



# DEMOGRAPHIC RESEARCH

*A peer-reviewed, open-access journal of population sciences*

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## ***DEMOGRAPHIC RESEARCH***

**VOLUME 30, ARTICLE 22, PAGES 641–670**

**PUBLISHED 6 MARCH 2014**

<http://www.demographic-research.org/Volumes/Vol30/22/>

DOI: 10.4054/DemRes.2014.30.22

*Research Article*

## **Social networks and fertility**

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This publication is part of the Special Collection on “Theoretical Foundations of the Analysis of Fertility,” organized by Guest Editors Johannes Huinink, Jens Ehrhardt, and Martin Kohli.

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## **Social networks and fertility**

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### **Abstract**

#### **BACKGROUND**

The fields of demography, sociology, and socio-psychology have been increasingly drawing on social network theories, which posit that individual fertility decision-making depends in part on the fertility behavior of other members of the population, and on the structure of the interactions between individuals. After reviewing this literature, we highlight the benefits of taking a social network perspective on fertility and family research.

#### **OBJECTIVE**

We review the literature that addresses the extent to which social mechanisms, such as social learning, social pressure, social contagion, and social support, influence childbearing decisions.

#### **CONCLUSIONS**

We find that all of the social mechanisms reviewed influence the beliefs and norms individuals hold regarding childbearing, their perceptions of having children, and the context of opportunities and constraints in which childbearing choices are made. The actual impact of these mechanisms on fertility tempo and quantum strongly depends on the structure of social interaction.

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## **1. Introduction**

Demographers are interested in population fertility and its dynamics. Changes in the tempo and quantum of fertility are macro phenomena; i.e., they are the aggregate result of the childbearing behavior of individual actors. Efforts to better explain fertility dynamics inevitably lead demographers to seek to gain a better understanding of the fertility behavior of individuals (how many children they intend to have, how many children they actually have, and how births are distributed over time). Explanations of fertility must refer to behavioral models, which apply to men and women who interact with others, are embedded in social networks with specific structures, and act in relation to their social environment. The intention to have a child, the value attributed to children, the norms regulating appropriate parenthood, the support available to parents, and all of the other elements involved in childbearing decision-making are created, diffused, and transformed by social interaction (Rossier and Bernardi 2009). The social embeddedness of human actions is the basic axiomatic assumption of the social networks approach (Granovetter 1985).

Demographers have turned to theories of social interaction to expand their range of explanations of observed fertility behavior, as well as of individual childbearing. They generally assume that childbearing is a social act, and that individual beliefs and behaviors are interdependent and are moderated by social interactions and social structures. Mechanisms such as social learning, social pressure, social contagion, and social support have been included in fertility models. Similarly, demographic models are designed to allow for increasing room for specifications of the social structure and social networks within which social mechanisms take place. Social network effects are (1) theoretically important because they are middle-range explanations that interpret individual fertility behavior as a form of social action; and they are (2) empirically important because they contribute to models and explanations of fertility outcomes at the individual level (e.g., the age at birth or childlessness) and fertility dynamics at the macro level (more or less rapid changes in fertility postponement or decline).

Since the 1980s, the importance of taking into account social interactions and ideational factors when investigating childbearing decisions and fertility decline in historical Europe has been increasingly acknowledged in demographic literature (see, e.g., the contributions in Jayakody, Thornton, and Axinn 2008). Coale and Watkins (1986) convincingly argued that the fertility decline in western societies starting in the 19th century was not caused only by structural factors related to the economic development of societies, but also by ideational factors which traveled across borders through language and cultural diffusion. Watkins (1995: 296) later argued “that one kind of social interaction, informal conversations with networks of relatives, friends, and neighbors, was important for historical change in bedroom behavior.” People not

only talked “about techniques of birth control and abortion but also about the costs and benefits of having children” (*ibid.*: 300). In this sense, social interaction “includes the active evaluation and transformation of new information and ideas by peers” (Bongaarts and Watkins 1996: 657).

Since this work by Coale and Watkins, a growing number of scholars have offered arguments and amassed evidence showing that individual fertility depends in part on the fertility behavior of other members of the population and on the structures of interactions between individuals. The key questions of this research strand include the following: Through which mechanisms can social networks influence individuals and couples in their childbearing behavior, and what are the effects of these mechanisms on population fertility? To what extent are social mechanisms effective, and under what circumstances? How do different structures of interactions differ in their effects on childbearing decisions? The answers to these questions are relevant for the specification of individual-level behavioral models of fertility, as well as for the definition of macro-level determinants of fertility dynamics.

Most of the empirical studies on the effects of social networks on fertility tempo and quantum in the wake of Coale and Watkins have focused on the high-fertility contexts of eastern Asia (Montgomery and Chung 1999; Montgomery and Casterline 1993; Rindfuss et al. 2004), sub-Saharan Africa (Valente et al. 1997; Kohler, Behrman, and Watkins 2001; Mace and Colleran 2009; Watkins 2000; Johnson-Hanks 2005; Sear et al. 2009), and Latin America (Rosero-Bixby 1999). This literature primarily addressed issues related to contraception, including the implementation of state programs for birth control, the diffusion of ideational change concerning modern contraception, and the acceptability and use of birth control. Since the early 2000s, social network approaches have been introduced to explain fertility changes in western post-industrial societies. Social effects have been included in analyses of timing and postponement of births (Kohler 2001; Kohler and Bühler 2001; Bergnéhr 2009), in explanations for the emergence of low fertility (Kohler, Billari, and Ortega 2002), and in discussions of the diffusion of childlessness (Basten 2009; Balbo, Barban, and Mills 2013).

