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Fertility intentions and outcomes. Implementing the Theory of Planned Behavior with graphical models.

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Fertility intentions and outcomes

Implementing the Theory of Planned Behavior with graphical models

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 Abstract

This paper studies fertility intentions and their outcomes. We derive the theoretical model from the Theory of Planned Behavior (TPB), and test its validity in a low-fertility context (i.e., Italy). We move beyond existing research and use the methodology of graphical models to generate a precise picture and a formal description of the developmental fertility decision-making process, representing the possible dependencies between all of the involved variables by a chain graph. Overall, this analysis strongly supports the validity of TPB, and therefore contributes to the systematic study of fertility decision-making processes. However, our findings also produce some evidence that challenges and complicates the application of the TPB to fertility research, especially regarding the role of background factors.

1. Introduction

The study of fertility intentions has become central in the discussion of fertility rates in developed countries, under the realistic assumption that, in an almost perfect contraceptive regime, having a child is a result of a reasoned, although imperfect, decision. The persistent low fertility levels seem increasingly to be the result of a "fertility gap" between the intended and realized levels of fertility. People claim to plan to have more children than they have (Chesnais 2000; Testa 2006), which suggests that they are unable to implement their intention. This state of affair is largely unexplored and calls for further research.

The foundation of this paper relies on a theoretical model derived from the Theory Planned Behavior (hereafter, TPB; Ajzen, 1991 and 2005; Ajzen & Fishbein 1980) applied to family demography research (Billari et al. 2009; Ajzen 2010). Fertility outcomes are seen as directly depending on fertility intentions, which in turn directly depend on attitudes (related to the perceived benefits and/or costs of reproduction), subjective norms (related to the social approval of behavior from relevant others), and perceived behavioral control. Possible constraints can further intervene from the time the fertility intention was formed and the subsequent behavior (such as a disruption of the couple's relationship). This multi-factor paradigm is expected to depend on several background factors as well (such as socioeconomic and social capital-related factors).

The TPB framework has so far not been tested in its full complexity, although some fragments of it have been investigated (e.g., Billari et al. 2009; Dommermuth et al. 2011). In this study, we fill this gap and move beyond existing research by implementing the TPB through graphical models, which appear to be particularly suited for this purpose. Through the class of graphical models, we provide a precise understanding and a formal description of the developmental fertility decision-making process by studying the dependencies and independencies among all the factors involved in the TPB, on the basis of their joint distribution. We adopt a chain graph model, in which variables are partitioned into a sequence of blocks: we can distinguish between pure response variables (in the last block), pure background variables (in the first block), and intermediate variables, which are responses for variables in previous blocks and explanatory for the subsequent variables. The partial ordering among the variables into blocks is fully derived by the TPB.

Our analysis focuses on Italy, a country that appears to be particularly relevant for this research, because fertility among Italians is stable at very low levels, and there is a large gap between intended and realized fertility. We use the 2003 Istat Household Multipurpose Survey on Family and Social Subjects (the Italian version of the first wave of Gender and Generation Survey), which includes batteries of questions specifically formulated as an adaptation of the Theory of

Planned Behavior for the study of fertility decisions (Vikat et al. 2007). We then use information from the second wave of the survey, gathered on 2007. The 2007 follow-up round was of particular benefit for our study, as it showed the extent to which the intentions reported in 2003 were realized, as well as the reasons why.

The following sections of the paper provide the theoretical background for our study and present information on the context in which Italians make their reproductive choices. We then present the data used, the methodological strategy employed, and the results obtained. The paper concludes with a discussion of our findings.

2. Theoretical background on the study of fertility intentions and realizations

2.1. The Theory of Planned Behavior as a theoretical framework for the fertility decision-making process

The importance of psychological characteristics, cognition, and social context for fertility decision-making and demographic behavior has long been emphasized in the literature (Fawcett, 1978; 1991). According to the TPB, which is an extension of the earlier Theory of Reasoned Action (Fishbein and Ajzen 1975; 2010), intentions are the immediate antecedents of corresponding behavior. This hypothesis is supported by several systematic reviews of the empirical literature, and strong intention-behavior correlations are also observed in the fertility domain (Billari et al. 2009; Ajzen 2010).

Central to discussions of family planning and fertility rates is the implicit or explicit assumption that, at least in developed countries with readily available contraception, having a child is the result of a reasoned decision. Adopting the TPB for fertility analysis means that observed reproductive behavior does not depend solely on individual characteristics, but also on fertility intentions (e.g., De Sandre et al. 1997; Sorvillo and Marsili 1999; Goldstein et al. 2004; Testa and Grilli 2006; Mills et al. 2008). Fertility intentions can be positive or negative. The former ones define the plan to have a/nother child, while the latter the plan not to have a/nother child[1]. Ajzen (2010) describes how the TPB can be used to model fertility decision-making process: when people formulate their intentions to have a(nother) child, they rely on three conceptually distinct types of considerations: attitudes, subjective norms, and perceived behavioral control.

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[1] Note that the concept of intentions is different than that of desires: desire is what people "want, desire, would like to do", while "intention" is what people "plan to do", given your current situation (Miller and Pasta 1995b) – for instance, one may want to have a child, but given the lack of partner he or she might not intend to have it.

The "attitudes toward the behavior," which can be favorable or unfavorable, are "readily accessible or salient beliefs about the likely consequences of a contemplated course of action" (Ajzen 2010). In the case of fertility decision-making, individuals would be expected to reflect on their attitudes about having a child before forming their fertility intentions. Such attitudes are a person's internal evaluation that having a child will have positive or negative (i.e., desirable or non-desirable) consequences for her/him (Billari et al. 2009).

The "subjective norms," are relate to the perceived normative beliefs and expectations of relevant referent groups or individuals who exert social pressure to perform or avoid the behavior (Ajzen 2010). In the case of fertility intentions, individuals would be expected to consider subjective norms for having a child; i.e., the individual's perception of the psychological support of or normative pressure on her/his fertility behavior from members of her/his close social circle.

Finally, individuals are assumed to take into account factors that may promote or hinder their ability to perform the behavior, and these salient control beliefs lead to the formation of "perceived behavioral control." This refers to the perceived capability of performing the behavior (Ajzen 2010). Because individuals are expected to carry out their intentions when the opportunity arises, intentions are assumed to be the immediate antecedents of behavior. However, because many behaviors pose difficulties in execution, it is useful to consider perceived behavioral control over having a child in addition to intentions. Like attitudes and subjective norms, perceptions of behavioral control follow consistently from readily accessible beliefs about resources and obstacles that can facilitate or interfere with the ability to have a child, such as income or wealth, labor force status, and education (Billari et al. 2009). The power of each control factor to facilitate or inhibit behavioral performance is expected to contribute to perceived behavioral control in direct proportion to the subjective probability that the control factor is present in each person (Ajzen 2010).

A schematic representation of the TPB applied to fertility research is shown in Figure 1. TPB does not discount the importance of background factors that can influence behavior indirectly by affecting actions, normative, and control beliefs. They are selected by a content-specific theory, which can complement the TPB "by identifying relevant background factors and thereby extending understanding of a behavior's determinants" (Ajzen 2010). Therefore, a number of well-establised factors studied in demographic research, such as age, parity, or education, are treated as external variables. Under ideal conditions and the operationalization of the TPB, the background factors should affect only the proximate determinants of fertility intentions, and should not have a direct impact on the intentions themselves.

According to the TPB, having a child is not properly defined as a behavior, but rather as an "outcome or behavioral goal." Using the TPB as a model of goal attainment, rather than of behavior, provides a less reliable explanation, as the goal is distant in time from the formation of the intention, and is reliant on intermediate behavior or intervening factors, such as divorce, the loss of the partner, the loss of fecundity, or a change of mind (Dommermuth et al. 2011). Measures of behavior or behavioral goals typically involve a specific action and target (e.g., having a child), and often also a specific context (e.g., with my current partner) and time frame (e.g., in the next three years). Consequently, a suitable fertility behavioral goal can be identified by a survey question such as: "Do you plan to have a child or another child in the next three years?"

