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The influence of the family network on the realisation of fertility intentions

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Abstract

The gap between fertility intentions and behaviour remains a contentious area of theoretical, methodological and policy debate. Previous fertility studies have focused on individual and institutional characteristics, at the expense of the recognition of meso-level family social capital and networks. This study examines the realisation of time-dependent fertility intentions for the transition to first and higher-order births. Building upon and extending the previous literature we explore two competing theoretical mechanisms of how high levels of family social capital operate to either enable or inhibit the realisation of intentions and the impact of cross-sibling effects. Using two waves of the Netherlands Kinship Panel Survey (NKPS), we also introduce a methodological extension by examining whether the inclusion of only those with positive fertility intentions in previous research has resulted in selection bias. By adopting a probit model with sample selection, we both avoid this selection problem and empirically test whether there is a bias. Results show that there are some, albeit negligible, unobserved characteristics affecting both an individual's fertility intentions and the realisation of these intentions. High levels of family social capital operate to deter from having a child, particularly when individuals already have at least one child, suggesting that individuals adopt a 'satisficing' strategy. Our findings also suggest that children may operate as a means to generate family social capital. Having a sibling with a young child is associated with a higher probability to realise one's own intention to have a first child.

1 Introduction

Why do people not realise their fertility intentions? Morgan and Taylor (2006) suggested that it is precisely this question that needs to be addressed in order to

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understand contemporary low fertility. Several researchers have argued that the postponement or abandoning of fertility intentions may be an underlying driver of low fertility (Hagewen and Morgan 2005; Spéder and Kapitany 2009). It is moreover vital to investigate the gap between intended and actual fertility in order to understand and evaluate the effectiveness of the use of the measure of fertility intentions as a valid predictor for both fundamental demographic research, but also for policy analysis and population projections. The study of the mismatch between intended and realised fertility behaviour reflects a wider debate about the true predictive power of individuals' fertility intentions (e.g. Quesnel-Vallée and Morgan 2003, Berrington 2004; Toulemon and Testa 2005; Testa and Toulemon 2006). Recent studies reveal a persistent discrepancy between intended and actual fertility (see European Commission 2006; Testa 2006). Some gap is to be expected due to the fact that fertility intentions are highly contingent on, and subject to, revisions (Quesnel-Vallée and Morgan 2003). Yet to what extent can we consider a gap as physiological? It is particularly relevant to understand why a gap is bigger in some circumstances than in others, and for some groups of individuals compared to others, and under what conditions fertility intentions can be considered as an adequate and reliable predictor of actual behaviour.

By investigating which factors affect the realisation of fertility intentions and how they operate, we can gain insights on the forces that facilitate or inhibit the realisation of childbearing intentions. In recent years, increasing attention has been devoted to the analysis of potential factors (Quesnel-Vallée and Morgan 2003; Adsera 2005, both focussing on the intended overall number of children; Spéder and Kapitany 2009; REPRO project, work package 4, 2010, focus on time-dependent, parity-progression intentions). Three main forces appear to drive the mismatch between desired and actual fertility, namely: demographic (e.g. age, parity), socio-economic (e.g. education and employment status) and ideational (e.g. religion) aspects.

The aim of this study is to build upon and extend existing research by investigating a largely ignored fourth factor, which is the role of the family network and specifically: family social capital and intra-familial social interaction. Previous research on the intention-behaviour gap in fertility has focused on micro-level individual and macro-level institutional characteristics, which has been at the expense of recognising vital meso-level family networks. Following the literature on personal networks (Kohler et al. 2001; Bühler and Philipov 2005; Bernardi et al. 2007) and focussing in particular on the family, we can identify two primary and complementary roles of the family network in shaping an individual's fertility choices (Balbo and Mills 2011). The first one, which is the more stable aspect, is the family as a source of social capital. Family social capital, which we operationalise as the strength and quality of family ties, may either facilitate or inhibit the realisation of fertility intentions. The second one, which can be considered as a more contingent force, is the family network as the locus of social interaction, where individuals engage in communication of

expectations, learn and are influenced by others' behaviour (e.g. Montgomery and Casterline 1996; Bongaarts and Watkins 1996; Kohler 2001; Bernardi 2003). Following Axinn et al. (1994) and Lyngstad and Prskawetz (2010), we operationalise this aspect via sibling interactions and specifically test whether the presence of young children of a sibling impacts the realisation of fertility intentions. Our aim, therefore, is to empirically test whether family social capital and intra-familial social interaction may be another factor to explain the gap between intentions and behaviour.

This study focuses on time-dependent, parity-progression fertility intentions and more specifically, on the intention to have a(nother) child within three years, coupled with the realisation of this intention both for the transition to first and higher-order births. We focus on short-term intentions for both theoretical and practical reasons. Previous studies (Dommermuth et al. 2009; Philipov 2009) have shown that short-term intentions are more accurate than long-term ones, due to the fact that people are more capable of predicting their life situation within a shorter period of time. A second more practical reason is that we use a panel dataset in this study that follows individuals for a period of 3.5 years, which permits us to examine their intentions and then behavioural outcomes during this time span.

This study builds upon and contributes to the existing literature on the realisation of fertility intentions in three central ways. First, we introduce several potential theoretical mechanisms, such as Simon's (1956, 1957) classic theory of 'satisficing' to understand the underlying mechanisms of how family social capital and intra-familial interaction either inhibit or facilitate the realisation of first and higher-order births. Previous research has focused on the impact of social capital on fertility intentions (e.g. Bühler and Philipov 2005; Philipov et al. 2006), but not on the impact of the realisation of these intentions. Although already a few studies have examined the impact of cross-sibling effects or sibling interaction on fertility behaviour (Bernardi 2003), they have focused on the number of nieces and nephews in relation to the number of children (Axinn et al. 1994) or on an individual's fertility timing (Lyngstad and Prskawetz 2010) and not on the realisation of fertility intentions. A second related contribution is the fact that we focus not only on the realisation of fertility intentions in general, but our aim is to examine whether family social capital and sibling interaction operate differently for first versus higher-order births.

Our final contribution is of a methodological nature. Previous research examining the gap between fertility intentions and behaviour has often compared the intended and achieved family size, thereby focusing on the overall expected and the actual number of children (e.g. Noack and Østby 2001; Quesnel-Vallée and Morgan 2003; Adsera 2005). We are instead interested in investigating the realisation of parity progression intentions (which in our case are also time-dependent because we look at intentions to have a(nother) child within three years). Some studies that have also followed this latter approach have adopted the

methodological strategy of using fertility intentions as one of the main covariates in the model predicting fertility behaviour (e.g. Berrington 2004, Toulemon and Testa 2005; Testa and Toulemon 2006). Although this approach is useful to test whether fertility intentions will predict subsequent behaviour, it does not allow the analysis of what factors facilitate or constrain an individual's positive intention to have a(nother) child. A handful of studies (Spéder and Kapitany 2009, REPRO project, work package 4, 2010) make use of multinomial regression models to compare those who realised the intention to have a child with those who postponed or abandoned their intention. However, when only individuals with positive fertility intentions are included in the model (Spéder and Kapitany in REPRO project, work package 4, 2010), the analyses may produce biased estimates. The current study takes a different approach by adopting a probit model with sample selection (Van de Ven and Van Praag 1981), which extends existing research by both avoiding the selection problem and also simultaneously empirically testing whether the inclusion of only samples with positive intentions produces biased estimates.

