Natalie Nitsche, Anna Matysiak, Jan Van Bavel, Daniele Vignoli

Educational Pairings and Fertility Across Europe: How Do the Low Educated Fare?[1]

ABSTRACT

Recent literature suggests that the fertility-education relationship may be mediated by the educational attainment of the partner, especially among the more highly educated. However, there are no studies focusing on the fertility of couples who are left behind in educational attainment. We address this by investigating how educational pairings among married and cohabiting partners relate to first, second and third birth transitions across 22 European countries, using EU-SILC panel-data. Our findings show no significant differences between homogamous low educated couples and couples with one low and one higher educated partner (either she low/he more education or he low/she more education) in second and third parity progressions. However, couples with one or two low educated partners have significantly lower progressions to second births compared to couples with two highly educated partners. These lower rates for the low educated contradict earlier patterns and may point to newly emerging socio-economic inequalities in family dynamics in Europe.

INTRODUCTION AND BACKGROUND

Education is one of the most well studied predictors of childbearing in the developed world today. While the causal direction of the relationship between family formation- and educational trajectories has proven challenging to tease apart (Brand and Davis 2011; Stange 2011; Nisen et al, 2013), it is well known that the obtainment of high levels of education has come hand in hand with the postponement of the transition to parenthood and of the formation of co-residential unions, and increases in childlessness in many nations (Martin 2000; Gustafsson 2001; Shang and Weinberg 2013; Miettinen et al 2015). Given educational expansion, highly educated women, and increasingly men, rather than individuals with low educational attainment, have taken center stage in the research on the fertility-education nexus. This applies specifically to the growing body of literature which investigates

[1] **Acknowledgements:**

The research leading to these results is based on a collaborative effort. The authors received funding from the European Union's Seventh Framework Programme (FP7/2007-2013) under grant agreements: 1) no. 627543 for *COUPFER/Marie Curie Action* (Natalie Nitsche), and 2) ERC Grant Agreement no. 312290 for the *GENDERBALL* project (Jan Van Bavel).

We are grateful to Tymon Słoczyński for his help at the early stages of this project.

how dynamics between married or cohabiting partners, such as their relative resources, division of housework, or educational pairings, are related to the couples' childbearing decision-making and behavior (Cooke 2004; Brodmann et al. 2007, Dribe and Stanfors 2010; Nitsche et al. 2015). Indeed, recent research suggests differentials in the fertility-education relationship of tertiary-educated individuals, dependent on the educational attainment of the partner. Among the highly educated, homogamous highly educated couples appear to have accelerated transitions to second or third births as compared to hypogamous or hypergamous couples with one highly educated partner only, at least in some contexts (Nitsche et al 2015). Higher opportunity costs for spending time away from the labor market and careers among highly educated women have been one of the chief motivators for investigating how the male partner's resources and help with chores and childrearing may ease work-family conflict for women in this more highly educated segment of the population. In consequence, highly educated couples have been studied more frequently than those with low educated partners, and not much is known so far on how couple dynamics operate among those couples with lower cumulative education in relating to their childbearing behavior. Yet, recent studies suggest that lower educated individuals may increasingly display distinct patterns in the family formation process. For instance, low educated men are now remaining childless more often than their more highly educated counterparts in Finland and Norway (Nisen et al 2014, Kravdal and Rindfuss 2008), while the incidence of early childbearing appears to even have significantly increased among recent cohorts of low educated women across most of Europe (Raymo et al. 2015). Also, given educational expansion, the group of those with low educational attainment is becoming ever smaller and more select (OECD 2011). Additionally, parental socio-economic resources in general and education in particular are consequential for children's life outcomes and chances (Erola, Jalonen, Lehti 2016). It's been suggested that children of lower educated parents face barriers to their own socio-economic advancement, be it through higher rates of divorce and lower available family resources (McLanahan 2004), limiting parental behaviors and beliefs (Davis-Kean 2005), or other pathways. It is thus timely and relevant to investigate whether the coupling of two low educated partners may be associated with distinct patterns of childbearing behavior, and whether these in terms of socio-economic resources seemingly disadvantaged unions may display differences in first, second or higher parity birth

transition rates compared to couples in which one of the two partners or even both partners have higher educational attainment. Our study sets out to address this question. Using the EU-SILC, a current panel study conducted in 20+ European countries, we investigate how educational pairings among couples are related to their first, second and third birth transition rates, focusing on couples with at least one partner with low educational attainment. We use discrete time event history models to understand whether birth hazards differ among homogamous low educated versus homogamous medium educated couples, and whether there are differences in the birth hazards among couples with two low educated partners versus couples in which only she or he is low educated while the other partner has more education. This draft presents first results for second and birth parity progressions. The results for first births will be added to the next version of the paper.

THEORETICAL CONSIDERATIONS AND HYPOTHESES

Following Oppenheimer's argument that the pooling of resources has become essential for families' welfare, having at least one low educated partner may be expected to make a family more vulnerable; even more so when both partners are low educated (Oppenheimer 1988, Oppenheimer 1994, Oppenheimer 1997). Given this argument, it would make a difference for the fertility of low educated women whether or not she has partnered with a man with more education/more earning potential. In extension, it could be expected that couples with two low educated partners display the lowest birth transition rates to either parity as they have the fewest resources at their disposal.