Importantly, fertility intentions can be individual, but the realization of these intentions depends on couple behavior, which can be concordant or discordant. In the latter case, the result may be a lower degree of correspondence between intentions and actual behavior (Thomson 1997; Miller and Pasta 1995a). However, Miller et al. (2004) suggest that the relevant conjunction of male and female motivations to have a child occurs at the level of behavior, rather than at the intermediate level of intentions. Even though the TPB is a model of individual cognition and behavior, and is not intended to explain joint decision-making or joint action, Dommermuth et al. (2011) have argued that it can be an appropriate framework for building a social cognitive model of fertility decision-making for couples. In fact, by extending the logic of the Miller et al. (2004) model to the TPB, it is possible to model separately the influences on the intentions of males and females, taking into account the relative influence of one member of the couple on the other's intentions, but not to model joint intentions.

Demographic research directed towards explaining or predicting fertility intention within the reasoned action tradition of the TPB has focused primarily on the decision to have a child relative to the decision to not have a child (Billari et al. 2009; Jaccard and Davidson 1975; Jorgensen and Adams 1988; Thomson 1997) and on the timing of the intentions (intentions in the short run versus intentions in long run, Dommermuth et al. 2011). In addition, we analyze the complete path leading to fertility behavior: the transformation of the behavioral goal of having a child into an effective action, within the explanatory framework of TPB and considering the most common background variables (i.e., determinants) of fertility behavior.

Figure 1. A schematic presentation of the Theory of Planned Behavior for fertility decision-making
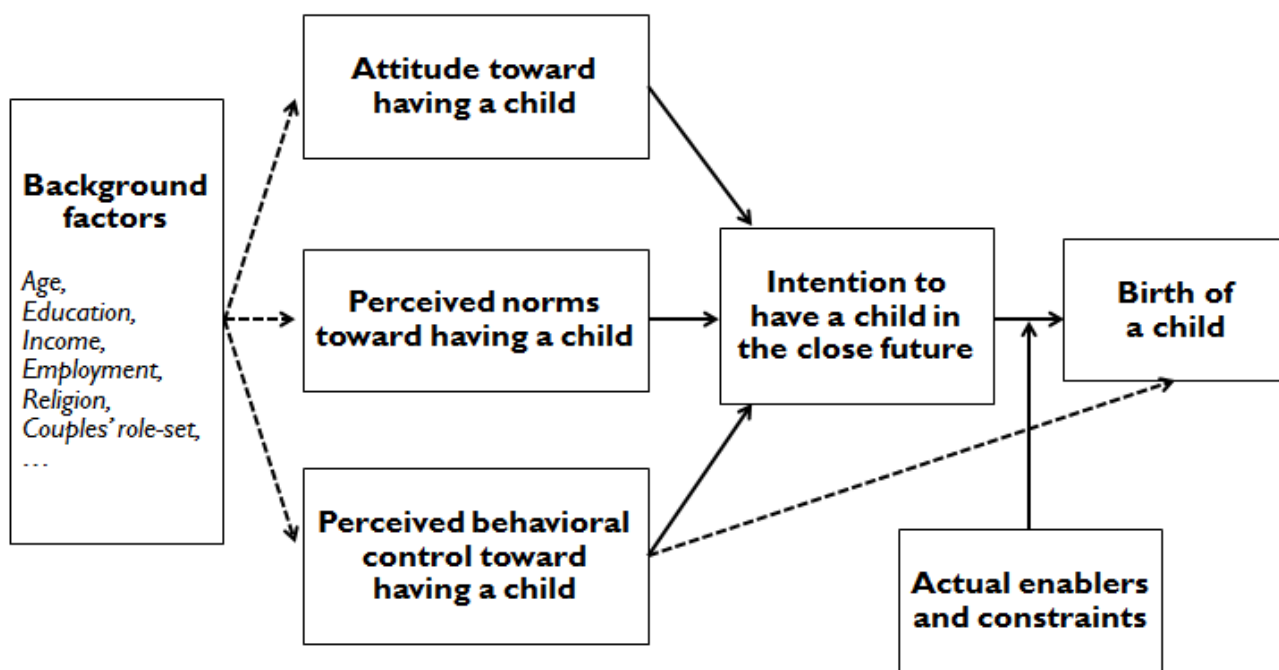
2.2. Empirical evidence on the determinants of fertility intentions and realizations

There is a plethora of empirical research focusing on the determinants of fertility intentions suggesting that they depend on several demographic, socioeconomic, and gender-related factors. In contrast, the literature investigating the correlates of the realization of fertility intentions is scarce, mainly due to a severe lack of appropriate longitudinal data. Overall, the factors that have been found to increase (or decrease) the gap between positive fertility intentions and their subsequent realization (or, conversely, non-realization) are not much different than the factors affecting positive (or negative) fertility intentions alone.

According to the TPB, the distinction between attitudes, norms, and perceived behavioral control should completely filter the role played by background factors on fertility intentions, which will in turn determine the subsequent realization. We address this issue by focusing on a set of background factors that have been proven to influence both fertility intentions and their realization.

It has been suggested that the factors affecting fertility intentions are both demographic and socioeconomic. Of the purely demographic factors, parity and the woman's age play crucial roles in the definition of fertility intentions (Morgan 1982; Noack and Ostby 1985; Bongaarts 1992, 2001; Thomson 1997; Berrington 2004; Meggiolaro 2009; Liefbroer 2009; Rinesi et al. 2011). Generally,

the documented findings show that there is an inverse relationship between fertility intentions and parity (Thomson 1997; Bühler 2008). Positive fertility intentions also seem to be less frequent among older women (De Sandre et al. 1997). Moreover, the effect of the type of union has been widely investigated. Liefbroer (2009) showed that married women have higher average fertility intentions than those who do not have a partner or who are cohabiting. Accordingly, Vignoli and Régnier-Loilier (2009) have found that, in Italy, cohabiting couples want fewer children than married couples. In France, however, no such effect has been found (Toulemon and Testa 2005; Vignoli and Régnier-Loilier 2009).

The role of education was emphasized in a cross-country study by Heiland et al 2008. In many European societies, higher educational levels were associated with the intention for a greater number of children. The positive association between educational level and fertility intentions was also confirmed by a study on France (Toulemon and Testa 2005) and by a study on Bulgaria and Hungary (Philipov et al. 2006). Compared to women with less education, highly educated women displayed better labor market opportunities and earnings, as well as greater bargaining power within the couple, which encourages a more equal division of housework and childcare between partners, and which could in turn facilitate fertility intentions (Mills et al. 2008).

Among the relatively few studies have looked at the successive steps towards realization demographic factors appear to play a pivotal role. In particular, a woman's age and parity are crucial (e.g., Noack and Østby 2002; Quesnel-Vallée and Morgan 2003; Rinesi et al. 2011): postponing motherhood results in having fewer children than originally planned. Moreover, the greater the distance between the actual and expected number of children, the faster the transition towards childbearing in a short period (Thompson et al. 1990; Symeonidou 2000). The type of union is also important. Married couples are more likely to realize their intention to have a/nother child in the United States (Schoen et al. 1999; Quesnel-Vallée and Morgan 2003), Italy, and France (Regnier-Loilier and Vignoli 2011). The fertility intention-realization gap is smallest for highly educated women (Toulemon and Testa 2005; Rinesi et al. 2011; Regnier-Loilier and Vignoli 2011). Finally, the effect of gender roles seems to vary in different contexts: in Greece, less traditional women have greater difficulties than more traditional women in realizing their positive fertility intentions (Symeonidou 2000); while in other contexts, such as Sweden, the trend is reversed (Thomson 1997).

3. The Italian case

The specific features of the Italian situation guide the selection of the crucial background factors for the implementation of the TPB in this context. Fertility is stable at very low levels and the country has currently one of the lowest fertility levels in Europe. Since 1970s the Period Total Fertility Rate (PTFR) has fallen to lowest-low levels, reaching its lowest point of 1.2 in 1995. Although in the following years the country experienced slight improvements in period fertility, the PTFR has remained relatively low (1.4 children per woman in 2010, Istat 2011). Younger generations increasingly opt for late entry to parenthood, and the proportion of the childless has increased substantially in the country. The mean age of childbearing, not counting non-national residents, reached almost 32 years in 2010 (Istat data), often leading to involuntary childlessness (Tanturri and Mencarini, 2008).

