First sexual intercourse and risk behaviours: a multi-process analysis

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Abstract

Adolescence and youth are periods of great changes in an individual's life, during which experiencing first events of the transition to adulthood and, sometime, violating social norms. Early timing of first sexual intercourse may affect some negative outcomes, which could be assimilated to other adolescent's risk behaviours. Literature has already analysed the effect of problem behaviours on timing of sexual intercourse, showing a positive association between them, whereas less common are the analyses that look at the inverse relationship.

This study focuses on the relation between initiation of intercourse and initiation of four risk behaviours (marijuana use, other drug use, risky driving, problem drinking). Using multi-process event history analysis on data on Italian university students collected in 2000-2001 and in 2017, we intend to verify to what extent the initiation into risk behaviours anticipates first intercourse, and if and how initiation into sexuality influences the initiation of other risk behaviours.

Keywords: Sexual intercourse; risky behaviour; multi-process survival models; Italy

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Introduction

Adolescence and youth are a period of great changes in the course of an individual's life. Girls and boys are subject to biological, psychological, and social developments. They start their quest for autonomy from authorities of parents, family, and school to be aware of themselves, to discover and try to find their place in the world (Steinberg and Sheffield Morris, 2001). This is then the time of experiencing first events of the transition to adulthood but also, sometime, to violate social norms with risk behaviours (Jessor, 1984).

First sexual intercourse is one of the events of transition to adulthood. With the disconnection of sexuality from the formation of a stable union (marriage) occurred during the last century, it represents one of the first events of this process not only for men – as occurred in the past - but also for women. However, when it comes early in the teen-ages, it could be seen as a problem behaviour. The timing of first sexual intercourse is indeed a key variable for the wellbeing of the individual's present and future life. Early initiation at sexuality, for example, may increase the risk of unintended pregnancies because adolescents are less likely to practice effective contraception (Hayes, 1987); moreover, sexually active adolescents have a higher risk of contracting sexually transmitted diseases (Sonnenstein et al, 1989). In this perspective, the timing of first sexual intercourse is a key variable affecting some negative outcomes, which could be assimilated to other adolescent's risk behaviours like marijuana use, risky driving, problem drinking, or tobacco use. Literature has already analysed the effect of problem behaviours on timing of sexual intercourse (Crockett et al., 1996), showing a positive association between them. Less common – as far as we know, empirical studies do not concentrate on it – are the analyses that look at the inverse relationship.

This study focuses on the relationship between (early) initiation of sexual intercourse and initiation of four risk behaviours (problem drinking, marijuana use, other drug use, risky driving), assuming that – net of other factors - they could be interrelated and feed each other. We aim to answer to the following questions: "Which is the effect of risk behaviours on the timing of first sexual intercourse?"; "Among the four risk behaviours, which is the one that has the strongest impact on first sexual intercourse?"; To what extent initiation at sexuality does influence the initiation of the four risk behaviours?". In doing so, we control and analyse the role played by other individual and contextual factors suggested by the literature. To this end we will use multi-process event history models and analyse data on Italian university students coming from two representative surveys conducted in 2000-2001 and in 2017.

Data and Methods

This study is based on SELFY, a survey driven by a group of researchers from the Universities of Padua, Florence and Messina (Italy). The survey, carried out in the first half of 2017 with the aim to draw an updated picture of sexual and emotional attitudes and behaviours among Italian university students, reiterates an almost identical survey carried out in 2000-2001. In 2000-2001 about 5,000 students were interviewed, and in 2017 about 8,000; all students were attending the first and second year of undergraduate courses in Economics and Statistics in Italian public universities. The surveys collect information on the family of origin, friendship, school attendance, sexual behaviour and sexual biographies, at risk behaviours. The sample is formed by the union of the two samples of university

