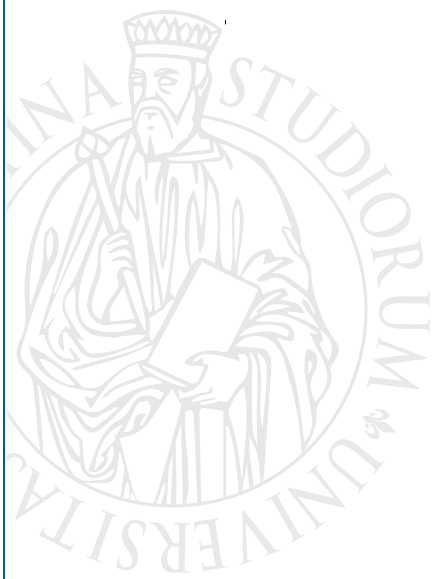
UNIVERSITÀ DEGLI STUDI FIRENZE
DISIA
DIPARTIMENTO DI STATISTICA, INFORMATICA, APPLICAZIONI "GIUSEPPE PARENTI"

Diverse pathways in young Italians' entrance into sexual life: The association with gender and birth cohort

Valentina Tocchioni, Marcantonio Caltabiano, Silvia Meggiolaro



DISIA WORKING PAPER
2021/11

Diverse pathways in young Italians' entrance into sexual life: The association with gender and birth cohort

Valentina Tocchioni[a], *Marcantonio Caltabiano*[b], *Silvia Meggiolaro*[c]

Abstract

BACKGROUND

Sexual development is a complex process, the study of which should consider not only first sexual intercourse, but multiple behavioural trajectories in a comprehensive perspective. Moreover, first romantic relationships and sexual experimentation during adolescence form the building blocks for subsequent more mature relationships and sexual behaviours later in life.

OBJECTIVE

This study focuses on young Italians' first romantic and sexual experiences, with a twofold aim. We seek to both describe the trajectories characterizing the first stages of youth's affective and sexual development and to study the differences among them by gender and birth cohort.

METHODS

Applying sequence analysis and subsequent cluster analysis to a sample taken from two surveys conducted in 2000-2001 and 2017 on Italian university students, we identify young people's affective and sexual development trajectories. This is followed by a multinomial logistic regression analysis to discern the effect of gender and birth cohort on the probability of belonging to a given pathway.

RESULTS

We identify six distinct sexual ideal-types among young men and women, with gender differences that characterize the trajectories of affective and sexual development of most of university students. That said, our results also suggest that differences between the two genders have narrowed over time.

CONTRIBUTION

The findings confirm the importance of considering not only first sexual intercourse and the 'typical' trajectory of affective and sexual development, but also accounting for diverse trajectories so as to accurately capture the complexity of youths' early romantic and sexual lives.

Keywords: First sexual intercourse; romantic relationships; first sexual experiences; sequence analysis; university students; Italy

[a] University of Florence, email: valentina.tocchioni@unifi.it
[b] University of Messina, email: marcantonio.caltabiano@unime.it
[c] University of Padua, email: silvia.meggiolaro@unipd.it

1. Introduction

Romantic relationships and sexual experimentation during adolescence form the building blocks for subsequent more mature relationships and sexual behaviours later in life (De Graaf and Rademakers 2006; Joyner and Campa 2006). As such, a broad definition of romantic and sexual development must necessarily be adopted. Indeed, in addition to the traditional milestone of first sexual intercourse, events of fundamental importance in the process of transition from adolescence to adulthood include first romantic relationships and first non-complete sexual experiences (ranging from kissing to light and heavy petting) (Billari and Ongaro 2004; van de Bongardt et al. 2014; Dalenber et al. 2018; Olmsted 2020).

Recently, two important changes have emerged with regard to young romantic relationships and sexual life. First, adolescents' engagement in these activities has increasingly come to be seen as a normative feature of individual development and the transition to adulthood, as opposed to risky behaviours to be prevented (Collins et al. 2009; Tolman and McClelland 2011). Second, this shift in perspective has been accompanied by a change in empirical research. From an exclusive focus on factors that may prevent youth from experiencing romantic or sexual relationships, many studies now seek to gain a broader understanding of the diverse trajectories wherein adolescents engage in (or abstain from) romantic relationships and sexual behaviours - important factors in the formation of later adult relationships (Boislard et al. 2016, O'Sullivan et al. 2007, Vasilenko et al. 2015).

In this framework, gender continues to be a crucial factor in explaining young people's differing pathways relative to romantic relationships and sexual behaviour (e.g., Wesche et al. 2017). That said, there is evidence among the most recent cohorts that young women's trajectories have begun to converge with those their male counterparts (Bajos et al. 2019).

We seek to move beyond these premises through an exploration of young Italians' first romantic and sexual experiences that aims to both: a) describe the trajectories characterizing these youths' early affective and sexual development and b) discern the differences among these pathways by gender and birth cohort. Our first objective responds to a need to consider youths' affective and sexual development as a complex event, defined not only by first sexual intercourse (as often occurs in the literature) but also other events, such as first romantic relationship and first non-complete sexual experiences. This has become all the more important as, compared to the past when just *one* typical male/female pathway to sexual debut existed, today this process is more complex. As such, analyses of young people's romantic and sexual trajectories must necessarily consider the eventuality of *multiple* pathways. To this end, in a first step, we explore young Italians' emotional and sexual life trajectories through a sequence analysis, identifying different profiles in a subsequent cluster analysis. In a second step, we scrutinize whether and how the propensity of belonging to a specific trajectory

varies by gender and birth cohort, as well as whether this has changed over time by sex. Our setting is particularly well suited to exploring this question. Indeed, while Italy has long been considered an archetype of the double-standard system (where young men's and women's transition to adult sexuality has been markedly opposed), there are signs, if but very recent, of greater resemblance between young men and women (Castiglioni 2004; Dalla Zuanna and Mencarini 2004; Bozon and Kontula 2014; Minello et al. 2020). In line with a double-standard, we might expect more precocious trajectories to involve primarily male youth, whereas the more cautious and traditional ones would be prevalently female. We endeavour to verify whether this association between gender and the pathways to adult sexuality has indeed seen any change in recent years in Italy, reflected in a progressive convergence in the trajectories of young men and women.

The paper is organized as follows. Section 2.1 describes the complex process of sexual development, and confirms the necessity of considering not only first sexual intercourse, but multiple life-course events in order to better understand youths' sexual lives. Section 2.2. turns to the transition to adult sexuality by gender, an important factor in this process, particularly in a context such as Italy. Section 3 presents our research questions followed, in Section 4, by a discussion of the data used: a sample obtained from two surveys conducted in Italy in 2000-2001 (SIS – Sexuality of Italian Students) and 2017 (SELFY – Sexual and Emotional LiFe of Youth). Section 5 presents the analytical strategy, the results of which are reported in Section 6. We first show the outcomes of the sequence analysis and subsequent cluster analysis (6.1), and then those of the multinomial logistic regression exploring the effect of gender and birth cohort on the probability of belong to a specific trajectory (6.2). Section 6.3 offers several robustness checks. Finally, Section 7 concludes.