Low fertility has often been linked in the literature to the difficulties women face in combining work and family (Salvini 2004). Italy records extremely low levels of female labor market participation. In stark contrast to other European countries, only 46% of Italian women are employed, and there are sharp differences in the women's employment rates according to the number of children they have: over 57% of Italian women without children are in the labor market, compared to 55% of women with one child and 45% of women with two or more children (OECD data, 2008).

These tensions between work and fertility stem from a combination of family policies, labor market structures, and social norms. First, the country has a very low supply of public childcare facilities for small children aged 0-2: 12%, compared to 20% in the EU as a whole. Second, the labor market structures create barriers to women's employment due to rigid working hours, a scarcity of part-time jobs, and a strong insider-outsider divide. The exceptionally high level of unemployment among women relative to that of men points to the presence of strong barriers to women's employment (Adsera 2005). Finally, the gender division of household chores is heavily asymmetric, and the degree of social disapproval of mothers who work when their children are young is high (e.g., Mencarini and Tanturri 2006). Recent studies have shown that gender-based perceptions of the roles of parents, both inside and outside the household, are a determinant of lower fertility intentions and outcomes (Cooke 2003; Mencarini and Tanturri 2004; Mills et al. 2008); and thus tend to confirm McDonald's theory that there is a link between gender equity and fertility (2000).

Culturally driven factors are also crucial. People with a higher degree of religiosity (i.e., who frequently attend religious services) plan to have more children (Vignoli and Regnier-Loiliér 2009), and are more likely to realize their fertility intentions (Regnier-Loiliér and Vignoli 2011). Additionally, Italy is characterized by a strong attachment to the family and strong intergenerational

ties (De Rose et al. 2008). In particular, given the intergenerational transmission of fertility behavior between mothers and daughters, large families tend to replicate themselves over time (Dalla Zuanna 2001). A final important factor is geography. The country is still marked by important regional variations in economic and social patterns. The North-to-South gradient persists even today, with consistent empirical evidence showing that egalitarian gender norms and spousal (female) autonomy are stronger in the North than in the South (e.g., Salvini 2004).

In short, the quantum and the tempo of fertility (both in terms of intentions and outcomes) is particularly low and delayed compared to European standards, due to the social and cultural background that permeates the country. Overall we expect that labor market status and the characteristics of the job (e.g. contractual arrangements), gender division of domestic labour, and family background will necessarily shape the intended and realized fertility.

4. Data

4.1. *Italian GGS survey and descriptive results on the fertility intentions-realizations link*

In this study, we use the Italian Gender and Generation Survey and its corresponding follow-up survey. The Italian variant of the GGS is a prospective and retrospective survey conducted by the Italian National Statistical Office (Istat) in 2003, which is called Family and Social Subjects, or GGS-FSS (2003). The follow-up survey, which looked at critical points in life histories from a gender perspective, was jointly conducted by Istat and the Ministry of Labor in 2007. GGS-FSS (2003) has a sample of about 24,000 households and 50,000 individuals. The follow-up includes 10,000 interviews with people aged 18-64.

Individuals' intentions to have a child within the next three years were surveyed using the following question: "Do you intend to have a child in the next three years?" The four possible answers were: "definitely not," "probably not," "probably yes," and "definitely yes." Limiting the question about childbearing intention to a foreseeable time frame avoided some of the problems associated with the surveying of intentions. Answers to questions about an individual's fertility intentions are likely to capture a social norm; i.e., the number of children individuals think they should have rather than the number they will have. Questions about intentions that cover a foreseeable time period and that therefore are "in close temporal proximity to the prospective behavior" (Ajzen and Fishbein 1973) are generally considered to be better predictors of actual behavior (Billari et al. 2009; Philipov 2009). They allow researchers to make inferences based on a person's current status about what economic, institutional, and familial conditions are crucial in her/his decision process to have a/nother child.

We excluded women who did not have a partner from our analysis, because their childbearing intentions may not reflect a realizable plan. Overall, our selected sample consisted of 5,742 individuals (in 2,871 married or cohabiting couples). Linking the two Italian GGS waves allowed us to assess whether the expressed fertility intentions were realized. We covered the period of 2003-2007, during which the births of 368 children were registered. In 2007, about 15% of respondents had given birth to a child, irrespective of the birth order. These results are relatively consistent with those of a handful of other studies based on different data sources (e.g., Rinesi et al. 2011).

The association between fertility intentions and realizations turned out to be particularly strong at the extremes: the stronger the intention to have or not have children, the greater or the lower the observed proportion of respondents who realized this intention. In particular, we found that negative fertility intentions are a potent predictor of subsequent fertility behavior. By contrast, positive fertility intentions tended to overestimate fertility realizations: 38% of the Italian respondents who firmly stated the intention to have a child in the following three years did not achieve their goal. Generally, this pattern is in line with much empirical research: negative fertility intentions tend to accurately predict subsequent fertility behavior, while positive fertility intentions tend to systematically overestimate fertility realizations (Westoff and Ryder 1977; Monnier 1989; Schoen et al. 1999; Symeonidou 2000; Noack and Østby 2002).

4.2.   *The relevant variables and dimensions for the TPB model*

As in all of the Gender and Generation Surveys, the 2003 Italian FFS survey included the full battery of questions needed to implement the TPB (Vikat et al. 2007). In addition to questions about the intention to have a child, three blocks of questions were used to operationalize attitudes, subjective norms, and perceived behavioral control. The items are reported in Table 1. Ten items were utilized to characterize attitudes towards having a child. Each of these items was introduced by the question: "If you were to have a/nother child within the next three years, would it be better or worse in relation to…"Among the possible responses were: "much better," "better," "neither better nor worse," "worse," and "much worse." Subjective norms were measured through three questions. The respondents were asked to rate the extent to which they agree that different groups of people think they should have a/nother child. All three items were introduced by the following question: "If you were to have a child in the next three years, to what extent would the following persons agree with your choice?" Among the possible responses were: "would strongly agree," "would agree," "would neither agree nor disagree," "would disagree," "would strongly disagree." Finally, the survey included 10 items intended to capture perceived behavioral control. The following

question was posed for each of the item: "The decision about whether to have children can depend on various situations. How much would your decision about whether to have a child in the next three years depend on..." Among the possible answers were: "a lot," "quite lot," "a little," and "not at all." In the case of perceived behavioral control, we reversed the scale, because this made it easier to show the possible positive effect of the perceived ability to overcome constraints with a positive coefficient in the regression model.

We used factor analysis to verify whether the items acted as valid and reliable measures of the proposed TPB variables (Billari et al. 2009, Dommermuth et al. 2011)[2]. We tested both a three-factor solution (the proposed factors were attitudes, subjective norms, and perceived behavioral control) and a four-factor solution (which allowed for attitudes to fall into two groups), as was done in Billari et al. (2009) and Dommermuth et al. (2011). Four factors are identified (Table 1). Two are interpreted as attitudes factors, one as a measure of subjective norms, and one as a measure of perceived behavioral control. The first of these factors is hence called "positive attitudes" because it represents beliefs about the benefits of having a child, while the second is called "negative attitudes" because it represents beliefs about the costs or personal losses associated with having a child.

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[2] We used alpha factor analysis of the correlation matrix and then performed a rotation of the loading matrix through oblimin criteria.

Table 1. Factor loadings and factor alpha coefficients of items of perceived behavior control, subjective norms, and attitudes regarding the intention to have a/nother child within the next three years.

