The Only Child Experience

A study on how having no siblings influence childbearing behavior

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Abstract

In a society with a strong two-child family norm, but where children tend to reproduce the fertility behavior of their parents, it is relevant to study the childbearing patterns of only children. Do they follow the stream or do they follow their parents? There is very little previous research on this topic, but there is some evidence that show that only children are not more likely to prefer a one-child family themselves. Using GGS data from Sweden and Norway, this study aims to understand if being an only child is a determinant for having an ideal family size of one child, or having a completed family size of one child. The study is limited to those who want at least one child and to those who have at least one child (i.e. the study excludes childless). The analysis is conducted with binomial logistic and linear (OLS) regression methods.

The study finds that only children more often do prefer a family size of one child and more often end up with a final family size of one child, compared to sib children. However, the association between being an only child and having a one child preference is also influenced by socio-economic status in the family of origin. If the parents’ education is high (post-secondary/tertiary), the likelihood of someone having a one-child preference decreases. The relationship between being an only child and having a final family size of one child is partly mediated by the experience of parental separation and/or own separation, where both factors increase the odds of stopping at one child. The conclusion and main contribution of this study is that there seems to be a family of origin socialization mechanism influencing the fertility of only children, making them more likely to both prefer and have a one-child family, compared to sib children. Thus, only children are more likely to deviate from the two-child norm, compared a person with siblings.

Keywords

Only Children, Fertility, Intergenerational transmission, Socialization, Two-child norm
## Contents

**Introduction** 4  
Research questions 5

**Previous research** 6  
Sibship size influence on fertility behavior 6  
The two-child norm 7  
One-child families 8  
Only children 9  
Biological heritability of fertility 11

**Theoretical context** 12  
Hypotheses 17

**Data and method** 18  
Data 18  
Dependent variables 20  
Independent variables 21  
Method 24

**Results** 25  
Descriptive statistics 25  
Regression analysis 29  
Post estimation 35

**Discussion** 36

**Acknowledgements** 40

**List of references** 41

**Appendix**
Introduction

In a society characterized by a strong two-child family norm, but where research show that children are likely to reproduce the fertility behavior of their parents, it is relevant to study the childbearing patterns of only children. Do they follow the stream or do they follow their parents? The experience of having a sister or brother is shared by many, but not all. As a part of a trend towards a smaller family size in general, the proportion of one child families have increased over the last century in Europe, particularly in Eastern and Southern Europe. In Western and Northern Europe, the share of one-child families has remained rather stable over the same period (Frejka, 2008). According to Frejka, the proportion of one-child mothers in Norway has fluctuated between 17 and 22 percent across cohorts born from 1950 to 1965 (completed fertility). In Sweden, the proportion of one-child mothers has varied across cohorts from about 18 % among those born in 1945, 15 % among mothers born in 1960 and increasing to 17 % among mothers born in 1970 (completed cohort fertility) (SCB, 2017).

While the most common family constellation typically includes more than one child, the one-child family and the only child experience is indeed a non-negligible characteristic of European demographics.

Many studies have aimed to explain how family of origin influences different outcomes in life, for example: educational attainment, divorce, age at parenthood and completed fertility. Identifying different mechanisms of intergenerational transmission (both positive and negative) is important when trying to find pathways that explain the reproduction of social and financial inequalities, which in turn affects the opportunity and freedom to make choices (McLanahan and Percheski, 2008; Dahlberg 2015). One important finding has been that sibship size is positively correlated with final family size (Murphy, 1999). The more siblings you have, the larger family you have, and vice versa. Other studies have aimed to understand determinants of becoming a one child-parent, a group where only children seem to be overrepresented (Parr, 2007). Yet, another finding show that only children are not more likely to prefer a one-child family themselves, compared to those with siblings (Blake, 1981). Thus, the studies relevant to this topic does not give a clear answer to the question; are only children more likely to want (or to have) a one-child family themselves, or are they not? An investigation into the reproductive patterns of singletons will contribute to this field of study
by focusing specifically on the fertility outcomes of only children. It can also add knowledge to the scientific discussion about future population development in Europe, where the share of one-child families is increasing and findings on the childbearing of singletons will be of value.

**Research questions**

The main aim of this study is to answer the question: *how does having no siblings influence reproductive behavior?* Specifically focusing on whether they model their childbearing according to that of their parents, or not. It means looking at two different outcomes of fertility behavior, namely: the one-child family preference and the final family size of one child. This study will exclude individuals with a preference for zero (0) children, and a final family size of zero (0) children, thus only analyzing those who wants, or has, at least one child. The empirical analysis will be conducted with merged data from the Generations and Gender Survey from Sweden and Norway, two similar fertility and societal contexts. However, it is reasonable to believe that the relationship studied can be influenced by some mediating or confounding factors. The second research question will determine *if the association between being an only child and reproductive behavior is influenced by other factors such as marital disruption and social background*. In the analysis, I will also investigate whether age at parenthood is significantly different for only children, compared to sib children. The layout of this thesis will begin with a review of relevant previous research, theoretical frameworks related to the intergenerational link leading to four hypotheses that will be tested in the analysis section. It will be followed by a discussion connecting the empirical results to previous research and theory, ending in a conclusion with the most important findings.

**Previous research**

*Sibship size influence on fertility behavior*

There have been many studies devoted to describing and explaining the association between family of origin and family demographic behavior. The earliest piece of evidence of the
intergenerational transmission of family size show that there is a positive correlation between the fertility of the mother and that of her daughter (article from 1899 by Pearson, Lee & Bramley-Moore). In a meta-study of research conducted from 1899 to the end of the 20th century, Murphy (1999) concludes that there exists an overall positive correlation between number of siblings and total number of children, the average correlation coefficient being between 0.15 and 0.2. The intergenerational link also seemed to become stronger over time, but this conclusion was later revised in a more recent study by the same author. The correlation was found being stable, but no longer increasing (Murphy, 2013). Another finding from the same study is that the correlation is stronger in Eastern and Southern Europe, and somewhat weaker in Western and Northern Europe.

Findings of sibship size effects on fertility from the Northern European context corroborates the general findings from other contexts. In a study from Denmark, sibship size is shown to be positively correlated with the fertility patterns of 25 and 26-year olds (Murphy and Knudsen, 2002). They also conclude that there is little evidence for the existence of birth order effects on intergenerational transmission and that having half-siblings (as a proxy for parental partnership breakdown) do not seem to have a strong influence on fertility behavior. A more recent study from Sweden on multigenerational transmission of childbearing show that there is a strong association between the final number of children of close and extended kin and the risk of having a(nother) child among women and men born between 1970 and 1982 (Kolk, 2014:1). The strongest association is found between the index generation and the parents. In the above-mentioned study by Kolk, only children is used as a reference category, and it is clear that they have a lower risk of transitioning to parities one, two and three, compared to those with one or more siblings. Studies on fertility outcomes and whether siblings influence each other show that people with one or more siblings do tend to influence (and be influenced by) the fertility decisions of their sibs (Lyngstad and Prskawetz, 2010. In Norway, this association was strong for first birth rates, but almost negligible for second birth rates. This means that having no siblings leads to fewer potential peers that could influence fertility decisions. Singletons have a smaller network (at least to begin with).
Evidence from France show that individuals with no siblings do tend to desire fewer children on average (2.0 children) compared to those with one or more siblings (2.1-2.3 children) (Regnier-Loilier, 2006). However, 44.7 % of only children wants to have 2 children themselves, which is an equal share compared to the two child-preference of those with one sibling (44.0%). A key finding in this study is that family size preference seems to be influenced by size of family of origin, but only under certain conditions such as: stage of family formation (if the person is single) or if he or she is not already a parent. After the transition to parenthood, the influence of family of origin on family size preference seem to diminish entirely. Regnier-Loilier also finds that 61 percent of only children would have preferred to have had (more) brothers or sisters, a finding which is not discussed further by the author.