2. Background

2.1 The process of sexual development

The focus of many studies on sexual development has been first sexual intercourse. Yet, from a life-course perspective, sexual development is a more complex process that includes other events, such as initial, non-complete sexual experiences (Carpenter 2015). Moreover, both sexual and romantic development should be considered, as they are closely related (Thornton 1990). In fact, romantic relationships constitute the primary context for sexual activity (Furman and Shaffer, 2003). For many adolescents, such relationships precede the beginning of sexual life, then develop into opportunities to engage in first non-complete sexual experiences, and ultimately first sexual intercourse (Thornton 1990). Generally, both romantic and (non-complete or complete) sexual experiences are important components of adolescents' social maturation and can impact behaviour

into early adulthood (Connolly and McIsaas 2009; Lewis, Marston and Wellings 2013; Rauer et al. 2013).

Although the link between romantic relations and sexual initiation may seem evident, most studies continue to focus on sexual debut, where involvement in a romantic relationship is solely a predictor of having ever engaged in sexual intercourse (Van Oss Marín et al. 2006; Manlove et al. 2012). Meanwhile, the initial phases of affective and sexual trajectories are often downplayed (van de Bongardt 2015). This is rather surprising, given the emphasis of the life-course perspective on understanding how different processes are sequenced and interrelated (Elder 1988).

Previous studies embracing a life-course perspective have tended to focus on the United States, often through use of different waves of longitudinal samples. They generally find that the stages of adolescent affective and sexual development are clearly defined and follow a pattern: first sexual intercourse is usually experienced later than a first romantic relationship, and different levels of intimacy are expected depending on the dating stage (Roche and Ramsbey 1993). Broadly speaking, such research has identified a progression from less to more intimate experiences (Haydon et al. 2012, Smith and Udry 1985). This progression can be described as a sexual trajectory, dependent on age, where the steps and timing may differ according to, for example, level of education, ethnicity, or whether the adolescents have behavioural issues, or are sexual minorities (de Graaf et al., 2009, Williams et al. 2008). The timing of the events may also vary: youth who enter into steady relationships earlier are also more likely to be sexually active at younger ages (Thornton 1990, O' Sullivan 2007).

Gender has also been shown to be a relevant factor in various attitudes and behaviours related to sexuality (Reese et al. 2014). Broadly, early sexual initiation continues to be seen as less permissible for females than for males (Crawford and Popp 2003) and, as a consequence, young males are usually both more precocious than females (Regan et al. 2004) and more likely to engage in risky sexual behaviours (Moilanen et al. 2010). Men are also more likely to report having had first sex with a casual partner than are women (Martinez et al. 2011, Minello et al. 2020). Romantic and sexual trajectories may accordingly also differ by gender. For example, Wesche et al. 2017 create latent classes of romantic and sexual behaviours among US college students and report a higher percentage of women in the most conservative sexual behaviour group, whereas the class with disconnected romantic and sexual lives was male-dominated. Similarly, Kahn and Halpern (2018) identify a higher prevalence of US male adolescents among early/atypical initiators of sexual debut.

Finally, as sexual mores have become more tolerant in recent decades, birth cohort likely also matters in the sequence and spacing of events related to sexuality (Caltabiano, Castiglioni and De Rose 2020). In some countries, age at first sexual experience and at intercourse has decreased between

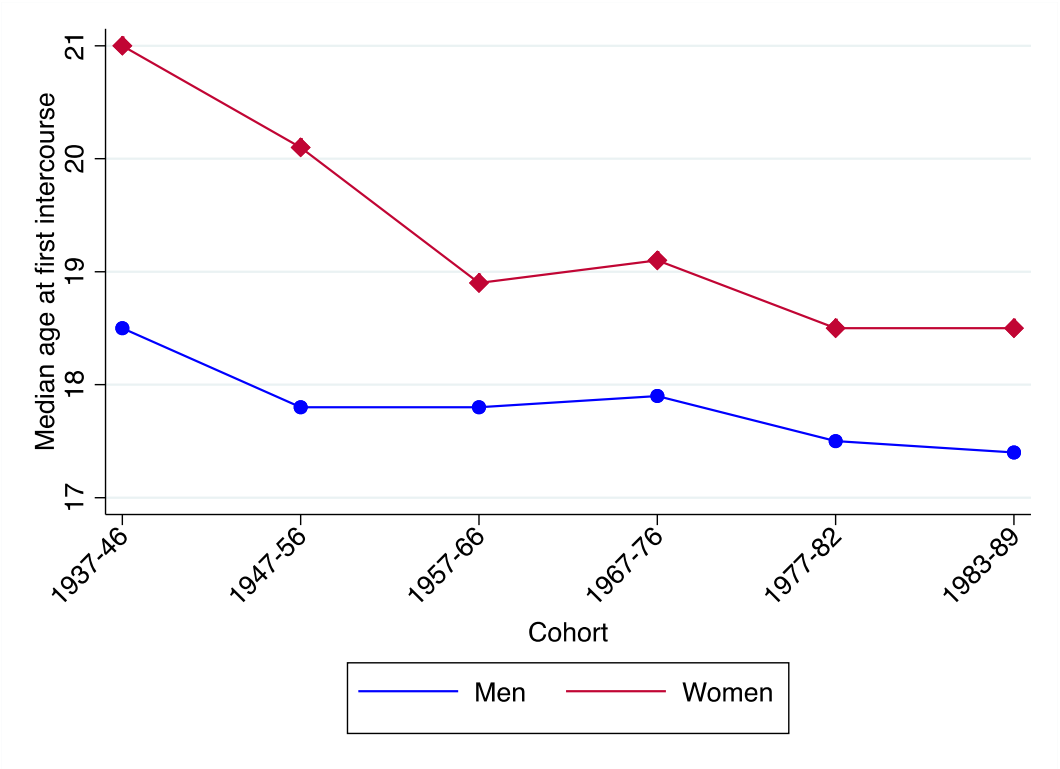
successive birth cohorts over the past decades, such as in the Scandinavian countries and in Britain, with the spacing between these two events consequently narrowing. In other countries, namely the United States and Asian countries, age at first intercourse has instead remained stable or even increased (for Scandinavia, see Hansen et al. 2020; for the UK, see Lewis et al. 2017; for the US, see Ethier et al. 2018; Twenge et al. 2017; for a worldwide review, see Bongaarts et al. 2017, Inchley et al. 2016, 2020). Moreover, birth cohort may interact with gender: in recent cohorts, young women's sexual behaviours have shown dramatic changes, tending to converge with those of young men, as Bajos and her colleagues (2010) find for France.

2.2 The transition to adult sexuality for Italian young men and women

The beginning of affective and sexual life is not 'gender-equal' in many societies, today as in the past (Bozon 2003). In this perspective, Italy offers a particularly interesting context for study. In contrast to Western and Northern Europe's more egalitarian structure, this country has long been characterized by a double-standard system (Bozon and Kontula 2014; Minello et al. 2020; Caltabiano et al. 2020).