students who participated to either the surveys conducted in 2010-2011 or that conducted in 2017. More specifically, 6,085 men[1] aged 17-26 and 6,518 women aged 17-26.
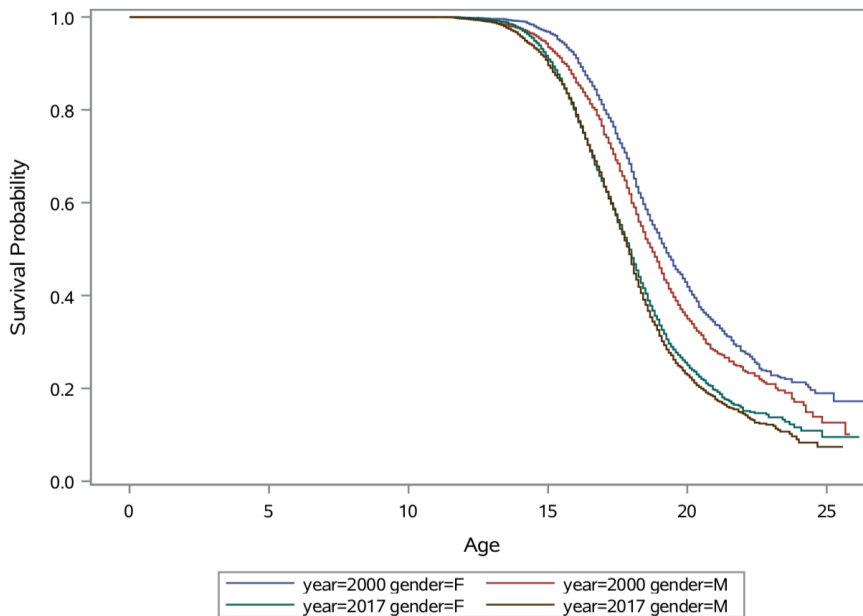
Early initiation of intercourse and initiation of the four considered risk behaviours may be simultaneously influenced by some common determinants (i.e. parents' role), and may also influence each other directly. To gain insight into these issues, the empirical analysis is based on simultaneous hazard modelling, separately for young men and young women in order to better grasp their possible differences (Lillard & Waite, 1993). Our multi-process hazard model consists of two single-process hazard models estimated jointly, and each process is represented by a continuous hazard equation. More explicitly, one equation represents the transition to individual's first intercourse, and the process time is the time elapsed since 11 years old until his/her sexual intercourse, or the time of the interview; whichever occurred first. The other equation represents the transition to four risk behaviours (problem drinking, marijuana use, other drug use, risky driving), and the process time is the time elapsed since 11 years old until the occurrence of a risky behaviour (multiple-spell approach), or the time of the interview; whichever occurred first.

In the first equation, our main explanatory variables are four binary indicators of four at risk behaviours, namely problem drinking, marijuana use, other drug use, and risky driving. We concentrate only on *the first time* that those events happened. Overall, this effect might be biased due to a possible selection of individuals with early sexual intercourse into the pool of those who live at risk behaviours according to unobserved individual-specific characteristics, such as his/her risk-aversion. In order to account for this selection effect, we will estimate the two equations jointly (see Lillard, Brien, & Waite, 1995; Lillard & Panis, 1996).

Preliminary results

Figure 1 shows Kaplan Meyer survival curves for the transition to first intercourse, by survey year and gender. In 2000-2001, the transition to first sexual intercourse is slower for both young men and women in comparison with the year 2017; analogously, in both years young men are more precocious than women, but, interestingly, in 2017 the behaviours of the two genders are much more similar than it was in 2000-2001. When young people are 25 years old, nearly 20% of young women did not have their first intercourse in 2000-2001, whereas this percentage is nearly half and around 10% for young men in 2000-2001 and young women in 2017, with a slightly lower percentage for young men in 2017.

