

# Friend and peer effects on entry into marriage and parenthood: A multiprocess approach to interrelated family-formation processes

Nicoletta Balbo<sup>1</sup>  
Nicola Barban<sup>2</sup>  
Melinda Mills<sup>3</sup>

Paper prepared for IUSSP 2013 submission – Please do not quote or cite

## Introduction

Research examining the impact of the social interaction effects of peers and friends (sometimes also referred to as cross-friend effects) beyond fertility behaviour has remained limited. Due to the lack of suitable data and difficulties with identifying endogenous interaction effects, quantitative research (e.g., Manski & Mayshar, 2003; Lyngstad & Prskawetz, 2010) has only marginally examined these questions. Research on family-formation behaviours beyond fertility is virtually absent, although the same theoretical considerations regarding the importance of social interaction could most certainly be applied to other demographic behaviours, such as marital decisions.

In the current study, we aim to extend existing research on social interaction effects by investigating to what extent friends' and peers' behaviour can influence the entry into marriage and parenthood during the transition to adulthood. In the demographic and sociological literature, entry into marriage and parenthood have been established as closely interrelated events, both in terms of their timing (Rindfuss et al., 1988; Manning, 1995; Mills & Blossfeld, 2005) and the life planning they imply (Liefbroer, 1999; Barber et al., 2002). Some studies have specifically addressed the issue of spuriousness of the relationship between these two processes (Lillard, 1993; Upchurch et al., 2002; Baizán et al. 2003; 2004; Steele et al., 2005; 2006).

Building upon and extending previous research, we introduce two main contributions to the field. First, we investigate how social interaction might impact the entry into marriage and parenthood differently. So far, diffusion and social interaction studies have almost exclusively focused on fertility. We extend the existing literature by examining friends' and peers' effects on two different family-formation behaviours (i.e., marriage and childbearing). Our second contribution is a theoretical and empirical extension of the social interaction and diffusion literature on marriage and family formation. We not only consider entry into marriage and parenthood as two independent transitions, but also as two joint outcomes of an individual's unique, underlying family-formation strategy. Our aim is then to uncover whether cross-friend interactions affect the interrelated decisions of getting married and having a child. In this way, we provide a unique contribution to the existing research, which until now has only investigated the effect of social interaction on isolated life-course outcomes (mostly fertility choices, such as cross-sibling effects on fertility, Lyngstad & Prskawetz, 2010).

Using the National Longitudinal Study of Adolescent Health (Add Health) and focusing young adults in the American context, we aim to answer to the following research questions: *Do cross-friend interactions affect both the entry into marriage and parenthood or do they only influence one of the two processes? Is there a difference in the susceptibility to the influence of friends versus peers between marriage and fertility processes? To what extent are the previously established peer effects on fertility affected by the presence of common unobserved heterogeneity?*

## Theoretical Framework

To understand how cross-friend interactions and peers might influence family formation, we can draw on two bodies of literature. Both the sociological and demographic literature has identified the

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<sup>1</sup> University of Groningen. Department of Sociology/ICS, Email: n.f.g.balbo@rug.nl

<sup>2</sup> University of Groningen. Department of Sociology/ICS, Email: n.barban@rug.nl

<sup>3</sup> University of Groningen. Department of Sociology/ICS, Email: m.c.mills@rug.nl

two processes of social learning and social influence, with the economic literature offering the additional mechanisms of cost-sharing dynamics and network externalities.

*Social learning and social influence.* An individual's life course decision-making is not only driven by his or her own personal characteristics and institutional factors, but also by the characteristics and the behaviour of people with whom that individual interacts with (Bongaarts & Watkins 1996; Montgomery & Casterline 1996; Kohler 2001; Bernardi, 2003). A body of research in demography has identified two processes through which relevant others (e.g., relatives, friends, colleagues) matter for fertility choices: *social influence* and *social learning* (e.g., Montgomery & Casterline 1996; Kohler et al., 2001). Social influence refers to consensus in peer groups that constrains attitudes and behaviours, whereas social learning relates to how individuals gain knowledge from others.

*Cost-sharing dynamics and network externalities.* Economic research identifies two other possible, complementary channels via which social interaction might work: cost-sharing dynamics and network externalities (Kuziemko, 2006; Balbo & Barban, 2012). Cost-sharing dynamics refer to the opportunity for people consuming the same kind of goods or experiences to share the costs and uncertainty associated with it. Network externalities are instead defined as an increase in the benefit or surplus that an individual derives from an experience when the number of other people consuming it increases (Katz & Shapiro 1985).