In such a system, the transition to adult sexuality is typically very different for men and women. Before the 1970s, first sexual intercourse was a rite of passage from adolescence to adulthood for Italian males, often experienced before having a (later) first romantic relationship. First intercourse typically occurred with an older and more experienced woman, sometimes a prostitute (Barbagli et al. 2010). For women, sexuality was instead closely guarded and romantic relationships rarely permitted by parents (Caltabiano, Dalla Zuanna and Rosina 2006), with the exception of with the future spouse. First intercourse took place upon marriage or with their husband-to-be just before wedding. Finally, in this double-standard context, median age at sexual debut considerably differed between men and women—around 18.5 for the oldest cohorts of males born in 1937-1946, and about 21.0 for their female counterparts (see Figure 1).

Figure 1: Median age at first sexual intercourse by cohort and gender. Italy.



Source: own elaboration on Caltabiano (2013: 45)

When the sexual revolution of the 1960s reached Italy, there occurred a slow convergence in the age at first sexual intercourse between men and women (Caltabiano et al. 2006; Caltabiano 2013; see also Figure 1). The key factor in this shift was a detachment of sexuality from family formation for women, who began experiencing sexual debut before marriage (though usually still within a romantic relationship). Meanwhile, greater numbers of men had first sexual intercourse with a romantic partner (Castiglioni 2004; Caltabiano 2013). Yet, non-traditional situations, where sexual debut for young women was disconnected from a romantic relationship, remained uncommon (Billari and Ongaro 2004; Caltabiano 2007).

Up until the 2000s, first romantic relationship and first sexual experience continued to be quite distanced events for young women, with sexual experiences usually following the first serious relationship. In contrast, many young men still had their first sexual experience before having a stable partner (Billari and Ongaro 2004; Dalla Zuanna and Mencarini 2004). Thus, until very recently, more traditional behaviours continued to be practiced in Italy. This was coupled with a relatively higher median age at first intercourse compared to young people living in Central and Northern European countries (Minello et al. 2020), despite the fact that the spacing between first sexual experiences and full sexual intercourse had started to narrow (Billari and Ongaro 2004).

Finally, the decade of the 2010s saw a new pattern, converging toward the ‘egalitarian regime’, where young Italians’ sexual experiences, and sometimes intercourse as well, increasingly

preceded the first romantic relationship not only for young men, but also for a non-negligible number of young women born in the 1990s, together with a lower age at first sexual experiences (Minello et al. 2020).

3. Research questions

Despite the importance of taking a holistic view of the process of romantic and sexual development, most previous work has focused on just one event, usually first intercourse. What is more, the literature has tended to concentrate on *the* typical pathway to sexual debut for young men and young women. Accordingly, one male and one female trajectory are described as the only feasible paths, whereas those less common / deviant are either considered less relevant or simply ignored. In addition, the double-standard and egalitarian systems have historically been viewed as distinct archetypes. Yet there is reason to believe that a 'typical' trajectory of affective and sexual development is too restrictive. The *destandardization* of the life course, namely the end of a standard path of transition to adulthood - with fixed milestones at identical ages for everyone (Brückner and Mayer 2005; Widmer and Ritschard 2009) - means greater complexity in the pathways to sexual debut. This might be particularly true in a country like Italy, where the double-standard system has been losing ground in favour of an egalitarian system. In other words, the 'typical' pathway to sexual debut for young men and young women could indeed be vanishing, replaced by a greater variety of trajectories. Given these premises, we investigate Italian young people's sexual and romantic life trajectories by gender and birth cohort. In particular, we aim to answer the following research questions.

First, *what different pathways characterize young Italians' sexual life debut?* In exploring this question, we seek to shed light on the process of affective and sexual development, and the potentially different trajectories among Italian youth.

Second, we aim to discern whether and to what extent men are overrepresented in less traditional and more precocious sexual pathways, and conversely, women in those that are more traditional and less precocious. Along with gender differences, we are also interested in any eventual cohort differences - particularly the extent to which some trajectories may be overrepresented among older birth cohorts and others among the younger cohorts, thereby suggesting the emergence of new patterns of behaviour in recent years. We seek to verify whether more precocious sexual life trajectories are associated with the youngest birth cohorts, and more prudent sexual life trajectories with the oldest cohorts. Accordingly, our second research question asks: *Does the propensity to belong to different sexual life trajectories vary by young people's gender and birth cohort?*

Finally, there is growing evidence that the sexual lives of young people are converging between the two genders. We accordingly explore whether and to what extent a higher propensity of belonging to more precocious trajectories for men tends to disappear among the youngest cohorts, or, conversely, whether the higher propensity of belonging to more conservative trajectories for women decreases among the more recent cohorts, thus narrowing the differences between young men and women. Put differently, we endeavour to verify whether and how the link between gender and sexual pathway has changed for the youngest cohorts. Accordingly, our third and final research question asks: *Over time has the association between youth's gender and sexual life debut pathway changed?*

4. Data

The analysis of young Italians' sexual biographies is based on data gathered from two surveys: the SIS (Dalla Zuanna and Crisafulli 2004) and the SELFY (Dalla Zuanna et al. 2019). Conducted in 2017, the SELFY survey replicates the SIS survey, carried out in late 2000, early 2001.[1] Both investigate the sexual and emotional life of youth, namely students attending undergraduate courses in economics and statistics at Italian public universities. Overall, nearly 5,000 students were interviewed in 2000-2001 and around 8,000 students in 2017 (see Dalla Zuanna et al. 2019, for more information on the survey methodology and respondent characteristics).

For this study, we selected 8,243 students aged 20 and over, 3,012 of whom were interviewed in 2000 (42.0% men) and 5,231 (54.4% men) in 2017. In the surveys, first sexual intercourse and the first romantic relationship were investigated by asking students whether they had ever experienced either of these two events, and for those answering in the affirmative, their date (month and year). Participants were also asked about whether and when they had experienced first non-complete sexual experiences (in completed years). We imputed the time of occurrence (month and year)[2] according to the respondent's date of birth (month and year) and age at first non-complete sexual experience, verifying that the first non-complete sexual experience preceded, where applicable, first sexual intercourse.[3]

In our sample, 981 students (11.9%) declared having had a first romantic relationship but did not report the date. For these students, we imputed the age (in number of months since age 11) at which they experienced the first romantic relationship through a truncated regression, separately for

[1] For brevity, we hereon refer to the year of this survey as '2000'.
[2] For each respondent, we randomly imputed the number of months of the corresponding age, and subsequently computed the month and year of first non-complete sexual experience.
[3] We excluded 374 students (4.2% of 8,787 interviewees aged 20 and over) from the sample due to a missing value relative to first non-complete sexual experience or incoherent values with first sexual intercourse. In addition, we did not include another 170 students (1.9%) in the sample because they declared having had experienced first sexual intercourse, but did not report the date.

