The influence of family structure and family socioeconomic status on sexual initiation of first, second, and third generation Mexican-origin adolescents.*

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Tables and Figures are listed at the end of the manuscript.

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BACKGROUND

The rapid growth of the Latino population in the U.S. (Ennis, Rios-Vargas, and Albert 2011), coupled with sexual health disparities (Centers for Disease Control and Prevention, 2010; Hamilton & Ventura, 2012) has prompted a great deal of research into the sexual health of Latino adolescents. In order to design successful interventions to reduce disparities we must stop assuming Latinos are a homogenous group and untangle differences by country of origin and immigrant generation (Afable-Munsuz & Brindis 2006; Dehlendorf, Marchi, Vittinghoff, & Braveman 2010; Driscoll, Biggs, Brindis, & Yankah 2001). Despite growth in the literature, we still have little understanding of how and why sexual health behaviors differ across immigrant generation in Mexican-origin adolescents, the largest Latino group in the U.S. (Ennis et al. 2011). Therefore, I will examine how family structure and family socioeconomic status (SES) help explain differences in age at sexual initiation among first, second, and third generation Mexican-origin adolescents.

Segmented assimilation theory was developed by Portes and Zhou to understand why some immigrant groups are "upwardly mobile" and improve their economic position in the U.S. and why some are "downwardly mobile" and become more impoverished. Future mobility of adolescents is based on: (1) human or parental capital/ family socioeconomic status; (2) family structure; and (3) modes of incorporation (government policy, societal reception, and the strength of the co-ethnic community), as well as cultural norms the family encourages, such as respecting elders (Portes & Zhou 1993). This theory has been used to study adolescent behaviors, such as substance use and delinquency (Eitle, Wahl, & Aranda 2009; Nagasawa, Qian, & Wong 2001; Portes, Fernández-Kelly, & Haller 2005), but has not yet been used to study sexual initiation. Although research shows that first generation Latino adolescents have a later age at sexual

initiation than subsequent generations (Guarini, Marks, Patton, & Coll 2011; Jimenez, Potts, & Jimenez 2002; McDonald, Manlove, & Ikramullah 2009; Minnis 2001), reasons behind this finding remain poorly understood. Adapting segmented assimilation theory to study multiple immigrant generations can assist in the exploration of factors related to sexual initiation.

Family is a key element in segmented assimilation theory. Family structure has been operationalized as the parental situation in the home; two biological parents versus another type of structure. Living with two biological parents is associated with upward mobility in the second generation, improving educational and vocational outcomes and decreasing risk for adolescent childbearing and incarceration (Portes et al. 2005). Living with two biological parents has been associated with a lower risk for sexual initiation in adolescents in all race/ethnic groups (DuRant, Pendergrast, & Seymore 1990; Merten & Henry 2011; Upchurch, Aneshensel, Mudgal, & McNeely 2001). One reason for a lower risk of sexual initiation in the first and second generation as compared with the third, is because the first and second generation are more likely to live with two biological parents (Clark, Glick, & Bures 2009; Landale, Thomas, & Van Hook 2011), which may provide more parental supervision and improve SES. Segmented assimilation theory does not specifically address grandparents but Perez (1996) argues that the presence of grandparents in the household can buffer harsh effects of poverty and promote upward mobility in immigrant families. Thus, in addition to biological parents, I examine the presence of grandparents, who may improve child supervision and encourage protective cultural norms, such as the importance of virginity often found in Latino families (García 2009; Gilliam, Berlin, Kozloski, Hernandez, & Grundy 2007; Villarruel 1998).

Parental capital is another key element in segmented assimilation theory and has been operationalized as parental SES, i.e. education and occupation. Not surprisingly, low family SES

has been associated with risk for dropping out of high school, incarceration, and adolescent childbearing in the second generation (Portes et al. 2005). Little is known about specific determinants of parental SES, such as education and employment type, and their relationship with sexual initiation. This is important to understand because they may have different influences on sexual initiation than family SES as a combined variable. Higher parental education has been shown to decrease risk for sexual intercourse (Santelli, Lowry, Brener, & Robin 2000), however, Aneshensel (1989) found no relationship between rates of sexual initiation and mother's or father's employment or father's education. An increase in mother's education was associated with an increase in rates of sexual initiation. Although first and second generation immigrants have a lower risk for sexual initiation, they are more likely to have a lower family SES than third generation immigrants, which warrants further exploration of family SES (Lopez & Velasco 2011).

