hampers the contemporary social relations with peer group and the distances to activities may become longer. Additionally, separated families with less economic resources may not be able to make investments for the child (e.g. hobbies and cultural activities) that would result in better health (Thomas & Högnäs, 2015). Moreover, economic hardship may also increase the

parents' psychological distress and impair inter-parental relationships which may influence child mental health (Linver, et al., 2002).

In sum, all three perspectives have gotten support from empirical studies (Amato & Keith, 1991b). Also in theoretical reflections scholars have stressed both the economic disadvantage (Thomas & Högnäs, 2015), the parental absence (Grätz, 2015) and the family conflict perspective (Amato & Keith, 1991b; Amato, 1993). However, all perspectives should be seen as necessary for a complete understanding of the mechanisms through which parental separation affects child psychological well-being (Amato, 1993).

## 2.4 The heterogeneity in the association of parental separation and child psychological well-being

As presented previously, the evidence shows that parental separation has a negative but moderate mean effect on mental health. There is, however, a high variability in the child outcomes in separating families and thus a decline in well-being after separation is not unavoidable. (Amato 2010; Anthony & Amato 2014; Amato & Keith, 1991b.) Moreover, some studies show that in the long run the majority of children show good adaptations after separation (e.g. Huurre et. al., 2006). For instance, in the study of Anthony and Amato (2014), 60–70 percent of individuals did not experience any remarkable increase in mental health problems after experiencing a parental separation. Because of the variation in child outcomes, generalizing a single regression coefficient to most children from separated families is rather misleading (e.g. Amato, 2010; Bhrolcháin, 2001) and the children from different kinds of separated families should be studied more precisely (Amato, 2010).

The variety in children's responses to parental separation have been studied more thoroughly only until recent years (Bernardi & Boertien, 2017). For instance, Nunes-Costa et al. (2009) found that children of divorce with low levels of hostility and conflict in co-parenting show good levels of adjustment, comparable to those of children from low-conflict intact families. Likewise, in the study of Feldhaus and Timm (2015) the effect of parental separation on depressive symptoms was particularly high

in families characterized by high-conflicted parent-child relationships. In contrast, in parent-child relationships characterized by high levels of intimacy the negative effects were substantially reduced. Also child's living arrangements after family dissolution are likely to matter. According to the meta-analysis of Bausermann (2002), children living in joint-custody arrangements after separation have mainly been better adjusted on multiple measures of emotional and behavioral adjustment, compared with children living in sole-custody arrangements.

According to a few studies, the well-being of children sometimes even increases after the separation, if the conditions prior to separation have been unfavorable in the family (Hanson, 1999; Jekielek, 1998). The family members may feel relieved and even do better after separation, if the everyday life in the family had been characterized by conflicts, alcoholism or violence (Nunes-Costa et al., 2009; Öberg & Öberg, 1999; Amato, 2010; Booth & Amato, 2001). Positive impacts on child's psychological well-being have also been found in some research when certain subgroups or outcomes have been studied. For instance, Hanson (1999) found that children from high-conflict separated families were doing just as well as and sometimes better than children from high-conflict families that remained intact. In the study of Anthony and Amato (2014) over 10 percent of children from separated families experienced an increase in well-being after parental separation, when the well-being was measured by self-control, interpersonal skills and absence of externalizing problems.

Also the relationships between parent and child may improve in some separating families. In the qualitative study of Arditti (1999) many offspring, especially daughters, reported that their relationship with their custodial mother developed particularly close after parents' separation, a finding that is consistent with a quantitative study of Booth and Amato (2001). Close parent-child relationships after separation are likely to be an important factor preventing many negative impacts on child psychological well-being. For instance, the study of Feldhaus and Timm (2015) showed that in parent-child relationships characterized by high levels of intimacy the effects of separation on depression risk were considerably reduced.

The studies showing heterogeneity in the effects of parental separation remind that the separation processes can be very different. In recent years researchers have become increasingly interested in the moderating role of social background of the child (Bernardi & Boertien, 2017). The next section focuses on socioeconomic resources that are – theoretically and according some empirical evidence – assumed to influence on how the parental separation affects child’s psychological well-being.

#### *2.4.1 Parents’ socioeconomic resources compensating for the negative impacts of separation?*

It is pointed out that the effects of parental separation on child well-being may be less detrimental if the family has resources and the living conditions are otherwise favorable (Grätz, 2015; Amato, 1993). This assumption follows the compensation theory, which states that the consequences of a disadvantageous life event are less harmful if the individual and the family have resources – such as cognitive abilities, income or health – by which the negative consequences can be prevented. On the contrary, an adversity or disadvantage experienced early in life is likely to persist or become even larger over time for individuals from disadvantaged families. As a compensatory element for a family adversity, parents’ socioeconomic resources are assumed to be one important factor. (Bernardi, 2014; Grätz, 2015.)

In the context of parental separation, it is possible that family break-up is less detrimental to children from high socioeconomic background. With the social and financial resources parents may be better able to compensate and prevent the negative consequences of the family dissolution, for instance when the child needs special support (Grätz, 2015; Anthony & Amato, 2014). Studies from recent decades have provided theories about the compensatory effect of parental socioeconomic resources. For instance, families with more financial resources may be able to retain the house they were living in, so that children can avoid changing school and neighborhood after family break-up (Hagan, et al., 1996). They may also confront less economic difficulties after the separation. Moreover, better educated parents may be more aware of the potential negative effects of divorce on the children (Mandemakers

& Kalmijn, 2014). Separating parents with a higher socioeconomic position may also behave differently in order to compensate for the negative consequences of a family adversity (Bernardi, 2014), perhaps partly due to the higher awareness of the negative consequences for the child. It is also possible that parents with higher socioeconomic position are on average more motivated in caregiving after the dissolution. For instance, it has been found that non-resident fathers with a higher socioeconomic position visit their children more often and have more contact with their children after separation when compared to low-educated non-resident fathers (Cooksey & Craig, 1998; Arditti & Keith, 1993).

The compensation theory has also been empirically tested, though the evidence is still limited (Bernardi & Boertien, 2017). Some studies show weaker association between parental separation and child well-being in families with higher socioeconomic position. Mandemakers and Kalmijn (2014) found that parental divorce in childhood was less harmful to child's psychological well-being if the mother was better educated. Additionally, higher economic resources of separating parents moderated the negative impact of divorce. In the study of Anthony and Amato (2014) the effect of parental divorce on child's self-control and externalizing problems was stronger in more disadvantaged families compared to children in more advantaged families (e.g. more social and economic resources and less parental mental health problems). Furthermore, in the study of Grätz (2015), the association of parental separation and child's educational achievement varied by parents' educational level. Children with highly educated parents were not negatively affected by their parents' separation, but among children from low-educated families, the parental separation lowered the school achievements.

On the contrary, some studies show an opposite result, suggesting that the parental separation would be more harmful in families with high socioeconomic resources. This effect may take place because children from higher socioeconomic background might have more resources to lose from a parental separation, which often leads to moving to a single-parent household (Bernardi & Boertien, 2017). In the study of Bernardi and Radl (2014), parental divorce was more strongly associated with children's tertiary education attainment if the separating parents were highly educated. Here, it was

suggested that divorce has more negative consequences for children of low educated parents. Furthermore, in the study of Mandemakers and Kalmijn (2014), the parental separation had a stronger negative impact on child's psychological well-being if the father had more educational or financial resources. The scholars noted that experiencing parental separation in a family with a high-resource father may be more disadvantageous – compared to a separating family with a low-resource father – because losing a father with high resources may lead to more substantial changes in child's everyday life and well-being. Thus, the moderating role of parents' socioeconomic resources may vary depending on whether the resources are measured from mother or father (Bernardi & Boertien, 2017). Perhaps, the high resources of mother can be better used to compensate and prevent the negative consequences of a separation, because usually the child stays with the mother after the break-up (Mandemakers & Kalmijn, 2014).