young men and women. The restricted age range was given by the lower limit (-11 months, corresponding to 10 years and 1 month of age) and upper limit (164 months, corresponding to 24 years and 8 months of age), identified within the sample of respondents to this question. The covariates included in the truncated regression are: student's age class in which s/he had a first sexual non-complete experience (if occurred), student's age class in which s/he had first sexual intercourse (if occurred),[4] if s/he has friends of the same sex or of the opposite sex, smokes, goes to discotheque, practices sport, is satisfied with his/her body (all the variables are fixed to when s/he was age 14-15; except the covariate on friends which was nominal with 6 categories, all others were included as ordinal variables with 3 or 4 categories), type of high school attended, macro area of residence during high school, mother's birth cohort. We included a longer list of covariates in the truncated regression imputation, but for our purposes we exclude those that proved to be not significant.[5]

Table 1 shows the most relevant ages (25th percentile, median and 75th percentile) at which students in the sample had their first romantic relationship, their first non-complete sexual experience and their first sexual intercourse, according to gender and year of interview. Young men tend to be more precocious in their first non-complete sexual experience and first sexual intercourse. Meanwhile, young women's age at first romantic relationship is lower than that of young men (except for at 25th percentile). Compared to 2000, in 2017 young Italians tend to have experienced all three events at relatively younger ages (with a few exceptions). Moreover, the differences between men and women are fewer, especially with regard to first sexual intercourse.

Table 1: Age at 25th percentile, median age and age at 75th percentile at first romantic relationship, at first non-complete sexual experience and at first sexual intercourse by gender and interview date.

	2000	2017	2000	2017	2000	2017
	First romantic relationship		First non-complete sexual experience		First sexual intercourse	
Age 25° percentile						
Males	14.3	13.7	14.1	14.3	17.1	16.4
Females	14.4	13.8	14.8	14.9	17.6	16.4
Median age						
Males	16.5	15.9	15.6	15.8	18.8	18.0
Females	16.1	15.6	16.3	16.2	19.3	18.1
Age 75° percentile						
Males	19.2	18.8	17.3	17.2	N.D.	19.8
Females	18.3	18.1	18.1	17.7	N.D.	20.1

[4] For both covariates concerning the age class in which a student had a first non-complete sexual experience/sexual intercourse, a residual category indicates the non-occurrence of the event before the interview date.
[5] Robustness checks in the results section examine potential bias due to the inclusion of these students.

5. Methods

In order to describe the different sexual life-course trajectories of young people (our first research question), we employed a sequence analysis with an optimal matching (OM) algorithm (Abbott 1995), and subsequent clustering. This allows to consider the affective and sexual development of youth as a complex event, defined not only by the first sexual intercourse but also by the first romantic relationship and the first non-complete sexual experiences. Specifically, we take into account the *sequencing* and *timing* of these three events. Having reconstructed the sequences and identified various clusters, we estimated multinomial logistic regressions to analyse the effect of student's gender and birth cohort on the probability of belonging to a specific trajectory (our second research question). Lastly, in our multinomial logistic models, we included an interaction term between gender and birth cohort to explore whether and how the link between individual's gender and sexual pathway has changed among the youngest cohorts (third research question).

5.1 Sequence Analysis

In order to identify the various sexual life-course profiles of young men and women, we carried out a sequence analysis with an optimal matching (OM) algorithm as a dissimilarity measure and subsequent clustering of sequences. As a first step, we reconstructed the sequences of young men and women aged 20 or more at interview, according to three time-varying variables: whether the student had experienced his/her first romantic relationship; whether s/he had had a first non-complete sexual experience; whether s/he had had first sexual intercourse (complete sexual experience). All statuses are absorbing in that once a person has experienced an event of interest (i.e. s/he had her/his first sexual intercourse), s/he no longer changes status. What is more, as non-complete sexual experience always precedes sexual intercourse, there are six possible states in the sequences (note that we omit the word 'first' for sake of synthesis – i.e. 'no sexual intercourse' reads 'no first sexual intercourse'):

1) No romantic relationship; no non-complete sexual experience; no sexual intercourse.
2) Romantic relationship; no non-complete sexual experience; no sexual intercourse.
3) No romantic relationship; non-complete sexual experience; no sexual intercourse.
4) Romantic relationship; non-complete sexual experience; no sexual intercourse.
5) No romantic relationship; non-complete sexual experience; sexual intercourse.
6) Romantic relationship; non-complete sexual experience; sexual intercourse.

Each sequence covers the adolescent period from age 11 to 20[6] with a monthly observation unit, totalling 108 months of observation.

In a second step, having constructed the sequences, we evaluated the distance matrix among sequences through an OM algorithm, with constant substitution costs (Studer and Ritschard 2016, Raab and Struffolino 2019).

We then clustered similar biographies using Ward's algorithm to create a universe of typical or 'ideal-type' sexual life trajectories, according to the OM distance matrix (Aassve, Billari and Piccarreta 2007). As a cluster quality measure, we followed widely employed measures in sequence analysis such as the average silhouette width, which measures the coherence of the assignment of each sequence to a cluster and thus provides a way to assess the optimal number of clusters, and the point biserial correlation, which measures the 'capacity' of the clustering to reproduce the distances (Studer 2013). In our context, both average silhouette widths and point biserial correlation consistently supported six clusters as the best grouping (e.g. Devillanova, Raitano, and Struffolino 2019; Raab and Struffolino 2019).

As a robustness check, we repeated the cluster analysis using different distance metrics, namely the dynamic Hamming distance, the Hamming distance, and the OM algorithm with transition substitution costs (see Studer and Ritschard 2016 for a detailed description of the different distance metrics). In all cases, average silhouette widths and silhouette plots showed a worse specification of clusters. Sequence analysis and cluster analysis were performed employing the TraMineR (Gabadinho, Ritschard, Muller, and Studer 2011) and WeightedCluster (Studer 2013) packages of the software R (version 4.0.3).

5.2 Multinomial regression

After having identified the various sexual life pathways (first research question), we estimated multinomial logistic regressions to analyse the effect of gender and birth cohort on the probability of belonging to a specific trajectory through a stepwise procedure (see Table A1 in the Appendix for model results).

Recall that our second research question asks whether the propensity of belonging to different sexual life trajectories varies by young people's gender and birth cohort. In an effort to respond to this query, we modelled the probability of being associated with a specific trajectory, where we include as key covariates student's gender and student's birth cohort. We divide the latter into four groups – two for the SIS data and two for the SELFY data – in such a way as to reduce as much as

[6] The sequences stop just before students are 20, namely when they are 19 years, 11 months of age.

possible any unbalance of their numerosity in each group.[7] As a result, the four groups consist of students born in the following calendar years: 1975-1979 and 1980-1981, both groups formed by university students interviewed in 2000-2001; 1991-1995 and 1996-1997, both groups formed by university students interviewed in 2017.

Our third research question asks whether the association between gender and young people's sexual life pathways has changed over time. Namely, whether female students in the youngest cohorts are associated with more precocious sexual life trajectories than their older counterparts or, similarly, whether the propensity of being associated with more precocious trajectories for men tends to disappear among the youngest cohorts. To answer this question, we included an interaction term between student's gender and student's birth cohort in the multinomial logistic regression.