Studying Latinos as a homogenous group assumes that factors such as family structure and SES have the same association with sexual initiation in each country of origin and immigrant generation, despite their diverse backgrounds. I advance prior research by using segmented assimilation theory and discrete time survival analysis to: (1) examine whether the relationship between immigrant generation and age at sexual initiation in Mexican-origin adolescents varies by family structure; and (2) examine whether the relationship between immigrant generation and age at sexual initiation in Mexican-origin adolescents varies by family SES.

METHODS

I use data from all four waves (1994-2008) of The National Longitudinal Study of Adolescent Health (Add Health). This is the largest nationally representative longitudinal study of adolescents focusing on health and consists of both in-home and in-school survey data. The in-

home survey for Wave I, 1994-1995 included 20,745 7-12th graders. Wave II in 1996, followed up with 14,738 of the Wave I participants, in grades 8-12 (those in grade 12 in Wave I were dropped from Wave II but re-entered in Wave III). Wave III, 2001-2003, includes 13,690 participants from Wave I in addition to 1,507 partners. Wave IV 2007-2008, includes 15,701 participants 24-34 years old (Bearman, Jones, & Udry 2004). In order to understand differences between immigrant generations I restrict the sample to Mexican-origin respondents.

Measures. *Dependent variable.* Age at first sex is a continuous variable by single years. The respondent was asked, "In what month [and year] did you have sexual intercourse for the very first time?" in Waves I & II "How old were you the first time you had vaginal intercourse?" in Waves II & IV. I reconcile discrepancies in age at first sex between waves by taking the earliest wave response in the assumption that recall bias increases with each wave and Upchurch et al.'s (2001) analysis of discrepancies between Wave I & II showed the earliest wave and other methods of reconciliation did not affect the association with independent variables. Those who had their first sex prior to Wave I were not excluded because it removes participants with the earliest ages at first sex (Goldberg, Adsera, & Tienda 2013).

Independent variables. Immigrant generation is categorical variable. First generation is those born in Mexico and moved to the U.S. after age six (Glick, Ruf, White, & Goldscheider 2006; Myers, Gao, & Emeka 2009); second generation is those born in Mexico and moved to the U.S. prior to age six and those born in the U.S. to at least one parent who was born in Mexico; and third generation "plus" is those born in the U.S. to U.S. born parents who define themselves as "Mexican." For family structure, living with two adoptive or biological parents is coded as 1 and those living in another type of parental structure as 0. Living with a grandparent or great grandparent is coded as 1 and those with no grandparent as 0. For family SES, mother's and

father's education is measured in continuous years. Mother's and father's employment are categorical variables: unemployed, unskilled, and skilled/professional. Because of the small sample size in the first generation for skilled (n=50) and professional employment (n=25) of mothers, they were combined for all generations. Categories were made based on Sachs et al.'s (1994) definition of unskilled laborers being involved in production.

Covariates. Gender is a dichotomous variable, male is coded as 1, female as 0. Mother's age at first at respondent's birth is in continuous years. Language spoken at home at wave I is dichotomous, English as 1, other as 0. Parental religiosity is a numeric scale, 1 is low religiosity and 4 is high religiosity, based on average attendance at services and how important religion is, similar to a scale used by Landale, Schoen, and Daniels (2009). Finally, because almost 25% of the sample do not live with any father figure, I use a control variable of the presence of a father in the home as 1 and no father figure as 0.

Analysis. After dropping respondents without a sample weight, the final sample size is 1,638 Mexican-origin participants. I also adjust for sample weights and the complex sampling design of Add Health. The proportional hazard for age at sexual initiation was analyzed using complementary log-log transformation in a person-year dataset. The models are not stratified by gender because interactions between generation and gender were not significant (not shown).

Preliminary Results

Table 1 shows the means and percentages of variables included in the analysis. The second generation makes up almost half of the sample at 47.47%, followed by third generation at 39.14% and first generation at 13.39%. Means in the person-year data set show an average age at sexual initiation among males and females as 18.5, although it differs by generation with the earliest age in the third generation, followed by the second, and then the first generation. Over

half (59%) of the sample lives with two biological parents while average education for both parents is almost 11 years and on average mother and father have an unskilled occupation.