The delayed adoption of the social network approach in demographic research on fertility in contemporary western countries may be attributable to an implicit assumption that in individualistic and secularized postindustrial societies, social norms and constraints are not effective; and that parenthood and childbearing is an intimate, couple-based choice that is free of any social considerations. The empirical evidence does not support such an assumption, as we will argue in this paper.

We discuss here the most recent contributions of the social networks approach to theoretical explanations of fertility dynamics in contemporary post-industrial societies. After reviewing the four social mechanisms most often associated with fertility change,

and discussing the relevant structural dimensions of social networks (Section 2), we review some recent studies that have used a social network approach to explain fertility in modern western societies (Section 3). We then outline a research agenda for social network approaches in family and fertility research for the next few years (Section 4). We conclude with a brief summary of the ways in which the social network approach has been combined with other theoretical explanations of fertility dynamics and behavior, as well as the extent to which it is compatible with these explanations, and the degree to which it complements them (Section 5).

## 2. Social mechanisms between individual action and social structures

Social network theory combines two different sociological perspectives on human (inter)action (Burt 1982; Granovetter 1985; Wellman 1988; Emirbayer and Mische 1998). On the one hand, social actors are dependent on their structural environment; i.e., on society, on an organization, or on the network of personal relations in which they are embedded. On the other hand, this structure does not fully determine their actions; instead, it provides a framework of opportunities for action, and thus allows for individual agency. Social structure builds the context of action, “constrains actors in their ability to take actions” (Burt 1982: p. 9), shapes actors’ interests, and affects how individuals perceive “the advantages to be had by taking each of several alternative actions” (ibid.). According to this theoretical framework, individuals are embedded in social structures or social networks, which can be perceived as “ongoing systems of social relations” (Granovetter 1985: p. 487). Research that has focused on the nature of these social relations—and the ways in which these relations influence actors’ attitudes, emotions, and behavior—has highlighted the importance of different social (influence) mechanisms; i.e., the “theoretical constructs that provide hypothetical links between observable events” (Hedström and Swedberg 1996: 290).

However, neither in general social (network) theory (e.g., Agneessens and Wittek 2008; Borgatti and Foster 2003; Erickson 1988; Friedkin 2001; Marsden and Friedkin, 1993) nor in research in the field of fertility (e.g., Bernardi 2003; Bongaarts and Watkins 1996; Keim 2011; Kotte and Ludwig 2012; Lois 2013; Montgomery and Casterline 1993) is there agreement on how many and which distinct mechanisms must be considered. In our analysis of the literature on social networks and fertility, it became evident that four specific mechanisms are most commonly examined: social learning, social pressure, social contagion, and social support.

The first social mechanism is *social learning*: i.e., the process of the acquisition, the exchange, and the shared evaluation of information within a network. A concept widely used in social psychology (e.g., Miller and Dollard 1941; Bandura 1962), social

learning stresses that individuals observe the actions and behavior of other individuals and learn from their experiences. Individuals may adopt the behavioral models of others, reject these models, or learn about the consequences of different modes of actions. Social learning produces behavioral change when observations of and discussions within a network modify individuals' views on the feasibility and the consequences of a given course of action. Depending on their social position, individuals may be exposed to innovation in different ways; and they may react to this exposure in different ways as well, with some adopting and some rejecting the innovation. The concept of the macro consequences of social learning processes was developed by Rogers (2003), who introduced a general model of diffusion of technological innovations in the early 1960s. Innovative ideas and behavior, such as voluntary childlessness and fertility postponement, follow similar innovation dynamics.

The second powerful interaction mechanism is *social pressure* (Festinger et al. 1950; Asch 1955), which refers to the force that leads individuals to conform to accepted social norms in order to gain the approval of—or, alternatively, to avoid conflict with—their peers. This pressure may take the form of broad cultural or institutional norms which are expressed more or less explicitly in, for example, gender roles, household power structures, and social organizations. The chances individuals have to deviate from these norms (or innovations) are low in highly connected, homogeneous networks because the norms are shared (among similar individuals), and the measures used to enforce the norms are effective (connected individuals can easily coordinate sanctions against deviance).