We first present our theoretical framework, which includes attention to the Theory of Planned Behaviour, family social capital and cross-sibling effects. This is followed by a description of the two waves of the Netherlands Kinship Panel Study (NKPS) data used in this study, the measurement of variables and our analytical approach of a probit model with sample selection. The results are then described in relation to our central theoretical expectations, followed by a conclusion and discussion.

2 Theoretical framework

Recent studies have theoretically and empirically linked the Theory of Planned Behaviour (TPB) (Ajzen 1991) to social network theories of fertility (Rossier and Bernardi 2009; Billari et al. 2009). Building upon these previous studies, we use the TPB as our starting point, and thus consider that having a child is a purposive or intentional behaviour (Figure 1). The TPB states that the intention to perform a specific behaviour is the result of the combination of three antecedents: (i) *attitudes* towards the behaviour in question (i.e. perceived cost and benefits); (ii) *subjective norms* about that behaviour (e.g. influence of relatives and peers); and, (iii) *perceived control* over behaviour (i.e. the extent to which behaviour is perceived to be subject to control). The TPB holds that background factors such as the family network are already inherent within the three antecedents of intentions. By assuming that fertility intentions are the proximate antecedent of behaviour, the TPB claims that factors which have an impact on intentions will also have an impact on behaviour, but not vice versa. Engaging in a behavioural outcome depends not only on a favourable intention but also on a sufficient level of *actual behavioural control.* This refers to the extent to which a person has the

skills, resources and other prerequisites required to enable them to enact the intended behaviour.

As Figure 1 demonstrates, our conceptual model extends the TPB framework by assuming that an individuals' immediate family network exerts influence not only on attitudes, perceived control and subjective norms, but also during the later phases of decision-making.[1] We anticipate that this effect strengthens when the time span between intentions and predicted behaviour is longer due to the fact that individuals are exposed to family influence for a longer period of time. Since reproductive behaviour is not routine behaviour, but a crucial life decision that involves certain prerequisites (e.g. having a partner), fertility intentions generally involve 'long-term' planning. We therefore argue that intra-family mechanisms can influence actual behavioural control and act as further reinforcing factors that influence fertility behaviour outcomes (see Figure 1). Besides institutional settings (e.g. family policy and availability of public child care) and individual demographic and socio-economic factors (e.g. income, education and employment status), we argue that the family context affects an individual's ability to control and realise fertility behaviour. An individual's family network might be seen as social capital, and therefore a source of stability, well-being and informal resources (e.g. information, economic, emotional and informal child care support, see Bühler and Philipov 2005).

We also anticipate that two additional family network mechanisms are at play. First, instead of only assuming that family social capital is a *source* of actual behavioural control, following Astone et al. (1999), we argue that having a child is primarily a form of *investment* in social capital. Having weak family ties might therefore reinforce already positive intentions to have a child, which then operates as a way to acquire new social capital. We acknowledge that this latter mechanism appears to contradict the one described above. However, since previous research has produced evidence for both mechanisms, the current study aims to test which explanation prevails and under what circumstances (see next paragraph for parity-specific hypotheses). Second, following Kohler's (2001) argumentation related to social interaction and diffusion theories, intra-family social interactions might influence and enhance fertility behaviour. The childbearing and childrearing experience of a sibling may reinforce already positive fertility intentions, leading to a higher likelihood of realising them. We now elaborate upon the two central family network effects and their relationship to fertility, which are: family social capital and intra-familial interaction.

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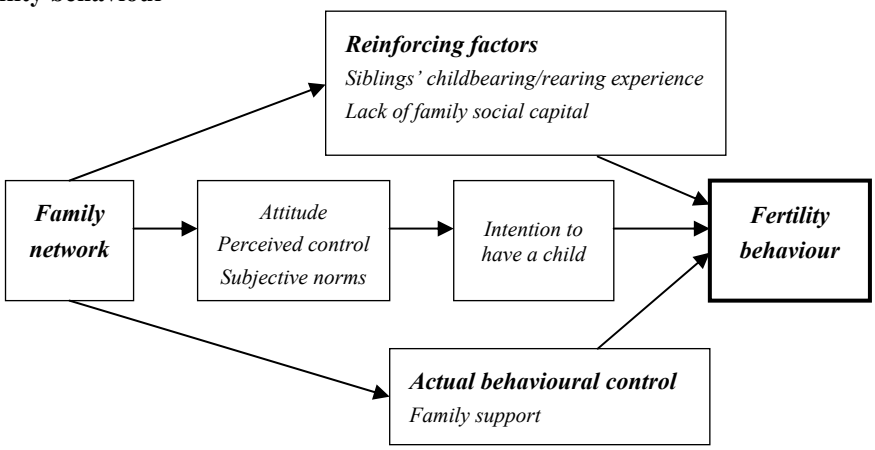
[1] Given that the focus of this study is on the link between intention and behaviour and not on the formation of the former, we were not directly interested in testing the effect of Ajzen's three antecedents on intentions. However, we would have nonetheless included them in the empirical model if adequate measures would have been in the data, which unfortunately was not the case.

Figure 1:
Integrating the family network and the Theory of Planned Behaviour to predict fertility behaviour



3 Family social capital

According to Coleman (1988, p.384), "the social capital of the family is the relation between children and parents (and, when families include other members, relationships with them as well)". Astone and colleagues (1999) underline that the concept of social capital not only refers to the relationships themselves, but also to their quality and strength, as well as the resources available through those relationships. Social capital resources can include goods as well as knowledge, information, money, capacity to work, influence, power or active help (Bühler and Philipov 2005).

Recent demographic research has shown that social capital, next to economic and cultural resources, is an important factor for fertility decisions (e.g. Schoen et al. 1997; Bühler and Philipov 2005; Philipov et al. 2006). This body of research looks at supportive network relationships as strategies for coping with one's socio-economic circumstances in relation to fertility (e.g. assistance in child care). Since these studies have focussed on the role of social capital in the formation of fertility intentions only, our goal is to extend this body of research on social capital and fertility by investigating its role in relation to the realisation of fertility intentions.

The relationship between social capital and fertility is not a straightforward one. Previous research has presented a puzzle, since there is theoretical and empirical support for two competing hypotheses about how family social capital might operate to impact the realisation of fertility intentions. The first mechanism supposes that people who possess more social capital might feel more secure and supported, and are therefore more likely to realise their fertility intentions sooner.