Table 2 shows the hazard probabilities for initiation of first sex and family structure. Each model includes the baseline model and the variables being tested. Model 1 is the baseline model and includes age and age squared, immigrant generation, and adjusts for gender. The model shows that the first generation has the lowest hazard probability for sexual initiation ($p=0.001$), followed by the second ($p=0.042$), and then third generation. Males have a higher hazard probability for sexual initiation than females ($p=0.021$). Model 2a includes two biological parents and 2b includes an interaction between two biological parents and immigrant generation. Having two biological parents decreases the hazard probability for sexual initiation and accounts for some of the difference in the hazard probability for sexual initiation between the second and third generation because the coefficient for the second generation loses statistical significance ($p=0.284$). The interaction of two biological parents by immigrant generation is not significant.

Model 3a includes the presence of a grandparent in the home which decreases the hazard probability of sexual initiation ($p<0.1$), while model 3b includes an interaction between living with a grandparent and immigrant generation that did not achieve significance. Model 4a adds English spoken at home which is not significant alone but accounts for some of the difference in the hazard probability of sexual initiation between the second and third generation because the coefficient for the second generation becomes non-significant after entering language in the model ($p=0.17$). Model 4b adds religiosity and similar to English spoken at home, it is not significant alone but accounts for some of the difference in the hazard probability of sexual initiation between the second and third generation ($p=0.78$). Model 4c adds mother's age at the respondent's birth. A later age at respondent's birth is associated with a decrease in the hazard

probability of sexual initiation (p=0.004). Mother's age at respondent's birth also accounts for some of the difference in the hazard probability of sexual initiation between the second and third generation (p=0.67).

Table 3 shows the hazard probabilities for initiation of first sex and family SES; each model with the variable being tested the baseline model from Table 2. Model 5a includes mother's education and 5b includes an interaction between mother's education and immigrant generation. Although mother's education is not significant, it accounts for some difference in the hazard probability for sexual initiation because the coefficient second generation is no longer significant (p=0.2). The interaction shows that an increase in years of mother's education increases the hazard probability for sexual initiation in the first generation as compared to the third generation when education is zero. Model 6a includes father's education and 6b includes an interaction between father's education and immigrant generation; both models adjust for a resident father present. Father's education alone is not significant although it also accounts for some difference in the hazard probability for sexual initiation because the coefficient second generation is no longer significant (p=.297). The interaction shows that as years of father's education increases, the hazard for sexual initiation increases for the second generation compared to the third generation when education is zero (p=0.06). Difference between the first and third generation was not significant.

Model 7a includes types of mother's employment which are not significant but account for some of the difference in the hazard probability between the second and third generation. Model 7b includes the interaction between mother's employment and immigrant generation and shows that the hazard probability for sexual initiation in first generation immigrants compared to third generation immigrants is lowest among participants with unemployed mothers, followed by

unskilled mothers, and skilled/professional mothers. Mother's employment is not significant for the second generation. Model 8 includes type of father's employment which again, is not significant but accounts for some of the difference in the hazard probability between the second and third generation. The interaction between father's employment and immigrant generation is not shown because it is not significant and complicates the table.

Models that included a statistically significant interaction were graphed to show trends. Figure 1 shows that for first generation immigrants, an increase in mother's education increases the hazard probability of sexual initiation. In second and third generation immigrants, mother's education decreases the hazard of sexual initiation. Figure 2 shows that in the first and second generation, as father's education increases, the hazard of sexual initiation increases, while in the third generation, the hazard decreases. Figure 3 shows that in the first generation having a mother who is unemployed decreases the hazard probability of sexual initiation ($p<0.55$), followed by unskilled mothers ($p=3.40$) and finally skilled/professional mothers.

Discussion

Early sexual initiation has been associated with a higher risk for adolescent pregnancy and an increase in sexually transmitted infections (STIs) (Moore et. al 1995; Santelli & Beilenson 1992) and Latino adolescents have a higher risk for adolescent pregnancy and STIs than non-Latino whites. In order to reduce disparities in the largest Latino group, Mexican-origin Latinos, we must understand drivers of disparities. In this analysis, I have attempted to disentangle family structure and family SES characteristics that segmented assimilation theory has associated with risk for "downward mobility," by specifically examining hazard probabilities for sexual initiation among first, second, and third generation Mexican-origin immigrants.