Contrasting predictions can be made based on the theoretical approach of uncertainty reduction. According to the narrative inspired by the socio-psychological uncertainty reduction framework from Friedman et al. (1994), having children may serve as a strategy to reduce biographical uncertainty. This theory contends that uncertainty reduction is a universal immanent value driving the choices of all rational actors, and "*having a child changes life from uncertain to relatively certain*" (Friedman et al. 1994, p. 383). From this perspective, women with limited options in the labour market may respond to unfavorable employment prospects by choosing the "alternative career" of mothers. These women are likely to perceive motherhood as a strategic choice to structure an otherwise uncertain life course.

McDonald (2000) draws a similar conclusion by arguing that globalization fuels a process that systematically excludes certain subgroups of the population from participating in the labour market. "*By having children, they are able to participate in family life which at least provides some meaning in life*" (McDonald 2000, p. 10). This is why less educated women are likely to increase their fertility in times of crisis while further reducing their labour market attachment (Sobotka et al. 2011). The empirical evidence to back up this approach is limited. Edin and Kefalas (2005) show that the poorest women in non-permanent employment may decide to have a child before marriage because entry into motherhood may increase their social status and make the future safer. A recent finding by Kreyenfeld (2010) indicates that economic uncertainty accelerated childbearing among poorly educated women living in Germany. It is not yet known whether there may be differences in this accelerated childbearing behavior of low educated women based on the education or socio-economic background of her partner. If we extend the uncertainty approach to couples, we may hypothesize that couples with two low educated partners may be the most likely to seek uncertainty reduction and to display accelerated birth transitions as both partners may strife to reduce their joint rather high level of uncertainty, much to the contrast of the prediction based on Oppenheimer's argument. However, uncertainly reduction may operate differently among coupled than among single individuals. It is possible that establishing a co-residential union and living with a committed partner serves as uncertainly reduction in and of itself (Mills, Blossfeld, and Klijzing 2005), in turn quenching the need for further uncertainty reduction via childbearing. In the case that the formation or existence of the union serves as the mechanism of uncertainty reduction, we might hence expect no differences in birth rates among low educated individuals conditional on partner's education, especially among married individuals who have formalized their unions.

DATA AND METHODOLOGICAL STRATEGY

Data and Sample

The data for the analyses come from the EU-SILC, an ongoing household panel that was launched in 2003, with nearly all EU member states participating by 2005. It provides a household roster and

collects detailed information on all household members aged 16 and above. It is a rotational panel by design, meaning that it consists of four subsamples which are interviewed in parallel for four consecutive years (except for Norway and France where the observation period is 8 years), but each subsample enters the panel at another point in time. We use EU-SILC data for our study because it provides full household rosters, detailed information on educational attainment and enrollment of all household members, has a longitudinal panel design, covers a wide array of European countries, and is current and ongoing, hence depicting the current family situation in Europe. But the data also has disadvantages, which are the fairly short observation duration and the lack of retrospective information on fertility and partnership histories as well as missing educational histories.

We constructed three analytic event history sub-samples, namely for the transition to first births, second births, and third or higher order births. In this current draft paper version, we will only provide findings on second and third birth transitions. The EU-SILC does not provide information on non-resident children or previous dates of union formation and dissolutions. Therefore, fertility histories were reconstructed from the information on household composition, relationship statuses within the households, and birth years of their members. We limit our analysis to cohabiting and married couples involving women aged 18-35 for all three samples. The construction of fertility histories through the household roster implies the possibility of left-truncation. In other words, if children were born when their mothers were very young, they may already have left the parental home before their mother turned 35, which is especially likely among lower educated individuals who tend to make the transition to parenthood earlier in the life course than individuals who obtain more education. Our data does not allow us to take union duration or time since completing education into account, hence we cannot control for this selectivity in the analyses.

The sample of couples exposed to second, third or higher order birth-risks consists of unions including a woman who meets the age conditions listed above and who were living with at least one child aged 5 or below. The condition on the age of the child was introduced in order to exclude couples from the sample who were rather unlikely to give birth to another child either because of their preferences or health conditions or union quality 80% of second births and 70% of thirds births

observed in our pooled sample occurred within 5 years after the birth of the previous child. Moreover, including longer birth intervals would make it more likely that the current partner is a new partner, and not the biological parent of the older sibling(s) (Kreyenfeld and Heinz-Martin 2015). All couples were considered at risk for childbearing until that event occurred, until union disruption or until the date of the exit from the panel, whichever came first. Both partners were allowed to re-enter the sample in case they formed another union during the panel.

The EU-SILC offers panel data for 30 European countries, 22 of which are included in our sample. We excluded data from Spain and Ireland due non-response substitution that has been conducted in these countries for households that dropped out and cause subsequent issues with representativeness (Iacovou, Kaminska & Levy 2012). In addition, we found unrealistically low numbers of births by exposure time in Cyprus, Malta, and Romania when compared to the period TFR. We therefore excluded these countries from the sample as well. Finally, we excluded Bulgaria and Lithuania, as these countries have particular high attrition rates with has been shown to bias fertility estimates based on the EU-SILC (Dasre and Greulich 2016).