Studies of women in eastern European countries (e.g. Bulgaria and Poland: Bühler and Philipov 2005; Bühler and Fratzack 2007) have shown that the availability of economic, instrumental and emotional support is certainly taken into account during fertility planning and that more supportive network resources positively influence both the timing (earlier births) and quantum (number of births) of fertility intentions. Based on these findings, we propose our first hypothesis on the realisation of short-term fertility intentions, which is:

H1a) the higher the level of family social capital, the higher the probability of realising the intention to have a(nother) child within three years.

This is due to the fact that high levels of family social capital aid in reducing uncertainty and also the costs related to childbearing.

However, there might be a second opposing mechanism at play for those with strong family ties, which is the fact that individuals are more likely to adopt a 'satisficing' strategy. Here we draw from Simon's (1956, 1957) classic theory of 'satisficing', which refers to the decision-making process where individuals opt for an adequate rather than an optimal solution in particular situations. Simon (1956, 1957) argues that individuals lack the cognitive resources often demanded by complex decision-making situations which entails that they are often uncertain about what constitutes a satisfactory outcome. In Simon's view, when deciding whether or not to have a child (or an additional child), individuals are unaware and unable to calculate the circumstances. This is attributed to the complex factors involved when making these decisions, but also to uncertainty about the future and, for those having a first child, to inexperience and inability to calculate the consequences. The individual is therefore only able to evaluate his or her fertility behaviour on the basis of the probability that it will be satisfactory, which is a 'satisficing' strategy. By choosing to realise their intention to have a(nother) child, individuals opt for an outcome that has the maximum probability of being satisfactory, which is close to optimisation under conditions of uncertainty (and therefore it might have changed from when the intention was formed).

We contend that individuals with high levels of family social capital would be likely to adopt a satisficing strategy since their strong family network is a near optimal solution for personal fulfilment and thus operates as an adequate replacement for one or additional children. These 'satisficed' individuals lack the urgency to invest in their family network and would therefore be less likely to realise their childbearing intentions within the planned time span. This leads us to a second, competing hypothesis:

H1b) the higher the level of family social capital, the lower the probability of realising the intention to have a(nother) child within three years.

To understand this process further, we can also turn to explanations developed by materialist anthropologists (e.g. Greenhalgh 1995), sociologists and demographers (e.g. South 1991; Astone et al. 1999). Here the central argument is

that children do not deplete or necessitate social capital, but rather *generate* social capital by establishing new or better relations among persons (parents, relatives and friends, from whom potentially drawing resources) and by guaranteeing more security for parents in their old age (Billari and Galasso 2008; Mills and Begall 2010). Building upon this body of research, we anticipate that those with weak family ties would be more willing to have a child to improve their own social capital (Schoen et al. 1997). In a recent study using Bulgarian data, Bühler (2008) demonstrated that children can operate to improve their own parent's social networks. Fertility intentions are influenced by the notion that a child will strengthen the relationship between parents and relatives and provide support in old age. This echoes the classic work of Hoffman and Hoffman (1973) where parents are seen as attributing a set of values to children such as the expansion of the self, affiliation, stimulation, accomplishment and social comparison. Zelizer (1994) likewise attests that the value of children has shifted from the role of economic contribution to the household to being a more sentimental criterion and operating as an extension of the emotional satisfaction and self-actualisation and thus personal social capital of their parents.

As outlined briefly in the introduction, we are also interested in exploring how (higher) social capital impacts the transition to the first birth, compared to higher-order births. The decision to have the first child is qualitatively different from having subsequent children, since the former marks a totally new transition into parenthood (Billari et al. 2009; Philipov et al. 2006; Schoen et al. 1999). We therefore adopt the assumption that the underlying drivers of first and higher-order births are different and will investigate whether family social capital dynamics might have different effects and intensities. Specifically, we anticipate that the two competing social capital mechanisms for those with higher levels of family social capital (Hypotheses 1a and 1b), will have stronger effects for higher-order births. If family ties are indeed a source of support, additional children will translate into the need for more supportive resources to counter the costs and uncertainty associated with having additional children. It may be that strong family relationships allow people to be satisfied and fulfilled with their existing social network and therefore less likely to invest in a big family (more than one child), whereas having the first child might be more of an answer to biological needs and social norms. Therefore, building on H1a and H1b, our second set of hypotheses predicts the following:

H2a) a higher level of family social capital has a stronger positive effect on the realisation of the intentions to have another child than on the realisation of the intentions to have the first child

H2b) a higher level of family social capital has a stronger negative effect on the realisation of the intentions to have another child than on the realisation of the intentions to have the first child

4 Intra-familial interaction: cross-sibling effects

There is increasing acknowledgement of the importance of informal social relationships and social interaction in influencing individual childbearing behaviour (Montgomery and Casterline 1996; Bernardi 2003; Bongaarts and Watkins 1996; Kohler 2001). An individual's fertility is not only influenced by individual characteristics but also by the features and behaviour of the people with whom the individual interacts. The rationale behind this perspective is that individuals, through social interactions, gain knowledge and information from others (social learning) and are influenced by others (social influence; Kohler 2001).

Following Axinn et al. (1994) and Lyngstad and Prskawetz (2010), in the present study, we focus on intra-family social interaction effects on fertility, and specifically on siblings' interactions. While past demographic research has considered siblings as an instrument to control for genetic or shared environmental effects (e.g. twin studies), in recent years the importance of siblings' effects on socio-demographic behaviours has been acknowledged by several authors (e.g. Hogan and Kitagawa 1985; Haurin and Mott 1990; Powers 2001). Indeed, siblings are a primary, strong and often stable component of an individual's personal network, since relationships among siblings are likely to be close and long-lasting throughout the life course. Siblings can act as role models (Haurin and Mott 1990), be a source of information on life course transitions (Bernardi 2003) or, through their behaviour, reinforce already existent family attitudes, values or influence (Axinn et al. 1994).

Very few studies have investigated the cross-sibling effects on reproductive behaviour in industrialised countries. Relevant exceptions include the qualitative work of Bernardi (2003) which highlights siblings' childbearing experience as a source of information, and two quantitative studies that make use of micro-data, namely those of Axinn et al. (1994) and Lyngstad and Prskawetz (2010). The former shows that the number of nieces and nephews is correlated with number of children; the latter investigates cross-sibling effects on an individual's fertility timing and rates. We aim to extend this literature by focusing on another fertility outcome: the realisation of fertility intentions.

Perhaps the strongest reason for the lack of research on this topic rests with the fact that social interaction effects are endogenous. Or, as Manski (1995) explains: "the behaviour of an individual varies with the distribution of behaviour in a group containing the individual. The interactions are endogenous because the outcome of each group member varies with the outcomes of the other group members, not with other attributes of the group". Put differently, the cross-sibling effects on fertility might not be due to 'imitation mechanisms', social pressure or information exchange but rather as a result of the effect of other unobservable family background factors (since family, in the case of siblings, is our 'reference group') on every sibling. Some authors have tried to solve this issue using new

model specifications (see Kravdal 2003), yet these solutions have been contested, with the appropriate method for estimating cross-sibling effects remaining open (Lyngstad 2008).