The two-child norm

As family formation of only children is the focus of this study it is highly relevant to review the overall completed family size-development in Europe and the Nordic countries. In a study from 2008, Tomas Frejka concludes that the two-child norm remains strong throughout Europe, but also that the share of one-child families gradually has increased, particularly in Southern, Central and Eastern Europe (for example in Romania and Russia). In Western and Northern Europe, the share of one-child families has remained rather stable. The share of childless have increased in most countries throughout Europe. Frejka follows the two-child-family trend from cohorts born in 1900 through to the 1965 cohorts, and it is apparent that a final family size of two children gradually has become the norm over the 20th century and that the share of larger families (three children or more) has become less prevalent. A pattern that he predicts will last into the foreseeable future (Frejka, 2008).

In another study conducted a couple of years after Frejkas overview, Tomás Sobotka and Éva Beaujouan (2014) aimed to understand why the two-child family ideal persists in Europe. With low fertility rates in many countries, increasing family instability and complexity, and a general trend where family norms are becoming less constraining, would it not also lead to less adherence to an ideal family size of two children? When data on family size ideals
(preferences) from 168 surveys conducted from 1979 to 2012 in 37 European countries was analyzed, the conclusion was that the two-child norm was still very strong (Sobotka and Beaujouan, 2014). A family size of one child would in many ways be the rational choice, it would be “cheaper” (lower opportunity, and financial, cost), more practical and emotionally sufficient for the parents. However, Sobotka and Beaujouan argues that there are five possible explanations for people still wanting two: 1. The possibility to have one child of each sex, 2. The stereotypical only child is perceived as spoiled and problematic, and the parents are viewed as selfish, 3. The first child gets to have a confidante (one of the most cited arguments for having a second child), 4. An insurance-strategy if something happens to one of the children, 5. Fitting the societal norm, where it is often simply expected for couples to have two or more children. In addition to this evidence from the wider European context, research from Norway show that there is a strong two-child norm in society where about 80 percent of one-child mothers go on to having a second child (Lappegård, 2009). The same pattern can be seen in Sweden, where also more than 80 percent of mothers have a second child (Duvander, 2003; SCB, 2011).

One-child families

In societies characterized by a strong two child-norm, it is relevant to study the one-child parent. There seem to be several factors that can determine this specific outcome (completed fertility of one child). In a study from France, the strongest correlations were found between, ‘having family size of one child’ and the two factors: ‘high age at first birth’ and ‘not living in a union at the time of birth’ (or if the parents broke up within 10 years after the child was born) (Breton and Prioux, 2009). When controlling for covariates, the influence of being an only child significantly increased the risk of stopping at one child. Another important finding by Breton and Prioux, was if the partner already had a child, this increased the risk of stopping at one child substantially. Also, nationality background and if the parents of the index person did not live together during childhood, increased the risk of having only one child.
The share of one-child mothers in Australia increased from 8 percent to 11 percent between 1991 and 2001, and were projected to increase further. This raised the question of why, and which women stopped at one child? (Parr, 2007) The main findings were that socio-economic background (highest educational level), father's occupational category, age at first birth and immigration background (birthplace) were the most important determinants for this outcome. A high education level, if the father had a high-status job (managerial), a high age at first birth and if the woman originated from East Asia, all increased the risk of stopping at one child. However, this finding by Parr (2007) should probably be interpreted in the Australian context, where a large share of immigrants originates from Asian countries, among them China, which has had a very particular demographic development related to the former one-child policy. Another (uncontrolled), finding in this Australian study, was that women without siblings were much more likely to have one child (22 percent) compared to those with siblings (13 percent).

It is also relevant to understand some contemporary developments of the determinants for having a small family (not specifically a one-child family, though). In an overview of recent family demographic findings, Billari and Esping-Andersen (2015) points to the fact that a high education level no longer seem to be a determinant of low fertility, at least not in more gender egalitarian contexts (Billari and Esping-Andersen, 2015). This development is evident in the Nordic countries (Sweden, Norway, Finland and Denmark), where an extensive study has shown that the negative educational gradient for women’s completed fertility no longer exists (Jalovaara et.al., 2017). This contradicts the theoretical concept of the second demographic transition, where a high education (for women especially) is regarded as a predictor of low fertility (primarily caused by childbearing postponement), and that women’s entry into higher education and the labor market leads to decreasing fertility rates (Lestaeghe, 1991).

*Only children*

Historically, having no siblings have been regarded as a disadvantage, and only children have been branded as: "spoiled", "isolated", "self-centered" and "overprotected" (Blake, 1981). In
a study by Blake (1981) from the United States, individuals without siblings have been identified as being more likely to come from an advantaged socio-economic background (higher parental education and higher status of parental occupation), they are more likely to have grown up in an urban environment and have an overall higher educational attainment (and occupational status) compared to those with siblings (but not that different from those with one sibling) (Blake, 1981). However, Blake argues that only children are not always advantaged. They are more likely to have experienced a parental break-up and they have less sociability (less frequent meetings with friends etc.), compared to those with siblings. On average only children desire fewer children compared to siblings, but they are not more likely to prefer a one-child family themselves, according to Blake (1981). In this study, the author concludes that overall, children from small families do far better than children from large families. This relationship between smaller family size and higher educational achievement, occupational status and income is corroborated in other studies (Parr, 2006; Marks, 2006).

Many studies on demographic and other behavioral outcomes of only children is focused on the Chinese context. It makes it no less interesting, but since this study is set in the Nordic context, which differs a lot from China with respect to demographic regime (former one-child policy), culture and society, I will only mention two of the Chinese studies. The first found that among Chinese schoolchildren, only children had overall higher scores on verbal tests, but no major differences in personality traits were found (i.e. level of ”selfishness” or ”disrespect for elders” etc.) (Falbo and Poston, 1993). Contradicting Falbo and Poston's findings, a study on Chinese 4-6 year olds and 9-10 year olds show that only children are indeed more prone to be egocentric and less cooperative, compared to sibling children (Jiao, Ji and Jing, 1986).

The large part of research on the characteristics of only children have been conducted within the field of psychology. In a research review-study by Mancillas (2006) he traces the theories of the personality of the only child way back to 1898, where a study concluded that; having no siblings was so problematic that “being and only child is a disease in itself” (Mancillas, 2006, p. 268). While the modern perception of only children is not quite that extreme, there is
still a general idea that being an only child is a negative trait, even though it has been shown to be an advantage in many aspects. Mancillas concludes that most associations found between being an only child and negative personality traits, such as; being spoiled, maladjusted, lacking social competence etc. are false, and must be remnants of the old stereotype. But only children do differ in some aspects, Mancillas concludes that the parent-child relationship is typically more intense for an only child, compared to a sib child.

In the Oxford Handbook of Evolutionary Psychology, the section on birth order and sibling competition briefly summarizes some characteristics used to describe the singleton. They are seen as a ‘controlled experiment’ that lack competition from other siblings and experience no parental discrimination, and they tend to have personality traits somewhere in between typical first-borns and second-borns. Only children are regarded as conscientious and parent-identified (Sulloway, 2007). Overall, previous research does not seem to offer any evidence that the personality traits of only children differ significantly from those of sibchildren. One could possibly say that only children might be less ‘social’, and that the relationship between them and their parents is more intense, compared to those with siblings.