Until now, there is only a limited amount of divorce studies that have tested the compensatory theory and the results have been rather inconsistent. Moreover, the child outcomes have mainly considered academic achievement or child's later socioeconomic position. (Mandemakers & Kalmijn, 2014; Grätz, 2015.) In recent research, only a couple of studies have tested the compensatory effect on child psychological well-being (e.g. Mandemakers & Kalmijn, 2014) and to my knowledge, there is no research studying the compensatory effect on the risk of depression. Due to the lack of evidence, studying the contingencies under which parental separation leads to various child outcomes has pointed to be a priority for future research (Amato, 2000).

## 3. Study design

### 3.1 Aims of the study

Previous sections have presented two perspectives on the association between parental separation and child depressive symptoms: selection and heterogeneity. Based on the findings of previous research, three hypotheses are tested in this study. First, there is an association between parental separation and adolescence depressive symptoms in Finland. Second, this association is partly due to the pre-separation family circumstances, which both increase the risk of separation and child depressive symptoms. Third, the association between parental separation and adolescence depressive symptoms varies by parents' socioeconomic resources.

This study complements earlier evidence in four ways. First, documenting the association between parental separation and child depression is important, because the association may change in time due to a cohort effect. I argue that the negative effects of parental separation may become weaker in a society where separation becomes more normalized and the awareness of potential effects of the separation grows. As separation becomes more commonplace, it may become less stigmatizing and also less selective of troubled families (Sigle-Rushton et al., 2005). Some evidence suggests that parental practices in the separated families would nowadays be less harmful for the child. According to a Swedish study of Gähler and Palmtag (2014), parents separate in less quarrelsome circumstances today and the children from younger age cohorts have more contact with the non-custodial parent. Moreover, it can be assumed that good parental practices after separation are discussed to an increasing extent in societies where the family dissolutions are more common. Also the public support for separating families, such as therapeutic interventions, has improved in many countries (Glenn, 1998; Amato, 2001).

Second, only a few studies of the impacts of parental separation on child mental health have been carried out in Finland during 1990–2018. The results have been incoherent and the study designs have been somewhat limited. For instance, Huurre et al. (2005) found impacts on certain child health outcomes such as depression, but this applied

only to females. In contrast, Palosaari and Aro (1994) found significant differences in young adulthood depression between individuals from intact and separated families. However, both of these studies used cross-sectional data which did not enable them to thoroughly study the selection effect. For instance, Huurre et al. controlled only for parents' occupation and used a rather small sample (N=1,471), which may not be able to identify small group differences. By using a large register-based dataset, this thesis is able to provide more accurate information on the association between parental separation and adolescent depression in Finland.

Third, it is argued that the potential factors causing selection to separation and also affecting child outcomes requires more understanding (e.g. Amato, 2010). Scholars have often suggested that the pre-separation family conditions might explain why childhood mental health problems are more common among children exposed to parental separation, but there are few empirical studies examining whether the association can be explained by such selection processes (Strohschein, 2012). Moreover, to my knowledge, there are only a couple of studies that have been able to include several covariates in the analysis (e.g. Strohschein, 2012; Mandemakers & Kalmijn, 2014; Sigle-Rushton et al., 2005). This study aims to provide better understanding of the magnitude of the selection by taking into account parents' socioeconomic resources and mental health together with other pre-separation family circumstances.

Fourth, the heterogeneity of separation effects has been studied relatively little until recent years (Grätz, 2015) and several scholars have called for more research on this topic, instead of focusing on mean differences (e.g. Amato, 2000 2010). Particularly, little is known about the interaction effect of separation and parents' socioeconomic resources on child *psychological* well-being. This study addresses the question of heterogeneous impacts by analyzing the association between parental separation and child well-being across educational subgroups. It has been suggested that education reflects social, economic and cognitive resources and thus is a good single indicator of the socioeconomic resources of the family (e.g. Mandemakers, 2014).

This study examines three questions:

- 1) Is there an association between parental separation experienced at the age of 9–14 and depressive symptoms at the age of 15–21 among Finnish individuals born in 1990–1997?
- 2) How strong is the association after adjusting for family characteristics from the pre-separation time (sociodemographic factors and mental health problems)?
- 3) Does the association between parental separation and adolescence depressive symptoms vary according to the parents' highest education?

### 3.2 Data

This study uses EKSU014-Children data which is a longitudinal register-linked panel data, combining information from Statistics Finland and the Social Insurance Institution of Finland. The data from Statistics Finland includes information of demographic and socioeconomic characteristics and family structure. The Social Insurance Institution of Finland provides data on all psychotropic drugs purchases, including antidepressants. The EKSU014-Children data is a 20 % random of all Finnish households with at least one child aged 0–14 at the end of 2000. All household members are included in the data.

The study sample consists of birth cohorts 1990–1997 who belonged to the Finnish population register each year at least until their 15<sup>th</sup> birthday (N=100,325). From this sample 70,478 individuals were selected to the actual study population, which only included children living between ages 0–8 in a household with two biological parents. This means that the biological parents of all study individuals remained married or cohabiting at least until child's ninth birthday. The excluded individuals (N=29,847; 30 %) are displayed below.

- Individuals who experienced a separation of their biological parents before age of nine were excluded (N=22,845; 23 %), so that the confounding factors occurring in childhood could be measured from the pre-separation time.
- Individuals who did not live with both biological parents between ages 0–8 were excluded (N=7,002; 7 %). The restriction excluded those two-parent

families where one parent lived any year outside the household because the reason to moving out could not be specified. Individuals living in a) single parent families b) families with one biological and one non-biological parent and c) families with same sex parents were also excluded.

The restriction to individuals belonging to Finnish population register each year at least until 15<sup>th</sup> birthday was made to ensure that all study individuals had been living with both biological parents during childhood years. This was not possible to confirm for individuals who spent any childhood year outside of Finland. Moreover, the possible parental separation of these individuals may not have been recorded in the register.

The total study population was restricted to individuals living their childhood years with two parents, in order to compare groups who are as similar as possible except for the exposure to parental separation in later childhood (ages 9–14). By restricting the study groups to two-parent families and by controlling for the many pre-separation family circumstances it was possible to assess selection and to compare individuals who differ mainly regarding the parental separation.

The restriction to two *biological* (or adoptive) parents was made due to a technical reason. Individuals living in a two-parent family where one or both parents were non-biological were excluded though they would have met the study requirements. This was made because the data did not enable to specify these two-non-biological-parent families from other family forms, such as single parent families, that did not agree with the terms. Moreover, the data on psychotropic drug purchases comprised only biological parents.

### 3.3 Predictor and outcome variable

The predictor variable *parental separation at ages 9–14* divided the study population into two groups. Children, who experienced a separation of their biological parents between 9<sup>th</sup> and 15<sup>th</sup> birthday, constitute the group of exposed individuals (value 1). The separation was defined as a parental divorce or break-up of a cohabitation. The date of parental separation was derived from the date of moving apart. If the date was

missing among married couples the official date of divorce was used as the date of separation. The reference group (value 0) consisted of individuals whose two-biological-parent family remained intact (married or cohabiting) at least until the child's 15<sup>th</sup> birthday. Thereby, the reference group included both individuals from non-separating families and individuals who experienced parental separation after their 15<sup>th</sup> birthday.

Both parental divorces and break-ups of cohabitations were included in the group of exposed, because the changes in family structure and the consequences for children are likely to be similar in both kinds of union dissolutions (Amato, 2000). In the family break-up, the child often loses the other parent from his or her everyday life.

Additionally, parental conflicts and moving to a reconstituted family, for instance, are typical after separation regardless parents' prior marital status.

The outcome variable measured antidepressant purchases between ages 15 and 21. The variable was coded 0 for individuals who did not purchase antidepressants during the follow-up and 1 for individuals who purchased antidepressants at least once (failure event). All antidepressants with Anatomical Therapeutic Chemical (ATC) code N06A were included in the antidepressant purchases (also including the combination product code NO6CA01). Tricyclic medications with code N06AA were excluded (but not N06AA22 and N06AA24) because they are commonly used to non-psychiatric symptoms and thus they do not reflect well the psychiatric morbidity (Gardarsdottir et al., 2007; Sihvo et al., 2008). The variable of antidepressant purchases aims to reflect the depressive symptoms of the study population. Because the failure event (value 1) includes both single and multiple antidepressant purchases, it is likely to indicate both mild and severe forms of depressive symptoms.