Our model on the probability of belonging to a specific cluster also includes several control variables (added through a stepwise procedure), identified in the literature as playing a role in young people's sexual lives (see, for example, Forste and Haas 2002, Zimmer-Gembeck et al. 2004, Coppola 2007, Boislard and Poulin 2011, Parkes et al. 2011, White and Warner 2015). So as to avoid issues of reverse causation, these all precede or are concomitant with the beginning of students' sexual sequences. In a first step, we included in the model our key covariates, namely gender and birth cohort (Model *A*), followed by the addition of two other individual-level covariates, namely student's final lower secondary education score (as a quantitative variable that varies from the minimum score of 6 up to the maximum of 10) and type of high school attended - lyceum, technical, or vocational (Model *B*). We then included variables about life experiences, specifically: if the student smoked when s/he was 11-13 years old, if the student went to discotheques when s/he was 11-13 years old (both dichotomous variables), and the frequency of Mass attendance when s/he was 13, with five categories ranging from never to once a week or more (Model *C*). We further added the following family-background variables: highest level of education among the two parents (at most lower-secondary education, upper-secondary education, or tertiary education), a dichotomous variable about mother's work when the respondent was 11-13 years old, and if the parents were married, cohabiting or separated when the student was 11 (Model *D*). We then added a contextual covariate consisting of the macro-area of residence during high school, differentiating between the North, Centre, South of Italy, or abroad (Model *E*). In the last step, and in an effort to answer our third research question, we included an interaction term between gender and birth cohort[8] (Model *F*).

[7] In the SIS data, the majority of students interviewed were born in 1980 (15.6% of the overall sample), while in the SELFY data, most were born in 1996 (31.4% of the overall sample).

[8] Using a likelihood-ratio test we verified that the inclusion of the interaction term improved our model ($\chi^2_{(15)} = 29.21$, p-value = 0.0151).

6. Results

6.1 Young people's sexual life pathways

By clustering students' sequences, we identified six distinct sexual ideal-types of young men and women. Table 2 lists these six detected clusters[9] and provides the distribution of students by gender and year of interview within each category. In what follows, we provide a description of these clusters, complemented by Figure 2, which shows the state distribution plot of students' sexual life-course trajectories (namely, the distribution of states within the cluster at each month of the observation period) from age 11 (corresponding to Time=0) to age 20 (Time=107).

Table 2: Clusters of students' sexual life courses. Students' absolute and percentage frequencies (by column) of clusters by gender and year of interview

Cluster label	2000				2017			
	Men		Women		Men		Women	
	abs.v.	*%*	abs.v.	*%*	abs.v.	*%*	abs.v.	*%*
The benchmark	174	*13.8%*	363	*20.8%*	408	*14.3%*	435	*18.2%*
The forerunners	405	*32.0%*	461	*26.4%*	1008	*35.4%*	813	*34.1%*
The late starters	134	*10.6%*	189	*10.8%*	236	*8.3%*	198	*8.3%*
Romantic love	110	*8.7%*	215	*12.3%*	434	*15.3%*	427	*17.9%*
Sexuality explorers	251	*19.9%*	374	*21.4%*	361	*12.7%*	251	*10.5%*
Sex without commitment	190	*15.0%*	146	*8.4%*	397	*14.0%*	263	*11.0%*
Total	**1,264**	***100.0%***	**1,748**	***100.0%***	**2,844**	***100.0%***	**2,387**	***100.0%***

The first cluster, *The benchmark*, is formed by students who experienced all three events in the 'traditional' order (first a romantic relationship, then a non-complete sexual experience and finally sexual intercourse). The spacing between one event and the next is quite standard, with students having had a first romantic relationship at age 17.3 and first sexual intercourse at age 18.8 (median ages). Overall, 1,380 students belong to this cluster, characterized by both a prevalence of women, and higher percentages of students interviewed in 2000.

The second cluster, labelled *The forerunners*, resembles *The benchmark* cluster, except for the fact that each event occurs earlier in time. It is similarly formed by students who had a first romantic relationship, then a first non-complete sexual experience and finally first sexual intercourse,

[9] For each cluster, we opted for a label that recalls the key characteristics of the given sexual life-course trajectory.

but at a median age of 16.5. Overall, 2,687 students belong to this (most numerous) cluster. There is a slight prevalence of men, and the percentage distribution increased by 6% from 2000 to 2017.

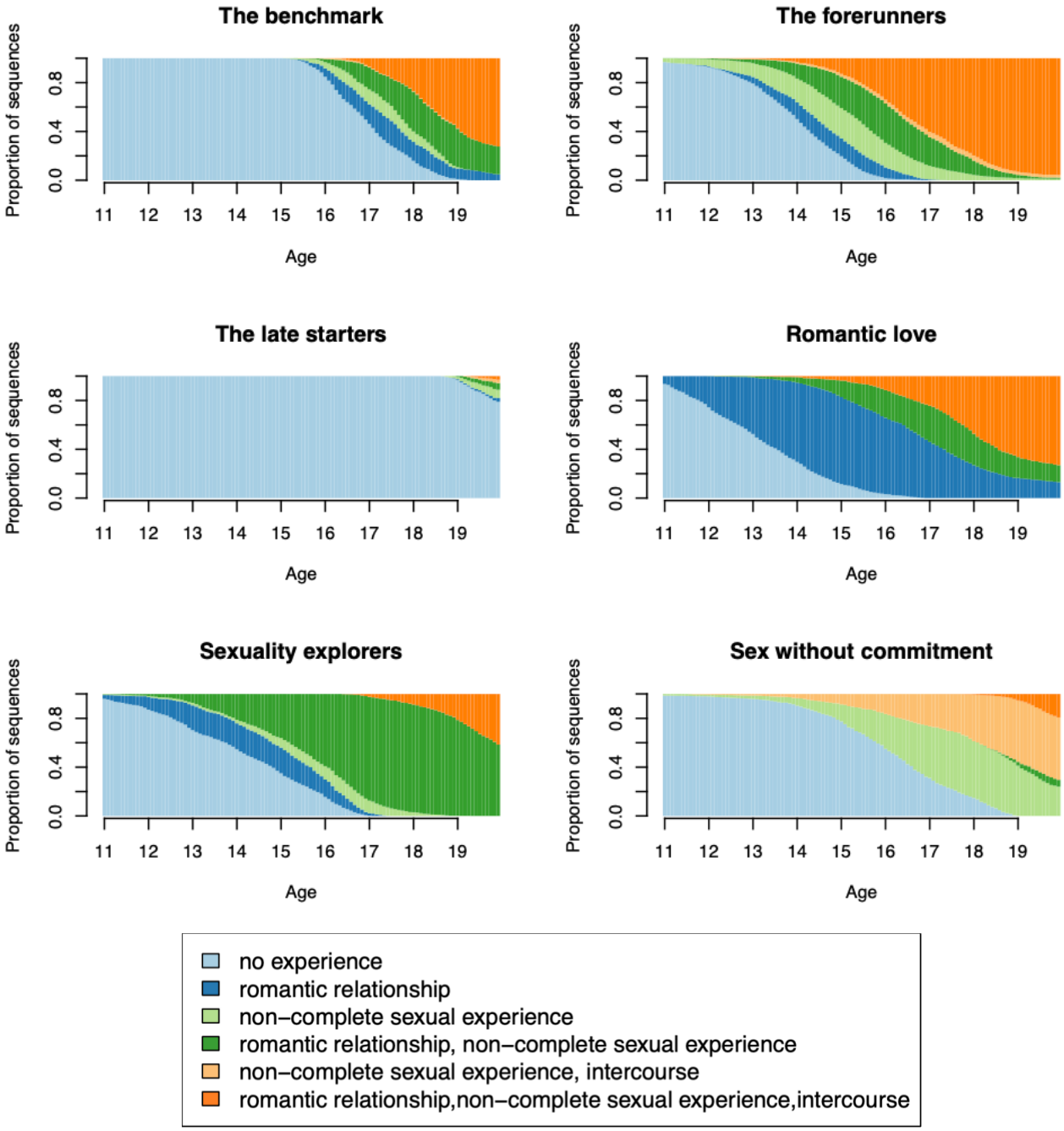
The third cluster, *The late starters*, is characterized by similar proportions of men and women and a slight decline in 2017. Here, the three events are quite delayed: at the age of 20, only 3.0% of young people had experienced all three events, and just 5.7% had had first sexual intercourse, whereas 78.9% had neither had a romantic relationship or a sexual experience.