Items	Factor 1 Negative attitudes	Factor 2 Positive attitudes	Factor3 Subjective norms	Factor 4 Perceived behavioral control
If you were to have a/another child during the next three years, would it be better or worse in relation to…				
- The possibility of doing what you want	0.58			
- Your employment opportunities	0.55			
- Your partner's job opportunities	0.30			
- Your financial situation	0.59			
- Your sexual life	0.42			
- What people think of you		0.41		
- The joy and satisfaction you get from life		0.64		
- The closeness between you and your partner		0.65		
- The closeness between you and your parents		0.55		
- Certainty in your life		0.63		
If you were to have a child in the next three years, to what extent would the following persons agree with your choice?				
- Most of your friends			0.62	
- Your mother			0.78	
- Your father			0.71	
The decision about whether to have children can depend on various situations. How much could your decision about whether to have a child in the next three years depend on...				
- Your economic situation				0.72
- Your job				0.67
- Your housing conditions				0.68
- Your health				0.56
- Your partner's job				0.70
- Help from non-cohabitant relatives in caring for the children				0.65
- Help from your partner in caring for the children				0.69

Source: 2003 FFS – Italy, own calculations
Note: The loadings shown are those that are useful for placing the item in the factor (>.04).

5. A statistical model for implementing the TPB

5.1. *Chain graph models*

The TPB itself illustrates a temporal sequence for the process leading to the decision to have a child. The existence of such a sequence suggests the possibility of using the class of graphical models to gain a precise understanding of the developmental fertility decision-making process, as they allow us to study the conditional independence structure among all of the variables involved in this process, and depict this structure by a graph.

Graphical models[3] are a class of multivariate models that are useful for studying, estimating, describing and visualizing the relationships among an entire set of variables of interest. A multivariate model is graphical whenever its conditional independence structure can be univocally depicted by a graph. A graph $G = (V, E)$ consists of two finite sets: a set V for nodes and a set E collecting edges between nodes. The edges in a graph can be undirected (lines), or directed (arrows). In graphical models, nodes represent variables, and the absence of a connection between two nodes represents a conditional independence. Graphs are therefore utilized to give a theoretically rigorous but intuitively easy to understand representation of the complex relationships among variables, on the basis of their joint distribution. These relationships are described in terms of conditional independence, which is the key concept of graphical models. Two variables, X and Y, are conditionally independent given a third variable Z, denoted by $X \perp\!\!\!\perp Y \mid Z$ following the Dawid (1979) notation, when controlling for Z, X does not provide additional information on the distribution of Y, and vice versa. A conditional independence statement is visualized in the graph by the absence of a connection between two nodes.

In this study we use chain graph models, which are the most appropriate to empirically implement the temporal sequence to the fertility decision-making process. They are in fact graphical models associated with a chain graph (Lauritzen and Wermuth, 1989): i.e., a graph with both directed and undirected edges. These graphs, also called block-recursive graphs, are particularly useful when, as in our case of the fertility decision-making process, variables admit a partial ordering on the basis of subject matter considerations, as hypothesized by the TPB. Variables are then partitioned into blocks. Variables belonging to a single block are considered to be of equal standing. Variables belonging to different blocks can be joined by arrows, representing a directional association. Consequently, it is possible to distinguish between pure response variables (in the last block), pure explanatory/background variables (in the first blocks), and intermediate

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[3] See Lauritzen (1996) and Edwards (2000) for a comprehensive introduction of graphs and graphical models.

variables, which are responses for variables in previous blocks and explanatory for the subsequent variables.

To better understand how conditional independence can be read from a chain graph, it is helpful to look at Figure 3, which shows a chain graph consisting of five blocks, as in our case. The first block (a) on the left collects the two nodes corresponding to the two pure explanatory variables X_1 and X_2. The second block (b) collects the intermediate variables X_3 and X_4. They are assumed to be responses for X_1 and X_2 and explanatory for the variables in blocks (c), (d), and (e). Blocks (c) and (d) contain one node each, for variables X_5 and X_6, respectively. Finally, the last block (e) contains the variables X_7 and X_8, which are studied only as responses, given all the other variables. Here we are adopting the convention of ordering blocks from left to right. The arrows are oriented accordingly. The Markov rules are the properties that establish how conditional independencies can be deduced by a graph. For chain graphs, different sets of Markov properties are possible, giving different classes of chain graph models (see Drton, 2009, for a summary). Here we adopt the Lauritzen-Wermuth-Frydenberg (LWF) class of Markov properties (see Lauritzen and Wermuth, 1989; Frydenberg, 1990). The simplest LWF Markov property to use when reading conditional independencies off a graph is the so-called pairwise block-recursive Markov property. According to this property, the absence of an edge between two nodes in a single block implies that the corresponding random quantities are conditionally independent, given all the remaining random quantities in their block and in the preceding blocks. Moreover, the absence of an arrow between two nodes (in different blocks) suggests that the corresponding variables are conditionally independent, given all of the remaining variables in the block of the nodes pointed to by the missing arrow and in the previous blocks.

For example, in Figure 3, the lack of the edge between nodes 1 and 2 corresponds to the marginal independence statement $X_1 \perp\!\!\!\perp X_2$, as no previous blocks are present. On the other hand, the absence of the edge between nodes 3 and 4 indicates that $X_3 \perp\!\!\!\perp X_4 \mid X_1, X_2$. The absence of the arrow from node 3 to node 5 implies that $X_3 \perp\!\!\!\perp X_5 \mid X_1, X_2, X_4,$. Similar statements can be deduced for the other missing arrows: for instance, $X_3 \perp\!\!\!\perp X_6 \mid X_1, X_2, X_4, X_5$; while $X_4 \perp\!\!\!\perp X_6 \mid X_1, X_2, X_3, X_5$, and $X_4 \perp\!\!\!\perp X_7 \mid X_1, X_2, X_3, X_5, X_6, X_8$. Further Markov properties propose ways to reduce the conditioning set of variables for the independencies implied by the pairwise block-recursive Markov property, and show how to detect independencies among subgroups of variables (see Lauritzen, 1996).

In a LWF chain graph model as adopted here, estimates for the parameters of the joint distribution of the variables was obtained via maximum likelihood. The multidimensional problem has be simplified by using the factorization property of chain graph models, into a sequence of univariate models, as suggested by Cox and Wermuth (1996). Each univariate model has been

specified according to the nature of the response, where all of the variables in the same and in the previous blocks are considered as explanatory. The edges selection was achieved using a stepwise procedure which compares the model for the reduced graph with the complete graph by means of the Likelihood Ratio test (with the significance level set at 0.05).

Figure 3. Example of a chain graph with five blocks
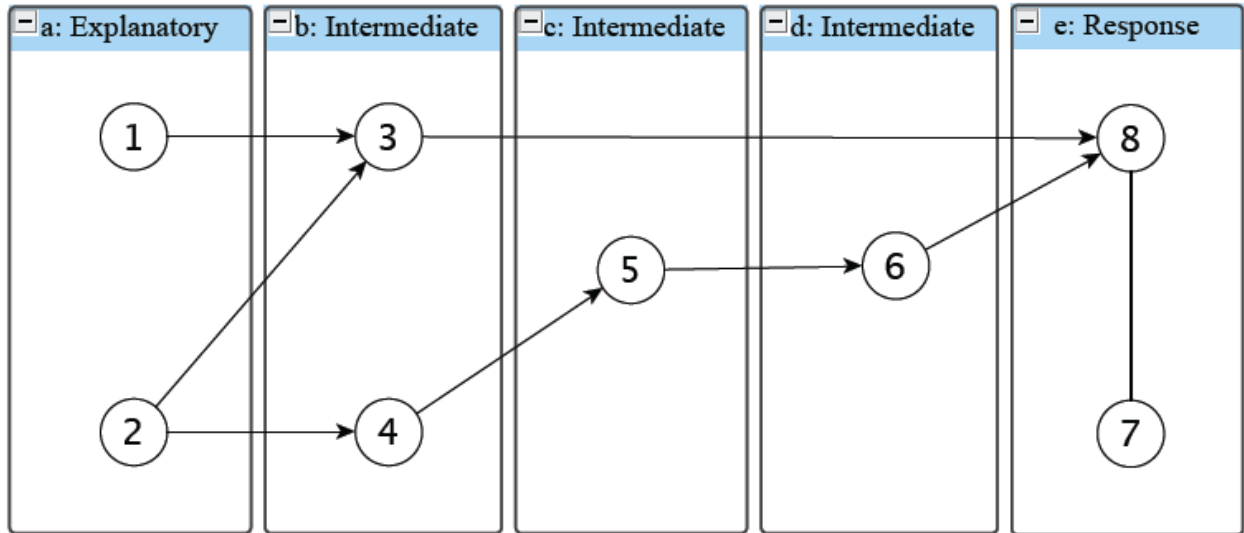
5.2. *Chain graph specification*