We expect that friends might influence an individual's risk of both getting married and becoming a parent, although we believe that the main mechanisms via which such an influence occurs are different for the two life transitions. These two events indeed bring about different levels of costs and lifestyle changes, with entry into parenthood having deeper implications than marriage.

*Entry into marriage.* Assuming that a large part of young adults get married after already co-residing with their partner or having experienced cohabitation with a former partner, the transition to marriage should not bring about a high degree of uncertainty, costs or considerable life changes. Therefore we do not expect that cross-friend effects primarily work via cost-sharing strategies or learning processes. Rather, people may be positively influenced by their friends who get married mainly because of the network externalities that can be generated and social influence mechanisms that lead people to conform to their friends (Nazio & Blossfeld 2003). Network externalities might for example consist of the opportunity to share the joy of the wedding experience or to together 'consume' the first steps of the new married life. Social influence, instead, might work via social comparison, pressure and social norms. We therefore expect that *the higher the number of friends who are married, the greater an individual's risk of entry into marriage (H1).*

*Entry into parenthood.* Cross-friend effects on fertility likely operate mainly via social learning mechanisms and cost-sharing dynamics (Balbo & Barban, 2012). Compared to getting married, having a child brings about more uncertainty and costs (monetary ones, such as foregone earnings, opportunity costs in terms of a professional career, as well as non-monetary ones, such as relational costs) (Mills et al., 2011). We assume that having friends with children, with whom an individual can share his or her experience as a parent, might reduce the uncertainty associated with it because friends can offer behavioural examples and provide relevant information on how to face the transition to parenthood and deal with the substantial life changes it brings about (Bernardi, 2003). Moreover, having the opportunity of experiencing parenthood together with (or right after) other friends make this transition less relationally costly, because life changes within a social group are synchronized (or at least shared) and the risk of being left alone or lagging behind is reduced. Based on this, we pose the following hypothesis: *the higher the number of friends who have a child, the greater an individual's risk of becoming a parent (H2).*

*Simultaneous influences on entry into marriage and parenthood.* Young adults continue to see a stable union as the optimal and appropriate setting for having a child (Manning & Smock, 1995;

Hobcraft & Kiernan, 1995; Kiernan, 1999; Smock & Greenland, 2010; Thomson et al., 2012). Entry into parenthood is much higher in a co-residential partnership, and especially marriage, compared to singlehood (Baizán et al., 2004). However, a body of research has highlighted that this association might be spurious and therefore the sequence of events (e.g., first partnership and then parenthood) might not reflect a causal relationship (Brien et al., 1999; Baizán et al., 2003, 2004). There might be some common unobserved subjective factors that simultaneously affect both family-formation decisions (Aassve et al., 2006).

For this reason we therefore consider entry into marriage and parenthood as two joint outcomes of an individual's unique, underlying family-formation strategy. This strategy is influenced not only by unobserved personal family predispositions and attitudes, but also by unmeasured social norms, influence and pressure which an individual is exposed to within her social network. We envision these unobserved forces to influence both marital and parental decisions in a concordant way (e.g., either positively or negatively impacting both processes), leading people to choose consistent family formation paths over their life-course. We therefore expect that *the risk of entry into marriage and having a first child might be partially determined by common individual factors, which are positively correlated (H3)*.

Our ultimate goal is to uncover whether cross-friend effects on fertility, which have been found in previous research, are actually at play even when we take into account possible preceding cross-friend influence on the transition to marriage and control for common inter-individual heterogeneity affecting both marital and fertility decisions. For this reason, we focus on a conventional demographic pathway in which an individual first experiences marriage, followed by parenthood.

## **Data and method**

The data we use come from all of the four waves of Add Health, a panel study of a nationally representative sample of adolescents in the United States. The Add Health cohort (born between 1976 and 1982) has been followed into young adulthood with four in-home interviews (Wave I in 1995, Wave II in 1996, Wave III in 2001-2 and Wave IV in 2008-9), at the end of which the sample was between 24 and 32 years old. We restrict our sample to women only, not younger than 15 years old, who are observed until around age 30.

## **Analytical strategy**

### *Strategy to identify interaction effects*

To disentangle confounding contextual effects from true cross-friend influence, we exploited the Add Health survey design and in particular information on the network structure from the *friends module* at Wave III. We identified and distinguished between two different categories of an individual's former school mates: friends and peers. Friends were classified as those who were identified as current friends by the respondent at Wave III. We defined peers as those who were merely former school mates of the respondent but have never been friends. Including and estimating both types of ties in our analysis allowed us to distinguish between the effect of the shared social context (operationalized by peer effect) from the cross-friend interaction effect.