The limit between the follow-ups of parental separation and child depressive symptoms was set to child's 15<sup>th</sup> birthday to obtain enough observations in both follow-up periods. Older age limit would have reduced the total sample because the younger age cohorts would not have reached the follow-up of antidepressant purchases. Correspondingly, younger age limit would have dropped the amount of individuals exposed to parental separation. Furthermore, based on the pre-analysis

with the current data the prevalence of antidepressant use under 15 years of age was low. From the study population 0.58 percent purchased antidepressants at age of 14 (cf. 1.06 % at age of 15 and 1.63 % at age of 16).

The follow-up of the outcome event lasted until 31 December 2012. For those individuals who turned 22 before this, the end of the follow-up was set to the day before their 22<sup>nd</sup> birthday. In the end of the follow-up period all study individuals were 15–21 years old.

### 3.4 Control variables and modifier

Based on previous findings regarding selection into parental separation, ten control variables were included in the regression models. These variables adjusted for the socioeconomic, demographic and mental health conditions in the family during the pre-separation time. Except for parents' age and child's sex, all control variables were measured between child's fifth and ninth birthday. The follow-up started from child's fifth birthday, because in the oldest age cohorts the psychotropic drug purchases could not be measured from the first childhood years (data available only since 1995).

The follow-up of the control was set to end at child's ninth birthday in order to adjust for the impacts of the pre-separation family conditions on parental separation and adolescence depressive symptoms. Measuring control and predictor variables in temporal order decreases the reverse causality between the events. For instance, the use of psychotropic medication and separation have shown to be strongly associated (Metsä-Simola, 2018), and presumably, the effect takes place in both directions.

Family socioeconomic circumstances were controlled for by measuring parents' education, income and unemployment. *Parents' highest education* was taken from that parent who had higher education when the child was 5–8 years old. The education was coded into four categories: 1) basic education 2) upper secondary education 3) lower tertiary education and 4) upper university degree or doctoral studies. The variable *taxable household income* indicated the average income level per a household member when the child was 5–8 years old. If the data was missing from

those particular years, it was derived from the first childhood years. The household income was counted by first dividing the annual taxable household income with consumption units of the household and then counting the annual mean when child was 5–8 years old. Finally the mean household income was divided into quintiles. The inflation and transition to the new currency were taken into account by calculating the quintiles separately in each age cohort. The variable *parental unemployment* was measured at ages 5–8 and it got three values: 1) no parental unemployment period or (2) one parent having one unemployment period or 3) one or both parents having (totally) at least two unemployment periods. The unemployment period was defined as at least six months of unemployment that occurred within a calendar year.

The dichotomous variable of *parents' marital status* indicated either parental cohabitation or marriage when child was 5–8. If cohabiting parents married before child's ninth birthday the marital status was defined as married. Moreover, *parents' average age at child's birth* and *the place of residence* were controlled. The average age indicated the parents' mean age at the time the child was born. Parents' age was coded into four categories: 15–24, 25–34, 35–44 and 45–58. The place of residence indicated the hospital district where the family lived when the child was 5–8 years old (totally 22 districts in Finland). If the family moved during these years, the place of residence was taken from that district where the family stayed most of the years. The hospital district was used as a controller for the rural-urban differences (see section 2.2.1), because it was the only variable available indicating geographical area.

The variable *parental psychotropic drug purchases* measured medicine purchases that the parents made when their child was aged 5–8 years. The data was provided by the Social Insurance Institution of Finland and included all psychotropic drug purchases that the study individuals made during the follow-up years. The variable was coded 0 for children whose parents had no antidepressant or other psychotropic drug purchases at these ages. Value 1 indicated that one or both parents had purchased antidepressants once or several times. Correspondingly, value 2 indicated that one or both parents had purchased any other psychotropic drugs once or several times. Value 3 indicated that both antidepressant(s) and other psychotropic drug(s) were purchased by one or both parents.

The control variables measuring child characteristics included *child's sex*, *birth year* and *child's psychotropic drug purchases at age of 5–8*. The variable of psychotropic drug purchases was constructed in the same way as the parental psychotropic drug purchases, but because of the low prevalence in purchases the variable was coded into two categories. Value 0 indicated no antidepressant or other psychotropic drug purchases and value 1 indicated at least one antidepressant or other psychotropic drug purchase at age of 5–8.

*Parents' highest education at age of 5–8* was also used as a modifier in the subgroup analysis to test if the resources modify the association between parental separation and adolescence depression. The variable aimed to measure the biological parents' educational resources during the process of separation. Here, it was presumed that the education level of the biological parents does not change remarkably after child has turned 9. The modifying effect was analyzed with interaction term.

### 3.5 Methods

The association between parental separation and antidepressant purchases is first analyzed with cross tabulations where statistical significance is tested with Pearson's chi-squared test. To study the magnitude of selection, also the associations between controls and parental separation as well as controls and antidepressant purchases are analyzed with crosstabs and tested with Pearson's chi-squared test.

The Cox proportional hazards model is used to estimate the association between parental separation and antidepressant purchases. Cox regression is a type of survival model that analyses the hazard of the outcome event (antidepressant purchases) occurring during the follow-up time. As in logistical regression, a dichotomous outcome variable is used in the Cox regression, but the Cox model also takes into account the timing of the outcome event.

The effect of the predictor variable and covariates on the risk of the outcome event is measured by the hazard ratio (HR). When using a discrete predictor variable the HR

describes how much the risk changes when a group category is compared to reference category. The HR can take any value above zero. Value less than one indicates a smaller risk, and value greater than 1 indicates a higher risk for the group compared to the reference category. For example, if the hazard ratio is 1.8, the particular group has 1.8 times greater (or 80 percent higher) risk for the outcome event compared to the reference group. Hazard ratio does not describe absolute risk but the risk in relation to another group. (Kleinbaum & Klein, 2005.)

The follow-up time of each study individual is defined by censoring individuals who do not experience the outcome event during the follow-up time. Also individuals who exit the study population before the end of the follow-up are censored. In this data the exit can mainly occur due to death or moving abroad. By means of the censoring all study individuals can be kept in the analysis though the follow-up time is limited to the time spend in the study population. This enables to study a larger and more representative sample. The weakness is that the censored people can be selected by some unmeasured factor. (Tabachnik & Fidell, 2007.) However, with low rates of mortality and emigration in Finland, this is not likely to be a great concern in this study.

In addition to the outcome variable, also a time variable is used when estimating the hazard of antidepressant use. This variable indicates the time spent in the outcome follow-up. The time started from 15<sup>th</sup> birthday and ended in one of the following time points:

- a) the date of first antidepressant purchase between ages 15–21
- b) 31 December 2012, if no antidepressant purchases were made until this date. (This was the last date from which data on antidepressant purchases was available.)
- c) the day before 22<sup>nd</sup> birthday, if the person turned 22 before 31 Dec 2012 and if no antidepressant purchases were made before 22<sup>nd</sup> birthday
- d) the date of exit from the study population because of death or moving abroad, if this occurred before the events a, b and c.