In the setting of the chain graph, the TPB guides us to put variables into blocks. The sequence of the fertility decision-making process is produced by "background variables" (block a), "perceived behavioral control," "subjective norms," "positive and negative attitudes" (block b), "fertility intentions" (block c), "actual constraints" (block d), and "fertility outcome" (block e); see Table 2. The background variables of the first block (a) were selected based on recommendations from the literature, as outlined in Section 2.2 (number of children, woman's age, duration of the couple's relationship, type of couple, woman's and man's educational levels and employment situations, gender arrangements between the partners); as well as based on the peculiarities of the Italian context, as highlighted in Section 3 (religiosity, number of siblings, macro-region of residence, municipality size)[4]. The variables in the second block (b) are derived variables, obtained as a score from the original variables concerning "positive and negative attitudes," "subjective

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[4] Note that the intentions to a have a child are often considered in the literature as "parity-progression intentions" (Billari et al. 2009; Neyer et al. 2011). However, our study had to use a very small-scale sample, and, as a consequence, we could not stratify our analysis by parity.

norms," and "perceived behavioral control." The derived variables were obtained by summing the original variables,[5] and were then considered as ordinal variables[6].

The variables in the first block (a) were considered as background variables, and their joint distribution was not studied. The derived variables in block (b) are intermediate variables, as they are dependent on the background variables and explanatory for the variables in the following block. As dependent variables, they were modelled by adopting a cumulative logit model for ordinal variables. For the variables in the third block (c), we estimated a cumulative logit model predicting fertility intentions and a logit model regarding the partners' disagreement on fertility intentions, which are supposed to be strongly predictive for reproductive behaviors (e.g., Thomson et al. 1990; Thomson 1997; Rosina and Testa 2009; Regnier-Loilier and Vignoli 2011).

The fourth block (d) of "actual constraints" includes the binary variable for the disruption of the couple's relationship, which is studied as a logit model. The inclusion of this block is absolutely in line with the TPB and highlights the importance of intervening factors between the time when fertility intentions are formed and the fertility outcome. These factors tend to be neglected by fertility studies that assume that the determinants of intentions also influence the subsequent behavior. In reality, however, problems can arise after the moment when the intentions are expressed that inhibit their realization, such as unexpected problems between the couple (Regnier-Loilier and Vignoli, 2011). Finally, the last block (e) consists of the pure response variable—i.e., the fertility outcome—whose dependence on the variables in the previous block was estimated by adopting a logit model.

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[5] See Cox (2008) for the properties of sum-derived variables.

[6] The derived variables were constructed on the basis of the four latent factors reported in Section 4.2. We preferred derived variables to factor loadings as they are not latent variables, and can therefore be more easily inserted into the joint distribution of the chain graph model, while still giving similar information.

Table 2. Variables considered in the analysis together with descriptive statistics

BOX BACKGROUND VARIABLES

var. name		Modalities	FREQ (%)
NCh	Number of children	0 (Ref.)	12.7
		1	30.3
		2+	57.1
AgeW	Age of woman	<30	9.5
		30-40 (Ref.)	54.2
		>40	36.3
CDur	Couple's duration	0-4	15.5
		5-10 years (Ref.)	20.9
		>10	63.6
CTy	Type of couple	Married (Ref.)	96.2
		Cohabiting	3.8
Reg	Region of residence	North (Ref.)	48.9
		Centre	17.0
		Mezzogiorno	34.1
MunS	Municipality size	Big (Ref.)	16.8
		Medium	39.6
		Small	43.6
CEd	Couple's levels of education	Both low (Ref.)	24.1
		Both medium	29.7
		Both high	6.1
		Her > Him	22.9
		Him > Her	17.2
WE	Woman's employment situation	Public sector (Ref.)	21.0
		Priv. sect. / perm. contr.	35.5
		Priv. sect. / temp. contr.	4.8
		Not working	38.8
ME	Man's employment situation	Public sector (Ref.)	19.9
		Priv. sect. / perm. contr.	73.8
		Priv. sect. / temp. contr.	2.9
		Not working	3.3
CHD	Current housework division	<95% women (Ref.)	65.6
		≥ 95% women	34.4
SHD	Woman's satisfaction with housework division	Yes / Moderate (Ref.)	4.3
		Not at all	95.7
Rel	Religiosity	At least once per month (Ref.)	55.2
		Rarely/Never	44.8
Sib	Siblings	Both partners without siblings	2.4
		At least one partner with large family	29.9
		Other (Ref.)	67.7

BOX ATTITUDES TOWARDS BEHAVIOR

PAtt	Positive attitudes	Class 1	8.8
		Class 2	79.7
		Class 3	11.5
NAtt	Negative attitudes	Class 1	5.4
		Class 2	86.5
		Class 3	8.1
SubN	Subjective norms	Class 1	12.0
		Class 2	71.6
		Class 3	16.4
PBC	Perceived behavioral control	Class 1	13.9
		Class 2	70.8
		Class 3	15.3

BOX OF INTENTIONS

Fint	Fertility intentions	Definitely not	48.7
		Probably not	24.7
		Probably yes	16.2
		Definitely yes	10.5
Agr	Partners' agreement on fertility intentions	Yes (Ref.)	92.8
		No	7.2

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CDis	Couple's disruption	No (Ref.)	96.1
		Yes	3.9

BOX REALISATIONS

Child	Fertility outcome	No (Ref.)	84.1
		Yes	15.9

6. Structure of (in)dependence among the variables of TPB in Italy

Overall, the analysis produced a large and interesting set of empirical findings. Here, the final chain graph (displayed in Figure 6) is split into two figures for a better reading (figures 4 and 5). We mainly focus on what is in/dependent of/on what. We provide insights regarding the direction of the effects only when it appears to be relevant for the discourse (the detailed table of results is in the Appendix)[7].

Looking at Figure 4 we can see that the proximate determinants of fertility intentions considered in the TPB (PAtt, NAtt, SubN, PBC) are not independent. Only the "perceived behavioral control" (Pbc) is independent of the index standing for "subjective norms" (SubN), given the "positive" (PAtt) and "negative attitudes" (NAtt), as well as the background variables (Figure 4). We can also discern which background variables influence the three type of considerations, conditionally on the other variables on "own considerations." The "perceived behavioral control" depends on the number of children (Nch), the current gender division of housework in the family (CHD), and the woman's age (AgeW). The "positive attitudes" dimension depends on the degree of religiosity (Rel), the number of children (NCh), and the duration of the couple's relationship (CDur). The "negative attitudes" dimension depends on the number of children (Nch), the current division of housework (CHD), and the area of residence (Reg). The "subjective norms" dimension depends on the number of children (Nch), the number of siblings (Sib), the duration of the couple's relationship (CDur), the woman's age (AgeW), and the number of children (NCh). Overall, the only background factor influencing all the "own consideration" is the number of children, while some of the background variables do not influence any of the proximate determinants of fertility intentions. They can be visualized in Figure 4 by the fact that they stand alone: the man's and the woman's employment situations (ME, WE), the woman's satisfaction regarding the housework division (SHD), the parents' residential proximity (PRP), the municipality size (MunS), the type of couple (CTy).

Corroborating the scheme of TPB, the level of fertility intentions (Fint) depends on all of the predicted proximate determinants of fertility intentions: (positive and negative) attitudes, subjective norms, and perceived behavioral control (Figure 5). According to TPB, under ideal conditions and operationalization, the background factors should affect only the proximate determinants of fertility intentions, and should not have a direct impact on the intentions themselves. However, our empirical analysis does not validate this part of the theory, showing that some of the background

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[7] Note that the dependence structure among the background variables have not been studied because their association is far outside of the scope of the paper. Incidentally, this is also standard practice in chain graph models.

variables also have a direct effect (this is also in line with Billari et al. 2009). In this respect, for some of the background variables, the TPB works: this is the case, for instance, regarding the couple's education (CEd), as its influence on fertility intentions is mediated by subjective norms (SubN). By contrast, a direct influence of the background variable on fertility intentions has been found for several demographic factors, such as the number of children (NCh), the woman's age (AgeW), and the duration of the couple's relationship (CDur); for some socioeconomic factors, such as the woman's employment status (WE) and the partners' housework division (CHD); as well as for culturally driven factors, such as the degree of religiosity (Rel). The directions of the direct impact of all these covariates confirm previous research (Berrington 2004; Liefbroer 2009; Rinesi et al 2011; Vignoli and Régnier-Loilier 2009). As expected, the more equal the division of household labor is within the couple, the higher the fertility intentions are (confirming the previous result for Italian context of Mills et al. 2008).