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[1] A male university student was excluded from the sample because he had his first sexual intercourse before 11 years old.
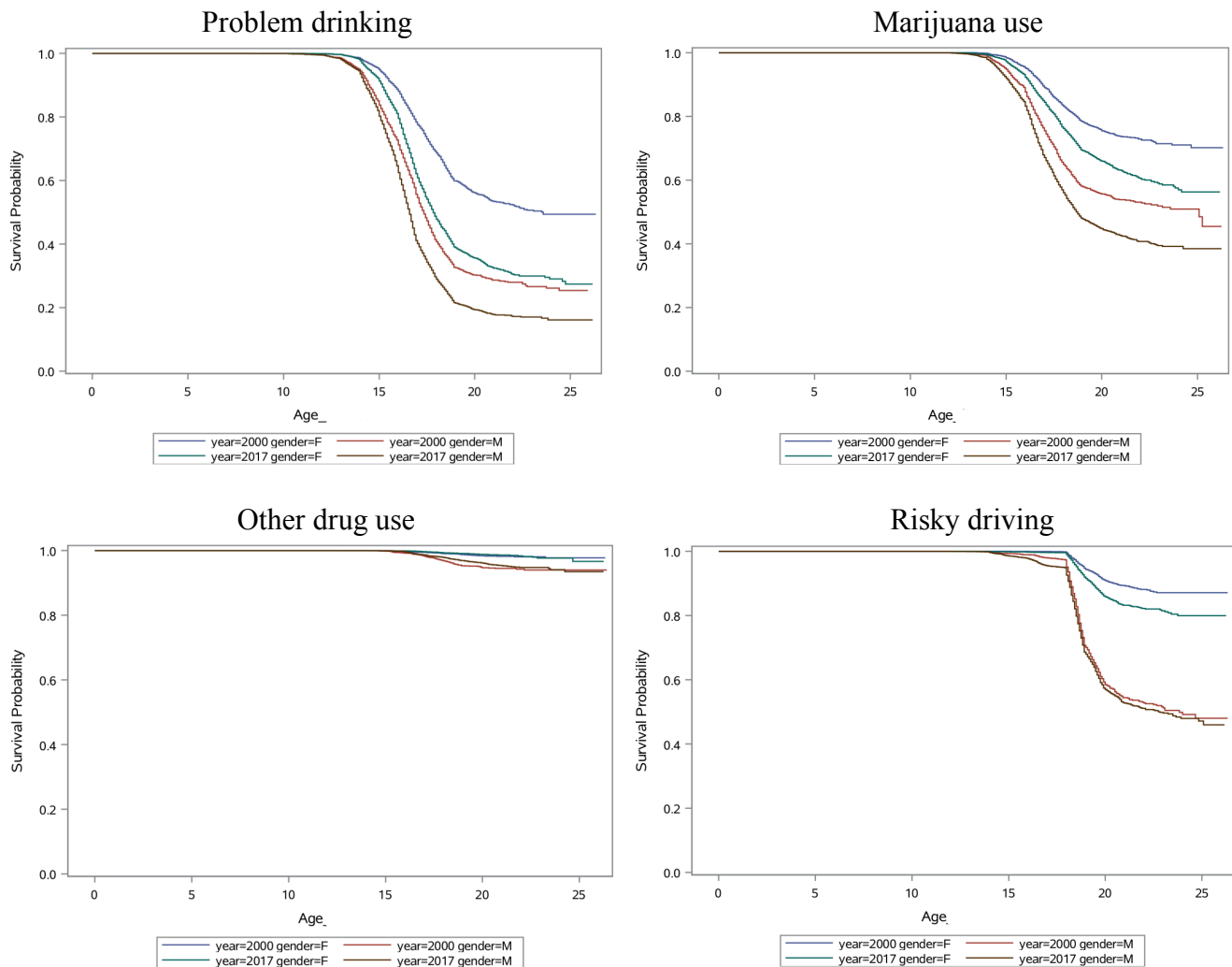
Figure 1: Kaplan Meyer survival curve for the transition to first sexual intercourse. 2000-2001 and 2017. Men and Women.

Data: own elaboration on SELFY data.

Figure 2 shows Kaplan Meyer survival curves for the initiation to four at risk behaviours, by survey year and gender. Two common aspects to the transition to all risk behaviours are: first, young women had always a lower risk than men in the two survey years; second, youth's behaviour always shows a higher risk for the youth interviewed in 2017 than for that interviewed in 2000-2001. According to problem drinking and marijuana use, it is worth mentioning that the four survival rates obtained combining gender and survey year are very different at the end of the observation period: while around 50% (70%) of young women aged 25 who did never get drunk (smoked marijuana) in 2000-2001 on one hand, less than 20% (40%) of young men aged 25 who did never get drunk (used marijuana) in 2017 on the other hand. Instead, initiation to other drug use is characterised by very low risks irrespective gender and survey year. Finally, while survival curves of risky driving are very similar for young men in the two survey years, young women have a higher risk of driving fast in 2017.

Figure 2: Kaplan Meyer survival curve for the transition to first-time problem drinking, marijuana use, other drug use, risky driving. 2000-2001 and 2017. Men and Women.

Data: own elaboration on SELFY data.

Table 1 shows some preliminary results from semiparametric event history models, analysing the impact of four risk behaviours on the timing of first sexual intercourse. Models 1 show – for males and females, separately - the effect of experiencing risk behaviours (time-varying covariates), just controlling for the year of the interview; models 2 show the same effects controlling with additional background covariates (parents' education, parental union biography, mother's work during early adolescence, place of birth), as well as some respondent's individual characteristics (attending religious services in early adolescence; type of secondary school; having had a romantic relationship).