*Biological heritability of fertility*

A factor that can influence the variance in fertility outcomes is biological heritability, but it is seldom accounted for in social science research. The fundamental theorem of natural selection (defined by Sir Ronald Fisher in 1930) state that there is a genetic component explaining the variance in reproductive fitness, but its effect diminishes over time (as natural selection works its way across generations), as described by for example Rodgers (2001). However, if forces such as mutations or change in environment are applied to human populations, the effects of genetic fertility determinants are assumed to increase. The idea, as is that genetic influence on fertility is strongest when childbearing decisions are most conscious and deliberate, compared to when they are strongly influenced by societal norms and economic conditions (Rodgers et.al, 2001; Kohler et.al. 1999).
Even though several studies have found no significant influence of genetics on fertility (e.g. Langford and Wilson, 1985), two studies on Danish twins show that there is indeed a genetic factor that can explain fertility outcomes such as: number of children, transition to first birth and age at first pregnancy attempt. However, both studies find that the genetic factor is dependent on the demographic and socioeconomic context (for example: state of demographic transition etc.), in line with Fisher's theorem (Rodgers et.al, 2001; Kohler et.al. 1999). Both studies emphasize the fact that they have not assessed the genetic transmission of fecundity between parents and children. Another study on the intergenerational transmission of fertility, investigates the socio-culturally homogenous Hutterite population and show that there is a significant genetic component that explain the variance in reproductive fitness. Fertility correlations between parents and sons were 0.29 and daughters 0.18 in this case (Plushnikov et.al., 2007). Genetics can also work through pathways other than the direct heritability of reproductive fitness, factors like heritability of fertility preferences or socio-economic status could have a genetic component that influences childbearing (Kolk, 2014:2). Genetics as a predictor of fertility cannot be overlooked in the case of only children, when the strong two child norm is considered and that parents of only children might have wanted a larger family, but was not able to conceive due to biological secondary infertility. We can therefore not rule out the possibility that secondary infertility can be inherited. However, assessing the influence genetics might have on the childbearing of only children is not within the scope of this study.

**Theoretical context**

When explaining associations between the index generation and the parental generation the most commonly used theoretical concept is intergenerational transmission. It can be driven by three different mechanisms: socialisation, socio-economic status inheritance and genetics (Bernardi, 2016). Research with focus on the intergenerational link often try to determine which mechanism is most prominent for the particular relationship investigated and under which conditions the intergenerational link is strong or weak, respectively.

Socialisation of fertility behaviour involves the passing of norms, values, preferences and attitudes across generations. According to Bernardi (2016) early socialisation is ‘the most
fashionable explanation of the similarities in the trajectories of parents and children’ (Bernardi, 2016, p. 4). Fashionable or not, the logic is that the family of origin is the context within which the child is primarily exposed during the early formative years. It is also the child’s most up-close experience of a family structure and fertility behaviour. The socialisation mechanism can also influence children way into adulthood. Bernardi argues that parents are among those who have sanctioning power over fertility decisions even after the child has grown up.

How fertility behaviour is transmitted, within the more general socialisation framework, is investigated by Litton Fox (1982). She argues that there are several different categories of factors that determine fertility behaviour. Primary foci of fertility socialisation are variables related to actual childbearing: age at first birth, total number of children and the spacing between childbirth. Secondary foci are: attitudes and preferences towards childbearing behaviour. Tertiary foci are: preconditions of fertility such as sexual behaviour and attitudes, and contraceptive use and attitudes. Also, according to Litton Fox, there are other variables that influence fertility, for example lifestyle preferences. However, socialisation works differently at different stages of life, and pretty much all factors related to childbearing behaviour are subject to change over the life course, especially after the first child is born (Litton Fox et.al, 1982).

Litton Fox and colleagues (1982) has developed a model which can be applied to studies of fertility socialisation (of actual childbearing behaviour or preferences thereof). It offers a comprehensive rationale of variables that are relevant to any analysis of the association between family of origin and individual fertility behaviour. As previously mentioned, family is the primary context for socialisation and factors like parent's fertility behaviour and values, influence the child, and it can both be modelled or counter-modelled. Also, family can work as a filter for influences coming from external sources. Other factors important for fertility socialisation are: parental background (socio-economic status influence for example parenting style), family structure and parents’ satisfaction with their life and marriage, sibling effects (siblings inspire each other’s childbearing) and quality of the parent-child relationship (good relationship implies stronger effect of socialisation). There are also external factors, such as:
government policies that influence childbearing, cultural background factors, institutional factors (church-going, school context, work and media) and influences by friends, peers, partner and own children (Litton Fox et.al, 1982). Considering these possible factors as determinants of fertility outcomes, they can (with a few exceptions) be applied in a model determining fertility patterns of only children, especially when considering the finding that the relationship between a parent and only child is likely to be more intense, compared to a parent – sibling relationship, as described by Mancillas.

A study of fertility socialisation from the United States, show a positive association between the mother's preference for her daughter's family size and the fertility preference of the child (both in teen years and at age 23) (Axinn et.al 1994). This association is stronger than the relationship between the actual family size of the mother and the daughter's fertility preference, and it is taken as evidence for the fact that values and preferences of parents are very important for the fertility behaviour of the children (Axinn et.al. 1994). However, the influence of parental preference on the child’s family size seem to decrease as the child grows older. Relevant to the sibling or no-sibling-context is the finding that teenage daughters also tend to be influenced by the childbearing of older siblings. Axinn, Clarkberg and Thornton find that if there are little nieces and nephews around, the daughter tends to desire more children. This sibling-effect is similar to the finding in the Norwegian study by Lyngstad and Prskawetz (2010), mentioned in the previous research section. The sibling-influence is of course not possible if you do not have siblings. In conclusion, socialisation is one explanatory mechanism behind the reproduction of fertility behaviour. Socio-economic status inheritance is another.

There is an association between educational attainment, occupation and income (SES) in the family of origin and the fertility behaviour of the index generation. In economic terms this can be described as the relationship between the amount of resources invested in children (in non-human capital and human capital), the SES outcomes and the subsequent fertility behaviour of the child (number of children and childbearing preferences) (Becker, 1994). The logic relevant to only children is that parents with a higher socio-economic status tend to prefer (and to have) smaller families, subsequently they have more resources to invest in each child.
Hence, Becker argues that the child(ren) will be more likely to also have more resources in their adult life and to have (or to prefer) a smaller family themselves. A general framework describing this association show that high parental SES can be related to: a taste for non-children (i.e. material things), a taste for a certain quality of children (to have few children), higher income, higher price of children (high opportunity cost) and a higher propensity to regulate fertility (use contraceptives) (Thornton, 1980). Almost all increases in parental SES-factors have a negative influence on the fertility preferences of the second generation. Apart from income, if the parents have a high income it increases the family size preferences of the child, according to Thornton. However, other studies have shown that there is a negative association between income and fertility (Balbo and Billari, 2012).

However, we need to keep in mind that this study is set in the Nordic context where socio-economic background has been shown to only have a limited effect on the intergenerational transmission of fertility behaviour (Stanfors and Scott, 2013; Kolk, 2013). Instead continuities in childbearing behavior has rather been attributed to the socialisation mechanism. One of the explanations being that a strong welfare state (education system, social safety net, family policies etc.) mitigate the reproduction of socio-economic inequalities (Stanfors and Scott, 2013). In Norway, educational attainment of the parental generation influences the timing of first birth for the anchor generation (especially for daughters), but also here SES (educational attainment) does not have a large effect and a sizeble influence of intergenerational transmission on age at first birth remains (Riise, Dommermuth and Lyngstad, 2016). A study from Sweden assessing which socio-economic factor is most important in determining the timing of parenthood, found that out of three different background characteristics (parents’ education, occupational class and social status), parental education was found to be the most influential on the outcome (Dahlberg, 2015). When studying the intergenerational transmission of fertility, it is therefore important to take socio-economic status, both for parents and index person, into account, and it needs to be interpreted in the proper context.