The third mechanism is *social* or *emotional contagion*, which is defined in the sociological literature as the “process by which a person catches an idea or behavior from another person” who is seen as socially similar (Burt and Janicik 1996). This process is contingent on the social structure individuals are embedded in: the more complex the structure is, the less likely it is that people will see themselves as socially similar; and, therefore, the less likely it is that contagion processes will be effective. In research on fertility decision-making, the term social contagion is often used metaphorically (e.g. Lois 2013) to denote a temporal synchronization of generative behaviors among network members caused by other network effects, such as social learning and social pressure. Rather than using the term in this metaphorical manner, we stress that social or emotional contagion is an independent mechanism which goes beyond social learning (in which a step through cognition is necessary). Thus, in seeking to understand social contagion, we look to social psychology, which has long held that individuals' emotional states can be altered through contact with other individuals. Two sub-mechanisms can also be identified: emotional contagion and mimicking. Emotional contagion means that individuals can spontaneously pick up emotional states and behaviors (e.g., weeping, laughter, fear, joy, excitement) of groups

or other individuals they come in contact with (Lippitt, Polansky, and Rosen 1952; Hatfield, Cacioppo, and Rapson 1994). Mimicking is the automatic adoption by individuals of attitudes, goals, or behaviors that others are perceived to hold without any conscious intent or awareness (Aarts, Gollwitzer, and Hassin 2004; Marsden and Friedkin 1993). Both mechanisms are based on the assumption that behavior can be influenced below the level of individual awareness, and that rational consideration can be undermined to some extent. While these mechanisms are often applied to short-term situational behavior (e.g., a concert crowd cheering together in joy), there is evidence that longer lasting emotional states, such as happiness and loneliness, also spread in social networks (Cacioppo, Fowler, and Christakis 2009; Fowler and Christakis 2008; Hill et al. 2010). Additionally, qualitative data suggest that these mechanisms affect attitudes toward having children: e.g., women may report emotional arousal when they spend time with babies in their networks, and this happy feeling may trigger their own desire to have a family (Bernardi 2003).

The final mechanism is *social support*, or the process of the exchange of goods and services between related individuals. The idea of social support is crucial to theories of social capital. According to this theory, individuals invest in social relationships in order to create social capital that they can mobilize in case of need (Bourdieu 1986; Lin 1999a). Social capital exists in relationships between people, and can be seen as an asset which facilitates actions (Coleman 1988). The concept of social capital is closely related to the concept of social networks, since family members, friends, neighbors, colleagues, and others of significance to the individual are the primary sources of social support. It is possible to distinguish between material support (e.g., money), instrumental support (e.g., household help, fixing things, childcare), and emotional support (e.g., comforting). As these different forms of social support facilitate actions, they can be regarded as personal resources available to individuals who are situated in a social network of informal relationships (Portes 1998; Lin 1999b). Unlike the effects of social learning, social pressure, and social contagion; the effects of social support may be more ambiguous. If, for example, a society does not place a high value on children or view caring for children as a shared responsibility, fewer people may be willing to support parents. If, however, there are relatively few parents in a given context, people may offer these parents more support, and may view parents as having “sacrificed” for society by having children.

Obviously, social mechanisms and diffusion processes are not the only sources of social change. Values, ideas, norms, and behaviors depend to a large extent on the institutional, economic, and technological conditions prevalent in a society. For example, humans have long sought to control fertility, and birth control was practiced in the past via the regulation of sexuality and nuptiality. It was not until easy-to-use and reliable oral contraceptives became available that couples and individuals had the



opportunity to control conception independent of other norms. Similarly, the rising demand for extra-familial childcare is attributable to changing norms regarding the participation of women in the labor market and changing ideas about gender-equal opportunities; however the actual provision of childcare depends on the institutional/political and economic contexts, which may or may not allow for the implementation of work-family reconciliation policies. The specific role of social interaction is to moderate the effects of these structural and institutional features by accelerating or decelerating the process of social change; often functioning as a social multiplier for the diffusion of technological innovations, policy incentives effects, and ideational change (Kohler 2001; Rindfuss et al. 2004).

## **2.1 The structure of social interaction**

Mechanisms occur in social interactions between individuals. In order to evaluate the functioning of social mechanisms, it is crucial to examine the nature of the relational ties between individuals, as well as the ways in which relationships are structured, and the specific composition of the individuals involved. These ties have a number of characteristics. For the discussion here, the most relevant characteristics of these ties are their strength, their duration, their multiplex nature, and their reciprocity. The structure of a social network can be characterized by its size and its density, as well as by the specific patterns of clustering among the members, which may result in the formation of “cliques” and “bridges” within the network. Finally, network composition refers to the specific mix of network members in terms of their personal characteristics, such as age, education, occupation, and number of children (cf. Degenne and Forsé 1999; Wasserman and Faust 2009; Prell 2012).

The effects of social learning, social pressure, social contagion, and social support on childbearing choices and fertility tempo and quantum are moderated in specific ways by the types of ties, the structure, and the composition of the network. Social learning is highly dependent on the nature and structure of the ties (and the two are often correlated). Various studies in the area of the diffusion of information and of (technological) innovations have found evidence that weak ties and sparse networks play a crucial role in spreading new information (Granovetter 1974). Research has shown that as people are learning about childbearing, the meaning of the information transmitted and negotiated in conversations, as well as the degree of reliability of the informer, are crucial for effective learning and actual adoption (Bongaarts and Watkins 1996). Hence, strong ties are more important than weak ties for the adoption of modern contraceptives (Bühler and Kohler 2004).