We clustered the single country samples into four sub-samples of country groups. Our Nordic country group includes Denmark, Finland, Norway and Sweden; the Western group comprises Austria, Belgium, France, Luxembourg, the Netherlands, and the UK; the Southern group consists of Greece, Italy, and Portugal; and the Eastern European group includes the Czech Republic, Estonia, Croatia, Hungary, Latvia, Poland, Slovenia, and Slovakia.

Models and Covariates

Dependent Process and Models

As our data are measured annually we estimated discrete time event history models, separately for the transitions to first, second, third and higher order births. Couple level random effects were added to the models in order to account for the correlation across observation years on the couple level. We constructed indicator variables which measure the actual combinations of her and his educational

attainment level. In order to avoid that the number of pairings becomes intractably large, we measured his and her education in three main groups: low, medium, and high education. Low education corresponds to the International Standard Classification of Education (ISCED) 0, 1 and 2 (i.e. lower secondary or second stage of basic education at most), medium education to ISCED 3 and 4 (i.e. upper secondary and post-secondary non-tertiary) and high education to ISCED 5 and 6 (first and second stage of tertiary education). The three pairing-categories which are of main interest for our analyses include the low educated. They are: both are low educated, she has low education while he has higher education (medium or high) and he has low education while she has higher education (medium or high). Of the remaining categories, we only show results for couples with two partners with medium level education ('bothm'). This is the most common pairing in many countries, and also serves as a reference category in out models.

Covariates

The relationship between educational pairing and second / third (and higher parity) birth risks is estimated net of her and his enrolment in education, her age, the absolute difference between his and her age in years, marital status (married vs. cohabitation), year dummies to control for period effects, and country dummies to control for differences in birth rates between the single countries within the groupings. In the EU-SILC, enrolment is defined as being currently enrolled in the formal education system, meaning either primary, secondary, or tertiary schooling. Vocational training activities outside of the formal education system do not qualify as enrolment in this definition. Educational attainment is measured as the highest ISCED level attained at the time of interview. We treat both educational enrolment and attainment as a time-varying covariates, and allow for entry in and exit from enrolment as well as educational upgrading of either partner. Enrolment and attainment level are lagged by one year as we are interested in the relative educational pairing at the time of the conception instead of at the time of birth. We furthermore control for her age at first birth in order to account for time squeeze effects experienced by women who made the transition to the first child at later ages, the age of the youngest child, and a square term for the age of the youngest child.

Some limitations of our empirical approach should be mentioned at the outset. Most importantly, our data provide only a snapshot of couples' life courses and do not allow us to distinguish between timing and quantum effects. In other words, we are unable to verify whether couples who did not have a (next) child within three years eventually had one later on. Second, we are unable to control for a selection of certain couples into stable unions or parenthood. Our findings about the determinants of parity progression do therefore not allow drawing conclusions about completed fertility. It is possible that couples of some educational pairings are less likely to separate than others, and hence have longer exposures to the 'risk' of childbearing, so that elevated birth rates may be partly due to higher union stability.

RESULTS AND DISCUSSION

We illustrate our results by providing a series of figures that plot predicted birth probabilities by years elapsed since the birth of the previous child, separately by country group and parity. Using the nlcom command in STATA 14, we estimated standard errors and 95% confidence intervals around the predicted values, holding the values of the other covariates constant at their mean or modal values. Figures 1-8 show predicted second and third birth rates from our models. The figures display the predicted probabilities and also indicate graphically whether the predicted values of the educational pairings differ significantly from each other (without showing confidence bands). The reference category we chose here are couples with two low educated partners (line for those is always red and solid). Solid lines for the other educational pairings indicate significant differences to the reference category (both low educated), while dotted lines mean that the differences in the predicted probabilities of this specific group and the reference group (both low educated) are statistically insignificant.

Figures 1-4 show predicted second birth rates by years elapsed since the first birth. In Western, Eastern, and Southern Europe, there are no significant differences in parity progressions to second births between couples with two low educated partners and couples with one low educated partner and one partner with more education. Such differences appear to exist in the group of Nordic countries.

Here, homogamous low educated couples display significantly lower predicted parity progressions to second births than couples with one low educated partner only. However, couple years at risk and number of events for the low educated groupings in the Nordic countries are low, as the group of low educated individuals is a rather small minority across North European countries (only 3% of all couple time at risk is among couples with two low educated partners, and about 11% of all couple time at risk is evenly distributed between hypogamous and hypergamous couples with one low educated partner). A result that stands out across the country groupings is that couples with either one or two low educated partners are displaying lower parity progressions to second births than couples with two highly educated partners throughout.