Another factor relevant to the association between only children and fertility, touched upon by Litton Fox, is the experience of parental marital disruption (an indicator of family complexity). It is well known that experience of parental divorce also increases the risk of
divorce for the children (e.g. Amato 1996; Kiernan and Cherlin, 1999). This mechanism can also influence fertility behaviour, but it can work in two directions. On the one hand, fertility within unstable relationships could be lower due to less frequent intercourse or that the couple believes that the cost of separating would be too high if they had children. On the other hand, children could also be viewed as something that strengthens the relationship. Other studies have found that marital satisfaction and fertility reveals a nonlinear relationship (Balbo and Billari, 2012). A study on the intergenerational link between parental divorce and fertility argues that children from ‘unhappy’ families (bad marriages, unpleasant divorces etc.) tend to be less keen on family life (e.g. do not want to marry, prefer fewer children etc.), and that it can be explained by the socialisation of family attitudes and values from parent to child (Axinn and Thornton, 1996). The study distinguishes between different causes of marital disruption, where a parental divorce without remarriage has the most negative impact on fertility attitudes, remarriage mitigate this influence almost completely and if the parent was widowed (thus, not divorced) it had a positive influence on fertility and marriage attitudes of the child. The fact that the influence of parental union dissolution on fertility behaviour and attitudes works differently under different conditions needs to be considered when analysing this factor. A study from Sweden show that parental divorce increases the risk of marital disruption, but it can be explained by a wide set of factors working together such as: socio-economic and life-course factors, attitudes towards divorce and interpersonal behavior (anger, jealousy, infidelity, communication issues etc.), which all could transmit through the intergenerational link (Gähler et.al, 2009).

Breton and Prioux (2009) found that the influence of parental divorce significantly increases the probability of stopping at one child. However, it is more difficult to determine whether parents of only children are more likely to have experienced divorce or separation. There is some evidence that show that if a one child-parent is unmarried at the time of (first) birth it significantly increases the probability that they stop at one child (Parr, 2007; Breton and Prioux, 2009). This could be interpreted as the positive influence of divorce, separation (or possibly childbearing within cohabitation) on the probability of becoming a one-child parent. Also, one of the determinants of stopping at one child is that the couple never lived together in the first place.
When modelling the outcomes of the one-child family preference and the one-child final family size, this study will test three possible pathways of dependency, based on the theoretical arguments in this section: the (direct) socialisation pathway, the family instability inheritance pathway and the socio-economic inheritance pathway. Below is a graphic representation of this idea (Figure 1). The family instability and the socio-economic pathways are likely to have mediating effects on the focus of this study; the only child - one child family association (socialisation pathway). One arrow show the possible direct relationship between the characteristics of the parental generation and the outcomes. The arrows indicate the possible associations between the different factors that will be analysed, dotted arrows indicate net effects. Also, the genetic inheritance component (arrows below) can influence both sides of the relationship.

**Figure 1**

Based on the theoretical arguments in the previous section I expect to find the following:
H1: Only children model their parents’ family behaviour and values, and therefore have a higher propensity to prefer a family size of one child.

H2a: Only children are more likely to come from a family with high SES and to have a high SES themselves, and this has a mediating influence on the preference of a small family (one child).

H2b: Only children are more likely to have experienced parental or own separation, which would have a mediating influence on the preference of a one-child family.

H3: Only children model their parents’ family behavior and values, and therefore have a higher propensity to have a final family size of one child.

H4a: Only children are more likely to come from a family with high SES and to have a high SES themselves, which would have a mediating influence on a one-child family-outcome.

H4b: Only children are more likely to have experienced parental or own separation, which would have a mediating influence on a one-child family-outcome.

Furthermore, this study will assess if age at first birth is significantly different between only children and sib children. A higher age at first birth is traditionally associated with a higher educational level and a lower completed fertility, but this relationship has become weaker (at least under certain conditions) (Neyer and Andersson, 2013). However, a high age at parenthood is an important determinant for having a final family size of one child, according to Breton and Prioux (2009). H3 states that only children are more likely to have a one-child family, and therefore the fifth hypothesis will be the following:

H5: Only children have a higher age at first birth, compared to sib children.

Data and method
**Data**

The data used in this study is derived from Wave 1 of the Generations and Gender Survey (GGS) for Sweden and Norway. The Generations and Gender Programme aims to better understand relationships across generations and within couples in Europe, measuring various factors such as fertility behavior, partnerships, economic activity, family caretaking etc. It is a longitudinal survey of 18-79-year olds in 19 countries (17 European plus Japan and Australia), it collects information from the same panel every three years. So far, 12 countries have participated in two waves of the survey, but Sweden and Norway have only conducted Wave 1. Longitudinal GGS-data is thus not available for the two countries included in this thesis and the data used in the following analysis is cross sectional in character.

The data from Norway was collected over the period January 2007 to September 2008 and the Swedish data is from April 2012 to April 2013. The GGS Survey consists of two parts, a telephone interview followed by a self-administered postal questionnaire. The response rate for the Norwegian Wave 1 is 59.7 % (N=15 114) and 58.8 % for Sweden (N=9 688). However, this only applies to the telephone interview, the response rate for the postal questionnaire is lower. In Sweden, 29.5 % of the telephone interview respondents (2 858 individuals) did not complete the postal questionnaire, which means that there are many missing values in the data, particularly regarding preferred family size (postal question). For Norway, the non-response rate for the postal questionnaire is not readily available, but when studying the survey codebook, I have reason to assume that it is somewhere between 25 % and 30 %. The Swedish sample is drawn from the entire population between the ages 18-80 using proportion-to-size simple random sampling (one stage sampling). The Norwegian sample is drawn from the entire Norwegian population with a random probability sampling in four different stages (region, centrality, sex and age). The Norwegian data also has a bias related to education, where the lower educated are underrepresented and those with a college/university education are overrepresented in the sample. A non response- analysis of the Swedish data show that people with a lower education are overrepresented among non-responders, so are people in the 25-34 year age group and people born in non-European countries.
As previously mentioned, the analysis will include data from both Sweden and Norway, together (N=24 802). The motivation being that the main predictor, whether someone is an only child or not, is a relatively small group in the Swedish data (n=690), and a larger predictor subgroup would increase analytical robustness. Norway is a country similar to Sweden with regards to political, social, economic and fertility behavioral context (Duvander, Lappegård and Andersson, 2010). There are 877 only children in the Norwegian data. It is reasonable to assume that information from these two countries can be merged and analyzed as a unified dataset trying to answer the research questions at hand. I have no reason to believe that the object of analysis – only children – will behave differently in Sweden compared to Norway.

**Dependent variables**

This study aims to assemble some pieces of the puzzle mapping the only child experience influence on childbearing. The pieces will be three main family demographic outcomes: having a family size preference of one child, having a final family size of one child and age at first birth.

The first dependent variable measures whether someone prefers a one child family. In the postal GGS questionnaire directed at everyone under the age of 50 the exact question is: ‘How many children would you like to have?’. Important to note is that this question is not answered by everyone (even if it was included in their questionnaire). In the Norwegian data, people who say that they do not want any children during the next three years or that they do not want children at all (even after three years) have been filtered out from the family size preference-question. In the Swedish data, only people who are physically unable to have children have been excluded from answering this question. This issue with cross country comparability of the intentions-questions in the GGS-data (different filters, coding etc.) has previously been pointed out by GGP-researchers (Beaujouan, 2013). Regardless, all individuals with a preference of zero children will be excluded from the analysis, the reason is that a preference of not wanting any children whatsoever, is a fundamentally different
category than all other family size-preferences. In combination with the different survey filters used in the GGS, it is reasonable to limit the analysis to those who wants children (any number).

The variable used as the outcome in the multivariate models is a dummy derived from the family size preference-question. It takes the value ‘1’ when someone prefers one child, and ‘0’ if they do not. It will help to understand if only children tend to model the family size of their parents or not. This outcome will be analyzed for individuals without a childless-preference (as discussed above) and under the age of 30, when it can be assumed that the influence of the family of origin is still relevant, and before the preferences change due to life circumstances such as own parenthood, education, partnerships or lack thereof etc. (Dahlberg, 2013).