Table 1: Relative risks of transition to first sexual intercourse from semiparametric event history models: the role of problem drinking, marijuana use, other drug use and risky driving. 2000-2001 and 2017. Men and Women

Covariates	Models 1		Models 2[a]	
	Males	Females	Males	Females
Year 2017	1.314***	1.416***	1.367***	1.642***
Problem drinking	1.877***	1.713***	1.329***	1.165***
Marijuana use	1.430***	1.589***	1.172***	1.296***
Other drug use	1.252	1.768***	1.383*	1.765**
Risky driving	1.342***	1.058	1.238***	0.960

Notes: *** <0.001, **<0.01, *<0.05
(a) adjusted models with contextual & individual covariates

This preliminary, exploratory analysis confirms that the risk of experiencing first sexual intercourse has increased for men and women over the last 17 years. Findings, moreover, show that experiencing risk behaviours has a relevant impact on the risk of having a first sexual intercourse, but for some problem behaviours the effect is gender differentiated: relative risk for risky driving is not significant among girls (girls experiencing risky driving are however a low percentage in the two samples); in addition, the use of other (mainly synthetic) drugs has a lower impact on the male behaviour, while its initiation is highly correlated with females' first sexual intercourse. Interestingly, controlling for other covariates that literature suggests to be associate with sexual intercourse and risk behaviours does not heavily modify the effect of key covariates on the timing of sexual debut.

Finally, in Table 2 we present some preliminary results from semiparametric event history models, analysing the impact of first sexual intercourse on the timing of four risk behaviours, estimated through four separate models. Analogously to Table 1, models 1 show the effect of first sexual intercourse on each risk behaviour for males and females separately, controlling for the year of the interview, if the respondent has lived his/her first petting experience, if the respondent has lived his/her first couple relationship, and the other remaining three risk behaviours (all time-varying covariates). Models 2 show the same effects controlling for additional background covariates (parents' education, parental union biography, mother's work during early adolescence, place of birth) as well as some respondent's individual characteristics (attending religious services in early adolescence; type of secondary school).

Table 2: Relative risks of transition to first-time problem drinking, marijuana use, other drug use and risky driving from semiparametric event history models: the role of first sexual intercourse, petting experience and couple relationship. 2000-2001 and 2017. Men and Women

a) Transition to problem drinking

Covariates	Models 1[(a)]		Models 2[(b)]	
	Males	Females	Males	Females
Year 2017	1.368***	1.831***	1.330***	1.801***
Sexual intercourse	1.093*	1.181***	1.096*	1.157***
Petting	1.817***	1.772***	1.811***	1.744***
Couple relationship	1.072*	1.315***	1.061	1.308***

b) Transition to marijuana use

Covariates	Models 1[(a)]		Models 2[(b)]	
	Males	Females	Males	Females
Year 2017	1.219***	1.112*	1.127**	0.994
Sexual intercourse	1.127**	1.290***	1.112*	1.255***
Petting	1.648***	1.900***	1.633***	1.859***
Couple relationship	1.092*	1.128*	1.085*	1.133**

c) Transition to other drug use

Covariates	Models 1[(a)]		Models 2[(b)]	
	Males	Females	Males	Females
Year 2017	0.567***	0.533**	0.548***	0.613*
Sexual intercourse	2.344***	1.273	2.340***	1.233
Petting	1.156	1.345	1.104	1.291
Couple relationship	0.984	0.777	1.018	0.788

d) Transition to risky driving

Covariates	Models 1[(a)]		Models 2[(b)]	
	Males	Females	Males	Females
Year 2017	0.964	1.262**	0.956	1.224*
Sexual intercourse	1.261***	1.186*	1.270***	1.179
Petting	1.203**	1.098	1.203**	1.101
Couple relationship	1.128**	1.139	1.113**	1.146

Notes: *** <0.001, **<0.01, *<0.05
(a) adjusted models with other three risk behaviours
(b) adjusted models with other three risk behaviours, background & individual covariates

According to models presented in Table 2, the risk of experiencing risk behaviours has increased for men and women over the last 17 years for problem drinking, whereas it has decreased for other drug use. The risk of experiencing marijuana use (risky driving) has increased for males (females) only passing from 2000-2001 to 2017. At the same time, having a first sexual intercourse has a positive impact on the risk of experiencing all four risk behaviours for males, thus showing a strong interrelationship between initiation of sexual intercourse and initiation of other risk behaviours for the male students' universe. Instead, having a first sexual intercourse increases the risk of experiencing problem drinking and marijuana use for females, whereas it does not seem to affect other drug use and risky driving. Looking at the effect of having a first petting experience or a first couple relationship on risk behaviours, both events increase gender-specific risk for problem drinking and for marijuana use, and risky driving for males only. Generally speaking, the positive effect of having lived a first petting experience on risk behaviours is stronger than having being in a couple relationship. To sum up, at first glance the initiation into risk behaviours seems to anticipate first intercourse, and conversely initiation into sexuality increases the risk of experiencing other risk behaviours.

Next steps of this work will be oriented to: a) better defining the final set of control covariates; b) jointly modelling the transition to first sexual intercourse and to risk behaviours using multi-process models, in order to overcome possible selection bias; c) testing possible interaction effects between key covariates and the time.

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