Parity progressions to third births look similar (figures 5-8). There are no significant differences between the educational pairings involving one or two low educated partners in Western or Southern Europe. The Nordic countries again display significantly different parity progression rates between the low educated pairings. Both types of couples involving only one low and one higher educated partner have accelerated progressions to third births, compared to homogamous low educated couples, but these predictions are based upon small case numbers. In the Central and Eastern European cluster, hypogamous unions with a low educated man and a higher educated woman have significantly lower parity progressions to third births than homogamous low educated couples, but only in years 2-5 after the second birth.

Relating back to our hypotheses, we do not find evidence for the uncertainty reduction hypothesis, neither for second nor third birth transitions. In other words, couples with the lowest joint human capital (both have low education) do not have accelerated progressions to second and third births in any of the country groupings. It is possible that childbearing does not fulfill the same hypothesized role for uncertainly reduction among couples, as compared to individuals (who are possibly without a stable partnership). Rather, there is either no differential in parity progressions among low educated men or women contingent on the partner's education (Western and Southern European countries), or depressed second and third birth rates among homogamous low educated couples (in the Nordic context). These findings would confirm Oppenheimers pooling argument: couples with the lowest joint human capital may be those facing the most constraints in making the decision for another baby.

Yet, we need to interpret this finding with great care, as these specific findings hinge upon a very small number of events. An additional finding which has emerged from our analyses is that couples with one or two low educated partners have significantly lower progressions to second births compared to couples with two highly educated partners. These lower rates for the low educated contradict earlier patterns and may point to newly emerging socio-economic inequalities in family dynamics in Europe. The next version of the paper will additionally present results for first births.

Acknowledgements:

The research leading to these results is based on a collaborative effort. The authors received funding from the European Union's Seventh Framework Programme (FP7/2007-2013) under grant agreements: 1) no. 627543 for *COUPFER/Marie Curie Action* (Natalie Nitsche), and 2) ERC Grant Agreement no. 312290 for the *GENDERBALL* project (Jan Van Bavel).

We are grateful to Tymon Słoczyński for his help at the early stages of this project.

REFERENCES

Brand, J. E., & Davis, D. (2011). The impact of college education on fertility: Evidence for heterogeneous effects. *Demography*, *48*(3), 863-887.

Brodmann, S., Esping-Andersen, G., & Güell, M. (2007). When fertility is bargained: Second births in Denmark and Spain. *European Sociological Review*, *23*(5), 599-613.

Cooke, L. P. (2004). The gendered division of labor and family outcomes in Germany. *Journal of Marriage and Family*, *66*(5), 1246-1259.

Davis-Kean, P.E., 2005. The influence of parent education and family income on child achievement: the indirect role of parental expectations and the home environment. *Journal of family psychology*, *19*(2), p.294.

Dribe, M., & Stanfors, M. (2010). Family life in power couples. Continued childbearing and union stability among the educational elite in Sweden, 1991-2005. *Demographic Research*, *23*(30):847-877.

Edin K., Kefalas M.J. 2005. Promises I Can Keep: Why Poor Women Put Motherhood Before Marriage Why Poor Women Put Motherhood before Marriage, With a New Preface. University of California Press.

Erola, J., Jalonen, S., & Lehti, H. (2016). Parental education, class and income over early life course and children's achievement. *Research in Social Stratification and Mobility*, *44*, 33-43.

Friedman D., Hechter M., Kanazawa S. 1994. A Theory of the Value of Children. Demography 31: 375-401.

Gustafsson, S. (2001). Optimal age at motherhood. Theoretical and empirical considerations on postponement of maternity in Europe. *Journal of Population Economics*, *14*(2), 225-247.

Kravdal, Ø. and Rindfuss, R.R., 2008. Changing relationships between education and fertility: A study of women and men born 1940 to 1964. *American Sociological Review*, *73*(5), pp.854-873.

Kreyenfeld M. 2010. Uncertainties in female employment careers and the postponement of parenthood in Germany. European Sociological Review 26: 351–366.

Martin, S. P. 2000. Diverging Fertility among U.S. Women who Delay Childbearing Past Age 30. *Demography 37*(4): 523-533.

McDonald P. 2000. Gender equity, social institutions and the future of fertility. Journal of Population Research 17: 1-16.

McLanahan, S., 2004. Diverging destinies: How children are faring under the second demographic transition. *Demography*, *41*(4), pp.607-627.

Miettinen, A., Rotkirch, A., Szalma, I., Donno, A., Tanturri, M.L. (2015). Increasing childlessness in Europe: time trends and country differences. FamiliesAndSocieties Working Papers Series 33(2015), http://www.familiesandsocieties.eu/wp-content/uploads/2015/03/WP33MiettinenEtAl2015.pdf

Mills, M., Blossfeld, H.P. and Klijzing, E., 2005. Becoming an adult in uncertain times. *Globalization, Uncertainty and Youth in Society: The Losers in a Globalizing World*, *438*.

Nitsche, Natalie, Anna Matysiak, Jan Van Bavel and Daniele Vignoli. 2015. Partners Educational Pairings and Fertility Across Europe. FamiliesAndSocieites Working Paper 38 (2015). Available at: http://www.familiesandsocieties.eu/wp-content/uploads/2015/06/WP38NitscheEtAl2015.pdf

Nisén, J., Martikainen, P., Silventoinen, K. and Myrskylä, M., 2014. Age-specific fertility by educational level in the Finnish male cohort born 1940-50. *Demographic Research*, *31*(1), pp.119-136.