The second dependent variable measures whether someone has a final family size of one child. It is constructed in two steps; first by consolidating information on children in the household and any non-resident children. This creates a variable measuring the total number of children of the respondent, and from it a dummy is then derived taking the value ‘1’ if the respondent has ‘1’ as the total number of children and ‘0’ otherwise. This variable will be used to estimate whether an only child model their family size of origin or not (even after having a child). The outcome will be analyzed for those over the age of 40, when the clear majority have completed their fertility career (except for a very small share of individuals). Childless individuals will be excluded from the analysis, so that those who have been practically and biologically able to have children are the focus of the analysis. This also eliminates possible genetic (and other) infecundity-factors.

The third dependent variable measures age at entering parenthood. It should be noted that seeing how it is not calculated from exact birth dates, only from birth year, the true value might be off by one in some cases. However, this should be a random error and not have any large impact on the validity of the measurement. Age at first birth is a widely used demographic outcome that typically depends on socio economic-factors, gender equality
factors etc., it is also a behavior that can transmit across generations. By including this factor as an outcome in this analysis it will give insights into if and how the only child-factor influences the timing of childbirth which could be a determinant for final family size, and moreover add explanatory value to the whole only child – fertility puzzle.

*Independent variables*

The main independent variable is a variable which measures whether the respondent is an only child or not. In the analysis, this is a binary variable derived from two variables that indicate how many brothers and how many sisters the respondent says he or she has (only half and full-siblings are asked for). Thus, the variable takes the value ‘1’ if the number of brothers and number of sisters is both simultaneously zero, otherwise the only child dummy takes the value ‘0’. The independent variable distribution over sex shows that in the only child-subgroup there are 48.5 % men and 51.5 % women. In the sib child-subgroup there are 49 % men and 51 % women.

In one general aspect, singletons differ from sib children in the data. Figure 2 show that the age distribution of only children is clearly skewed towards the older ages (from roughly age 55 and up). A rather unexpected finding, but with some plausible explanations. One is that older respondents in the data more often wrongly have stated that they do not have any siblings (full or half) compared to younger people, because the sibling(-s) have died (even though the actual question is: ‘How many brothers and how many sisters do you have? Including those who have died.’). Another reason could be that the share of one child-mothers was higher in cohorts born in the early-to-mid 20th century. Statistics Sweden have data for cohorts from 1945, when the share of one-child mothers was about 18 % (SCB, 2016).

*Figure 2*
The first set of covariates measures the educational attainment of the respondent's parents and the respondent, respectively. The parents’ education variable measures the highest level of education attained by the parents collectively, so if the mother has the highest educational level her value will be kept in this variable, but if the father has the highest education, the father's value will replace the mothers’ value. The values used to measure the parents’ educational level in the GGS is: ‘0’ – pre-primary/primary, ‘1’ - lower or upper secondary and ‘2’ - post secondary/tertiary/academic. The educational level of the respondent holds the values: ‘0’ – primary/upper secondary, ‘1’ - upper secondary/post-secondary non-tertiary, ‘2’ - first stage of tertiary/second stage of tertiary. Both variables will be used to investigate the pathway of intergenerational transmission of socio-economic status and how it influences the fertility patterns of only children.

The second set of covariates include factors that describe family instability, both within the parental and index generation. The GGS question asked is: ‘Have your biological or adoptive parents ever separated?’ followed by ‘In which year did this happen?’ if the parents had
indeed separated. The variable included in this analysis will take aim at those who did experience a parental break up during the first 15 years of childhood, and it can take the values: 1 = ‘Yes, they broke up’, and 0 = ‘No, they did not break up/No, they never lived together’. The value ‘They never lived together’ could be regarded as an indicator of family complexity, but in this study, it will be included into the ‘0’-category (indicating that the parents did not break up), which is consistent with the Norwegian GGS codebook). It is also likely that the family experience of those whose parents never lived together is not the same as for those whose parents separated during childhood.

The covariate describing the union dissolution of the index generation is derived from a set of variables indicating if the respondent has had any previous partnerships (marriage or cohabiting), if they were married to the previous partner, if they had any children together and how the relationship ended (separation, death or other). The definition of separation experience used in this study is whether someone has gone through a divorce from marriage (with or without children) or if they have separated from someone with whom they have common children. In short, this variable is coded as ‘1’ if someone has either divorced from a marriage or separated from a partner with whom they had children, or, of course, divorced from someone with whom they had children. Otherwise it is coded as ‘0’, or missing (.)

Method

The analysis will begin with a section on descriptive bivariate statistics of the distribution of the three different dependent variables over the independent, only child, variable. This gives an overview of the main relationships investigated before heading into the more complex part of the study. To be able to assess the influence of being an only child on the ‘one-child preference’ and the ‘one-child completed family size’ and take the different covariates into account, binomial logistic regression will be applied. This is a commonly used regression method when dealing with a dichotomous outcome (a dummy variable) and makes it possible to estimate the effect of one units change in X on the odds of Y=1. Logistic regression estimate the real effect of any independent variable it gives you a relative estimate which does
not take the effect of any omitted variables into account. Nonetheless, it will be a useful tool for estimating models for the first and second dependent variables.

The logistic model will be created stepwise. In the first model (1A and 2A) the association between independent and dependent variable (first and second outcome) will be estimated. Model 1B and 2B will then add the covariate set on education (parental and respondent). Model 1C and 2C will replace the education covariates with the set on family complexity. Last, but not least, the full models (1D and 2D) will be estimated with all covariates. For the one child-preference outcome the “separation”-covariate will not be added since very few respondents under 30 (2.2%) have experienced a separation/divorce (and there is almost no variation between the sib child and singleton-groups). It can be difficult to compare logistic models across the same sample. For every new model, the logit regression still crams in all estimates between the values 0 and 1, which changes the probability scale with each new model and can underestimate the predictor effects (Mood, 2010). Standardized coefficients can make the outcome more equal in scale and subsequently more comparable. In this case, I will calculate marginal effects for the independent variable on the dependent to receive predicted probabilities which is easier to interpret across models over the same sample. In all main models, the observations with a childless preference and the childless will be excluded.

To model the outcome of the third dependent variable, age at entering parenthood, OLS will be the method applied. OLS is appropriate when the dependent variable is continuous (and in this case also, discrete). The estimates produced by OLS is the real estimated effect of X on Y. The first model (3A) estimated will be the dependent on independent-association (age at first birth on only child). If a significant influence between independent and dependent variable is found, the analysis will follow the same stepwise procedure as in the logistic model. This will make it possible to identify what pathways are significant (or not significant) between the experience of being an only child and age at entering parenthood. All bivariate associations and regression models in this study will be computed by using the Stata/IC statistical software package, version 13.0.
Results

Descriptive statistics

The first dependent variable, measuring the outcome of the one-child vs. several-children preference, is derived from the family size preference-variable in the GGS-data. In this descriptive section it will be interpreted in the context of the original variable, excluding respondents with a zero preference-value (n=1686, out of which 91 are only children). By country, the mean preference is 2.35 children in Norway and 2.48 children in Sweden. In general, only children tend to prefer a smaller family size on average (mean = 2.31 children, CI: 2.02-2.52), compared to sib children (mean= 2.42 children, CI: 2.38-2.46).