I support previous research showing first generation immigrants have the lowest risk for sexual initiation (at least $p<0.5$ in all models), followed by second and finally third generation immigrants (at least $p<0.1$ in four models) (Guarini et al. 2011; Jimenez et al. 2002; McDonald et al. 2009), and that males have a higher risk for sexual initiation (Guarini et al. 2011; McDonald et al. 2009; Santelli, Lindberg, Abma, McNeely, & Resnick, 2000). Additionally, this analysis both supports and extends segmented assimilation theory. Consistent with previous research and segmented assimilation theory, living with two biological parents decreased the hazard of sexual initiation in all generations ($p=.001$) and accounted for some difference between second and third generations. However, no study to my knowledge has explored the role of grandparents in the home. Having a grandparent in the home was associated with the difference in hazard of sexual initiation between second and third generation, but was also associated with a lower hazard of sexual initiation in all generations ($p=.064$). Family structure that includes both parents, to provide supervision or economic stability, along with grandparents who may also aid in supervision or encourage protective cultural norms, is associated with a reduced hazard probability for sexual initiation.

This analysis extends segmented assimilation theory by allowing for differences between specific components of family SES as well as multiple immigrant generations, not just the second generation. While most studies use either mother's education or a composite variable to represent family SES, I found that mother's and father's education independently influenced the hazard of sexual initiation by generation (Figure 1 and Figure 2). Contrary to previous research finding parental education decreases risk for sexual initiation (Santelli, Lowry, et al. 2000), and partially consistent with Aneshensel (1989), I found that mother's education increases the hazard probability of first sex in first generation immigrants, while decreasing the hazard probability in

both second and third generation immigrants. Similarly, father's education increased the hazard for sexual initiation in both first and second generation. This could be because less educated parents in Mexico may encourage more traditional cultural norms such as the importance of virginity and less educated parents in the U.S. may not provide expectations or education on risks of sex.

Further extending segmented assimilation, I found that mother's unemployment decreased the hazard of sexual initiation in the first generation as compared to unskilled and skilled/professional mothers (Figure 3). Unemployment usually means less income in the family, which has been associated with risky sexual behavior (Dehlendorf et al. 2010; Driscoll et al. 2001; Portes et al. 2005). This finding could related to parental supervision in first generation families; if the mother is not working, she is in the home supervising the children.

Finally, religion, speaking English at home, and mother's age at respondent's birth accounted for some of the difference between hazard of sexual initiation between second and third generation, but not the first generation. The relationship between sexual initiation and language at spoken at home has been inconsistent. In contrast to Guilamo-Ramos et al. (2005), who found English at home increased risk for sexual initiation in Latinos who were born in the U.S. or lived most of their lives in the U.S., English at home accounted for some of the protection against initiation of sex in the second generation. There has also been conflicting evidence regarding religion and this analysis has shown that religiosity is somewhat protective against sexual initiation for the second generation only.

Conclusion

In this analysis, I have both supported and extended segmented assimilation theory by unraveling differences in the relationship between sexual initiation and family structure and

family SES across three immigrant generations. Both family structure and SES account for some difference in hazard of sexual initiation between second and third generation and most importantly, both mother's and father's education and mother's employment type influence hazard of sexual initiation very differently by immigrant generation. This means that adolescents of different immigrant generation are in fact different and thus require more attention in the literature, and also require different interventions to promote sexual health outcomes and reduce disparities. My future work will include the use of multiple imputation for missing data, and adding more covariates to the model including parental supervision, parental and respondent expectations of sex and educational attainment to help explain the current findings.

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Appendix: Tables and Figures

Table 1: Means and percentages of variables, Add Health 1994-2008	
Generation, %	
First	13.39
Second	47.47
Third	39.14
Age at first sex	18.5
Age at first sex by generation	
First	19.43
Second	18.46
Third	18.36
Male, %	47.62
Living with two biological parents, %	59.17%
Living with a grandparent, %	7.17%
Mother's education (years)	10.74
Mother's employment type	Unskilled
Father's education (years)	10.82
Father's employment type	Unskilled
Lives with a resident father, %	75.51
English spoke at home	51.33
Religion (scale 4= very religious)	3.35
Mother's age at respondent's birth	24.87