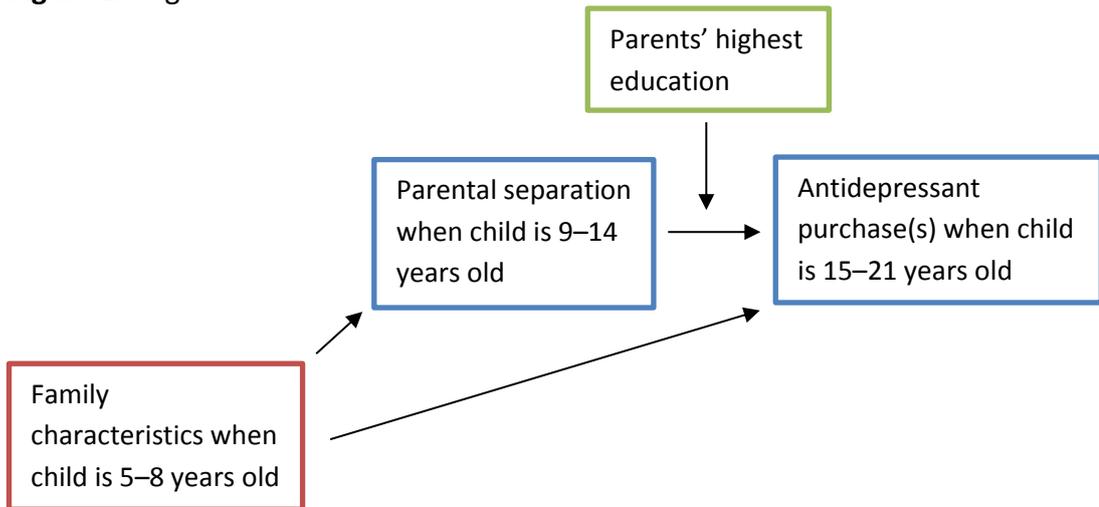
The proportional hazards assumption of Cox regression means that the effect of predictor variables has to be similar regardless of the time-point in the outcome follow-up. The assumption is tested by analyzing the interaction effect of predictor variable and outcome follow-up time (Wald test). Here the follow-up time is divided

into one-year periods. If the interaction effect is non-significant, the effect of predictor variable on the outcome event (antidepressant purchase) can be regarded as similar in every follow-up year. The proportional hazards assumption is also illustrated by the survival curves of Kaplan-Meier survival analysis. The assumption gets support if the survival curves of the study groups (individuals from separated and non-separated families) have same direction and they do not cross each other. In an ideal situation, they should be parallel. (Tabachnik & Fidell, 2007.)

Cox regression is used as the estimation method for three reasons. First, with Cox regression individuals who did not reach the age of 21 could be included in the analysis, which enabled to keep the study population larger. Second, Cox model does not only detect the differences in the prevalence of antidepressant purchases but also takes into account the differences in the timing of the purchases. This provides more accurate information because the study groups may also differ in the timing of the first antidepressant purchase. Third, because of the individual follow-up time, the Cox regression takes into account the potential differences in the length of the follow-up time between the study groups. If the mean age of the study groups differed, the other group would spend a longer time in the outcome follow-up. This would affect the prevalence of antidepressant purchases and also the estimated risk for antidepressant use if the timing was not taken into account.

The association between parental separation and child depressive symptoms is studied with three regression models. The first is an unadjusted model consisting of parental separation as the predictor and child depressive symptoms as the dependent variable. In the second model all control variables are included. Here, the predictor and control variables are adjusted for each other. The third model includes the predictor variable, all controls and the interaction term of parental separation and parental education. The models are demonstrated in the figure 1.

**Figure 1.** Regression models



The study sample was a representative random sample of all Finnish households including at least one 0–14-year-old child in the end of 2000. Thus, some study individuals come from the same household. To take the correlation between siblings into account, the standard errors were clustered by family's id [vce(cluster) option in Stata]. All analyses were carried out with Stata/MP 14.1.

## 4. Results

### 4.1 Descriptive statistics and associations

This section displays the distributions of the study individuals and demonstrates with cross tabulations the associations between a) predictor and outcome variable and b) control and predictor variables and c) control and outcome variables. This provides preliminary results for the research questions one and two (association and selection). The more detailed results for all three research questions are presented in the regression models in the section 4.2.

**Table 1.** Distributions of the study population by predictor and outcome variable

	Total sample	
	N	%
<b>Parental separation at age of 9–14</b>		
No	61,466	87.2
Yes	9,012	12.8
<b>Antidepressant purchase(s) at age of 15–21</b>		
No	66,378	94.2
Yes	4,100	5.8
<b>Total</b>	<b>70,478</b>	<b>100</b>

Table 1 shows the distributions of the study population by the predictor and the outcome variable. Being exposed to parental separation or purchasing antidepressants was not particularly common among the study population. From the total 70,478 individuals living in intact families until age nine, the majority (87.2 %) lived in a two-biological parent family at least until their 15<sup>th</sup> birthday and 12.8 percent experienced a separation of their biological parents at age of 9–14. When viewing the outcome event, a majority of the study population (94.2%) did not buy antidepressants during the follow-up years. Totally 5.8 percent of the individuals purchased antidepressants at least once during the follow-up. It should be noted that most of the individuals did not reach the age of 21 during the follow-up. If all individuals had been followed until 22<sup>nd</sup>

birthday, the prevalence of antidepressant purchases would probably have been higher.

**Table 2.** The association between parental separation and antidepressant use

	Antidepressant purchase(s) at age of 15–21					
	No		Yes		Total	
	N	%	N	%	N	%
<b>Parental separation at age of 9–14</b>						
No	58,134	94.6	3,332	5.4	61,466	100
Yes	8,244	91.5	768	8.5	9,012	100
			p<.0005			
<b>Total</b>	66,378	94.2	4,100	5.8	70,478	100

Table 2 shows the association of the predictor and the outcome variable. Purchasing antidepressants was more common among individuals who had experienced a parental separation. 8.5 percent of people from separated families purchased antidepressants at least once during adolescence and young adulthood. The prevalence was smaller among individuals who did not experience a parental separation until their 15<sup>th</sup> birthday. From these people 5.4 percent purchased antidepressant(s) during adolescence and young adulthood. The association between parental separation and antidepressant use was tested with Pearson  $\chi^2$ -test and it was highly significant ( $p<.0005$ ).

**Table 3.** Distributions of the study population (N=70,478) and shares of individuals exposed to parental separation at age of 9–14 and individuals with at least one antidepressant purchase during ages 15–21 by control variables (hospital district and birth year not included)

	<b>Total sample</b>	<b>Share of individuals exposed to parental separation at age of 9–14</b>	<b>Share of individuals with antidepressant purchase(s) at age of 15–21</b>
	%	%	%
<b>Parents' highest education at age of 5–8</b>		p<.0005	p<.0005
Upper university degree	18.1	9.6	5.3
Lower tertiary education	40.6	12.0	5.4
Upper secondary education	37.5	14.8	6.4
Basic education	3.7	16.9	7.3
<b>Annual average taxable household income at age of 5–8 (quintiles)</b>		p<.0005	p<.0005
5 (highest)	19.99	11.0	5.0
4	19.99	12.2	5.7
3	20.00	13.1	5.4
2	20.01	13.4	6.4
1 (lowest)	20.00	14.3	6.8
<b>Parental unemployment period at age of 5–8</b>		p<.0005	p<.0005
No	75.8	11.8	5.2
During one year	10.8	15.2	6.9
During several years	13.5	16.6	8.3
<b>Parents' marital status at age of 8</b>		p<.0005	p=.165
Cohabiting	11.5	18.3	5.5
Married	88.5	12.1	5.9
<b>Parents' average age at child's birth</b>		p<.0005	p<.05
15–24	8.3	18.0	6.7
25–34	69.6	13.2	5.7
35–44	21.5	9.6	5.9
45–58	0.6	7.1	5.7
<b>Parental psychotropic drug purchase(s) at age of 5–8</b>		p<.0005	p<.0005
No	81.3	11.5	5.1
Antidepressant(s)	8.7	19.3	9.3
Other psychotropic drug(s)	6.4	14.5	7.2
Both antidepressant(s) and other psychotropic drug(s)	3.6	22.3	11.1
<b>Sex</b>		p<.05	p<.0005
Male	51.1	12.5	3.7
Female	48.9	13.1	8.0
<b>Psychotropic drug purchase(s) at age of 5–8</b>		p<.0005	p<.0005
No	98.3	12.8	5.8
Any psychotropic drug	1.7	14.0	7.8
<b>Total</b>	100	12.8	5.8

The distributions of eight control variables are presented in the table 3. In general, there were enough individuals in each category of the controls to run the further analysis. As an exception, the share of individuals with basic educated parents (3.7 %), individuals with parents from the oldest age group (0.6 %) and individuals with any psychotropic drug purchase at age of 5–8 (1.7%) were relatively small. Moreover, the share of individuals with parental antidepressant and other psychotropic drug purchases were small (3.6 %).