A considerable period of time passes between first romantic relationship and sexual experiences in the *Romantic love* cluster, though the former occurs at a relatively young age (median age of 13.1, the youngest age among the clusters, and earlier than the median age of 14.0 for the overall sample). Meanwhile, first sexual intercourse is anticipated by just a few months (median age of 18.2, compared to 18.6 for the overall sample). This predominantly female cluster sees a slight increase in 2017 for both men's and women's distributions.

The fifth cluster, called *Sexuality explorers*, is formed by students who delayed first sexual intercourse (median age of 20.4) relative to their first non-complete sexual experience (median age of 15.3). While here the two genders are very balanced, this pattern was more common in 2000.

Finally, the *Sex without commitment* cluster is formed mainly by men, and to a lesser extent by women who had their first non-complete sexual experience and intercourse without being in a romantic relationship (some of whom had a later first romantic relationship). At the age of 20, only 24.9% of this group had been in a romantic relationship, yet 70.4% had had first sexual intercourse and all had had a non-complete sexual experience. This largely male cluster comprises 996 students, though while the percentage of men is similar in the two surveys, the female component slightly increases in 2017.

Figure 2: State distribution plots of clusters of students' sexual life courses



Note: own elaboration on SIS and SELFY data

In sum, there are number of different profiles when it comes to students' sexual life-course trajectories, confirming the need to consider sexual development as a complex, differentiated process.

6.2 How gender and birth cohort shape young people's sexual life profiles

For ease of interpretation, we estimated predicted probabilities of belonging to a given sexual trajectory and present them graphically. Full model results are provided in the Appendix (Table A1).

Figure 3 shows confidence intervals of predicted probabilities of belonging to the six clusters according to student gender (Figure 3a) and birth cohort (Figure 3b) deriving from Model *E* (complete model, without the interaction term between gender and birth cohort).

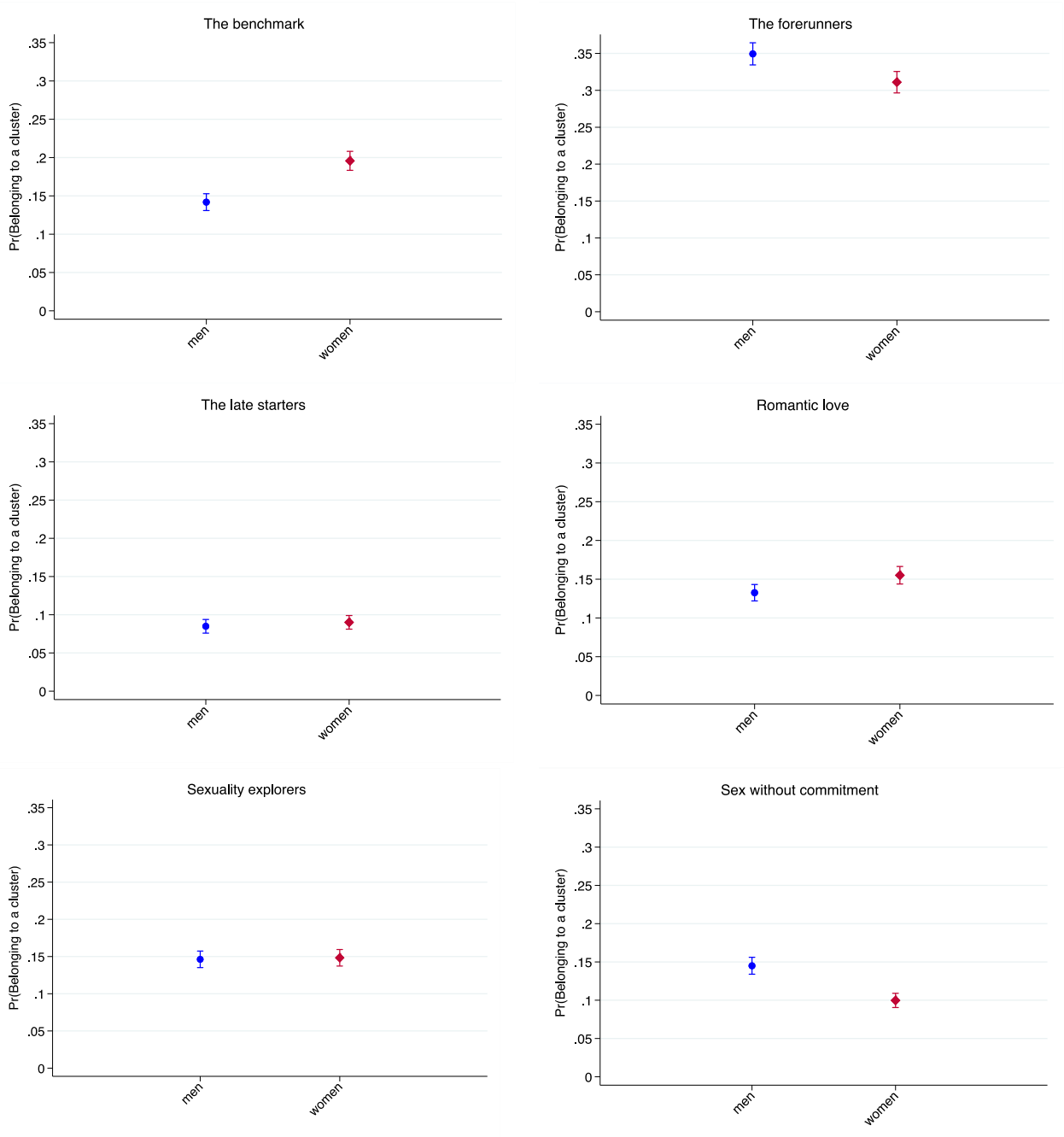
Specifically, we see in Figure 3a that the male and female confidence intervals of the predicted probabilities do overlap in two clusters: *The late starters* and *Sexuality explorers*. These two sexual trajectories do not seem to be gender-specific, showing 'typical' transitions to adult sexuality for both sexes (note that these two clusters account for 24.2% of the total sample). While the two confidence intervals do not overlap in the *Romantic love* cluster, they are extremely close to one another. Meanwhile, for the remaining three profiles (representing 61.4% of the overall sample), the confidence intervals of predicted probabilities do not overlap for male and female students. *The benchmark* profile has a slightly unbalanced cluster composition in favour of young women. In contrast, for both *The forerunners* and *Sex without commitment* clusters, young men have a higher predicted probability of being associated with these trajectories than do young women. These results suggest that gender differences do characterize the trajectories of affective and sexual development of most of university students. Moreover, certain profiles do not display the gender divide typical of the double-standard system.