We fully acknowledge this issue, but still claim that it is important to take siblings' interactions into account, even though we opt to model them in an intuitive way. Since our data do not allow us to include any family-fixed effect or use a multilevel specification, we model cross-sibling effects by defining an individual's probability to realise his/her intention to have a child as a function of the past fertility behaviour of one or more siblings (i.e. the presence of a young nephew/niece). We concede that this straightforward model specification does not permit us to infer any pure causal effects of siblings' behaviour on respondent's fertility. However, by looking at siblings' fertility behaviour while controlling for observable family background characteristics, we can uncover whether there is any influence of the family network on an individual's actual realisation of the intention to have a child that works via intra-sibship mechanisms. We therefore assume that cross-sibling effects on fertility operate as both a signal of family attitudes and values that are reinforced by a sibling's behaviour and as a consequence of social learning and influence processes that stem from observing siblings as role models and as a source of information. Assuming that a cross-sibling effect might be relevant and observable only when the childbearing experience is recent or the nephew or niece is still a young child, we hypothesise that:

H3) Individuals who have siblings with a young child (under the age of 12) are more likely to realise their fertility intentions, all other things being equal.

5 Data, measurement and analytical methods

5.1 Data and sample

We use data from Wave 1 (2002-2004) and 2 (2007) of the Netherlands Kinship Panel Study (NKPS), a large-scale survey of Dutch men and women aged 18-79 at Wave 1 (Dykstra et al. 2005). The NKPS provides us with an exceptional opportunity to use detailed longitudinal information on intra-family relationships and solidarity. Moreover, it provides us with data not only regarding the nuclear family but also about the extended family, including parents, siblings, grandparents and other relatives. 8,156 respondents participated in Wave 1, resulting in a response rate of 45%. This is comparable to the rate of other large-scale surveys in the Netherlands (Dykstra et al. 2005), keeping in mind that response rates in the Netherlands are generally lower than in other countries (De Leeuw and De Heer 2001).

74% of the Wave 1 respondents also completed the questionnaire in Wave 2. Given an attrition rate of 26%, we carried out an attrition analysis on the sub-

sample we selected for this study, using a probit to test whether the non-response pattern was random (the pseudo R-square, which can be considered a measure of the non-randomness, could only explain 4% of the attrition).
Results showed that males, singles and less educated individuals were more likely to drop out of the survey. Our results are very much in line with what has been found on the overall NKPS sample (Dykstra et al. 2007). Therefore, in preliminary analyses, we replicated our models using weighted data, provided by the NKPS. Since results were essentially the same as those with unweighted data, we preferred using the latter ones (following Rijken and Thomson 2011).

Table 1:
Descriptive characteristics of the sample (in per cent)

	Entire sample				**Sample with positive fertility intentions**			
	Childless		**With children**		**Childless**		**With children**	
Intention to have a child within 3 years					-		-	
Yes	49.6		17.1		-		-	
No	50.4		82.9		-		-	
Had a child								
Yes	16.0		14.0		23.8		42.3	
No	84.0		86.0		76.2		57.7	
Gender								
Men	47.6		33.1		48.7		32.8	
Women	52.4		66.9		51.3		67.2	
Partnership status								
Single	62.1		13.0		59.8		9.2	
Cohabiting	24.1		12.8		28.7		21.1	
Married	13.8		74.3		11.5		69.7	
Nephew/niece under 12								
No	78.7		60.0		81.1		55.3	
Yes	21.3		40.0		18.3		44.7	
Gender of sibling 1								
Male	51.6		53.1		51.9		48.3	
Female	48.4		46.9		48.1		51.7	
Gender of sibling 2								
Male	50.9		52.3		51.8		57.7	
Female	49.1		47.7		48.2		42.3	
N	1540	1730	794	296	1540	1730	794	296
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Standardised Age	0	1	0	1	0	1	0	1
Education (1-10)	6.6	2.0	6.2	2.1	6.7	1.9	6.7	1.9
Mother's education (1-10)	4.6	2.2	3.6	1.9	4.9	2.2	4.0	2.1
Father's education (1-10)	5.4	2.6	4.5	2.5	5.6	2.6	4.9	2.5
Number of siblings	2.0	1.6	2.7	2.1	1.8	1.4	2.3	2.1
Parity	-	-	2.0	0.9	-	-	1.3	0.6
Age difference with sibling 1	1.0	5.1	1.2	5.9	0.8	4.9	0.8	4.8
Age difference with sibling 2	-0.2	6.6	0.0	7.1	-0.1	6.6	-0.7	6.8
Family social capital	-0.1	0.9	0.0	0.9	-0.2	0.9	-0.2	0.9

We selected a sub-sample (N=3,270) of men and women aged between 18 and 45 years-old, with or without children, but not expecting a child at Wave 1. Within this sample, 1,090 people declared that they intended to have a child within three years in the first wave. We decided not to restrict our analysis only to respondents with a co-residential partner since we are interested in the evolution of fertility intentions over a longer time span of 3.5 years. Therefore, we believe that it is reasonable and realistic that people can find a partner and have a child within such a spell (see Table 1 for an overview of the characteristics of the sample).

5.2 Measurement of variables

Dependent variable: realisation of fertility intentions. Our dependent variable is the likelihood of realising the intention to have a child within three years. We computed this dependent variable using three questions from both waves of the survey: i) whether the respondent intended to have a(nother) child (*Do you think you will have (more) children in the future?*), ii) within how many years he/she intended to have a baby at the time of the first wave (*Within how many years' time would you like to have your first/next child?*); and, iii) whether the respondent had a child between the two waves or was pregnant at the time of the second wave (*Have you and your/this partner had a child together since the last interview?*). Using the first two questions, we identified those who had positive fertility intentions at Wave 1. We also made use of these questions to compute the fertility intentions variable included in the probit with sample selection. We opted to focus on the intentions to have a child within three years because the time span between the two waves was 3.5 years. For this group of people we computed a dummy variable that takes on the value 1 for individuals who had a child. We address the issue of how we controlled for potential selection bias in the last section that describes our analytical methods.

5.3 Independent variables

Family social capital is operationalised to measure the strength and quality of family ties. By first engaging in a factor analysis, we computed an index using the following items: *1) the ties between members of my extended family are tightly knit, 2) my extended family is more a collection of individuals rather than a single unit, 3) in our extended family we keep each other informed about the most important events, 4) the members of my extended family are very close*, 5) *when I am troubled, I can always discuss my worries with my family, 6) I place confidence in my family, 7) should I need help, I can always turn to my family, 8) I can always count on my family.* Possible answers are on a 5-point scale ranging from 1, *strongly agree*, to 5, *strongly disagree* (Cronbach's alpha=0.91). In order

to test for a potential curvilinear effect of family social capital on the realisation of intentions, we also computed and included the squared index in the analysis.