Figure 3

Figure 3 shows the variable distribution (in percent) over the two categories; ‘sib child’ and ‘only child’ for everyone below age 30. The tendency for only children to want smaller families can be observed visually, where the bars are higher for only children over the smaller
family sizes, and lower across the larger family preferences, compared to sibchildren. By far however, the two child-family ideal dominates as a preference for both sib children (55.9 %) and songletons (57.1 %). Looking at the focus of this study - the one child preference - it is clearly more common among only children (11 %) compared to sib children (5.3 %). Furthermore, wanting three children is more common if you have siblings (32.6 %), where 28.6% of only children wants three kids. Values of 4 children and above is twice as common in the sib child group (6.1 % of sib children and 3.3% of only children want 4 or more).

Continuing to the second dependent variable, measuring whether the final family size is one child, or more than one child. This is derived from the overall distribution of completed family size for everyone above age 40 who is not childless (N=13 129). In the Norwegian data, the mean family size (above 40 and not childless) is 2.48 and in Sweden the mean is 2.3 children, so Swedes seem to have fewer kids on average. Also in this case, those who are only children on average end up with fewer children in total (mean = 2.25 children per respondent, CI: 2.19-2.31) compared to those with siblings (mean = 2.42 children per respondent, CI: 2.4-2.44).

**Figure 4**

![Distribution of Final Family Size (%)
Sibchildren and Only children above age 40
(excluding childless)](chart.png)
By visually inspecting Figure 4 a similar pattern as in Figure 3 emerges. Only children seem to be overrepresented in the smaller family size categories (1-2 children) and underrepresented as parents of more than two children (3 or above). Examining the outcome of interest for this analysis, a final family size of one child, 17.7 % of singletons have a completed fertility of one, whereas 14.4 % of sib children stop at one child. A similar percentage difference can be found for the outcome of two children, where 50.1 % of only children and 45.3 % of sib children respectively stop at two children. 24.5 % of only children have three kids, compared to 28.5 % of sib children. Having a final family size of four children or above is more common for sib children (11.9 %) compared to singletons (7.8 %).

The distribution of the third dependent variable, age at parenthood, covers everyone over age 40 who have become a parent (n=13 055, out of which 932 are only children) (Figure 4). Important to note here is that this analysis does not differentiate the sexes. Both bivariate and multivariate analysis in this study calculates estimates for men and women, together. Within demography it is otherwise common to measure age at first birth for women only. By calculating the means, it is evident that women are younger on average at first birth (25,6 years) compared to men (28,4 years). In Norway, the mean age at parenthood is 26,2 and 27,9 in Sweden. On average only children are a wee bit older (27,2 years) compared to sib children (26,9 years) at the time of entering parenthood.

Figure 5
An overview over the distribution of the covariates across the independent, only child-variable, can be seen in Table 1. It shows that, for those under age 30, it is less common for singletons to have highly educated parents, but it is more common to be highly educated themselves, compared to sib children. In this age group, it a parental separation is more common in the singleton group. There does not seem to be any large difference by group for own separation (and as previously discussed, this factor will not be included in the multivariate analysis). Over age 40, the distribution of the education variables is similar those under 30. A low education is more common among only child-parents, but the singletons themselves have more often a higher education. Both parental separation and separation of respondent is slightly more common within the sib child group over age 40.
Note: Separation respondent = dissolution of relationship with common children and/or divorce from marriage.

**Regression analysis**

The main finding after conducting the descriptive analysis is that only children seem to be more likely to prefer a family size of one child and more likely to have a completed family size of one child, compared to sib children. These results are in line with the first and third hypotheses. Regarding age at parenthood, a more refined method needs to be applied to determine if there are any significant differences between the groups. With the aid of multivariate analysis, the aim is to identify possible explanatory pathways. Also here, respondents with a childless preference are excluded when estimating the influences on the one-child preference, and the childless are excluded when estimating the main models over the one-child family size outcome. Just for reference the final family size outcome will also be tested including childless respondents.

### Table 1: Distribution (%) of the independent variable over the covariates

<table>
<thead>
<tr>
<th>Covariates</th>
<th>Only child</th>
<th>Sibchild</th>
<th>Only child</th>
<th>Sibchild</th>
<th>Only child</th>
<th>Sibchild</th>
<th>Only child</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parental education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>10.2</td>
<td>9.2</td>
<td>51.7</td>
<td>47.8</td>
<td>40.3</td>
<td>34.0</td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>42.8</td>
<td>39.6</td>
<td>30.7</td>
<td>32.9</td>
<td>33.6</td>
<td>36.9</td>
<td></td>
</tr>
<tr>
<td>Tertiary/Academic</td>
<td>47.0</td>
<td>51.0</td>
<td>17.6</td>
<td>19.3</td>
<td>26.1</td>
<td>29.1</td>
<td></td>
</tr>
<tr>
<td>Respondent's education</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary/Lower-Secondary</td>
<td>26.9</td>
<td>29.3</td>
<td>14.7</td>
<td>19.5</td>
<td>15.4</td>
<td>19.1</td>
<td></td>
</tr>
<tr>
<td>Upper Secondary</td>
<td>43.0</td>
<td>47.5</td>
<td>52.3</td>
<td>49.8</td>
<td>48.4</td>
<td>47.7</td>
<td></td>
</tr>
<tr>
<td>Tertiary/Academic</td>
<td>30.1</td>
<td>23.2</td>
<td>33.0</td>
<td>30.8</td>
<td>36.2</td>
<td>33.2</td>
<td></td>
</tr>
<tr>
<td>Parental separation</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Separated</td>
<td>69.8</td>
<td>73.3</td>
<td>93.2</td>
<td>92.8</td>
<td>87.2</td>
<td>87.5</td>
<td></td>
</tr>
<tr>
<td>Separated</td>
<td>30.2</td>
<td>26.7</td>
<td>6.8</td>
<td>7.2</td>
<td>12.8</td>
<td>12.6</td>
<td></td>
</tr>
<tr>
<td>Separation Respondent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not Separated</td>
<td>79.3</td>
<td>97.8</td>
<td>70.7</td>
<td>69.9</td>
<td>78.1</td>
<td>79.3</td>
<td></td>
</tr>
<tr>
<td>Separated</td>
<td>21.9</td>
<td>2.2</td>
<td>29.3</td>
<td>30.1</td>
<td>20.7</td>
<td>2.7</td>
<td></td>
</tr>
</tbody>
</table>

Note: Separation respondent = dissolution of relationship with common children and/or divorce from marriage.
A potential issue with the outcome of logistic regression models is that it can be difficult to interpret the coefficients (the effect of X on Y). As Ben Jann, Swiss professor of Sociology, neatly put it: ‘What the hell do these coefficients mean?’ (Jann, 2013, slide 10). Therefore, to make the interpretations more comprehensible and the outcome more comparable across models, marginal effects (predicted probabilities) over the independent variable will be calculated and presented. In these figures, confidence intervals over the predicted probabilities is also presented. In general, the confidence intervals are wider for the only child-category because it is a smaller subgroup, and they are partly overlapping in some cases. All predicted probabilities are significant unless stated otherwise. In the last part of this section some post estimation-results will be presented.