When looking at the differences by birth cohort (Figure 3b), we do not observe any meaningful pattern over time for *The benchmark* profile, with a non-linear trend and overlapping confidence intervals. *The forerunners* and the *Romantic Love* clusters instead show a clear divide between the older (between 1975 and 1981) and younger (between 1991 and 1997) birth cohorts, with confidence intervals that do not overlap between the two groups (but overlapping CIs for the first two groups and the last two groups of birth cohorts, respectively). An increasing trend is also visible, with younger cohorts having a higher predicted probability of belonging to these clusters. *The late starters* profile displays a contrast between the oldest cohort (1975-1979), which has the highest predicted probability of belonging to this cluster, and the two youngest groups of birth cohorts (1991-1997), whose confidence intervals overlap one another but not those of the oldest cohort. Thus, while the most cautious pathway to adult sexuality seems to be more common among the oldest birth cohorts, it has recently lost strength, showing a decreasing trend.

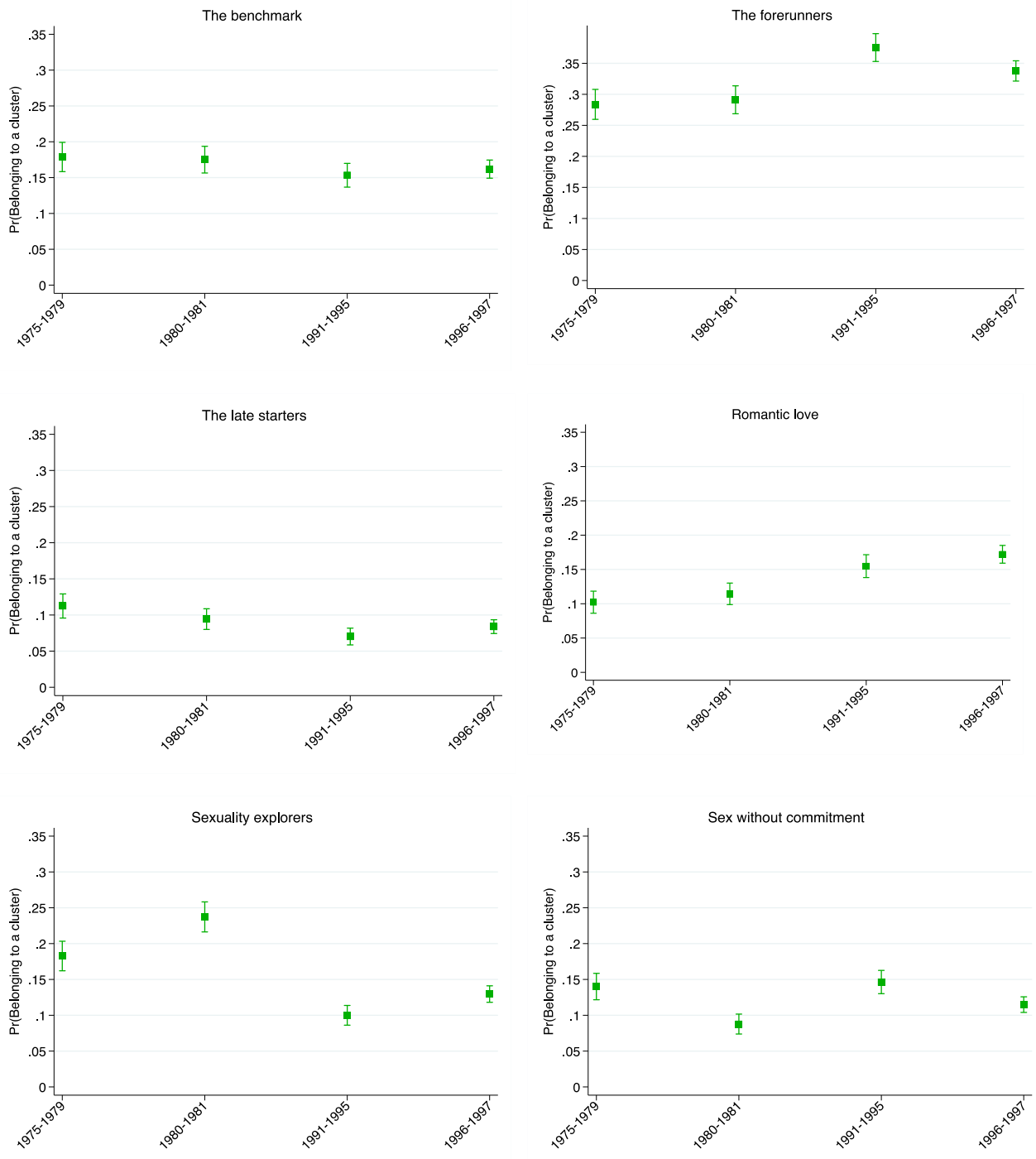
Finally, the last two profiles, *Sexuality explorers* and *Sex without commitment* do not show any meaningful pattern over time, with a non-linear trend and just a few overlapping confidence intervals. In sum, their composition does not seem to be associated with birth cohort. These findings suggest that new patterns have gained ground in recent years while the relevance of others has diminished. Though, these new patterns do not always consist of more precocious trajectories, as one might expect.