Strong and multiplex ties are likely to be more effective in exerting social pressure than weaker ties, and dense and homogeneous networks (i.e., those in which members know each other well and have generally similar attitudes) are more likely than sparse and heterogeneous networks to exert pressure on their members to follow normative patterns of behavior (Burt 1983; Marsden 1987; Coleman 1988). Strong ties, which imply more emotional closeness than weak ties, usually have the most effective sanctioning power. Density makes it easy to control and coordinate individuals' behavior through incentives and sanctions.

Because social and emotional contagion are, in a strict sense, dependent on personal interaction, contact frequency influences the opportunity for contagion. One way to operationalize strong ties is a high rate of contact frequency, as contagion generally takes place in strong-tie relationships; i.e., in interactions with siblings, friends, etc. We can distinguish analytically between the different mechanisms of influence and their relative dependence on different network structures. In practice, however, the different mechanisms are inter-related and can amplify, minimize, or even neutralize one another.

In the next section, we discuss the recent socio-demographic studies which have investigated social mechanisms and the structure of social interaction in order to explain the number of children individuals have, the timing and spacing choices of parents, and the investments parents make in their children. We also look at empirical work that examines the relationship between social effects and fertility dynamics at the population level. We limit the discussion to low-fertility contexts in western, post-industrial societies, as an overview of the progress made in this area and a set of recommendations for further research on this topic are needed.

### **3. Social networks' effects in low- and late-fertility contexts**

In the past 15 years, the role of social interaction effects in shaping fertility and family formation trends in western, post-industrial countries has increasingly been recognized, and has been catalyzed by the emergence of several strands of work that have developed a social networks perspective (e.g., Kohler and Bühler 2001; Balbo, Barban, and Mills 2013). This recent literature has two distinctive thematic orientations. The first strand focuses on the role of social effects on declining completed fertility, as well as on the emergence of a new trend of voluntary childlessness in some advanced post-industrial societies. It encompasses research on social interactions and the pace of change in the social meanings and the value of children, often in a comparative perspective across time and space, or across population sub-groups in specific societies. The second strand evaluates how social interaction moderates changes in the timing of

parenthood and the increasing age at the first birth, which is often described as childbearing postponement. In this section we examine these two orientations.

### **3.1 Social networks and the number of children**

Depending on the context, social mechanisms may act for or against having a large number of children. They act on quantum by accelerating or retarding the consequences of new structural conditions and of social norms related to the number of children people have. In societies or social groups in which it is advantageous to have a larger number of children—i.e., the cost of raising children is compensated for by the net benefits they produce for parents (or at least the parent in a more powerful position)—social learning and social pressure multiply the consequences of an opportunity-cost logic of action (Montgomery and Casterline 1996; Kohler 2001). The opposite is true for societies or social groups for which the opportunity costs of having children are reversed. In their historical and anthropological demography of childbirth and fertility control among Italian and Jewish women in the United States from 1920-1940, Watkins and Danzi (1995) argued that the fertility declines among these two groups were initiated and accelerated by the social interactions of women, in which they talked about birth control techniques. In these conversations, women not only learned about new contraceptive techniques; they learned which techniques were socially accepted by their peers (kin, friends, neighbors etc.). These discussions were also a source of normative pressure to limit family size. In addition, Watkins and Danzi looked the different network compositions of Italian women. Because their networks were relatively homogeneous, information about new birth control techniques spread slowly among the Italian women. Jewish women, by contrast, had more heterogeneous networks, which facilitated the exchange of information about these techniques. Thus, fertility among Jewish women declined earlier than among Italian women.

Social learning and social pressure have also been cited in studies that seek to explain the sharp rise in the number of childless adults in western, post-industrial societies; and in the rapid diffusion of childlessness from individuals with certain characteristics to the larger population (cf. Abma and Martinez 2006; González and Jurado-Guerrero 2006; Hara 2008; Tanturri and Mencarini 2008). In these works, declining fertility is shown to be only partially the consequence of new structural conditions, such as increasing female labor market participation or growing labor market insecurity (Bernardi, Klärner, and von der Lippe 2007; Gebel and Giesecke 2009; Kreyenfeld 2010; Kreyenfeld, Andersson, and Pailhé 2012; Özcan, Mayer, and Lüdiche 2010; Tölke and Diewald 2003). According to these scholars, the decline in fertility is also attributable to changing norms regarding parenthood and social learning