Model 1A in Table 2 estimates the primary association between being an only child and having a one child preference. The odds ratio-unit outcome for the only child-predictor is 2.29 (significant on the 5% level) and can be interpreted as the odds of only children having a preference of one child being 2.29 times higher, compared to the odds of this outcome for sib children. This association can also be seen in Figure 5, where the predicted probability of singletons wanting one child is 10.4 % compared to 5.1 % for sib children. In the following model (1B) the first set of covariates are introduced, the highest educational level of the parents (any) and the respondent’s highest reached educational level. The model estimates a significant association ($p=0.040$) between being an only child and the dependent variable (odds ratio of 2.17), but this time also the parents’ post-secondary/tertiary education level becomes significant ($p<0.007$) with an odds ratio of 0.36, while the respondent’s own educational level generates insignificant coefficients. This indicates that a high educational level of the parents, lowers the odds for someone wanting a family size of one child. Thus, parental education seems to be a factor that partly can explain the one child-preference. For this model, the marginal effect is 9.4 % for only children and 4.6 % for sib children, keeping the education covariates constant at their means.
In model 1C the association between the dependent and independent variable is significant at the 5 \%-level with a coefficient of 2.27 (the odds for Y=1 is 2.27 higher for singletons, than...
for sib children). The covariate added in this model measure whether the parents separated before the age of 16, and the model outcome shows that parental separation in this case does not have a significant influence on the one child-preference. For this model, the predicted probability of singletons preferring one child is 9.9 % and 4.8 % for sib children. Thus, parental separation does not seem to influence the one-child family ideal. Model 1D includes all covariates and in this case the influence of being an only child on the one child-preference remains significant (OR=2.14) and so does the highest level of the parents’ education (odds ratio of 0.37). Parental separation and educational attainment of the respondent does not have a significant influence in this full model.

Modelling the outcome of final family size of one child (excluding childless), the analysis starts out from the primary association of the influence of being a singleton on the propensity to stop at one child (Table 3). In model 2A the only child-coefficient is 1.28 (significant at the 1 % level), meaning that the odds of only children stopping at one child is 1.28 times higher than the odds of sib children stopping at one. When calculating the marginal effect of the independent variable, the probability of stopping at one child is 17.6 % for only children and 14.4 % otherwise (Figure 7). The next step (model 2B) includes the education covariate set. The only child variable generates a significant estimate (odds ratio=1.29). The other covariates, however, do not. Neither the parents’ education level nor the respondent’s education level are significant in estimating the outcome of this model. The predicted probabilities show the difference between singletons (17.3 %) and sib children (14 %).
Table 3: Logistic regression over Final Family Size of One Child, Above Age 40 (excluding childless individuals), Odds ratios

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Model (n=11857)</th>
<th>1A</th>
<th>1B</th>
<th>1C</th>
<th>1D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>B</td>
<td>p</td>
<td>B</td>
<td>p</td>
</tr>
<tr>
<td>Sibship</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Sib Child (ref.)</td>
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<td></td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Only Child</td>
<td></td>
<td>1.28*** 0.010</td>
<td>1.29*** 0.008</td>
<td>1.29*** 0.008</td>
<td>1.30*** 0.007</td>
</tr>
<tr>
<td>Parents Education Level</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-primary/Primary (ref.)</td>
<td></td>
<td>1.0</td>
<td></td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Lower/Upper Secondary</td>
<td></td>
<td>0.97</td>
<td>0.625</td>
<td>0.97</td>
<td>0.663</td>
</tr>
<tr>
<td>Post-Secondary/Tertiary</td>
<td></td>
<td>0.98</td>
<td>0.801</td>
<td>0.96</td>
<td>0.614</td>
</tr>
<tr>
<td>Education Respondent</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary/Lower Second. (ref.)</td>
<td></td>
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<tr>
<td>Upper Secondary</td>
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<td>0.154</td>
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<td>Parental Separation</td>
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</tr>
<tr>
<td>Not separated (ref.)</td>
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<td>1.0</td>
<td></td>
<td>1.0</td>
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</tr>
<tr>
<td>Separated</td>
<td></td>
<td>1.27** 0.021</td>
<td>1.27** 0.022</td>
<td></td>
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</tr>
<tr>
<td>Separation Respondent</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Not separated (ref.)</td>
<td></td>
<td>1.0</td>
<td></td>
<td>1.0</td>
<td></td>
</tr>
<tr>
<td>Separated</td>
<td></td>
<td>1.54*** 0.000</td>
<td>1.54*** 0.000</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*p<0.05=** p<0.01=***, ref.= reference category

Figure 7
In model 2C the influence of family complexity (separation) is estimated. The only child-estimate remains significant (OR=1.29). The influence of the covariates on the outcome show that both parental separation and the respondent’s own experience of separation has a significant influence on the odds of stopping at one child. If the respondent’s parents separated before the age of 16 the odds are higher to stop at one child (odds ratio=1.27). Also, for someone who have separated (divorced or from a relationship with common children), the odds are higher to have a final family size of one child (odds ratio=1.54), compared to those who have not separated. The marginal effect of being an only child on the outcome in this model is 17.8 % and 14 % for sib children. Model 2D includes both education and separation covariate sets, but the association between being an only child and having a final family size of one child remains significant (odds ratio=1.30). For the other estimates, both the parental separation factor and the respondent’s own separation experience is significant (odds ratio 1.27 and 1.54, respectively). This indicates that both having the experience of separation (self or parents) and the experience of being an only child makes it more likely to have a final family size of one child. Parental education level and education level of the respondent does not seem to have a significant influence on the dependent variable, in this model. The probability of singletons stopping at one child is 17.3 % compared to 13.7 % for sib children, other covariates kept at their means.

Continuing to the last part of the analysis; the OLS-regression over age at parenthood (age in years). The aim is to investigate if only children differ from sib children in any significant way, when adding covariates on parental and own education, and parental separation. It becomes clear that only children do not seem to differ significantly from sib children in this aspect. The only child-coefficients are not significant in any of the models. However, several other factors influence age at parenthood. Both education covariates (categories included as dummies) are significant in models 3B and 3D (at the 1 %-level), and positively related to age at parenthood. Also, parental separation generates significant coefficients in model 3C and 3D (and has a positive direction).
Post estimation

To understand whether the full models (1D and 2D) adds any explanatory value compared to models 1B and 2C, I conducted likelihood ratio tests. For the one-child preference the LR-test was run to check whether model 1B was likely to be nested in model 1D. It was not, which means that the parental separation-factor does not significantly add explanatory value to model 1B. A similar result was found when comparing models 2C and 2D for the one-child family size outcome. The LR-test showed that the full model does not explain the outcome better than model 2C.

Discussion
In the following section the aim is to understand the results from the analytical approaches in its theoretical and empirical context. What determines having an ideal family size of one child and a final family size of one child? And is the only child-factor relevant for explaining these outcomes? What other explanations and pathways of dependency are there?

The one-child preference

Among those under 30 years of age who want children (any number), having an ideal family size of one child is more likely for an only child compared to a person with siblings. This confirms the first hypothesis (H1), and it suggests a socialisation mechanism at work. When proceeding to control for the relevant covariates (marital disruption and socio-economic status), this association was influenced by one factor, namely; post-secondary/tertiary parental education level. In models 1B and 1D, the only child factor remains significant, which means that being an only child still increases the probability of wanting a one child family when parents’ education is controlled for. In both models the highest level of parental education was a significant determinant of the outcome. A high parental education, lowered the probability of someone preferring a one child family, and it seems to partly mediate the only-child/one-child association. Across models 1A-D the predicted probability of someone having a one-child preference is about twice as high for singletons, compared to those with sibs.

The only child-factor, together with the intergenerational transmission mechanism of socio-economic status (parental education) seem to explain the one-child preference in models 1B and 1D. Someone from a higher socio-economic status family is less likely to prefer a one child family. This might be because a person with a high SES background have experienced a childhood with fully sufficient resources (financial and human capital), which in turn could form the attitude that they also will have the choice and opportunity to provide for a larger family. This would go against the logic of Becker’s theory on human capital and family formation (individuals with higher SES are more likely to prefer smaller families), but it is coherent with the more recent findings that a higher education has seized to be a direct determinant of lower fertility. It is also similar to findings by Thornton, that a high income is not associated with a small family-preference. It is also possible that someone from a higher socio-economic status background is more likely to adhere to the societal norm (the two-child family ideal) compared to those with lower socio-economic status.
In all models, the respondents’ own educational attainment was not significant. The reason could be that either it has no influence on the outcome or that the age-interval (age 18-29) makes it difficult to assess the effect of educational attainment. The impact of family instability was also tested, but in no model was this factor significant in determining the one-child family ideal outcome. The reason might be that the experience of divorce or separation before age 16 does not influence the family size preference of one child. As discussed in the theory-section, however, the effect of parental relationship breakdown might be conditional on for example how “good” the separation was or if the parents’ re-partnered after the divorce etc. The measurement in this study does not distinguish any specific separation conditions, so perhaps parental separation influences the one-child preference if the data is more elaborate. This might be a topic for future research.