Note that the agreement between partners on fertility intentions (Agr) is independent of all the proximate determinants of fertility intentions, given the level of intentions and the background variables. Instead, they are influenced by the woman's age (AgeW), the woman's employment situation (WE), the man's employment situation (ME), the number of siblings (Sib), and (obviously) fertility intentions (FInt).

Moving to the constraints that may intervene between the point in time when people express their fertility intentions and the moment of the subsequent realization, we considered the likelihood of a disruption of the couple's relationship (Figure 6, blocks a-d). This event (CDis) is independent of the level of intentions (FInt), of the agreement between partners on the decision to plan to have a child (Agr), and of all proximate determinants of fertility intentions (PAtt, NAtt, SubN, PBC), given the background variables. Among the latters, the woman's age (AgeW), the duration of the couple's relationship (CDur), the type of couple (CTy), the woman's employment status (WE), the woman's level of satisfaction with the housework division (SHD), and the municipality size (MunS) seem to have a significant impact on the couple's disruption risk.

Figure 6 also offers evidence for the empirical validation of the TPB. As predicted, having a child (Child) is conditionally independent of attitudes (PAtt, NAtt), subjective norms (SubN), and perceived behavioral control (PBC); instead, these influence the previous step (the formation of intentions). In other words, the intentions (Fint) act as a filter between the "own consideration" related to fertility plans and the subsequent behavior. As expected, both the likelihood of a disruption of the couple's relationship (CDis) and the level of intentions (Fint) directly influence fertility outcomes (Child): the likelihood of having a child is higher when the fertility intentions are higher and when the couple remain together in the intervening period (see Appendix).

However, the fertility behavior is also directly influenced by some of the background variables, without being filtered by prior blocks. In particular, the most important determinants of the transformation of fertility intentions into the planned outcome are the demographics, such as the woman's age (AgeW), the number of children (NCh), and the duration of the couple's relationship (CDur). This has been already stated in previous research (e.g., Noack and Østby 2002; Quesnel-Vallée and Morgan 2003; Rinesi et al. 2011; Régnier-Loilier and Vignoli 2011), although without an examination of the joint distribution of all of the variables involved in the TPB, as was done in this paper.

Moreover, the role of a constraint typical of the Italian context emerges: namely, the couples' gender role arrangements have a direct crucial effect for making the step from fertility intentions to the subsequent behavior. This is a novel result for the literature on Italian low fertility. Note that the importance of this factor is neither captured by the proximate determinants of fertility intentions anticipated by the TPB nor by fertility intentions (no arrow goes from this variable to nodes in blocks b and c). Thus, only a direct (and no indirect) effect is estimated: Those women who perceive their level of involvement in the housework as fair (SHD) are more likely to have a child, while when the woman perceives the division of household chores to be unsatisfactory, the likelihood that she will have a/nother child is significantly lower. Even though being satisfied with the division of work may not correspond fully to a respondent's perception whether the division of work is fair and just, we regard satisfaction as a proxy for gender equity, assuming that a respondent would not be satisfied with the division of work if she/he perceived the division of tasks as truly unjust and unfair.

Figure 4. Conditional independence graph of background variables (block a) and peoples' own considerations (block b)
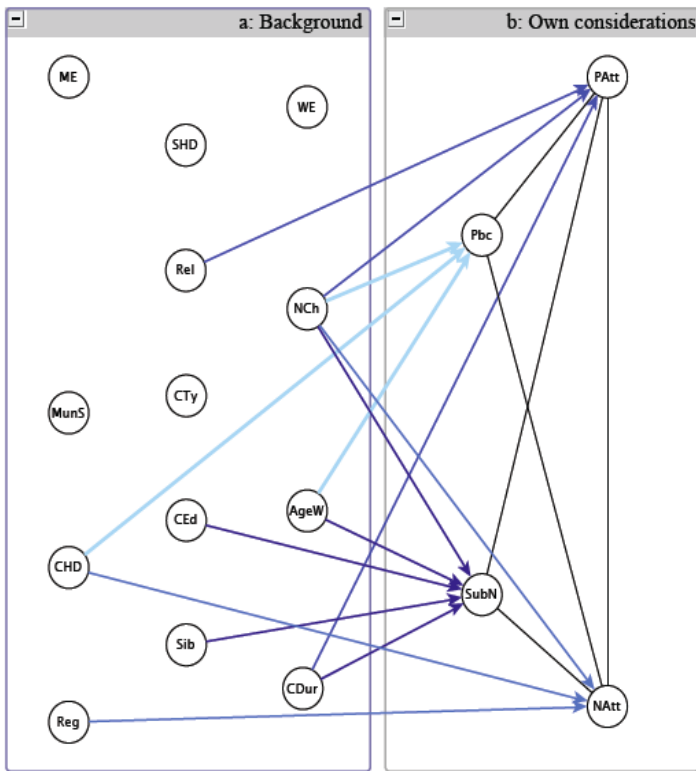