Table 2: Transformed hazard probablity for first sex for family structure and covariates								
	Model 1	Model 2a	Model 2b	Model 3a	Model 3b	Model 4a	Model 4b	Model 4c
Age	1.59***	1.62***	1.62***	1.60***	1.60***	1.59***	1.60***	1.56***
Age squared	-0.04**	-0.04***	-0.04***	-0.04***	-0.04***	-0.04**	-0.04***	-0.04***
Generation								
First	-0.51**	-0.48**	-0.55*	-0.53**	-0.53**	-0.53**	-0.53**	-0.43*
Second	-0.2*	-0.1	-0.11	-0.20*	-0.18~	0.21	-0.09	0.03
Male=1	0.22*	0.2*	0.2*	0.21*	0.21*	0.22*	0.22*	0.2
Two bio parents=1		-0.39**	-0.42*					
Two bio parents by								
First generation			0.14					
Second generation			0.03					
Grandparent=1				-0.38~	-0.29			
Grandparent by								
First generation					0.72			
Second generation					-0.35			
English at home=1						-0.02		
Relgious, high=4 low=1							-0.05	
Mother's age at respondent's birth								-.02**
_cons	-16.02***	-16.25***	-16.24***	-16.23***	-16.22***	-16.00***	-16.00***	-15.30***
Notes: ***p<0.001; **p<0.01; *p<0.05; ~p<0.10								

Table 3: Transformed hazard probability for first sex and family SES							
	Model 5a	Model 5b	Model 6a	Model 6b	Model 7a	Model 7b	Model 8
Age	1.56***	1.56***	1.59***	1.60***	1.58***	1.58***	1.64***
Age squared	-0.04***	-0.04***	-0.04***	-0.04***	-0.04***	-0.04***	-0.04***
Generation							
First	-0.46**	-1.47**	-1.46*	-1.16*	-0.49*	0.85***	-0.49**
Second	-0.13	-0.32	-0.11	-0.92*	-0.17	0.016	-0.13
Male=1	0.2~	0.2*	0.19*	0.18*	0.21*	0.21*	0.22*
Mother's education	0.00	-0.02					
Mother's education by							
First generation		0.11**					
Second generation		0.01					
Father's education			0.00	-0.04			
Lives with a father=1			-0.20	-0.14			
Father's education by							
First generation				0.06			
Second generation				0.07~			
Mother unemployed					-0.20	-0.9	
Mother unskilled					-0.09	0	
Mother skilled					-0.22	-0.24	
Generation by mother's employment							
First Gen Unemployed						-1.62***	
First Gen Unskilled						-1.18**	
First Gen Skilled						-0.78*	
Second Gen Unemployed						-0.24	
Second Gen Unskilled						-0.31	
Second Gen Skilled						-0.02	
Father unemployed							0.03
Father unskilled							0.10
Father skilled							0.03
_cons	-15.99***	-15.64***	-16.08***	-15.68***	-15.93***	-16***	-16.6***
Notes: ***p<0.001; **p<0.01; *p<0.05; ~p<0.10							