By virtue of the survey design, selection is less of an issue in our analysis. We simply assumed friendship to be exogenous to the family-formation decision-making (i.e., both marital as well as fertility decisions). Friendships and peer relationships under study were formed at the latest when respondents were around 12-15 years old (Wave I); therefore we could assume that their formation is exogenous to the decision to marry or become a parent.

### *Marriage and parenthood as two independent transitions*

The two hazards of getting married and conceiving the first child during month  $t$  for individual  $i$  are estimated using two separate *cloglog* discrete time hazard functions. The hazard functions for the probability that respondent  $i$  gets married or pregnant at time  $t$  are represented by  $h_i^m$  and  $h_i^c$  respectively, where:

$$\begin{aligned}
& \log[-\log(1 - h_i^m(t))] = \alpha D_i(t) + \beta_1 X_i + \beta_2 F_i^m(t) + \beta_3 P_i^m(t) + \varepsilon_i \\
(1) \quad & \log[-\log(1 - h_i^c(t))] = \alpha D_i(t) + \beta_1 X_i + \beta_2 M_i^c(t) + \beta_3 F_i^c(t) + \beta_4 P_i^c(t) + \delta_i
\end{aligned}$$

$D_i(t)$  is the baseline hazard, which in our case is a quadratic function at time  $t$  of the individual  $i$ 's duration (in age) between entry into the risk set (age 15) and the event under study (marriage or childbirth):  $\alpha D_i(t) = \alpha_0 + \alpha_1(\text{age}_i) + \alpha_2(\text{age}_i)^2$ .  $X_i$  represents a set of observed time-constant variables measuring individual  $i$ 's observable characteristics that affect  $i$ 's transition to marriage and first birth.  $M_i^c(t)$ , which is only present in the childbearing equation, is a time-varying covariate identifying whether and when individual  $i$  is married. It takes on a value of 1 in the months in which individual  $i$  is married, and 0 otherwise.  $F_i^m(t)$  and  $P_i^m(t)$  are two additional time-varying variables indicating respectively how many friends or peers get married over time.  $F_i^c(t)$  and  $P_i^c(t)$  instead represent the time-varying variables measuring how many friends and peers become parents. To measure cross-friend effects, we assumed the contagion to be linear on the absolute number of "infected" (i.e., married or parents) friends.  $\varepsilon_i$  and  $\delta_i$  represent the unobserved time-invariant individual-specific factors respectively influencing the risk of getting married and the one of having the first child. They are normally distributed random effects, with a zero mean and variance constrained to 1.

#### *Entry into marriage and parenthood as two interrelated processes: A multiprocess model*

In order to estimate the two processes simultaneously and, thereby taking into account cross-process unobserved heterogeneity at the individual level, we engaged in a multiprocess system (Equation 2),

$$(2) \quad \begin{cases} \log[-\log(1 - h_i^m(t))] = \alpha D_i(t) + \beta_1 X_i + \beta_2 F_i^m(t) + \beta_3 P_i^m(t) + \varepsilon_i \\ \log[-\log(1 - h_i^c(t))] = \alpha D_i(t) + \beta_1 X_i + \beta_2 M_i^c(t) + \beta_3 F_i^c(t) + \beta_4 P_i^c(t) + \delta_i \end{cases}$$

in which the two random variables  $\varepsilon_i$  and  $\delta_i$  are assumed to have a joint bivariate normal distribution.

## **Results and main conclusions**

### *Results of the two independent hazard models for marriage and parenthood*

Estimates of the two independent *hazard* models for the risk of getting married and becoming a parent are shown in Table 1. Net of the baseline hazard and the control variables' effect, we find no cross-friend influences on an individual's risk of getting married. Specifically, an increasing number of friends who enter matrimony do not raise an individual's risk to marry. We do, however, find a significant contextual effect, evident from the positive effect on that risk of an increasing number of peers (i.e. non-friends, former school mates) who get married. Therefore, our first hypothesis is not supported by the data.

However, our findings support our second hypothesis, since results of the *hazard* model for fertility show that an individual is more at risk of becoming a mother when the number of friends who are parents increases.

While marital choices seem to be affected by contextual factors, and perhaps a general social pressure stemming from the fact that coetaneous people start to get married more and more, the decision to become a parent is clearly more influenced by friends' behaviour. This difference might rest with the fact that parenthood brings about considerably more uncertainty as well as higher costs. Life changes associated with the transition to parenthood might be better borne and faced if they are shared with friends, which can be an abundant source of information. Synchronizing such a transition with friends, moreover, can be a good strategy to reduce relational costs, by minimizing

the risk of being left alone.