The NKPS provides us with general demographic characteristics about each of the respondent's (biological, adopted, half-) siblings; however, information about solidarity, partner and parental status are collected only for two randomly selected siblings, therefore our explanatory variable inevitably refers to these two siblings only. Even though this approach does not allow us to have full knowledge of the childbearing experience of all of the respondent's brothers and sisters, the random selection process through which the two siblings are chosen ensures against any selection bias. Indeed, if the two siblings would have been selected by the respondent, results might have been biased by the non-random selection of the sibling relationship.

Presence of siblings' children under the age of 12 was measured by creating a dummy variable that indicated whether at least one sibling had a child under the age of 12. It was only possible to derive this information from Wave 2 where the respondent was asked if the two randomly selected siblings had children under the age of 12 and additional questions which allowed us to determine if siblings had a child between the two waves. Since we unfortunately cannot determine when the siblings' children were born, but we want to ensure that these children were born before the respondent's child (which would be between Wave 1 and 2), we exclude those cases in which we know that the sibling has a child under 12, but the sibling gave birth to his/her first child between the two waves. This is due to the fact that we cannot determine if this occurred before or after the respondent's own childbearing.

5.4 Control variables

In order to avoid a spurious association between family network and fertility outcomes, we included several control variables in our models. The selection of the control variables is guided by findings from previous studies on this topic, specifically by Spéder and Kapitany (2009; REPRO project, work package 4, 2010), that have highlighted the importance of socio-demographic factors in the process of realising fertility intentions. Namely, we include: age, age squared (to control for a curvilinear effect of age), education (respondent's highest educational attainment is measured on a scale ranging from 1 - primary school not finished, to 10 - postdoctoral degree),[2] partnership status (a categorical variable with three categories: single, cohabiting or married at Wave 1) and parity (a scale measured at Wave 1 which is included in the models that analyse higher-order

[2] The exact question with its scale is the following: What is the highest level of education that you completed with a diploma? 1. Did not complete elementary school, 2. elementary school only, 3. lower vocational, 4. lower general secondary, 5. intermediate general secondary, 6. upper general secondary, 7. intermediate vocational, 8. higher vocational, 9. university, 10. post-graduate.

births). In previous analyses we also included a measure of religiosity in order to partially account for ideational factors (Spéder and Kapitany 2009), but since it was not significant, we opted to exclude it from the model.

In order to disentangle the role of intra-family social interactions and social capital from family background factors, we control for family and parents' characteristics that have been shown to be relevant for children's fertility behaviour (Axinn et al. 1994; Rijken and Liefbroer 2009). Specifically, after having considered several family factors (e.g. parental religiosity and parental disruption), we have included only those that have been shown to be significant in at least one of our models. These are the mother's and father's education (scale variables identical to the respondent's education measure) and the number of siblings (biological, half and adopted), which is a scale variable that allows us to control for the parents' fertility attitudes and behaviour. Finally, in the models where we test cross-sibling effects (Model 3 and 4), we controlled for the age differences among the respondents and each of the two randomly-selected siblings in addition to the siblings' sex.

5.5 Analytical methods

As highlighted in the introduction to this study, previous studies have only included those individuals in the analysis who have positive fertility intentions, which may result in potentially biased results. In order to control for the potential selection bias that would arise from looking only at individuals with positive fertility intentions, we opted for a probit model with sample selection (Van de Ven and Van Praag 1981). This entailed analysing a binary outcome (i.e. having a child or not) that is observed only for a specific part of a sample (i.e. those who already had positive fertility intentions at Wave 1). The assumption that unobserved factors affecting selection into that sample (i.e. the intention to have a child within three years) may simultaneously affect our binary outcome of interest (i.e. realisation of that intention) led us to use the Heckman sample selection model (1979), but in its specification for a binary outcome (Van De Ven and Van Praag 1981. See Appendix for a detailed description of the model).

We implemented probit with sample selection in the software STATA, which estimates the model using maximum likelihood (Billari and Borgoni 2005). In this way, the model is identified on the basis of distributional assumptions and therefore an exclusion restriction[3] is not required. However, it has been demonstrated that with at least one exclusion restriction (Sartori 2003), the Heckman procedure performs better. Therefore, following the strategy applied by Philipov et al. (2006), we first estimate the two probit equations separately, without considering sample selection, in order to look for a valid exclusion

[3] A two-step procedure, in order to be identified, requires that at least one variable that is in the selection equation be not contained in the outcome variable. Put in another way, we should find a variable that affects the formation of the intentions but not its realisation.

restriction. During these analyses, we did find that gender has a significant effect on fertility intentions but not on behaviour. This seems rather logical from a theoretical point of view as well. While the extent to which men and women intend to have a child may differ due to the fact that the formation of intentions takes place more at the individual level, the actual realisation of these intentions occurs at the level of the couple and should therefore be the same for both sexes. We therefore treat gender as our exclusion restriction and include it only in the selection equation (i.e. probit on intentions).

As mentioned previously, we are interested in exploring whether and how family social capital mechanisms work differently for the first child compared to higher-order births. As a consequence, we run separate models for childless people (N=1540) and for those who already have at least one child (N=1730). We restrict the analysis of possible cross-sibling effects to people with at least one sibling and with no children at Wave 1 (N=690). We exclude individuals who already have children for a practical reason. Since we do not have any information about when their siblings' children were born, we cannot know whether respondents who already have children at Wave 1 gave birth before or after their siblings. Since we are interested in the possible effect that siblings' fertility behaviour has on the respondent's fertility, we overcome this issue by only studying cross-sibling effects on childless people at Wave 1. It is relevant to note that previous research (Lyngstad and Prskawetz 2010) has shown that cross-sibling effects are almost negligible for higher-order births.

We also divided this sub-sample of childless people with at least one sibling into two further groups and ran separate analyses for those who only have one sibling (N=340) and those who have two or more (N=350). This decision was motivated by two central reasons. First, a family with only two children (i.e. respondent plus one sibling) might have substantially different background characteristics and preferences (which in turn could influence the fertility preferences of the children) compared to a larger family (i.e. more than two children/siblings). Having two children may be more normative and 'standard', while bigger families might have more selective characteristics. Therefore, since the data do not permit us to control for a family-fixed effect, we opted for dividing the sample into two more likely homogeneous groups and running separate analyses. Second, by putting together those with only one sibling and those who have more than one, we could not have controlled for the age difference between the respondent and each sibling and the sex of each sibling, as the age difference with the second sibling and his/her sex is missing for all those with only one sibling. We believe that this strategy allows us to better control for potential observable and unobservable family factors that could influence the realisation of an individual's fertility intentions.

6 Results

The results of our probit with sample selection models are shown in Tables 2 and 3. Table 2 shows results regarding the effect of family social capital on fertility. In this table, two models are reported. Model 1 contains estimates for the first child (i.e. childless people) and Model 2 shows the estimates for higher-order births (i.e. people who already have children). Table 3 reports the findings for intra-familial cross-sibling effects. Once again there are also two models: Model 3 includes only respondents with one sibling, while Model 4 refers to respondents who have at least two siblings. For each model, the outcome equation is reported in the first or top half of the table, which is the probit likelihood of the realisation of positive intentions. Below this, the bottom panel of the table contains the estimate from the selection equation, which is the probit likelihood of the intention to have a child within three years.