Figure 5. Conditional independence graph of background variables (block a), peoples' own considerations (block b), and fertility intentions (block c)
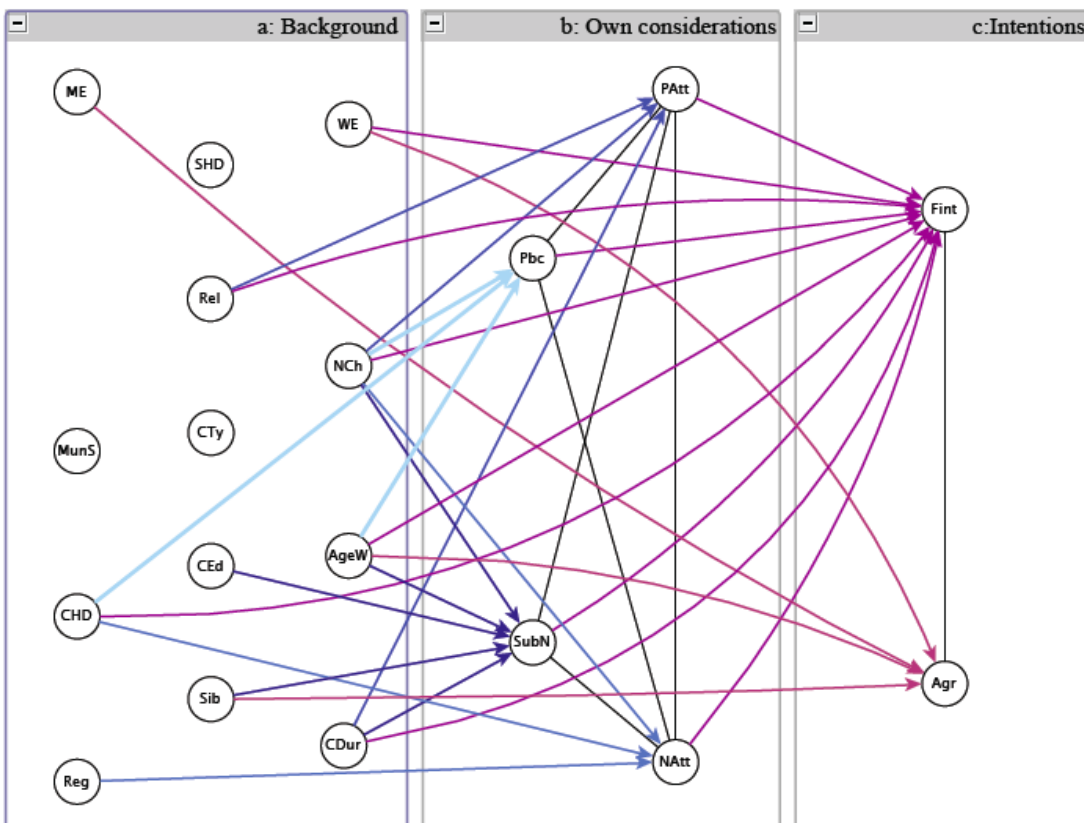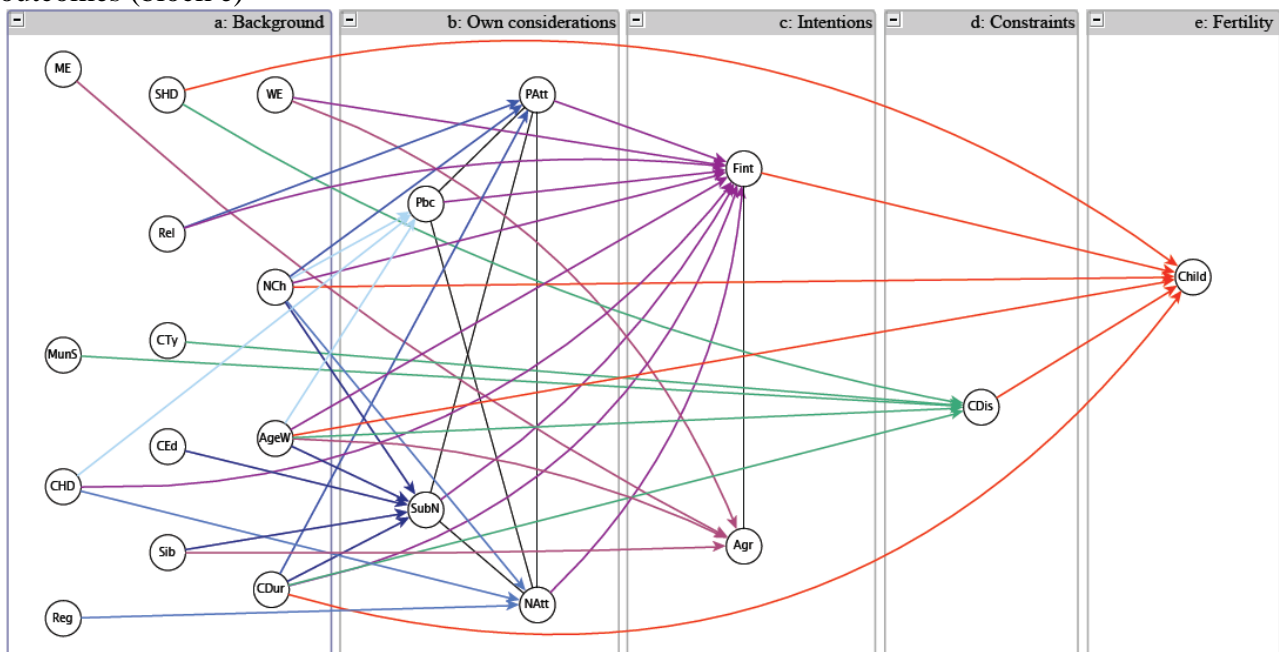
Figure 6. Conditional independence graph of background variables (block a), peoples' own considerations (block b), fertility intentions (block c), actual constraints (block d), and fertility outcomes (block e)

7. Conclusions

We have followed a common paradigm, expecting individuals to make their procreative choices intentionally, based on an evaluation, however imperfect, of the costs and benefits of reproduction. Besides this starting point, we relied on a framework built from the TPB (Ajzen 1988, 1991) and a further adaptation of the TPB to the fertility decision-making process (Ajzen 2010). Existing studies implementing the TPB for fertility intentions (Billari et al. 2009, Dommermuth et al. 2011) have not incorporated the subsequent stage of realization of intentions. We moved beyond existing research by representing all of the possible dependencies among the variables involved in the TPB, studied jointly, by means of a chain graph. We focused on the case of Italy, a lowest-low fertility country, where it was possible to rely on a specific module within the country-specific 2003 GGS survey that was designed to collect the relevant dimension of the TPB. Then, using the 2007 follow-up of that survey, it was feasible to look at the women's actual fertility behavior, and to thus complete the study of the whole process leading up to the decision to have a child.

Overall, our research supports the validity of the TPB, and therefore represents a contribution to the systematic study of fertility behavior as a key to understanding the contemporary fertility decision-making process. In this respect, the crucial finding of our study is that the distinction between attitudes, norms, and behavioral control is a strategy that encourages an oversimplification of the complexity of factors leading to fertility behavior. In fact, attitudes, norms, and perceived behavioral control are simultaneous determinants of fertility intentions, even after

adjusting for possible confounding background factors. And, even more relevant, none of these dimensions has an effect on fertility behavior: as predicted by the theory, they are all pre-filtered by fertility intentions.

However, our analysis also provides some evidence that challenges and complicates the application of the TPB to fertility research. Contrary to the TPB, the three dimensions formed by attitudes, subjective norms, and perceived behavioral control were not found to be independent each other, given the background variables. Independence seems to occur only between the perceived behavioral control and the subjective norms, given the attitudes and the background variables. Most important, a crucial problem of the operationalization of TPB is the role of background factors. According to the TPB, under ideal conditions and operationalization, the background factors should affect only the proximate determinants of fertility intentions—namely, attitudes, subjective norms, and perceived behavioral control—and should not have a direct impact on the intentions themselves. Contradicting these assumptions, our findings indicated that, in the course of the fertility decision-making process, not all background factors are mediated by the fertility intentions' proximate determinants. Net of the entire structure of (in)dependence that characterizes the variables involved in the TPB, some of the background factors directly influence fertility intentions, and others even influence fertility behaviors.

The study also contributes to the literature on low fertility in Italy providing us with findings concerning women's fertility decision making process. With the frame of TPB we identified the determinants of the perceived behavioural control, attitudes and social norms – all of which influence intention. The results from the graphical models were fully consistent with those of other studies of fertility intentions. As a matter of fact, they confirmed that stronger equality in terms of division of household labour favors fertility intentions and suggest that a perception of fairness of gender arrangements favors fertility outcomes, net of the level of intentions and the other factors involved – an interesting finding for Italy, otherwise thought of a society dominated by the male breadwinner model. Fertility realizations are naturally higher with stronger intentions, but it also depends on couple stability. The realizations are also influenced by variables that are not filtered through preceding blocks (i.e. intentions and proximate determinants of fertility intentions). For instance, woman's age, number of children and duration of the relationship matter. It confirms that Italian reproductive behaviors are strongly correlated with the demographics (such as women's fertility aging), likely being also drivers of subsequent infecundity and involuntary low fertility or childlessness.

Overall, our findings yield a new result that is empirically robust and theoretically coherent that add important insights to the effectiveness of the TPB for fertility research. However, the lack

of independence among background factors, fertility intentions, and outcomes inhibit a complete validation of TPB for fertility research in the Italian setting. We located both practical and theoretical potential reasons for this. First, a data issue can be at play: it is possible that the battery of questions provided us by the Italian GGS survey do not fully capture the three conceptually separated dimensions proposed by Ajzen. Second, our research design can matter. Namely, for pragmatic reasons due to the small-scale sample, we had to consider all parities jointly estimating the likelihood of having a child (net of the parity level). But background factors could be parity-specific. We cannot exclude that a future study employing a sample large enough to stratify the analysis by parity will bring about different results. Finally, a more intriguing and insidious explanation is theoretical. Our finding seem to venture the existence of further (psychological) factors which are unobserved, and therefore not built-in the three type of consideration—attitudes, subjective norms, and perceived behavioral control—predicted by the TPB.

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APPENDIX – Detailed model results. Stepwise procedure for model selection with comparison of the reduced model to the full model by means of the Likelihood Ratio test, to account for the multiple test problem (significance level set at 0.05).