Further, the table 3 shows the share of individuals exposed to parental separation and the share of individual with antidepressant purchases in adolescence and young adulthood in each control variable category. Despite the small N in some groups, all associations except one were significant (Pearson  $\chi^2$ -test). First, all associations between controls and parental separation were significant which points out that the two study groups differ significantly by many pre-separation qualities. Second, the associations between controls and antidepressant use were all significant, except the difference in antidepressant use between children from married and cohabiting families ( $p=.165$ ). Thereby, the pre-separation family qualities also define the risk of antidepressant use to some extent.

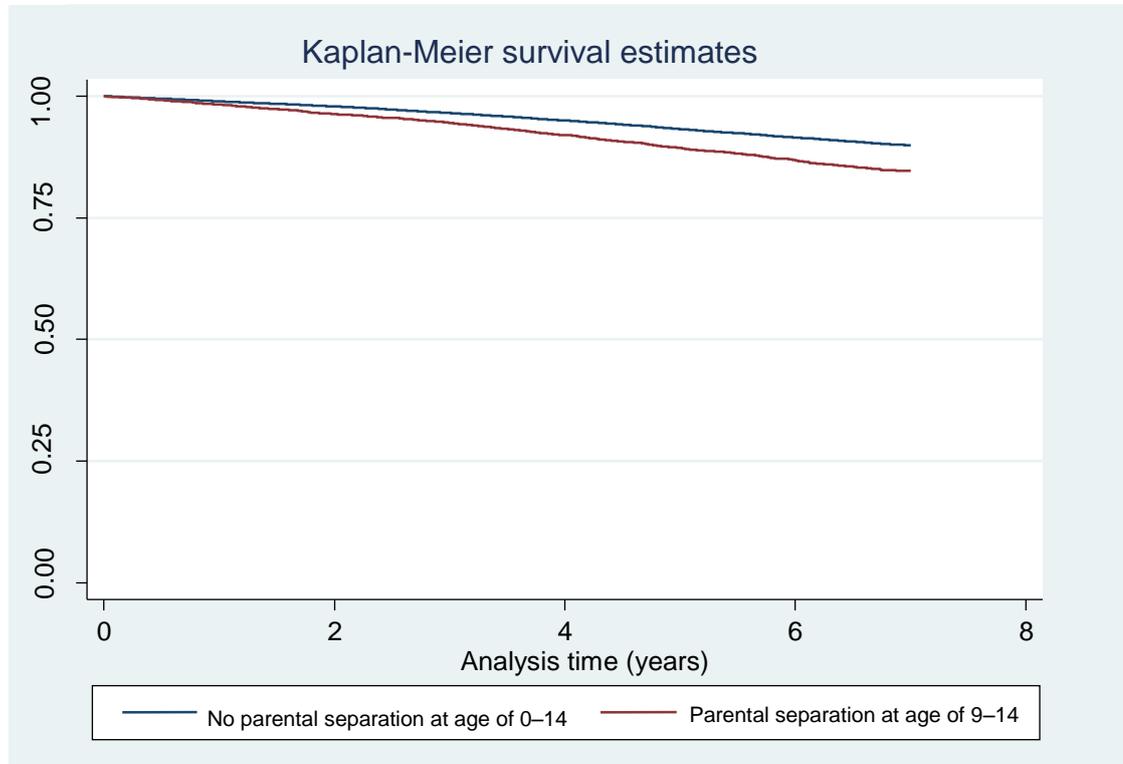
All socioeconomic factors were associated in the same way with predictor and outcome variables: lower parental education, household income and parental unemployment increased both the risk of parental separation and antidepressant use. Furthermore, parents' and child's psychotropic drug use when the child was ages 5–8 was associated in the same way with parental separation and with adolescent antidepressant use: the medication use increased both the parental separation risk and the risk for antidepressant use. Especially, if parents used both antidepressants and other psychotropic drugs, the risk of parental separation and child's antidepressant use was considerably high. Third, child's sex was also associated with parental separation and antidepressant use. Among girls the prevalence of antidepressant use was considerably higher compared to boys (8.0 % vs. 3.7 %,  $p<.0005$ ). The sex difference in the risk for parental separation was relatively small, though significant (males 12.5% and females 13.1 %,  $p<.05$ ).

Two control variables, marital status and parents' average age, were somewhat ambivalently associated with the parental separation and antidepressant use. Presumably, the confounding effect of these controls is low. In cohabiting families the separation risk was notably higher, but the child's antidepressant use at age of 15–21 did not significantly differ between married and cohabiting families. Among younger parents the separation risk was notably higher, but the differences in child antidepressant use by parents' average age did not differ remarkably. The only exception was the youngest parental age group (15–24) where both the parental separation risk and child's antidepressant use were comparatively high.

In general, the associations presented above show that children who experienced parental separation are to some degree selected by the particular family circumstances. It is likely that this selection partly explains the association between parental separation and child antidepressant use. This is further examined in the regression analysis.

## 4.2 Regression models

**Figure 2.** Kaplan-Meier estimates for surviving the use of antidepressant. Survival curves for the group of exposed to parental separation at age of 9–14 and for the group of not exposed at age of 0–14.



The Kaplan-Meier survival estimates were used to describe the probability of survival over time for those from separated and intact families. According to the figure 2, the survival curves of the study groups do not cross each other during the follow-up: they are tolerably parallel between ages 15–21. The proportional hazards assumption of Cox regression was actually tested with the Wald test. The association of parental separation and follow-up years was non-significant (chi-squared test  $p=.39$  for parental separation x follow-up year in an unadjusted Cox regression model). Thereby, the interaction effect was non-significant and the association between parental separation and antidepressant use was similar through the follow-up time. The proportional hazards assumption holds.

**Table 4.** Hazard ratios for purchasing antidepressant(s) between ages 15–21 among Finnish 1990–1997-born individuals by parental separation and parents’ highest education

	<b>Model 1</b>		<b>Model 2</b>		<b>Model 3</b>	
	Unadjusted		Fully adjusted		Fully adjusted + interaction term	
	HR	95% CI	HR	95% CI	HR	95% CI
<b>Parental separation at age of 9–14</b>						
No	1		1		1	
Yes	<b>1.60</b>	1.48–1.74	<b>1.45</b>	1.34–1.58	<b>1.39</b>	1.12–1.74
<b>Parents' highest education</b>						
Upper university degree			1		1	
Lower tertiary education			<b>0.90</b>	0.81–0.99	<b>0.90</b>	0.81–0.99
Upper secondary education			0.95	0.86–1.06	0.95	0.85–1.06
Basic education			0.97	0.81–1.15	0.90	0.74–1.10
<b>Parental separation x Parents' highest education</b>						
Parental separation x Upper university degree					1	
Parental separation x Lower tertiary education					1.02	0.79–1.32
Parental separation x Upper secondary education					1.04	0.81–1.34
Parental separation x Basic education					1.36	0.92–2.00

Model 2 adjusted for ten covariates: parents' highest education, household income, parental unemployment, parents' marital status, parents' average age, parental psychotropic drug use, child's sex, child's psychotropic drug use, child's birth year and hospital district. Model 3 adjusted for ten covariates + interaction term.

The results of Cox regression are presented in the table 4. The associations between parental separation and antidepressant purchases were significant in all three models (CI 95%). In the unadjusted model 1 individuals who have experienced a parental separation at age of 9–14 have a 60 percent higher risk of buying antidepressant(s) (HR 1.6, 95% CI 1.48–1.74) compared to individuals whose parents did not separate at least until the child’s 15<sup>th</sup> birthday. The association became somewhat weaker when all covariates were adjusted (model 2). When the confounding effects of the measured pre-separation family circumstances were fully taken into account, parental separation at age of 9–14 was still associated with a 45 percent higher risk of using antidepressants during adolescence and young adulthood (HR 1.45, 95% CI 1.34–1.58). Model 3 adjusted for all covariates and the interaction term. Here, individuals with separated parents whose highest education was upper university degree, had 39 percent higher risk for antidepressant use, compared to individuals with parents who

had the same educational level but who remained together at least until child's 15<sup>th</sup> birthday. The model was used to test if the association of parental separation and antidepressant use is significantly different between educational groups. The interaction term compares individuals who have experienced a parental separation during ages 9–14 to the reference group, consisting of individuals who have a) experienced a parental separation and b) at least one parent with an upper university degree. According to the model, the differences in the interaction effect of parental education and separation on antidepressant use were non-significant. Thus, there were not statistically significant educational differences in the impact of parental separation on antidepressant use.