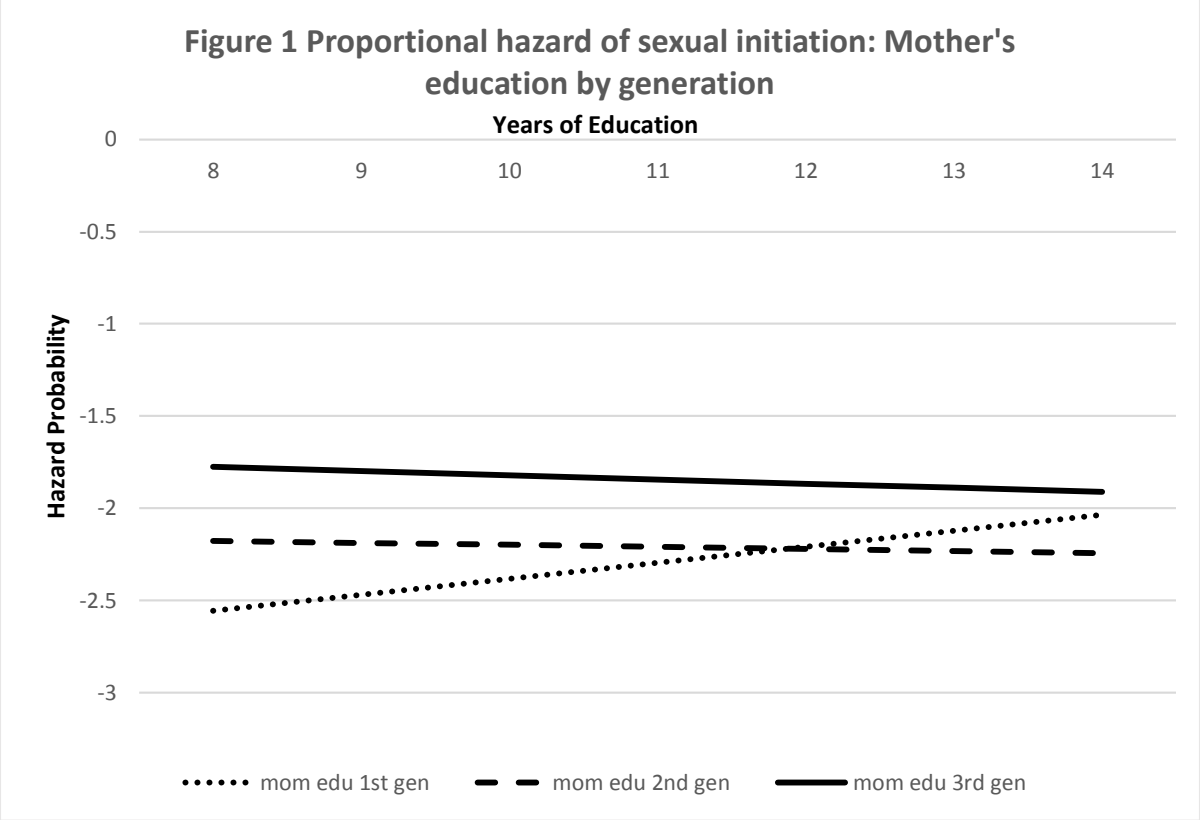
Figure 1 Proportional hazard of sexual initiation: Mother's education by generation
Years of Education
0
8
9
10
11
12
13
14
-0.5
-1
-1.5
-2
-2.5
-3
Hazard Probability
mom edu 1st gen
mom edu 2nd gen
mom edu 3rd gen

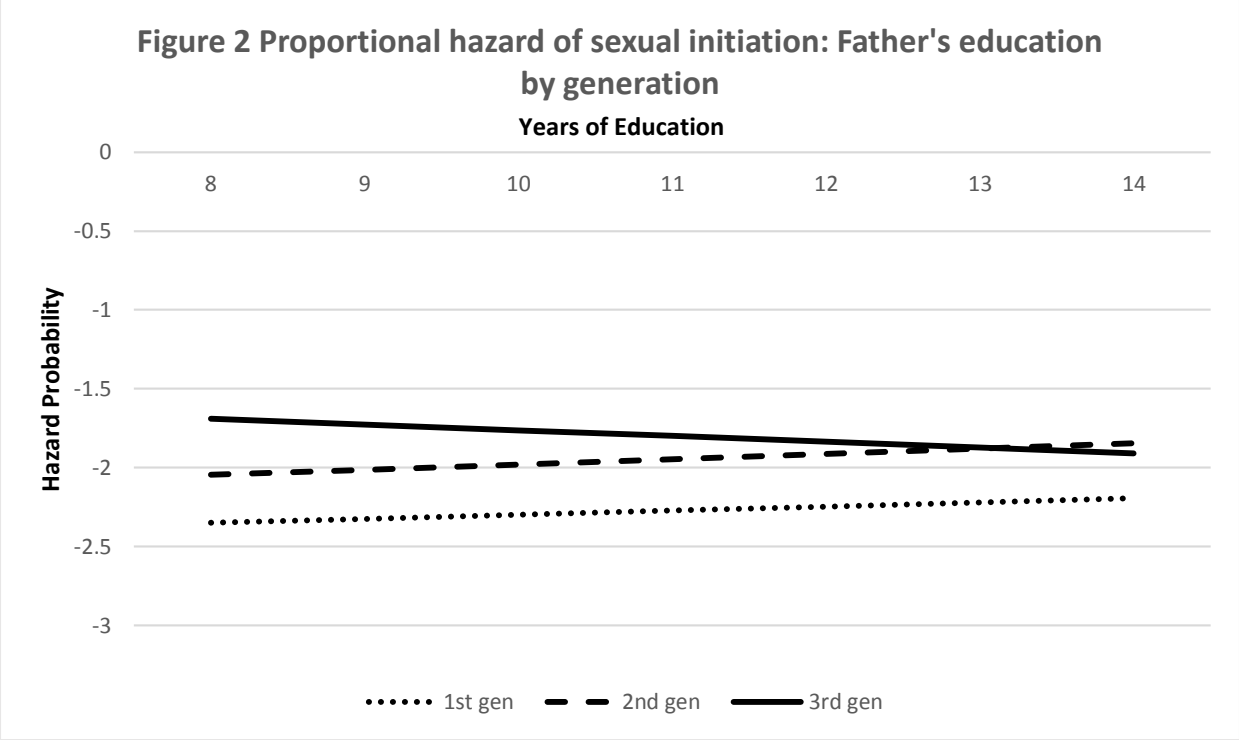
Figure 2 Proportional hazard of sexual initiation: Father's education by generation
Years of Education
0
8
9
10
11
12
13
14
-0.5
-1
-1.5
-2
-2.5
-3
Hazard Probability
1st gen
2nd gen
3rd gen