6.1 Empirically testing sample selection bias

The first finding that we should note is that in all models in both tables, the correlation coefficient for the residual component (i.e. rho) of the two equations is positive but never significant. From a behavioural point of view, this means that, although there are probably some unobserved characteristics which positively affect individuals' fertility intentions *and* their behaviour, this effect does not seem to play a significant role.

The test on rho suggests that we cannot reject the null hypothesis that rho is equal to zero, or in other words, that the correlation is not significant. Standard probit models of the realisation of positive fertility intentions could therefore have also provided us with unbiased estimates. We acknowledge, however, that our samples are small, which might lead to a low level of statistical power, thereby increasing the probability of a Type-II error (failing to reject the null hypothesis that rho is not different from zero, i.e. that the correlation is not significant). Because of this, and taking into account that preliminary analyses showed that standard probit models overestimate the effect of age (in all of the models) and parity (in Model 2) compared to the estimates of the probit with sample selection models, we opted to control for the small positive selection bias and estimated a probit with sample selection. Moreover, this model allows us to undertake an interesting comparison between factors affecting the formation of fertility intentions and those impacting on their realisation.

6.2 Family social capital

Turning first to the results of family social capital in Table 2, it should be recalled that initially we posed two competing hypotheses where we predicted higher levels of family social capital to result in either a higher (H1a) or lower

probability of realising one's fertility intentions (H1b). The results show that strong and supportive family ties do not significantly increase the actual behavioural control of an individual and enable him or her to be more secure and thus have a higher propensity to realise his/her intention to have a child. This implies that H1a is not supported by the data. Instead, we rather found some support for H1b, since we observed a negative association between social capital and the realisation of fertility intentions. We did not find any curvilinear effect of family social capital on fertility behaviour, since the squared term is not significant. In order to check the robustness of these findings we ran preliminary analyses using a categorical variable with three categories (low, medium, high family social capital, computed from the factor) and did find consistent results. It appears that when an individual possesses high family capital and at least one child, he/she appears to be socially fulfilled or satisfied with this position and opts for an adequate satisficing solution (i.e. adoption of a 'satisficing' strategy). In this sense, high levels of family social capital appear to deter from having a child.

This finding also relates to our second set of hypotheses, which are extensions of H1a and H1b to include a parity argument, where we anticipated a higher level of family social capital to have either a stronger positive (H2a) or negative (H2b) effect on fertility realisation for higher-order parities, compared to the realisation of intentions to have a first child. Although we did not find any effect of the strength and quality of family ties on the realisation of *first* child fertility intentions (Model 1), there is indeed a significant effect for higher-order births (Model 2) and thus evidence to support H2b. In other words, higher levels of family social capital translate into a lower likelihood of realising the intention to have *another* child.

Turning to the bottom panel of Table 2, where we examine fertility intentions (and not the realisation of these intentions), we observe, once again, a negative association between an increase in the level of social capital and, this time, the intention to have the first child. We do not find the same effect for additional fertility intentions.[4] This is likely to be related to the point discussed above regarding the distinct nature of first versus higher-order births. This latter finding, which has a rather small effect, might be explained by the fact that individuals who experience a low level of family social capital may feel unsatisfied and therefore may realise their intention to have a child within the planned time span because they want and need to invest in their social capital.

[4] According to the TPB, those elements that constitute the perceived behavioural control might also turn into actual behavioural control (in Ajzen's original scheme there is an arrow going from the former to the latter). We can therefore hypothesise that family social capital might affect fertility intentions as well as behaviour. However, in both cases, family social capital does not seem to operate as a source of control, but rather as part of an individual's 'satisficing' strategy.

Table 2:
Probit with sample selection estimates of the realisation of intentions (outcome equation) and fertility intentions (selection equation)

	Model 1: Childless		Model 2: With children	
Realisation of fertility intention				
Constant	0.1026	(0.7363)	-0.8506	(0.5867)
Age	0.1706	(0.3291)	-0.5245	(0.3117)
Age squared	-0.2388	(0.1573)	-0.1239	(0.0803)
Partnership status (ref: married)				
Single	-1.5113***	(0.2068)	-1.2304***	(0.3315)
Cohabiting	-0.5447**	(0.1979)	-0.1160	(0.1835)
Education[a]	0.0320	(0.0360)	0.1185*	(0.0594)
Parity[b]	-		-0.5394	(0.4115)
Mother's education[a]	0.0274	(0.0325)	0.0344	(0.0452)
Father's education[a]	-0.0472	(0.0252)	0.0138	(0.0351)
Number of siblings	0.0312	(0.0612)	0.0511	(0.0395)
Family social capital	-0.0444	(0.0734)	-0.1795*	(0.0899)
Family social capital squared	0.0280	(0.0440)	-0.0437	(0.0759)
N	794		296	
Fertility intention				
Constant	0.1600		-0.3048	
Women	-0.2046**	(0.0709)	-0.1788*	(0.0990)
Age	-0.5821***	(0.0436)	-0.8436***	(0.0767)
Age squared	-0.2331***	(0.0415)	-0.1421***	(0.0418)
Partnership status (ref: married)				
Single	-0.1524	(0.1085)	-0.3819*	(0.1511)
Cohabiting	0.1012	(0.1185)	-0.0901	(0.1293)
Education[a]	0.0355	(0.0211)	0.1508***	(0.0286)
Parity[b]	-		-1.0025***	(0.0792)
Mother's education[a]	0.0302	(0.0190)	-0.0155	(0.0272)
Father's education[a]	-0.0092	(0.0161)	0.0135	(0.0217)
Number of siblings	-0.0751**	(0.0244)	0.0543*	(0.0242)
Family social capital	-0.0958*	(0.0427)	-0.0973	(0.0549)
Family social capital squared	0.0367	(0.0280)	-0.0530	(0.0390)
N	1540		1730	
Log likelihood	-1228.0526		-661.5771	
Rho	0.2699		0.5576	
LR test of independent equations (rho = 0): Chi-squared(1)=0.12, Chi-squared(1)=0.64, P-value=0.7242, P-value = 0.4250				

Notes: Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; a= scale: 1-10, b= scale variable
Source: NKPS, wave 1 and 2 (2002-2003, 2007). Calculations by the authors.

6.3 Intra-familial interaction: cross-sibling effects

Table 3 reports estimates of the results of cross-sibling effects. Here our central hypothesis was that individuals who have siblings with a young child (under the age of 12) would be more likely to realise their fertility intentions (H3). When we examine both those with one (Model 3) and two or more siblings (Model 4), we observe that having a sibling with a young child is associated with a higher

probability of realising one's own intention to have a first child. We therefore find support for H3.