about new parenthood roles and ideals. When we look at this issue from a historical perspective, we can see that social norms supporting parenthood existed until the late 1960s, and that strong social pressure was placed on women and men to adhere to these norms (Maxwell and Montgomery 1969; Griffith 1973; Ory 1978). There was, however, a shift in the late 1960s, and since then voluntary childlessness has gradually become an option that has gained acceptance in western, post-industrial societies. Drawing on pioneering studies on voluntarily childless women by Veevers (1975), who found that these women experienced “social pressure from their parents, in-laws, siblings, work associates, friends, and doctors-from almost everywhere except their husbands,” Houseknecht (1977; 1979) argued that social support from reference groups can help women overcome the negative psychological effects of the pressures and the sanctions they are subject to when they decide not to adhere to the dominant social norm of having children. Houseknecht also found that women who wished to stay childless had fewer reference groups supporting their decision. As her research was carried out in the US in 1973, and childlessness has become more common since then, we can assume that more reference groups and stronger support for voluntary childless women are now available. Keim (2011) argued that the individualization processes which started in the late 1960s led to the emergence of more individualized personal networks; i.e., networks that are less family- or kin-centered, less dense, and more based on common interests than on formal membership. The general trends of modernization and individualization provide individuals with opportunities to choose their network partners (more) deliberately. Thus, couples and individuals who wish to stay childless or who delay having children can choose like-minded couples and individuals who support their choice. Recent research on the diffusion of childlessness stresses the role of social network media, which might provide new opportunities for people who choose to remain childless to find support. There are, for example, a growing number of groups that defend and promote child-free lifestyles on Facebook and other social media sites (Basten 2009).

There is some evidence for social contagion effects, whereby childbearing by significant others affects individuals’ childbearing intentions and behavior. These significant others may be family members, close friends, or more generic peers with whom the individuals are in regular contact (e.g., work colleagues). Using a large set of Norwegian register data and focusing on the fertility behavior of siblings, Lyngstad and Prskawetz (2010) found that there were cross-sibling influences on first births. The hazard rate for having a first child increased among women in the year after a sibling had a child. In contrast, using German data from the “Panel Analysis of Intimate Relationships and Family Dynamics” (Pairfam, cf. Nauck et al. 2013) from the birth cohorts 1971–73, 1981–83, and 1991–93, Kotte and Ludwig (2012) found only weak evidence of sibling contagion for the preferred number of children, and no effect of

childbirth events among siblings on actual fertility behavior. Yet they found strong peer effects: the more friends a woman has who have given birth within the last three years, the more likely it is that she will have a child. Further evidence for social contagion processes on fertility intentions came from a pioneering survey (N=510) conducted in Rostock, Germany; which showed that the composition of the social network has effects on fertility intentions (Bernardi and Giudici 2010; Klärner 2012). In particular, the presence of close network members who had children under age three seems to have promoted positive intentions to have a child. These results were supported by the findings Kopp et al. (2010: 118). Using a small-scale panel survey, they found that the childbearing intentions of individuals amplified between two waves when friends in their network had a first child or another child. In an analysis of German panel data (Pairfam), Richter et al. (2012) found a significant positive effect of the presence of children under age three in a person's network on his or her actual childbearing behavior, at least among eastern German respondents. Similarly, an individual's childbearing risk was shown to increase when a friend had a child in analyses of the U.S. National Longitudinal Study of Adolescent Health dataset (Balbo and Barban 2012; Balbo, Barban, and Mills 2013). Moreover, a very recent analysis of data from the Bamberg Cohabitors and Marital Couples Panel (Lois and Arránz Becker 2013) indicated that, for people under age 28, the number of parents in ego's network affects the likelihood of a first birth. In yet another recent analysis, pregnancy risks were shown to be influenced by childbearing among work colleagues (Pink, Leopold, and Engelhardt 2014).

The findings discussed so far do not address individuals' motivations. Instead, these studies reduce social contagion to a metaphor denoting a correlation, or to a mere "temporal synchronization of generative behaviors among network members" (Lois and Arránz Becker 2013: 2). Qualitative studies that have analyzed people's accounts of the subjective effects of childbearing among significant others on their own fertility provide better evidence for the contagion mechanism itself. In case studies in Italy and in Germany, some respondents reported that they were emotionally touched when they had contact with (young) children; i.e., that they experienced positive, warm, and tender emotions which led them to feel that they wanted to have a baby, or at least caused them to consider having children (Bernardi 2003; Keim 2011). It appears that such feelings can indeed have a synchronization effect on childbearing events among close-knit groups of friends, although this tends to be a sequential process rather than a group composition effect (Bernardi 2003; Bernardi, Keim, von der Lippe 2007; Keim 2011). Evidence for the existence of an independent mechanism of emotional contagion has also been found by Lois and Arránz Becker (2013).

At a general level of societal transformation and demographic transition processes, a couple's choice to stay childless may be accelerated once a critical mass of people

have chosen to be childless, and they “diffuse” the value and acceptance of such a choice (cf. Lutz, Skirbekk, and Testa 2006). This diffusion process may be accelerated due to contagion effects; e.g., the wish to have children because others have children will be less likely to arise if there are fewer children present in the social networks of adults. Thus, once the norm of having children has weakened because of the presence of a critical mass of childless individuals, contagion effects of childlessness may become increasingly relevant. For example, people may be influenced in their childbearing decisions by observing childless people experiencing positive and joyful events made possible by their more spontaneous, unencumbered lifestyle (cf. Keim 2011).