In sum, being an only child is positively associated with having a family size preference of one child, and this influence remains when controlling for education level (parents’ and respondent) and family instability-factors. This suggests a family of origin socialization mechanism influencing the family attitudes and values of only children, making them more likely to prefer a one-child family, compared to those with siblings. Socio-economic status inheritance (parents’ education level) seem to be a significant determinant of a one-child preference. Where a high education level decreases the likelihood of this outcome, and it seems to partly mediate the main association which (also partly) confirms hypothesis H2a. Respondents’ own education and family instability did not influence the association between being an only child and the one-child preference. Hypothesis H2b was not confirmed.

Final family size of one child

When evaluating the results for the second dependent variable, the third hypothesis (H3) is confirmed. Only children have a higher propensity to also end up with one child as final family size (among those over age 40, practically and biologically able to have children, i.e. with at least one child). The influence of being an only child remains significant in all four models. Only children seem to be more likely stop at one child, compared to sib children, when controls are added. This suggests a socialisation mechanism at work leading only
children to model their childbearing after their childhood experience. Forming the attitude that having a one-child family is desirable or that it at least is completely sufficient, regardless of socio-economic status, or experience of parental or own separation.

In this study, another emerging determinant of a final family size of one child is separation-experience. In all models where separation of respondent was included, it turned up significant. Separation (divorce or separation with common children) increased the likelihood to have a final family size of one child. This is in line with previous research findings that divorce might increase the probability to stop at one child. The influence of divorce on fertility can, however, work in different directions. In this case, the reason why a separation increases the probability to a stop at one child, might simply be because the separation happened before there was an opportunity to have a second child. Even if re-partnered, the effect of the previous separation might render a lower confidence in that the new relationship will last, and therefore someone would choose to stop at one child. Previous research has also shown that if the partner already has children, it increases the likelihood to stop at one child.

In all models, parental separation had a significant influence on the outcome. The experience of parental relationship breakdown increased the likelihood to have a final family size of one child. Together with the separation factor it would indicate a family complexity pathway influencing the outcome (but not explaining the only child influence). Parental separation can influence the respondents’ own likelihood to experience divorce (intergenerational transmission of divorce), but it could also influence the fertility behaviour and attitudes of the second generation to be less keen on family life and to prefer a smaller family.

In models 2B and 2D the coefficients points in the general direction of models 1B and 1D; the higher the education level (of both generations), the lower the probability of someone having a final family size of one child, but they are not significant on the 5% level. It could possibly be explained by the study’s setting in the Nordic context, where socio-economic factors are likely to have a smaller influence on fertility outcomes, compared to other parts of the world. Perhaps also the influence of the parents’ socio-economic status has diminished by the time the child (now over age 40) had their one and only child, and that the respondents’ own education level does not have an influence on potential deviance from the two-child norm.
In sum, being an only child seems to be a determinant of having a final family size of one child, and this confirms the third hypothesis (H3). Furthermore, parental separation and the respondents’ separation experience are also determinants of stopping at one child, but they do not seem to be mediating factors of the only child/one-child association. Parental education and respondents’ education does not significantly influence the one-child family outcome. Seeing how the effect of being an only child is not explained by any of the characteristics measured by the covariates, the conclusion is that both hypotheses H4a and H4b is not confirmed. The only child-effect remains and it can possibly be attributed to a potential childhood socialisation mechanism, other selection logic (perhaps less sociability resulting in a low desire to have many kin) or some genetic influence.

To check for robustness, models 2A-D were also estimated including childless individuals, and the results are presented in Table 4 in the Appendix. Overall, the results are similar to the models that exclude the childless. The only child-factor remains significant, but with slightly higher p-values and slightly lower odds ratio estimates. This indicates that the effect of being an only child is robust to the inclusion of childless individuals.

Age at parenthood
As for the association between being an only child and age at parenthood, no significant relationship can be found in this study. The parental separation factor and the socio-economic status factors have an influence on the outcome, but not the only child-factor. Hypothesis five (H5) is thus not confirmed. This is a relevant finding in relation to the outcome of one child as final family size, where age at first birth can be regarded as an unlikely confounder of the only child/one-child association.

On a side note, sex is a widely-used covariate, but it is not included as a control in this study for two reasons. First, there is no clear indication that sex would influence the associations studied. Second, it is likely that the models is sensitive to the adding of too many covariates and it might increase the risk of Type II errors. The estimates are therefore sex-average effects on the outcome.

‘Onlies’ – following the stream or following their parents?
The pattern emerging in this study is that only children behave differently compared to sib children. They more often prefer a one-child family and in the end, they are more likely to
stop childbearing at one child. But the factors influencing these associations are different. A lower socio-economic status background can partly explain a one-child family ideal; and for the actual family formation, the experience of parental and/or own relationship breakdown is also a determinant of the outcome. Not surprisingly, the two-child norm dominates for only children as well as sib children, but in the context of this study the results suggest that ‘onlies’ follow their parents. Investigating if a one-child preference directly matches a one-child final family size was outside the scope of this study and would need longitudinal data, but would be an interesting topic for future research. As would having access to couple level data, to see how the only child factor is influenced by whether the partner has siblings or not. Also, s study on the association between a childless-preference or ultimate childlessness, and being an only child, would add valuable pieces to the only child experience-puzzle.

Acknowledgements
I would like to thank my supervisor, Johan Dahlberg Ph.D., for excellent advice and guidance throughout this thesis-project. Also, I have greatly appreciated the entire Demography master’s programme which have provided me with knowledge and insights far beyond what I expected. A have truly had a great time writing this thesis, but my two kids, Pirmin (4 yrs) and Beppe (2 yrs), haven’t had a clue about what I’ve been doing. Kids (x2): - Mom, what are you doing? Me: - I am Working. Reading and writing on my computer. Kids (x2): -???
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Appendix

Table 5: Logistic regression over Final Family Size of One Child, Above Age 40 (including childless individuals), Odds ratios

<table>
<thead>
<tr>
<th>Predictor</th>
<th>Model (n=13 523)</th>
<th></th>
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<tbody>
<tr>
<td></td>
<td>1A</td>
<td>1B</td>
<td>1C</td>
<td>1D</td>
<td></td>
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<tr>
<td></td>
<td>B</td>
<td>p</td>
<td>B</td>
<td>p</td>
<td>B</td>
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<td><strong>Sibship</strong></td>
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<td>Sib Child (ref.)</td>
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<td>1.0</td>
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<td>Only Child</td>
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<td>1.21** 0.042</td>
<td>1.22** 0.037</td>
<td>1.22** 0.034</td>
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<td><strong>Parents Education Level</strong></td>
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<tr>
<td>Pre-primary/Primary (ref.)</td>
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<td>1.0</td>
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<td>Lower/Upper Secondary</td>
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<td>0.97 0.642</td>
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<td>0.95 0.491</td>
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<td><strong>Education Respondent</strong></td>
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<tr>
<td>Primary/Lower Second. (ref.)</td>
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<tr>
<td>Upper Secondary</td>
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<td>Tertiary</td>
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<td>0.90 0.201</td>
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<td><strong>Parental Separation</strong></td>
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<td>Separated</td>
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<td><strong>Separation Respondent</strong></td>
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<tr>
<td>Separated</td>
<td>1.70*** 0.000</td>
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p<0.05=** p<0.01=***