Table 3:
Probit with sample selection of the realisation of intentions (outcome equation) and fertility intentions (selection equation), childless individuals only (i.e. first-birth intentions)

	Model 3: 1 sibling		Model 4: 2 or more siblings	
Realisation of fertility intention				
Constant	-0.3471	(0.6157)	-0.0341	(0.7732)
Age	0.2472	(0.2599)	0.2617	(0.3555)
Age squared	-0.3894*	(0.1916)	-0.1756	(0.2077)
Partnership status (ref: married)				
Single	-1.4167***	(0.2810)	-1.8322***	(0.2562)
Cohabiting	-0.2529	(0.2522)	-0.8146**	(0.2721)
Education[a]	0.0215	(0.0592)	0.0516	(0.0522)
Mother's education[a]	-0.0121	(0.0522)	0.1187*	(0.0534)
Father's education[a]	0.0039	(0.0402)	-0.1229**	(0.0446)
Number of siblings			0.0974	(0.0732)
Age difference with sibling 1	0.0126	(0.0265)	0.0203	(0.0209)
Age difference with sibling 2	-		-0.0048	(0.0188)
Gender sibling 1 (ref.: male)	0.2040	(0.1823)	-0.1951	(0.1856)
Gender sibling 2 (ref.: male)	-		-0.0861	(0.1856)
Presence of a sibling' child	0.6382**	(0.2296)	0.4693*	(0.1974)
N	340		350	
Fertility intention				
Constant	0.6944*	(0.3342)	0.2014	(0.2860)
Gender (ref: Men)	-0.2966**	(0.1146)	-0.1299*	(0.0026)
Age	-0.5524***	(0.0718)	-0.5993***	(0.0613)
Age squared	-0.2904***	(0.0650)	-0.2428***	(0.0626)
Partnership status (ref: married)				
Single	-0.4087*	(0.1986)	-0.0095	(0.1471)
Cohabiting	-0.1872	(0.2112)	0.1902	(0.1657)
Education[a]	0.0151	(0.0353)	0.0164	(0.0281)
Mother's education[a]	0.0483	(0.0307)	0.0231	(0.0275)
Father's education[a]	-0.0176	(0.0261)	-0.0020	(0.0230)
Number of siblings	-		-0.0770*	(0.0338)
Age difference with sibling 1	-0.0092	(0.0158)	-0.0150	(0.0109)
Age difference with sibling 2	-		0.0176	(0.0094)
Gender sibling 1	-0.0876	(0.1135)	-0.0565	(0.0990)
Gender sibling 2	-		0.0461	(0.0999)
Presence of a sibling's child	0.0734	(0.1568)	-0.0037	(0.1153)
N	594		770	
Log likelihood	-461.7332		-564.4799	
Rho	0.4223		0.0094	
LR test of independent equations (rho = 0): Chi-squared(1)=0.34, Chi-squared(1)=0.00; P-value= 0.5571, P-value= 0.9910				

Notes: Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$; a= scale: 1-10
Source: NKPS, wave 1 and 2 (2002-2003, 2007). Calculations by the authors.

Looking at cross-sibling effects on fertility intentions at the bottom panel of Table 3, we see a lack of any significant effects. This result is quite surprising as we had expected to also find a positive effect on the intention to have a child, which would have operated via the role of subjective norms. This finding might be explained by the fact that some family values are incorporated into the intention, which may not be captured by the siblings' behaviour. Rather, the childbearing and childrearing experience of a sibling might enhance an individual's actual behaviour, via a learning process, and therefore positively influence the likelihood of realising positive fertility intentions.

In order to improve understanding of how cross-sibling effects operate on fertility, we also included interactions between the age difference among siblings and the dummy indicating the presence of a nephew/niece and between the gender of the sibling and the presence of a nephew/niece. However, none of the interactions proved to be significant, therefore they were not included in our final models. Although this lack of significance could be attributed to the small sample size, it might also be that intra-sibship mechanisms do not have different intensities in relation to the sex or age (older or younger) of siblings.

6.4 Control variables

Finally, turning to the control variables, we see that socio-demographic factors act as expected and generally in line with previous findings (Spéder and Kapitany 2009). As previously mentioned, we have identified gender as our exclusion restriction. Indeed, in previous analysis using independent standard probit for fertility intentions and their realisation, we could not find any significant gender difference in the latter process but we did observe that women are significantly less likely to intend to have a child than men, which has also been demonstrated in previous research (e.g. Mills and Begall 2010).

Age does not seem to have any effect on the realisation of fertility intentions, which appear to be negatively influenced by any marginal increase in age (and the relationship is curvilinear). People who do not have a partner at Wave 1 (i.e. singles) are (of course) less likely to realise their intention to have a child, at all parities. Obviously, this effect is much stronger on the realisation of the intention, since a partner is an essential prerequisite, than on its formation. Moreover, those without children (Model 1 and 4) seem to be less likely to realise their fertility intentions when they cohabit, as opposed to being married. A higher level of education is associated with a higher probability to intend as well as to realise the intention to have *another* child (Model 2). We expect that this positive effect of education can be explained as an income effect (Kreyenfeld 2001).

In analysing the realisation of the intention to have *another* child, we controlled for the number of previous children (i.e. parity). Model 2 shows no significant effect of parity on fertility outcomes, but the higher the parity, the lower the likelihood to intend to have another child. Therefore, the number of

children mainly affects the *intentions* to have another child, more than the actual behaviour. As for family background characteristics, we find a significant effect of parents' education only on the realisation of the intention to have a child for those people who are childless but have more than one sibling (Model 4). It is interesting to note that these variables only play a role for this specific sub-sample of people who come from a large family of origin. Since parental education operates as a proxy for family resources and values, the fact that mother's and father's education has an effect on the fertility behaviour of this group of people is not surprising. In a large family, resources might be particularly relevant since they need to be distributed across more individuals. Next to that, family values may be reinforced by intra-sibship behaviours. What we specifically observe is a positive effect of mother's education and a negative effect of father's education on the realisation of the intention to have a *first* child. In preliminary analyses, we also computed a categorical variable with three educational levels to check for a possible non-linear effect, but we did not find any. Some authors (e.g. Knijn and Liefbroer 2006) have argued that parents with higher education or income give children more resources, thus facilitating children's family formation. Other studies (Murphy and Wang 2001) have demonstrated that parents' higher education has a negative effect on children's fertility behaviour, because life goals other than family formation are transmitted. We finally find that the number of siblings only affects fertility intentions but not behaviour. While Model 1 and 4 show that a higher number of siblings are associated with a lower probability of realising the intention to have the *first* child, having more brothers and sisters seems instead to have a positive effect on the intention to have *another* child (Model 2). The first effect seems to be consistent with the negative role played on the intention to have the *first* child by a higher level of family social capital (a tight-knit or large family might make individuals socially fulfilled and inhibit them from investing in their own family social capital by having a child). The second positive effect might be the result of the influence of parents' fertility preferences and behaviour (for a large family) on the child's reproductive behaviour, who also aims to have a large family.