Social support is related to the number of children people have. On the one hand, having a supportive network alleviates the burdens associated with childrearing activities, and sometimes also the financial and psychological burdens of parenthood. On the other hand, starting a family may be viewed as way to build social connections. Thus, having children may be a more or less conscious investment in social capital and social integration (for instance, a desire to have stable and reliable social relationships in later life). People who live in strong welfare states may think of the support children are likely to provide mainly in terms of psychological assistance and psychological well-being. There is an intrinsic value associated with children as a source of well-being, for which having one or two children is sufficient. However, people who live in places where the welfare state is an imperfect substitute for family care may have additional motivations for having children, such as a desire to build a larger family network which would function as economic and health insurance when they reach old age.

Finally, in societies in which becoming a parent is increasingly considered to be one of many possible transitions, but not a necessary one, opportunities for social learning about alternative adult roles or alternative ways of parenting are growing. As Aries (1980: 650) put it in his essay on the changing motivations for childbearing in western societies, children are “one of the various components that make it possible for adults to blossom as individuals.” While such heterogeneity of values may diminish social pressure to become a parent across society as a whole, this is not necessarily the case within smaller networks. Ego-centered social networks may still be rather homogeneous in terms of values. In networks in which parenthood is valued, becoming a parent may represent a means of gaining social esteem or of avoiding social isolation.

Social interactions can help to modify and spread new ideas about parenthood and intergenerational relationships, and may affect the ways in which children are seen by parents through the social mechanisms described in Section 2.

### **3.2 Social networks and the timing of children**

Differences in the timing and spacing of births can be explained at the macro level of societal transformations, and at the meso level of social interactions (via the four mechanisms described above) within personal networks of relationships. Of particular interest are the (1) changes in the timing and spacing of births over time in distinct societies, and (2) the differences between various sub-groups of the population.

In the context of modern, post-industrial societies, the focus of this research has been on the delaying of parenthood to a later stage of life (postponement). This trend is closely linked to a general decline in completed fertility in developed countries, and to the “emergence of lowest-low fertility in Europe” (Kohler, Billari, and Ortega 2002; see also The ESHRE Capri Workshop Group 2010). Declining fertility in Europe and in other developed countries can only be proximately attributed to the availability of reliable means of fertility control. It is instead generally attributed to the diffusion of new ideals about parenthood and the changing preferences of women (Hakim 2003) and men.

The diffusion of new fertility ideals and family size preferences is only one way in which social interaction affects the timing of parenthood. The observation of the behaviors and experiences of others in close social proximity (social learning) can influence decisions about the timing and spacing of births rather directly. In her study on western German young adults, Keim (2011) showed how observations of the experiences of others can affect individuals’ ideas about the timing of births. For example, if couples observe that other couples in their social networks are slowly reaching the end of their fecund period and are experiencing difficulties in getting pregnant, they may decide to start trying to conceive earlier than they had originally planned. Conversely, couples may observe others becoming parents beyond the age of 30 or even 40, and they may note that many people in their reference group are still childless. In this case, their decision-making process about whether and when to have children may be slowed.

On the meso level of social networks and kin relationships, significant others can exert social pressure on individuals and couples to marry and have children by different means. In post-industrial societies, it is mainly the (potential) grandparents who pressure their daughters (and sons) to have children and to enter into a stable union. In a panel study conducted in the US in the 1970s, Udry (1982) found that pregnancies in young couples could be predicted by using respondents’ families’ normative expectations regarding childbearing. Barber and Axinn (1998) found that the childbearing preferences of parents influenced young adults’ own fertility preferences at least indirectly. Women whose mothers wanted them to have many children tended to choose marriage over cohabitation. An effect for men could also be shown: the sons of

mothers who wanted them to have many children chose marriage or cohabitation over a non-co-residential union.

Social support can influence the timing and spacing of births in various ways. Social support can facilitate the decision to have a child at earlier stages in life or in uncertain situations, e.g., a couple who are still in education may be more likely to have a child if they can rely on the social support of their parents. Social support can also facilitate an earlier transition to the second or subsequent child(ren) (Balbo and Mills 2011, 2012; Bühler and Fratzak 2007; Arránz Becker, Lois, and Nauck 2010; Richter et al. 2012). Bernardi and White (2010) found that the nature of the kin tie appears to be relevant to fertility outcomes. They estimated the effects of the intensity of social exchanges among kin for completed fertility (the number of children women have at the end of their reproductive lives), and found that increases in the proportion of possible exchanges among kin were positively associated with completed fertility.

Furthermore, research on teenage pregnancies has shown that social support can reduce the chances that teens will have non-marital births. Using data from representative national panel survey in the US, Houseknecht and Lewis (2005) showed that teenage girls who have strong ties to their parents and are embedded in dense community networks are less likely to have a non-marital birth. Houseknecht and Lewis assumed that the amount of social capital accessible through those network ties matters most in teenage childbearing. However, social support for the decision to have a child or to avoid pregnancy is not the only relevant factor; as social norms, social learning, and social pressure can also be important. Drawing on the results of a small-scale qualitative study among teenage girls in different parts of England, Arai (2007) suggested that teenage childbearing might be more normative in some communities than in others.