Nisén, J., Martikainen, P., Kaprio, J., & Silventoinen, K. (2013). Educational differences in completed fertility: a behavioral genetic study of Finnish male and female twins. *Demography*, *50*(4), 1399-1420.

OECD 2011: Education at a Glance, Editorial: "Fifty Years of Change in Education". OECD 2011. Available at: http://www.oecd.org/education/skills-beyond-school/48642586.pdf

Oppenheimer, V. K. (1988). A theory of marriage timing. *American Journal of Sociology*, 563-591.

Oppenheimer, V. K. (1994). Women's rising employment and the future of the family in industrial societies. *Population and development review*, 293-342.

Oppenheimer, V. K. (1997). Women's employment and the gain to marriage: The specialization and trading model. *Annual review of sociology*, 431-453.

Raymo, J., Carlson, M., VanOrman, A., Lim, S.J., Perelli-Harris, B. and Iwasawa, M., 2015. Educational differences in early childbearing: A cross-national comparative study. *Demographic Research*, *33*(3), pp.65-92.

Shang, Q., & Weinberg, B. A. (2013). Opting for families: Recent trends in the fertility of highly educated women. *Journal of Population Economics*, *26*(1), 5-32.

Sobotka T., Skirbekk V., Philipov D. 2011. Economic recession and fertility in the developed world. Population and Development Review 37(2): 267-306.

Stange, K. (2011). A longitudinal analysis of the relationship between fertility timing and schooling. *Demography*, *48*(3), 931-956.