7 Conclusion

The aim of this study was to both build upon and extend existing research on the intention-behaviour gap by investigating the importance of the role of the family network on the realisation of time-dependent fertility intentions for the first and higher-order children. Building upon previous research (Rossier and Bernardi 2009; Billari et al. 2009), we integrated family network mechanisms into the conceptual framework of the Theory of Planned Behaviour (Ajzen 1991), showing how intra-family dynamics can affect the end outcome of the fertility decision-making. We specifically looked at the family network as family social

capital, and as a place where relevant social interactions occur, by focussing on cross-sibling effects. We posed two competing hypotheses regarding the impact of high levels of family social capital on the realisation of fertility intentions, explored how these vary by parity and examined cross-sibling effects. Building upon previous research (Spéder and Kapitany 2009, REPRO project, work package 4, 2010), we were specifically interested in investigating factors facilitating or inhibiting the intention to have a(nother) child within three years. We therefore addressed the problem of selection bias stemming from only studying those who have positive fertility intentions by estimating a probit model with sample selection. This enabled us to check and control for a potential selection bias, which was shown to be present, but at a negligible level.

Our findings demonstrated that strong family ties and high levels of family social capital are associated with a lower probability to realise the intention to have a child, for those who have at least one child. As Schoen et al. (1997) maintain, having a child can be seen as a social investment by future parents. Applying the classic theory of Herbert Simon (1956; 1957), we argued that individuals are often unable to make the complex calculations required to understand how a child or additional child might influence their lives, also considering uncertainty and inexperience with the situation. Individuals therefore adopt a 'satisficing' strategy and opt for an adequate rather than their originally planned optimal solution. By extension, people who already have very satisfying family ties and a strong family network lack the motivation to enact their positive fertility intentions and are more likely to adopt a 'satisficing' approach.

While the sociological and demographic literature has usually highlighted the positive influence of the personal network on fertility behaviour as a relevant source of supportive resources (i.e. social capital, Bühler and Philipov 2005) and social pressure (Balbo and Mills 2011), we instead observed that a strong and pervasive role of the family of origin might actually discourage the realisation of the intention to have further children. This apparent inconsistency is likely to be the result of the interaction between the family's role and the macro institutional and cultural context. Following Balbo and Mills (2011), we contend that in contexts where public child care is scarce and the economic situation is uncertain, having greater family social capital might work as an incentive to realise an individual's plan to have another child. Conversely, in more certain economic circumstances and environments where support from the state is relevant, strong family ties might be unnecessary or even discourage fertility.

The results also revealed significant cross-sibling effects on the intention to have the first child. In line with recent finding of Lyngstad and Prskawetz (2010), we demonstrated that when a sibling has a young child under the age of 12, the individual is more likely to realise his/her intention to have a child. This suggests that a recent sibling's childbearing experience or an ongoing childrearing experience with a young child seems to facilitate the translation into behaviour of an individual's positive fertility intentions. This effect is most likely attributed to

different underlying mechanisms. First, the parental experience of a sibling could reinforce and intensify the transmission of positive parental values and attitudes towards childbearing. Moreover, since the transition to parenthood might bring uncertainty, having the opportunity to observe intimate members of one's network (e.g. siblings) experiencing this pivotal life event and learning form them, may reduce the degree of uncertainty and increase the actual behavioural control of an individual. We can therefore conclude that family settings in which the individual is surrounded by childbearing experiences of intimate others, affords them the opportunity to share information and feelings, which in turn facilitates the translation of their positive fertility intention into behaviour.

In our attempt to shed further light on the family network mechanisms influencing fertility behaviour, we also faced some constraints. First, our findings are based on relatively small samples, therefore further replications would be desirable to check the robustness of these findings. Second, in estimating cross-sibling effects on fertility we could not control for possible unobservable family factors affecting every sibling. Indeed, the data used in this study did not allow us to include family fixed effects or use a multilevel approach, which would have helped us to disentangle the direct influence of siblings' childbearing behaviour from other possible intra-family factors. Moreover, the lack of information on the exact timing of respondents' and siblings' childbearing, did not allow us to undertake a dynamic analysis using event history models. Finally, we measured cross-sibling effects based on the information of two randomly-selected siblings only, without having a comprehensive knowledge of the entire sibship. Although we are aware of the data constraints we faced, and that existing datasets usually do not have extensive information on social interactions and networks, we believe that it would be important to further investigate family influences, as well as peer ones. We need not neglect the fact that people and couples do not make their fertility choices in a vacuum, but embedded in family and peer networks. We therefore hope that future research will be able to make use of more extensive network data which would allow us to overcome these issues and gain further insights into social influence and learning processes among siblings and relatives, as well as among friends. Finally, it would highly desirable that cross-national data are used to further test and replicate our findings in a comparative perspective.

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Appendix

The probit sample selection model consists of two probit equations in which Y_1 and Y_2 are the two dependent binary variables. Y_1, the choice that is studied, is observable only if $Y_2 = 1$, where Y_2 is a preliminary choice. Looking at binary outcomes in terms of propensity, we assume that Y^*_2 is an unobservable outcome (i.e. the propensity of an individual to have positive fertility intentions), and $Y_2 = 1$ only if $Y^*_2 \geq 0$, with $Y_2 = 0$ if $Y^*_2 < 0$. If $Y_2 = 1$, individuals are faced with the studied choice, Y_1. Let Y^*_1 be the latent propensity random variable attached to the second binary choice (the realisation of the positive intention), so that $Y_1 = 1$ if $Y^*_1 \geq 0$, with $Y_1 = 0$ if $Y^*_1 < 0$. To explain latent propensities, we can introduce two sets of predictors, X_1 and X_2, and define a two-equation system. The first equation describes the probability of having positive fertility intentions (i.e. the selecting event):

Probit $(Y_2 = 1 | X_2) = X_2 \beta$

The second equation is defined only if $Y_2 = 1$, and it describes the probability to actually realise the positive intention (i.e. outcome event):

Probit $(Y_1 = 1 | X_1) = X_1 \delta$

In the same way, the system can be expressed linearly in terms of the unobservable propensities. The first equation describes the propensity to have positive fertility intentions:

$Y^*_2 = X_2 \beta + \varepsilon_2$

The second equation, defined only if $Y^*_2 \geq 0$, describes the propensity toward the realisation of the intention:

$Y^*_1 = X_1 \delta + \varepsilon_1$

Where β and δ are vectors of unknown regression parameters and $(\varepsilon_1, \varepsilon_2)$ is a zero-mean unit-variance bivariate normal random variable with corr $(\varepsilon_1, \varepsilon_2) = \rho$. As the two processes in question (i.e. developing a fertility intention and realising it) are made by the same individual and probably under similar circumstances, the two latent variables are likely to be correlated and the selection might not be neglected (i.e. ρ might be significantly different from zero). Therefore, estimating an equation for Y_1, an individual's probability to realise his/her positive fertility intentions, without taking into account the selection equation (i.e. the unobserved factors that affect the probability to have positive fertility intentions), might cause biased results of the parameters (Van De Ven and Van Praag 1981; Vella 1998).