#### **4. Outlook for future research**

While there is currently a broad consensus that social interaction effects are important for understanding fertility change, there is little evidence regarding their magnitude. Having a better understanding of the dynamics of social effects and of their relative contributions to social innovation could prove useful in efforts to estimate the future effects of policies on behavioral change. As Kohler (2001) has suggested for modern contraception use in rural Africa, the structure of social interaction can work as a social multiplier that either enhances or inhibits the effects of policy incentives. For instance, the introduction of paternal leaves as an incentive for fathers to take on part of the responsibility for caring for their children, and to support women in balancing motherhood and employment, may be met with social resistance. In a densely



connected social network, in which social pressure is likely to be high, the amount of time off a father actually takes off work may be small, despite the incentives. But later, after a critical mass of fathers have been on leave, the rate of use may be much faster, given that the new norm would become taking the leave. In a sparsely connected population, reaction to the incentives may be more rapid at the beginning, but the overall effect on the diffusion of paternal leave may be smaller. Policy evaluations which do not take into account social multiplier effects of this kind would miss an important element in estimating the actual success of the policy.

This example provides a basis for introducing a second underdeveloped aspect of social network research on fertility: namely, comparative research. It is well established that social interaction structures, as well as the content that circulates in these structures, are very much dependent on culture, social strata, and life course situations (Lüdicke and Diewald 2007). Although a study by Lois (2013) found that social contagion and social learning effects become less important with increasing age, there are virtually no studies that have systematically compared social networks effects on fertility choices according to age, education, employment, or residential status.

A third issue that should be explored in the years to come is that of the multiple mechanisms through which social interactions operate. The four fundamental social mechanisms we have discussed in this paper (social learning, social pressure, social contagion, and social support) interact with each other in ways that are rarely investigated in relation to fertility. For instance, social learning of a given behavior may not occur if norms that oppose this behavior are strongly enforced. Bernardi (2003) described the cultural and normative obstacles to social learning related to choosing a child-free life in a context in which this is a relatively uncommon choice. Social support and social pressure are likely to interact in similar ways.

One major challenge of considering all of these aspects is the paucity of longitudinal individual data on social network structures and composition, coupled with fertility history data. Such datasets are rare, and are demanding to collect. An exception is the ongoing German Family Panel (Pairfam); an initial analysis of network influences on family formation and extension using Pairfam data was recently published (Richter et al. 2012). Usually, however, social scientists are obliged to infer the factors that affect the decisions of individuals from the average characteristics and behaviors of people within a group (Kohler, Behrman, and Watkins 2001; Kohler, Billari, and Ortega 2002; Nazio and Blossfeld 2003). Occasionally, they use alternative datasets collected for other purposes, such as genealogical data, to infer social effects from the realized fertility of kin members (Bernardi and White 2010). Having access to large-scale data would allow researchers to study the interactions and transfers between family and peers, and could help them answer questions such as: How and when are relationships important for fertility? How do family and peers support fertility and when do they

discourage it? These data would have to refer to the characteristics of the network members, the structure of their relationships, and the content of their exchanges with others. We would need longitudinal datasets in order to make reliable inferences regarding the role of networks in fertility and the causation chains that link them.

## **5. Uniqueness and complementarity of a social network approach**

The literature for postindustrial societies that addresses the issue of social influences on fertility deals mainly with the influence of parents and spouses. The role of extra-household or extra-family social influences is rarely considered. The social network approach can make two major contributions to the existing explanations of fertility postponement and low fertility. First, the assumption that childbearing is a social act would be given real weight in the theoretical and empirical analyses. Because it is a social act, the decision to have a child involves more than just the child's parents and grandparents. Siblings, friends, and institutions are in the background of the decision-making process, as couples are aware of the experiences, preferences, and degree of support of others. This awareness is likely to influence them not only in their decision about whether to have a child, but in terms of the timing of births and the number of births. Second, the social network approach can provide reasons for shifts in attitudes, preferences, and behaviors. It can help to explain variation in the speed of changes over time in fertility behavior across geographical contexts and socioeconomic sub-groups of the same population. Individuals influence each other through the social mechanisms described above; the kind of social mechanism at play, as well as the effectiveness the mechanism, depend on the actual social interaction opportunities in the population. If a social network is very dense and homogeneous, social pressure and social contagion may play the biggest roles. If, however, a network is sparse and heterogeneous, social learning may play the major role. Therefore the speed of behavioral changes will depend on the structure of the social interactions.

We have shown a variety of ways in which the social network approach can explain childbearing choices, fertility quantum, the timing and spacing of childbearing, and parental investments in children. The number of children an individual or a couple want to have, including the choice of being childless, is a socially embedded preference. Intended or realized family sizes are partially the consequence of social interactions (acting through the social mechanisms described above). Individuals observe the behavior of others around them, form their intentions in relation to significant others, and discuss their ideas about parenthood and childbearing with friends and relatives. This is especially true when social norms about the "normal" or "ideal" number of children within a family are changing, and different life course options are viable and

becoming socially accepted, including childlessness. At the macro level, the proportion of the population who do not choose to have children would be expected to increase rapidly when more people make and approve of such a choice, and the related social costs are reduced (cf. Lutz, Skirbekk, and Testa 2006). Similarly, explanations of the timing and spacing of children in the individual life course rely on social mechanisms of influence. In particular, age norms concerning the minimum and maximum ages for childbearing, as well as sequencing norms concerning the periods in the life course when it is appropriate to have a child, are the subjects of informal conversations and evaluations among families and peer networks. These discussions give rise to both social learning and social pressure about timing choices (cf. Keim, Klärner, and Bernardi 2009; Mynarska 2010). Parental investments in children are primarily explained with reference to the expected social consequences of having children: i.e., the acquisition of social capital, social recognition for the parental role, and the social prestige of having “good quality” children.