Although the confidence intervals of the interaction term are overlapping, the hazard ratios can be seen as consistent with the hypothesis of educational differences. The risk for antidepressant purchases increases from a hazard ratio of 1 (ref. group) to a hazard ratio of 1.36 the lower the parental educational resources are in a separating family. That is, the association between parental separation and antidepressant use becomes stronger the less educated the separating parents are.

**Table 5.** Hazard ratios for purchasing antidepressant(s) between ages 15–21 among Finnish 1990–1997-born individuals by parental separation and parents' highest education

Parents' highest education	Parents remained together at least until child's 15 <sup>th</sup> birthday		Parental separation between ages 9–14	
	HR	95% CI	HR	95% CI
Upper university degree	1		<b>1,39</b>	1.12–1.74
Lower tertiary education	<b>0.90</b>	0.81–0.99	<b>1,27</b>	1.09–1.49
Upper secondary education	0.95	0.85–1.06	<b>1,37</b>	1.19–1.59
Basic education	0.90	0.74–1.10	<b>1,69</b>	1.26–2.26

Model adjusted for nine covariates (all controls except parents' highest education)

Table 5 shows the hazard ratios for purchasing antidepressants in different educational groups and family types. Compared to the reference group (individuals with parents remaining together at least until child's 15<sup>th</sup> birthday and having upper university degree as the highest education), all individuals with an experience of parental separation had a significantly higher risk for using antidepressants during adolescence and young adulthood. The increased risk was approximately the same in the groups

where parents had at least upper secondary education as the highest education (HR 1.27–1.39). On the contrary, in individuals with basic educated parents the parental separation caused a notably higher risk for antidepressant use (HR 1.69, 95% CI 1.26–2.26).

Because of the non-significant result in the interaction term (model 3), the differences in the impacts of parental separation between the educational groups (table 5) cannot be generalized to a larger population. However, the non-significant result may be due to the small amount of individuals with basic educated parents (N=2,606). If the sample were larger, the impact of parental separation could possibly be significantly different between basic educated families and families with higher education.

## 5. Discussion

This study shows that parental separation experienced in late childhood or early adolescence is moderately associated with depressive symptoms in adolescence and early adulthood. The use of antidepressants in adolescence and young adulthood was significantly more common in children from separated families. All pre-separation family circumstances were significantly associated both with the risk of parental separation and adolescent antidepressant use, excluding the association between parents' marital status and adolescent antidepressant use. The separated families were selected especially by the earlier socioeconomic circumstances and parents' mental health. Nevertheless, the pre-separation circumstances, including socioeconomic and demographic characteristics together with previous psychotropic drug use, explained only a minor part of the increased risk of adolescent depressive symptoms.

The moderation analysis shows that the increased risk for antidepressant use after a parental separation is somewhat stronger in low-educated families. This gives slight support for the compensation theory which assumes that the negative effects of parental separation on child well-being can be reduced by higher socioeconomic resources. However, the educational differences in the association were not statistically significant, and thus, cannot be generalized to a larger population.

The study result regarding the main association between parental separation and depressive symptoms (research question 1) is largely congruent with the previous studies that have mostly shown a moderate association between parental separation and child mental health (e.g. Amato, 2010; Anthony & Amato, 2014). Considering Finnish adolescents, studies of Tulisalo (1999) and Palosaari & Aro (1994) found a significant but moderate association between parental separation and depressive symptoms experienced in adolescence and early adulthood. In contrast, Huurre et al. (2006) found differences in psychological problems (including depression) between individuals from separated and intact families only among females.

The result of the main association appears to be in line with many studies conducted outside of Finland. According to recent meta-analyses, the association of parental separation and child well-being have been significant, but usually modest in magnitude (e.g. Amato, 2001 2014). In a meta-analysis of 92 studies mainly conducted in the 1980s (Amato & Keith, 1991b), the median effect size was .14 of a standard deviation. In the later review of Amato (2001) that investigated 67 studies from the 1990s, children with separated parents scored typically about one-fourth of a standard deviation lower than children from intact families (Amato, 2001). In the update meta-analysis comprising 17 studies mainly from the 2000s (Amato, 2014) children of divorced parents typically scored .3 of a standard deviation below children from intact families, which reflects somewhat smaller differences in child well-being nowadays compared to earlier decades.

The mean effect being modest rather than large has been explained by the fact that children's reactions to family disruption are substantially diverse (Amato, 2000; Anthony & Amato, 2014), and the effects of disruption would not comprise all children from separated families. For some children the separation is a painful experience, but many children adapt well after divorce and may even feel relieved and experience improvements in their well-being (Booth & Amato, 2001; Öberg & Öberg, 1999). Moreover, the modest association may also be due to the outcome variables that have usually been only crude measures of child well-being (Amato & Keith, 1991b).

It is notable that the coefficients of the group of parental separation indicate the risk of mental health problems only in relation to the group of non-separated families. When considering the absolute risks, that is to say the prevalence of mental health problems, the differences between children with separated parents and continuously married parents have not been large. (Amato, 2001). For instance, in previous studies the prevalence of depression and conduct disorders has been somewhat low also in children from separated families, though the risk for these disorders has been higher compared to children from intact families.

This analysis replicates the notion that the absolute risk for depressive symptoms after parental separation is moderately small. The prevalence of depressive symptoms in

divorce-children being 8.5 percent suggests that approximately 90 percent of the children exposed to parental separation do not suffer from depressive symptoms, at least when measured with psychotropic drug purchases. Thereby, the negative impacts of parental separation on mental health may concern only a part of children. This will be discussed more in the methodological considerations.

The analysis of selection into separation (research question 2) shows that the pre-separation family circumstances explain a minor part of the association between parental separation and antidepressant use. The group of separated families and families that remained intact at least until child's 15<sup>th</sup> birthday, differed mostly by their socioeconomic and mental health characteristics, which also were significantly associated with adolescent antidepressant use (table 3). After adjusting for all covariates in a regression model, the risk for adolescent antidepressant use in children from separated families still remained 45 percent higher compared to individuals whose parents remained together at least until child's 15<sup>th</sup> birthday. This indicates that parents' and child's mental health problems prior to separation – a factor that has been assumed to be partly responsible for the observed 'divorce effects' – explains a minor part of the increased risk of adolescent depressive symptoms. The result of the selection is in line with some recent divorce studies (e.g. Sigle-Rushton, et al., 2005) and reviews (e.g. Amato, 2014), which show that the selection effect explains only a part of the main association. For instance, in the study of Sigle-Rushton et al. the risk for malaise in adulthood remained 1.5-fold for those with an experience of parental separation in childhood after many relevant confounders were taken into account.

The result of the selection analysis provides slight support for the claim that parental separation in itself is partly responsible for the increased risk for depressive symptoms in later life. Because among the study individuals the average distance between the parental separation and the first antidepressant purchase was 6–7 years, the results suggest that the parental separation has semi-long impacts on psychological well-being. This can be regarded as slight support for the chronic strain model. However, a central question is what causes the 45 percent higher risk of antidepressants use in adolescents and young adults with an experience of parental separation. In my

interpretation, both causal effects and unmeasured confounding explain the higher risk.

Firstly, even though the data does not allow strong causal conclusions, theoretical arguments support the causal hypothesis which claims that in part of the children the family break-up increases mental health problems such as depressive symptoms. Parental separation is a longstanding process that includes many stressful adversities in a child's everyday life. The conflicts between parents, the parental absence after separation, loss of emotional support and changing neighborhood and even peer group are likely to be stressful experiences and significant risk factors for child mental health. At population level it is likely that these experiences lower the psychological well-being at least in some children. The causal hypothesis also gets support from the previous fixed effects studies that assess changes in well-being within individuals. The studies have shown that the parental separation has, on average, negative effects on child mental health (e.g. Anthony & Amato, 2014; Strohschein, 2005).