FIGURES

Figure 1

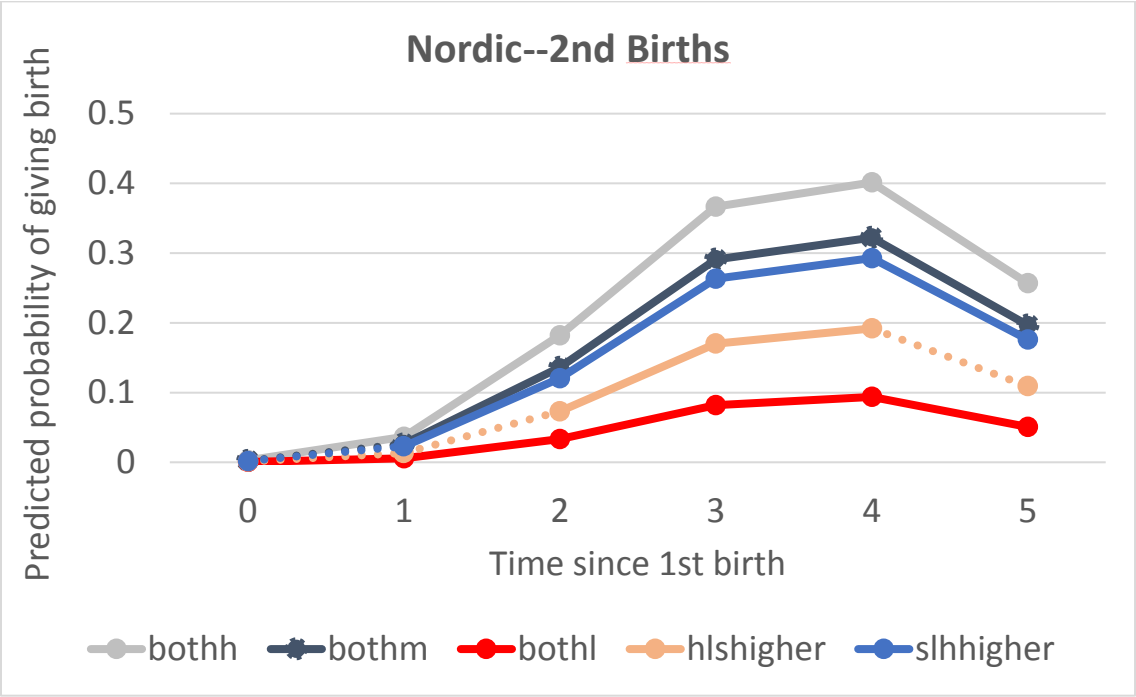

Figure 2

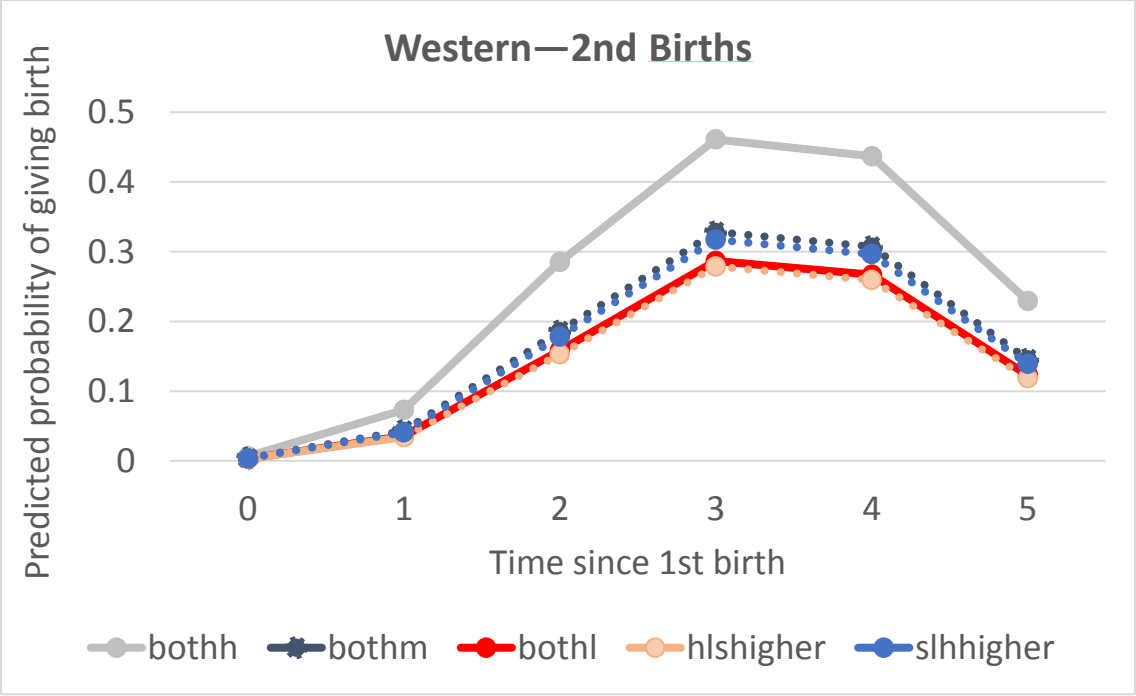

Figure 3