Far from being at odds with other micro and macro explanations of fertility behavior (value of children, theory of planned behavior, life course approach, etc.), the social network approach complements most of them, as it is the only approach that focuses primarily on the interdependence of individual behaviors through social mechanisms and on the structure of social interaction. First, it complements the value of children approach by suggesting that values may change over time due to a few social innovators and the progressive diffusion of new values through networks. The value of children approach cannot answer intriguing questions such as why the values of children in population A are changing faster than in population B. Researchers who adopt a social network approach would search for the answer to this question in the kind of relationships among individuals and in the structure of such relationships.

Second, the social network approach enlarges the economic approaches based on rational action by highlighting the social sources of a few important non-economic costs and benefits associated with children, and with specific timing and spacing choices (such as the relative weight of norm compliance when they are shared in a dense networks). Similarly, it complements the theory of planned behavior by including social sources of individual beliefs in the empirical analysis: social learning for behavioral beliefs, social influence for normative beliefs, and social support for control beliefs.

Third, the social network approach complements the life course approach to fertility, as networks are dynamic entities which evolve over time and in conjunction with life course transitions, including the transition to parenthood. Longitudinal data on networks are necessary to make the most of this complementarity. In the absence of such data, social networks and social influences effects can be analyzed in agent-based computer models. It is then possible to simulate influence mechanisms as well as

network structure effects in a dynamic context (see, among others, Aparicio Diaz et al. 2011).

Fourth, evolutionary biology explanations of fertility are closely related to social networks arguments, as kin social support would be a crucial condition for higher fertility (Mathews and Sear 2013a, 2013b).

Finally, given the ongoing lack of empirical data (and especially of longitudinal data, representative or comparative) and the challenges involved in collecting these data, social networks effects can be explored through modeling using simple heuristics, which can simulate the consequences of a diversity of social interaction conditions on fertility dynamics.

## **6. Summary**

The basic axiomatic assumption of a social network framework seeking to explain fertility is that individual fertility depends on the fertility behavior of other members of the population, and on the structure of the interactions between individuals. Adopting insights from social network theory and analysis, the framework assumes that individual beliefs and behaviors are interdependent and are moderated by social interaction mechanisms and social structures. Social mechanisms—such as social learning, social pressure, social contagion, and the social exchange of resources—affect individuals' beliefs and norms regarding childbearing, and the actual and perceived opportunities and constraints which shape their childbearing choices.

Social context is central to the explanatory models based on a social network framework. If the basic assumptions of theories on individualization processes in post-industrial societies (e.g., Beck and Beck-Gernsheim 2002) are correct, traditional family bonds with dense, kin-centered network structures should loosen; and more sparse networks of choice which include a higher share of friends should become more frequent. These changes in network size, structure, and composition—together with the spread of more individualistic networks—should then moderate the effects of social mechanisms in producing behavioral change by delaying or accelerating the flow of information and resources, as well as the opportunity structures of social pressure and contagion (cf. Keim 2011). Empirical evidence for the diffusion of more “individualized” networks of choice dates back to the work of Wellman (1979), who found that the personal networks in an urban setting in Canada tended to be sparse, loosely bound, and clustered. Yet there is a lack of research on the structure of personal networks at a representative level, and the available results are mixed. For example, Pahl and Pevalin (2005), in an analysis of data from the British Household panel, found

that chosen friendship ties are more prevalent and important in younger age groups, but that given kinship ties become increasingly important in later stages of life.

Social mechanisms and social structure characteristics constitute the two main channels through which social interaction approaches contribute to our understanding of fertility dynamics in post-industrial western countries. The effects of social networks are used to explain observed variations in fertility quantum (fertility decline and rising childlessness), in childbearing timing (fertility postponement), and in the social meaning of children. In particular, the role of these networks is to regulate the speed of changes. The emphasis on the rhythm of change is the most distinctive and original contribution of the social network approach to the explanation of fertility dynamics. The childbearing experiences of others, the acceptability of their choices, and the social visibility and the evaluation of the consequences of their decisions regulate the diffusion of new family size preferences, the emergence of different life course schedules for childbearing, and the position that parenthood occupies in the life course.

## **7. Acknowledgements**

The paper was presented at the conference on the “Theoretical Foundations for the Analysis of Fertility” (Lausanne, October 14-16, 2010). The conference was organized by the Working Group *A Future with Children: Fertility and Societal Development*. The paper is part of a Special Collection on “Theoretical Foundations of the Analysis of Fertility.” This publication is part of the research works conducted at the Swiss National Centre of Competence in Research LIVES Overcoming Vulnerability: life course perspectives, which is financed by the Swiss National Science Foundation.

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