Secondly, the 45 percent higher risk of antidepressant use in children of separated families may be partly due to unmeasured confounding, which is noticed in previous studies too (e.g. Anthony & Amato, 2014). Huurre et al. (2006) have pointed out that the family dissolution is often an indicator of many other problems that are more prevalent in separating families. Thereby, it is probable that the observed effects of parental separation on depressive symptoms would decrease if the potential unmeasured confounders such as parental happiness, parental investment or family conflicts were controlled for. I estimate that these type of circumstances are likely to have a large impact on child's psychological well-being. Hence, they are considered next.

It has been noted that the parental investment may be lower in families that later separate. Additionally, the quality of parenting may differ between separated and intact families (Amato, 1993). In the study of Sun and Li (2001) many social and financial investments for the child, such as helping the child in schoolwork; reading books for the child; knowing the child's friends and their families; and financing and taking part in child's social activities were less common in families that subsequently

separated. Presumably, these kind of parenting styles support the well-being of children and to some degree also prevent mental health problems (e.g. Amato, 1993). I argue that the subsequently separating parents are on average less oriented to the marital relationship and family life (see also Hanson, 1999), because these kind of features are likely to increase the separation risk. It can be assumed that the motivation for and commitment to the family life and raising the children are also central factors in child's psychological development – a hypothesis also supported by Amato (1993).

Another possible confounding factor is the level of happiness and satisfaction with the marital life. It can be assumed that the level of happiness is on average higher in families that remain intact, because it is likely to be a central factor maintaining the family relations and, of course, staying together. In contrast, the everyday life in families that later break up are likely to be more often marked by stressful and burdensome events, which are also likely to contribute to the later family disruption and child well-being (Amato, 1993). This study analysis controlled for the parental mental health prior to separation by adjusting for all pre-separation psychotropic drug use of the biological parents. This is likely to some extent take into account the pre-existing differences in mental well-being between intact and separated families. However, taking more extensively into account the possible parental differences in psychological well-being and happiness would require deeper and more qualitative information on psychological circumstances in the family.

Many social problems, such as conflicts, troubled family relationships and substance abuse, are likely to be more common in subsequently separating families (e.g. Nunes-Costa et al. 2009; Kelly, 2000; Huurre et al., 2006). For instance, in the American study of Collins et al. (2007), alcohol and drug use was more common among parents who later separated. These types of problems in the family are also likely to be related to many social and mental health problems in children (Hanson, 1999; Amato, 2010). In the study of Hanson (1999), children whose parents subsequently separated were exposed to more conflict and acrimony than children growing up in stable marriages. The result also showed that parental conflict was partly responsible for the association between separation and child welfare and adjustment. The central role of pre-

separation family conflict was also found in the study of Amato (1993) where the differences in well-being between children in intact and dissolved families decreased or even disappeared when the pre-separation family conflicts were controlled for.

In addition to parental characteristics, children may also suffer from social and mental health problems more often in families that later break up. Some studies show that children exhibit high levels of adjustment and behavioral problems long before their parents separate (Cherlin et al., 1991; Doherty & Needle, 1991). Thereby, the problems of the child may also contribute to the risk of family break-up (Bhrolcháin, 2001), for instance by causing disagreements and challenges for the parents in raising the child. This study aimed to take into account the child's early mental health problems by measuring all psychotropic drug use at age of 5–8. Presumably, this took into account to some extent the differences in early child psychological well-being between families that later separated and families that remained intact.

To conclude the considerations, both causal effects and unmeasured confounding are likely to contribute to the 45 percent higher risk for adolescent antidepressant use. Thus, the higher risk for depressive symptoms should be regarded as a sum of many limitations in the family. The parental separation appears to be one cause but other social and mental health circumstances are likely to contribute to the risk of adolescent mental health problems too.

Considering the question of compensatory effect (research question 3), the association between parental separation and antidepressant use was somewhat weaker in the groups with higher parental education. Nevertheless, the educational differences were not statistically significant and cannot be generalized to a larger population. In the study population, the educational differences were only moderate. This can be explained by three approaches. Firstly, it may be due to two opposite tendencies that affect in parallel and reduce the differences. On the one hand, parental separation may be more critical for the child adjustment if parents are not aware of the potential impacts on child and are not as able to socially and economically support the child during the critical years. On the other hand, the parental separation may be more severe in socioeconomically advantaged families, because it is less common among

peers and thus may be more stigmatizing. Moreover, the break-up of family can be perceived more severe if the family life has been characterized by ideal living standards.

Secondly, the small educational differences may be due to the extensive social policy in Finland that provides financial and social support for separated families. Thus, the separating families with less resources may not drift into as severe economic difficulties or social problems as it could be assumed, at least compared to countries where the welfare is more based on personal social insurances. For instance, the financial support for single-parents provided by state is comparatively high in Finland and also the public social support for separated families, such as therapy, can be regarded as comprehensive in Finland. In contrast, previous studies analyzing the compensatory effect have studied populations in other countries where less social and financial support may have been provided by the public sector (e.g. a sample of British birth cohort in Mandemakers & Kalmijn, 2014 and Bernardi & Boertien, 2017). This may explain why some previous studies have found stronger support for the compensation theory.

Thirdly, it is possible that the parents' education operates as a compensatory resource and prevents the decrease in child well-being only in some child outcomes, and thus, the educational resources would not be a particularly important protective factor in child mental health problems. In recent studies, stronger empirical evidence for the compensating role of parents' education has been found when child's educational achievements after separation have been measured (e.g. Bernardi & Radl, 2014; Grätz, 2015). Possibly the higher socioeconomic resources of separating parents can be used to prevent the decrease in child's educational achievements (e.g. financing child's studies), but not as much in child mental health. Perhaps, other parental resources, such as emotional and social resources play a more important role when taking care of child's mental well-being after a family disruption. In further studies the heterogeneity in the effects of parental separation on child well-being would be important to study with moderators such as parental investment, conflicts in the family and the quality of parent-child relations after separation, that have been found to be consequential in the adjustment to parental separation (Nunes-Costa et al., 2009).

## 5.1 Methodological considerations

The study results are based on a high quality register data with a large representative sample of Finnish children living in households with biological parents. This administrative data is unique because it does not suffer from reporting bias and selective loss during follow-up.

With the large panel data covering a period of 15–21 years from birth to adolescence, this study provided important and unique information on the selection into separation by the many early family circumstances. Compared to cross-sectional studies, this data had information on several family circumstances from each follow-up year and the variables included accurate information on the timing of the events. These qualities enabled to extensively control for socioeconomic conditions and other demographic characteristics. Moreover, by measuring all psychotropic drug purchases, this study was able to extensively control for the pre-separation mental health problems in the family. Mental health problems among family members have been found to cause strong selection into separation, but however, this factor has not been taken into account in most of the divorce studies. To my knowledge, there is only one study that has controlled for parents' mental health (parental depression in Strohschein, 2005) when studying the association of parental separation and child mental health outcomes.

Measuring adolescent depressive symptoms with antidepressant purchases has its strengths. Firstly, with register data the time of the antidepressant use can be rather accurately pinpointed. As aiming to study the effects of parental divorce on adolescent mental health, measuring depression with antidepressant use ensures that the problems in mental health occur after the presumed cause. Secondly, the data on antidepressant purchases do not suffer from reporting bias, a problem faced in many survey-based studies. This limitation has concerned earlier studies that have relied on interviewing the parents (e.g. Strohschein, 2012; Mandemakers & Kalmijn, 2014, Robbers et al., 2011), the child (e.g. Tulisalo, 1999) or teachers of the children (Robbers et al., 2011). Moreover, the questionnaires measuring depression have in some studies

been rather insufficient, not relying on any standardized measurement of depression (e.g. teacher and parent reported 'internalizing problems' in Robbers et al., 2011).