*Results of the multiprocess model*

Our findings show that the correlation between the unobserved heterogeneity of the two hazards is strong and positive (Table 3), indicating that transition to marriage and transition to parenthood can be considered as joint choices of a couple’s unique underlying family-formation strategy. The presence of this positive correlation between these two decisions moreover suggests that those women who marry early likely become early mothers as well.

However, if we compare the estimates of peer and friend effects of the multiprocess model (Table 2) with those of the two independent models, we cannot find substantial differences in both processes. Once again, peers have a stronger impact on marriage, whereas entry into parenthood appears to be more influenced by more immediate cross-friend effects.

**Tables**

**Table 1: Coefficient estimates (fixed part only) of two independent complementary log-log (cloglog) discrete time hazards of getting married and becoming a parent**

	Marriage			Childbearing		
	Coefficients	S.E.	Sig.	Coefficients	S.E.	Sig.
Constant	-30.900	3.457	***	-21.161	1.873	***
Age	1.985	0.315	***	1.460	0.182	***
Age squared	-0.038	0.007	***	-0.034	0.004	***
Black (ref: non-black)	-1.535	0.226	***	0.338	0.123	***
Intact family (other types of family)	0.031	0.154		-0.326	0.110	***
1 <sup>st</sup> income quintile (ref: 5 <sup>th</sup> income quintile)	0.563	0.241	**	0.854	0.197	***
2 <sup>nd</sup> income quintile	0.233	0.225		0.963	0.190	***
3 <sup>rd</sup> income quintile	0.149	0.198		0.778	0.186	***
4 <sup>th</sup> income quintile	0.100	0.201		0.486	0.195	**
Number of friends	-0.014	0.047		-0.049	0.036	
Parents went at least to college (ref: lower education)	-0.132	0.140		-0.477	0.105	***
Parental religiosity (ref: no)	0.529	0.135	***	-0.187	0.117	
Number of siblings	0.022	0.055		0.109	0.037	***
Married (ref: non married)				1.549	0.130	***
<b>Number of friends who became parents</b>				0.234	0.091	**
Number of peers who became parents				0.053	0.041	
<b>Number of friends who got married</b>	0.149	0.112				
Number of peers who got married	0.103	0.051	**			
N	1903					
Number of spells	149520					

\*  $p < 0.10$ . \*\*  $p < 0.05$ . \*\*\*  $p < 0.001$

**Table 2: Coefficient estimates (fixed part only) of a multiprocess model composed by two complementary log-log (cloglog) discrete time hazards of getting married and becoming a parent**

	Marriage			Childbearing		
	Coefficient	S.E.	Sig.	Coefficient	S.E.	Sig.
Constant	-31.787	3.464	***	-20.901	1.867	***
Age	2.062	0.316	***	1.425	0.182	***
Age squared	-0.039	0.007	***	-0.033	0.004	***
Black (ref: non-black)	-1.448	0.224	***	0.310	0.123	**
Intact family (other types of family)	0.003	0.153		-0.344	0.110	***
1 <sup>st</sup> income quintile (ref: 5 <sup>th</sup> income quintile)	0.634	0.238	***	0.860	0.197	***
2 <sup>nd</sup> income quintile	0.309	0.222		1.002	0.190	***
3 <sup>rd</sup> income quintile	0.201	0.197		0.782	0.186	***
4 <sup>th</sup> income quintile	0.119	0.200		0.501	0.196	**
Number of friends	-0.018	0.047		-0.049	0.036	
Parents went at least to college (ref: lower education)	-0.174	0.138		-0.475	0.105	***
Parental religiosity (ref: no)	0.460	0.134	***	-0.174	0.108	
Number of siblings	0.028	0.054		0.114	0.038	***
Married (ref: non married)				1.198	0.128	***
<b>Number of friends who became parents</b>				0.241	0.091	***
Number of peers who became parents				0.059	0.041	
<b>Number of friends who got married</b>	0.150	0.111				
Number of peers who got married	0.101	0.051	**			
N	1903					

\*  $p < 0.10$ . \*\*  $p < 0.05$ . \*\*\*  $p < 0.001$

**Table 3: Estimated random-effect covariance matrix of the multiprocess model**

	Marriage	Childbearing
Marriage	1	
Childbearing	0.561(0.106)*** <i>Corr. = 0.56</i>	1

\*  $p < 0.10$ . \*\*  $p < 0.05$ . \*\*\*  $p < 0.001$  from Wald test

*Note:* The reported values are the estimated variance of each random effect. The off-diagonal cell represents the covariance with standard error in parentheses and correlation between the two random effects.