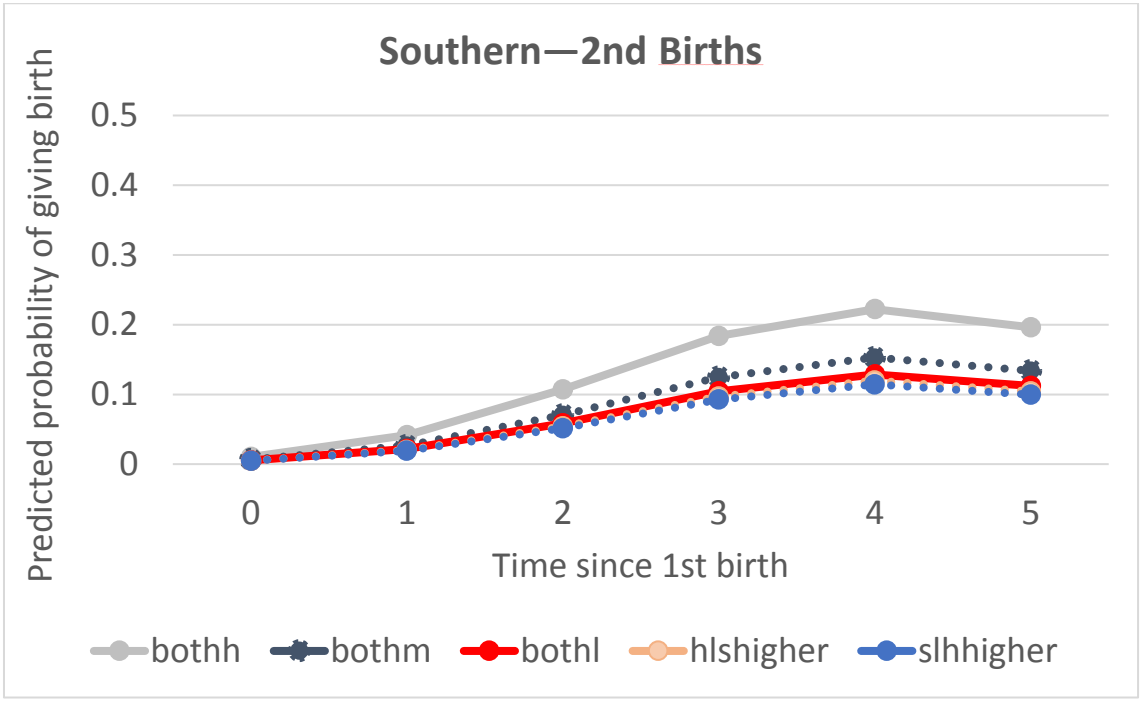

Figure 4

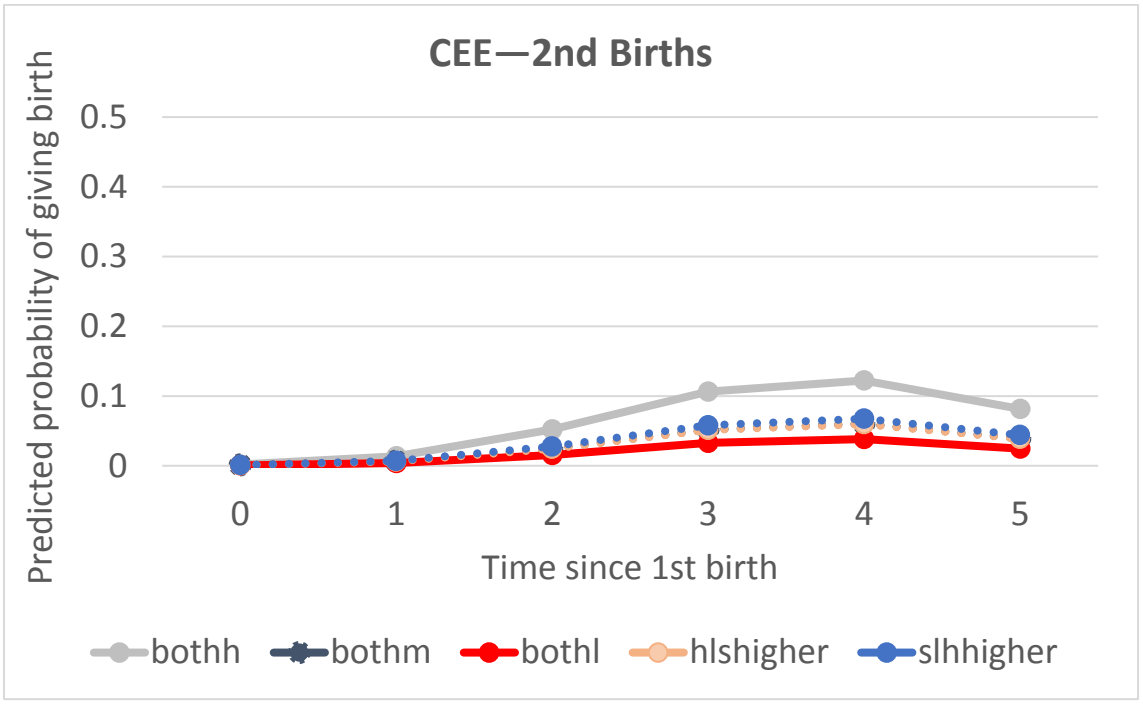

Figure 5

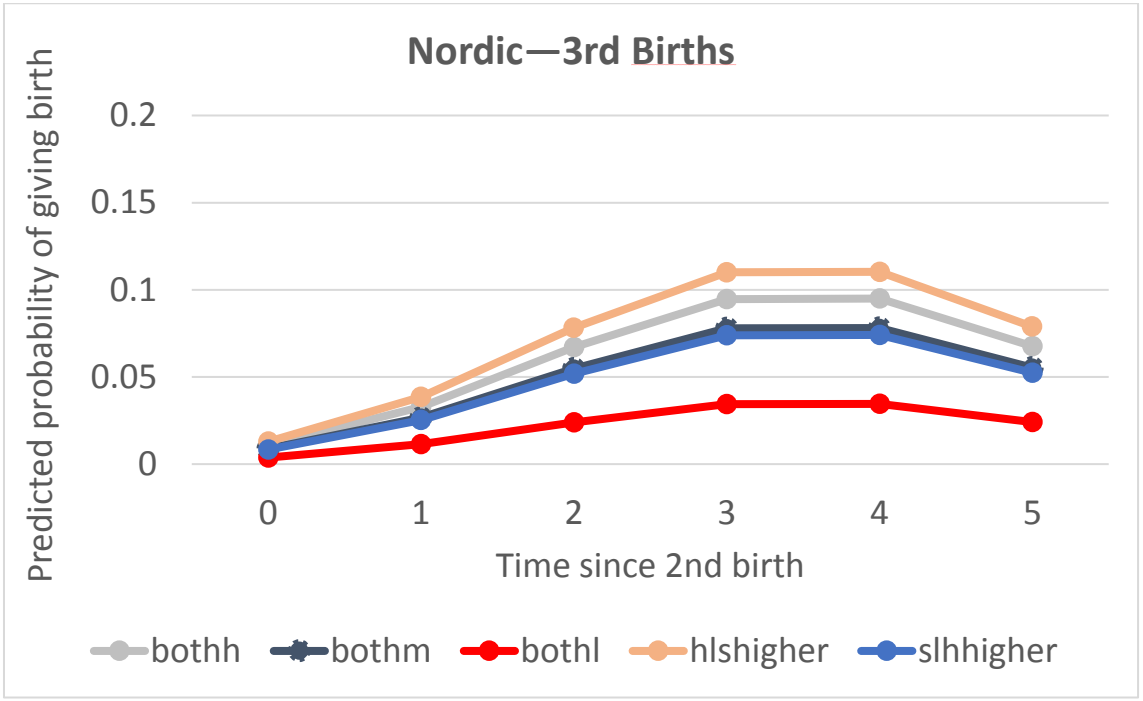