Measuring the prevalence of depressive symptoms with the particular outcome variable has some limitations. The dichotomous outcome variable of antidepressant purchases provides a crude estimate of the mental health differences, not making any difference in how severe forms of depression the children in both study groups are experiencing. Additionally, the mental well-being of adolescents who did not purchase antidepressants remains unclear in this analysis. Using a more comprehensive and sophisticated measure of depression would probably provide more accurate information on the mental health of all adolescents exposed to parental separation.

Measuring the prevalence of depressive symptoms with antidepressant purchases may suffer from mild bias, because the information of antidepressant users does not cover the total population suffering from depressive symptoms. Firstly, the measurement may suffer from under coverage. All individuals experiencing depression do not seek treatment for their symptoms, for example due to a lack of social support from parents and other authorities. Moreover, some individuals with mild forms of depression, such as feelings of anxiety and malaise, do not buy any antidepressants. Additionally, not all individuals with depression diagnosis treat their symptoms with medication. Secondly, some individuals may purchase antidepressants for purposes other than depression. However, it is likely that this group is only marginal, because the particular tricyclic medications often used for other purposes than depression were excluded from the data. Hence, I estimate that the former bias, that is to say the under coverage of depressive symptoms, is likely to be stronger. The result of this study may slightly underestimate the prevalence of depressive symptoms in adolescence and young adulthood.

Also the particular follow-up period is likely to contribute to the observed prevalence of depressive symptoms. Presumably, the prevalence of antidepressant use would be higher if the data covered years after 2012 and all individuals were followed until 21 years of age. Among 1990-born individuals who all reached 21 years of age during the follow-up, the prevalence of antidepressant purchases was 10.5 percent. It can be

assumed that the prevalence of antidepressant use at ages 15-21 would be around 10 percent or higher if all individuals were followed until 21 years of age. However, it is likely that this does not affect the study group differences in the risk of antidepressant use, because the mean ages of both groups were nearly the same.

The study result regarding the association between parental separation and antidepressant use can be considered reliable because it is based on a large population representative data. However, the restrictions in the study sample may contribute to the strength of the association. Firstly, individuals who experienced a parental separation after 15<sup>th</sup> birthday were included in the group of 'intact families', though they may have had a higher prevalence of antidepressant use. Secondly, individuals who experienced parental separation in early childhood were excluded. In these families, children may have a higher risk for mental health problems during adolescent years, for instance due to social and economic disadvantages. For instance, the study of Chun et al. (2016) has shown that parental separation experienced in early childhood (ages 0–9) was more strongly associated with depression in later life, compared to a parental separation experienced during ages 10–17.

Including individuals with an early experience of parental separation, and excluding individuals with a later experience of parental separation from the study sample, would probably have generated a stronger association, showing an even more increased risk of depressive symptoms among children of separated parents. However, the group of an early exposure to parental separation was excluded in order to study the selection by measuring the confounding childhood family circumstances from the pre-separation time. In contrast, the group of later exposure to parental separation was included in order to construct two study groups that have identical requirements except the exposure to separation before the outcome follow-up. The common requirement was that all children had to live with two biological parents until the 9<sup>th</sup> birthday.

On the contrary, another tendency may slightly overestimate the higher risk of depressive symptoms among children from separated families. The increased risk of antidepressant use in the group of exposed to parental separation may partly be due

to a higher propensity to seek treatment in separated families. According to the current results, separating parents seem to have mental health problems (psychotropic drug use) more often than parents staying together, and thus they may be more sensitive to recognize depressive symptoms in their children and seek treatment for them. Moreover, school and health care authorities may recognize depressive symptoms if the child has recently experienced a concrete adversity, such as a parental separation. It is possible that depressive symptoms in a child from an intact family are often considered as a sign of puberty.

The result of educational differences in the effect of parental separation may suffer from mild bias. It may be that high educated families are more active in seeking treatment for their health problems. Following this assumption, if the individuals with low educated and separated parents sought treatment for their depressive symptoms as actively as other educational groups, the increased risk among them would be even larger, showing a stronger compensatory effect. Nevertheless, to analyze if the possible inactivity in seeking treatment is responsible for the non-significant result in the educational differences, would require other measures of depressive symptoms. Alternatively, the compensation theory might get more support if an even larger study sample was used by which the small and potentially significant educational differences would be detected.

## 5.2 Conclusions

This study has shown that parental separation is moderately associated with depressive symptoms experienced in adolescence and young adulthood. Based on a) the analysis of selection, b) theoretical claims of the mechanism between separation and child well-being and c) earlier evidence from fixed effects studies, the higher risk for depressive symptoms is likely to be partly caused by the parental separation itself. In addition, other family circumstances also contribute to the increased risk for depressive symptoms after parental separation. Two arguments for the latter claim are presented.

Firstly, this study showed that families that later separate are on average more socioeconomically disadvantaged, suffer more often from mental health problems and also differ by other demographic characteristics. The analysis proved that these circumstances were partly responsible for the increased risk for adolescent depressive symptoms in adolescence and young adulthood. Secondly, also unmeasured factors contribute to the higher risk for depressive symptoms. Theories and earlier empirical evidence show that families that subsequently separate differ by many qualities compared to intact families. Parents' social and economic investments for the child, parenting styles, and different social problems such as conflicts and substance abuse are more common in separating families. These factors are also likely to cause psychological problems in children of divorce.

In my view, the many factors contributing to the mental health problems in adolescence and young adulthood indicate that social problems are often clustered in population and are inseparably related to each other. Thereby, a more holistic approach should be taken. The many unfavorable childhood circumstances, potentially causing the mental health problems, should be regarded as a whole. Many risk factors together are likely to have stronger impacts on child well-being than just the separation itself.

This study provides support for a notion that living in a separated family is, on average, less favorable to child's psychological well-being compared to intact families. However, in order to reduce any mental health problems experienced in adolescence and young adulthood, efforts should be taken to diminish the many substantial differences in families with young children. Public support for families suffering from health problems, unemployment, economic difficulties and other social problems is likely to play a central role.

Finally, some topics for future research are discussed. Because the association of parental separation and child well-being is fairly well studied, the future research should especially focus on two questions: causality and heterogeneity. In order to reduce the selection and obtain stronger evidence for the causality, the future research should use longitudinal datasets and more advanced methods. Here,

statistical methods that are better able to control for the unmeasured confounding (e.g. individual fixed effects models) should be favored. These methods would also provide more accurate understanding of what parts of the child well-being (e.g. psychological, social, economic well-being or educational achievements) are most vulnerable after experiencing the family dissolution.

Another question is the heterogeneity in the effects of parental divorce, a question that has pointed to be a priority for future research (Amato, 2010). By now, the question of compensatory effect of socioeconomic resources requires more research because of the limited and inconsistent evidence. Also other important moderators, such as the decline in economic standard or the child's living arrangements after divorce, would be important to examine. However, with register-based studies the diversity of separating families can be studied only to a limited extent and some relevant moderators fall out of scope.

Recent research has found some protective factors that moderate the link between parental separation and problematic child outcomes. These factors have included parents' smooth adjustment to the disruption, authoritative parenting (i.e. emotional support and responsiveness to children's needs), positive co-parental relationships and intimate parent-child relations after divorce. Additionally, if parents do not involve their children in disputes, children seem to show better adjustments. (Amato, 2014; Feldhaus & Timm, 2015.) These protective factors are related to social and psychological circumstances in the family. With a more qualitative fashion, future studies could complement the understanding of why children's responses to family dissolution are so variable and what factors are the most effective in preventing the negative outcomes.

Overall, this study found a significantly higher risk for adolescent and young adulthood depressive symptoms among individuals with an earlier experience of parental separation. The study suggests that the increased risk is partly caused by the socioeconomic and mental health circumstances together with many unmeasured social conditions, which are on average less favorable in subsequently separating families. The adolescent and young adulthood depressive symptoms are also likely to

be partly caused by the parental separation itself. In the study population the parental separation appears to have been less detrimental to children whose separating parents have more socioeconomic resources that compensate and prevent the negative consequences for child mental health. These results stress that several factors contribute to the risk of depressive symptoms, and thus a holistic approach in the prevention of mental health problems among adolescents is needed. Public health policy should target families suffering from different financial difficulties, social and mental health problems, or marital challenges. An early intervention would be crucial.

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