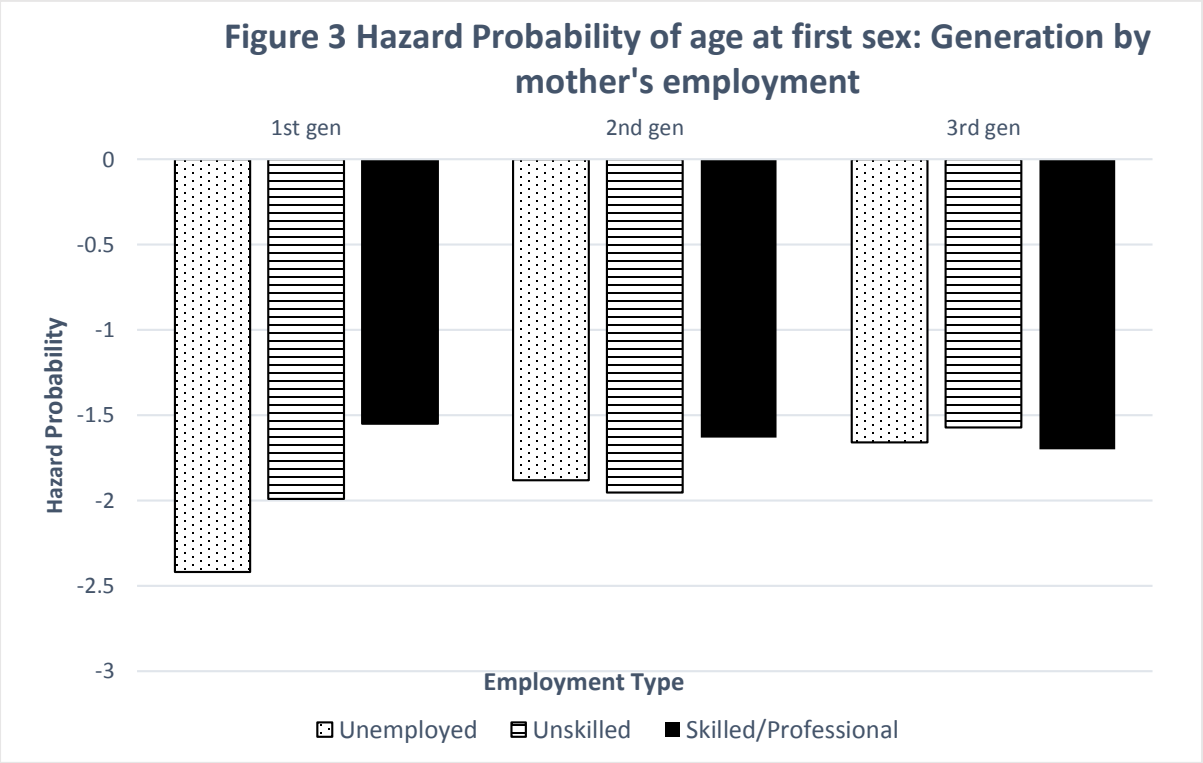
Figure 3 Hazard Probability of age at first sex: Generation by mother's employment
1st gen
2nd gen
3rd gen
0
-0.5
-1
-1.5
-2
-2.5
-3
Hazard Probability
Employment Type
Unemployed
Unskilled
Skilled/Professional