Figure 6

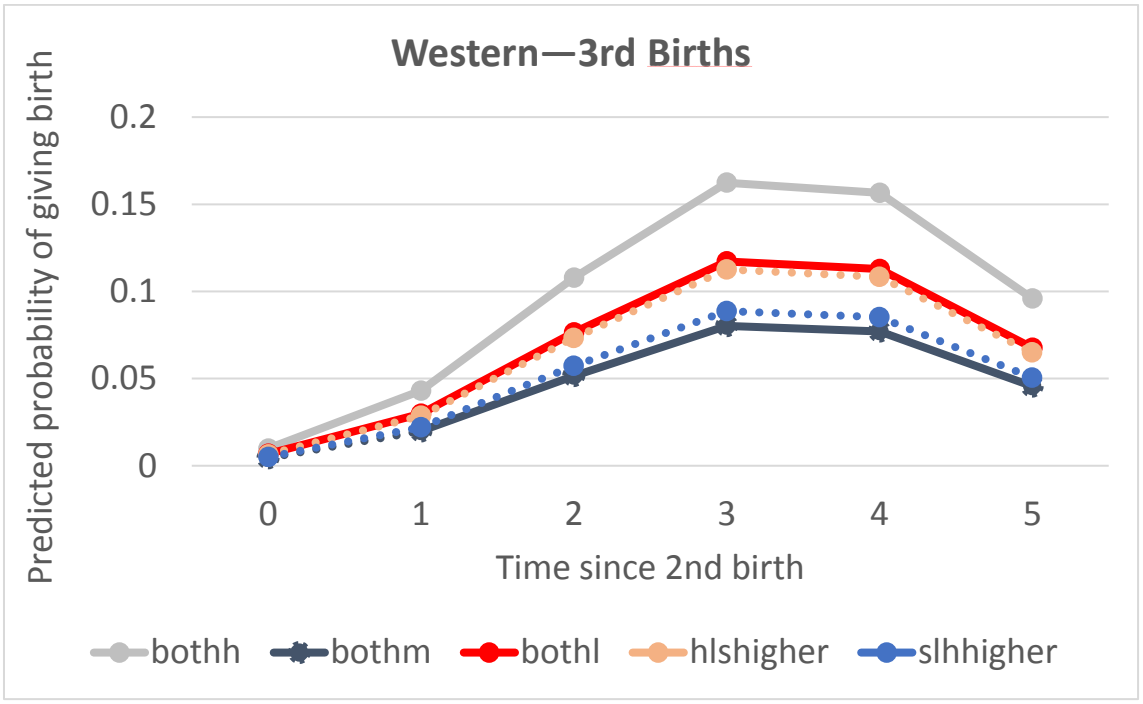

Figure 7

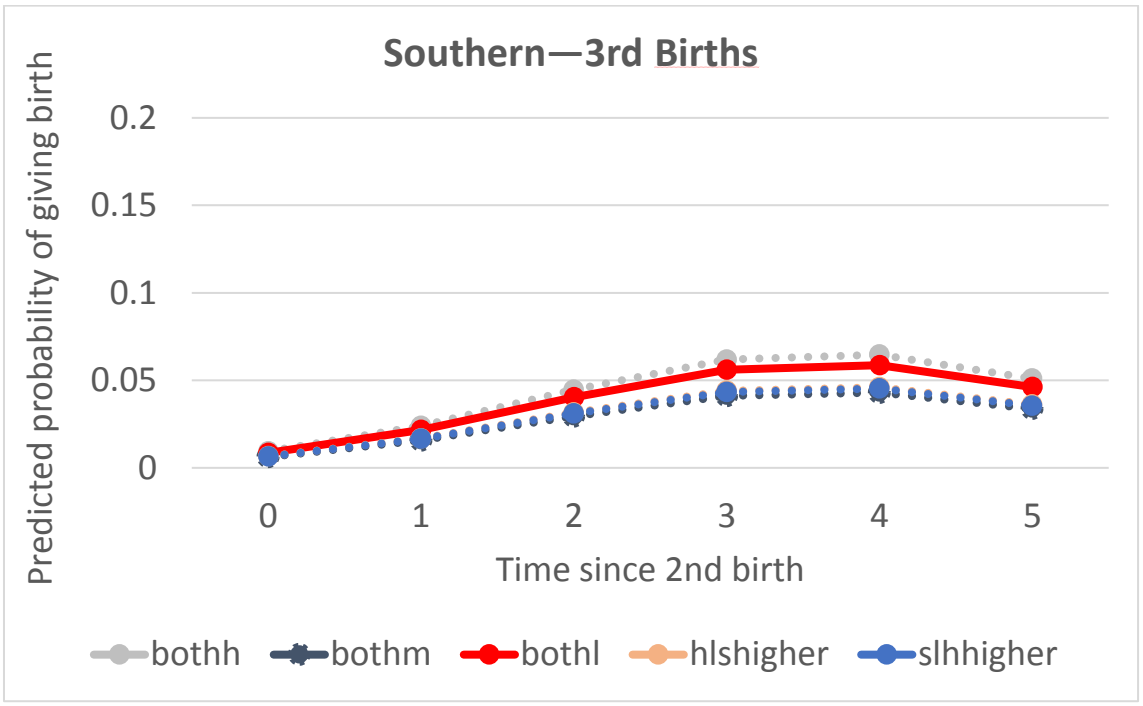

Figure 8