BLOCK B: OWN CONSIDERATIONS

Cumulative logit model predicting "positive attitudes" towards childbearing

Variables	Categories	Coeff.	St. Errors	t-stat
Number of children	0 (Ref.)	0		
	1	-0.205	0.161	-1.274
	2+	-0.590	0.178	-3.312
Couple's duration	0-4	-0.265	0.162	-1.636
	5-9 years (Ref.)	0		
	≥10	-0.671	0.158	-4.242
Religiosity	At least once per month (Ref.)	0		
	Rarely/Never	-0.228	0.099	-2.306
Negative attitudes	Class 1	-1.471	0.197	-7.461
	Class 2	-2.983	0.253	-11.766
	Class 3 (Ref.)	0		
Subjective norms	Class 1	0.792	0.153	5.171
	Class 2	2.426	0.205	11.852
	Class 3 (Ref.)	0		

Cumulative logit model predicting "negative attitudes" towards childbearing

Variables	Categories	Coeff.	St. Errors	t-stat
Number of children	0 (Ref.)	0		
	1	-0.198	0.198	-0.998
	2+	0.408	0.200	2.038
Region of residence	North (Ref.)	0		
	Centre	0.091	0.156	0.584
	Mezzogiorno	-0.323	0.129	-2.496
Current housework division	<95% women (Ref.)	0		
	≥ 95% women	-0.271	0.122	-2.230
Positive attitudes	Class 1	-1.623	0.166	-9.768
	Class 2	-2.906	0.250	-11.644
	Class 3 (Ref.)	0		
Subjective norms	Class 1	-0.713	0.165	-4.311
	Class 2	-0.783	0.238	-3.289
	Class 3 (Ref.)	0		
Pbc	Class 1	0.189	0.169	1.115
	Class 2	0.845	0.209	4.048
	Class 3 (Ref.)	0		

Cumulative logit model predicting "subjective norms" towards childbearing

Variables	Categories	Coeff.	St. Errors	t-stat
Number of children	0 (Ref.)	0		
	1	-1.194	0.143	-8.330
	2+	-2.278	0.161	-14.193
Age of woman	<30	0.189	0.178	1.061
	30-40 (Ref.)	0		
	>40	-0.391	0.106	-3.688
Couple's duration	0-4	-0.159	0.163	-0.979
	5-9 years (Ref.)	0		
	≥10	-0.686	0.172	-3.990

Region of residence	North (Ref.)	0		
	Centre	-0.435	0.124	-3.506
	Mezzogiorno	0.004	0.102	0.038
Couple's levels of education	Both low (Ref.)	0		
	Both medium	0.155	0.124	1.249
	Both high	0.609	0.203	2.999
	Her > Him	0.069	0.132	0.522
	Him > Her	-0.100	0.141	-0.710
Siblings	Both partners without siblings	0.631	0.301	2.092
	At least one partner with large family	0.394	0.292	1.347
	Other (Ref.)	0		
Positive attitudes	Class 1	0.971	0.155	6.286
	Class 2	2.479	0.208	11.940
	Class 3 (Ref.)	0		
Negative attitudes	Class 1	-0.088	0.198	-0.445
	Class 2	-0.697	0.249	-2.795
	Class 3 (Ref.)	0		

Cumulative logit model predicting the "perceived behavioral control" over childbearing

Number of children	0 (Ref.)	0		
	1	0.565	0.141	4.016
	2+	0.407	0.137	2.958
Age of woman	<30	0.351	0.147	2.386
	30-40 (Ref.)	0		
	>40	-0.335	0.089	-3.753
Current housework division	<95% women (Ref.)	0		
	≥ 95% women	-0.272	0.087	-3.125
Positive attitudes	Class 1	-0.582	0.149	-3.912
	Class 2	-0.194	0.193	-1.004
	Class 3 (Ref.)	0		
Negative attitudes	Class 1	0.102	0.187	0.546
	Class 2	0.978	0.235	4.164
	Class 3 (Ref.)	0		

BLOCK C: FERTILITY INTENTIONS

Cumulative logit model predicting fertility intentions

Number of children	0 (Ref.)	0		
	1	-0.961	0.130	-7.400
	2+	-2.195	0.143	-15.384
Age of woman	<30	0.278	0.149	1.857
	30-40 (Ref.)	0		
	>40	-1.125	0.100	-11.301
Couple's duration	0-4	-0.379	0.139	-2.726
	5-9 years (Ref.)	0		
	≥10	-1.144	0.147	-7.786
Woman's employment situation	Public sector (Ref.)	0		
	Priv. sect. / perm. contr.	0.118	0.109	1.089
	Priv. sect. / temp. contr.	-0.502	0.202	-2.487
	Not working	0.218	0.109	1.989
Current housework division	<95% women (Ref.)	0		
	≥ 95% women	-0.197	0.086	-2.298
Religiosity	At least once per month (Ref.)	0		

	Rarely/Never	-0.303	0.080	-3.796
Positive attitudes	Class 1	0.893	0.185	4.834
	Class 2	1.759	0.219	8.015
	Class 3 (Ref.)	0		
Negative attitudes	Class 1	-0.189	0.171	-1.103
	Class 2	-1.034	0.245	-4.217
	Class 3 (Ref.)	0		
Subjective norms	Class 1	0.539	0.146	3.692
	Class 2	1.306	0.180	7.253
	Class 3 (Ref.)	0		
Pbc	Class 1	0.361	0.120	3.006
	Class 2	0.188	0.151	1.246
	Class 3 (Ref.)	0		
Partners' intentions agreement	Yes (Ref.)	0		
	No	-0.293	0.144	-2.036

Logit model predicting partners' agreement on fertility intentions

Age of woman	<30	-0.613	0.203	-3.011
	30-40 (Ref.)	0		
	>40	0.597	0.213	2.804
Woman's employment situation	Public sector (Ref.)	0		
	Priv. sect. / perm. contr.	0.181	0.201	0.902
	Priv. sect. / temp. contr.	-0.057	0.330	-0.171
	Not working	0.644	0.212	3.038
Man's employment situation	Public sector (Ref.)	0		
	Priv. sect. / perm. contr.	-0.031	0.207	-0.149
	Priv. sect. / temp. contr.	-1.150	0.372	-3.089
	Not working	-0.386	0.417	-0.926
Siblings	Both partners without siblings	-1.894	1.035	-1.830
	At least one partner with large family	-1.866	1.028	-1.816
	Other (Ref.)	0		
Fertility intentions	Definitely not (Ref.)	0		
	Probably not	-1.301	0.221	-5.875
	Probably yes	-1.938	0.228	-8.515
	Definitely yes	0.088	0.370	0.237

BLOCK D: CONSTRAINTS BETWEEN 2003 AND 2007

Logit model predicting the disruption of couples' relationships

Age of woman	<30	0.609	0.429	1.421
	30-40 (Ref.)	0		
	>40	-0.841	0.460	-1.829
Couple's duration	0-4	-1.224	0.506	-2.416
	5-9 years (Ref.)	0		
	≥10	-0.340	0.485	-0.701
Type of couple	Married (Ref.)	0		
	Cohabiting	3.906	0.369	-10.590
Municipality size	Big (Ref.)	0		
	Medium	-1.056	0.469	-2.253
	Small	0.035	0.408	0.086
Woman's satisfaction regarding housework division	Yes / Moderate (Ref.)	0		
	Not at all	1.853	0.517	-3.586

BLOCK D: CONSTRAINTS BETWEEN 2003 AND 2007

Logit model predicting having a child

Number of children	0 (Ref.)	0		
	1	0.466	0.178	2.613
	2+	0.156	0.226	0.691
Age of woman	<30	0.375	0.186	2.012
	30-40 (Ref.)	0		
	>40	-1.494	0.291	-5.137
Couple's duration	0-4	-0.885	0.179	-4.954
	5-9 years (Ref.)	0		
	≥10	-1.553	0.212	-7.314
Woman's satisfaction regarding housework division	Yes / Moderate (Ref.)	0		
	Not at all	-2.207	0.754	2.926
Fertility intentions	Definitely not (Ref.)	0		
	Probably not	0.647	0.232	2.785
	Probably yes	1.950	0.229	8.536
	Definitely yes	3.236	0.250	12.935
Couple's disruption	No (Ref.)	0		
	Yes	-1.487	0.414	-3.589