Figure 3: Results from Model *E*: Predicted probabilities of belonging to the six clusters according to student gender (Fig. 3a) and birth cohort (Fig. 3b). CI 95%.

a) By gender



b) By birth cohort



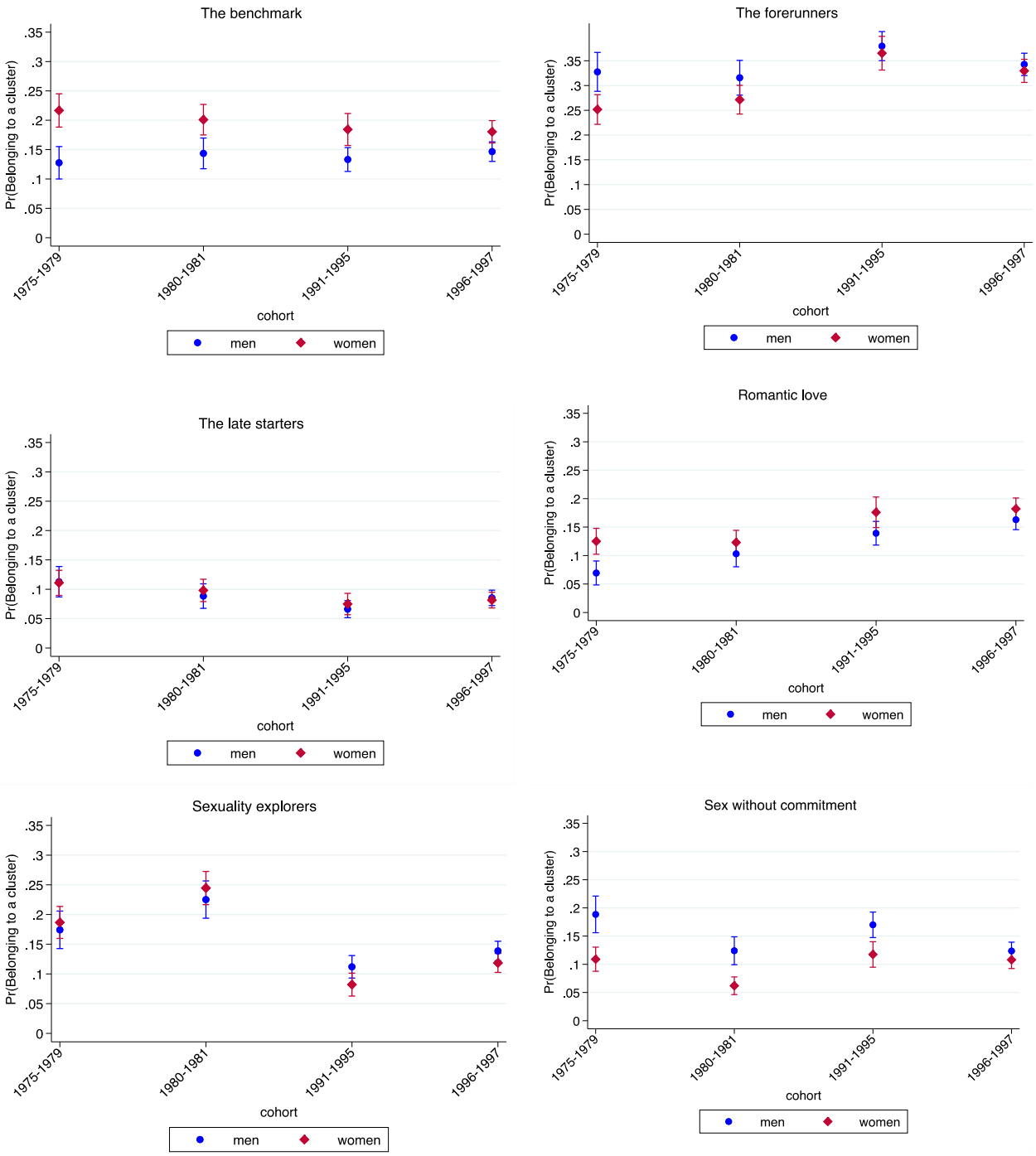
Note: own elaboration on SIS and SELFY data. To estimate predicted probabilities, gender (in Figure 3a) and birth cohort (in Figure32b) are allowed to vary, while gender (in Figure 3b), birth cohort (in Figure 3a), student's final lower secondary score, type of high school attended, frequency of Mass attendance when student was 13, smoking when student was 11-13, attendance of discotheque when student was 11-13, parental highest level of education, mother's work when respondent was 11-13, parental partnership when student was 11, and macro-area of residence during high school are kept at the mean value.

Figure 4 shows confidence intervals of predicted probabilities of belonging to the six clusters according to student gender and birth cohort deriving from Model *F* (complete model with interaction term between gender and birth cohort – third research question). For the (female dominated)

Benchmark profile, the confidence intervals of predicted probabilities overlap between men and women for the youngest birth cohort only, whereas they do not overlap for the remaining birth cohorts. Meanwhile, instead, the confidence intervals of predicted probabilities for *The forerunners* and *Romantic love* clusters do overlap between young men and young women starting from the 1980-1981 birth cohort. Thus, while in the past *The forerunners* profile was male-dominated and the *Romantic love* cluster was female-dominated, both clusters have become more gender equal in terms of their composition. *The late starters* and *Sexuality explorers* profiles are the only clusters where all of the young men's and women's confidence intervals overlap for all birth cohorts, thus indicating no change in composition over time for these groups. Finally, as already observed in Figure 3a, *Sex without commitment* is clearly male dominated across all birth cohorts. That said, there is a narrowing between young men's and women's confidence intervals of predicted probabilities among the most recent cohorts, which even overlap for those born in 1996-1997. This pattern implies a changing composition over time within this group, with the male prevalence seeming to disappear among the most recent cohorts.

In sum, these results suggest that differences between young men's and women's sexual life trajectories have lessened over time. Indeed, we see an overlap between men and women in all of the clusters for students born in the most recent years.

Figure 4: Results from Model *F*: Predicted probabilities of belonging to the six clusters according to student gender and birth cohort. CI 95%.



Note: own elaboration on SIS and SELFY data. To estimate predicted probabilities, gender and birth cohort are allowed to vary, while student's final lower secondary education score, type of high school attended, frequency of Mass attendance when student was 13, smoking when student was 11-13, attendance of discotheque when student was 11-13, parental highest level of education, mother's work when respondent was 11-13 years old, parental partnership when student was 11, and macro-area of residence during high school are kept at the mean value.

6.3 Additional analyses: robustness checks

As mentioned above, 981 students (11.9%) did not report the date of their first romantic relationship. To include them in our sample, we imputed their age (in months) when the event occurred.

To test this decision, we carried out a robustness check, repeating our analyses on a smaller sample that excludes those students with a missing value for the date of first romantic relationship. We reconstructed the sequences for this reduced sample of 7,262 students and then conducted the sequence analysis with the OM algorithm and cluster analysis using Ward's algorithm, following the same criteria as described in Section 5.1. For comparison purposes, we focus on the solution given by six clusters,[10] which were exactly the same six clusters as obtained in our original sample with discarded missing values, though the percentage of students in each cluster varies slightly (see Table 3). Finally, we estimated multinomial logistic regressions to analyse the effect of gender and birth cohort on the probability of being associated with a given cluster, as described in Section 5.2.

For the most part, we observe similarities between pathways among the two samples. When (for the sake of brevity) investigating the third research question, a comparison of the results obtained using the imputed sample and the reduced sample shows that two clusters, *The Late starters* and *Romantic Love* are identical. All the confidence interval overlaps by birth cohort and gender correspond. The results for *Sex without commitment* cluster is also extremely similar, though we observe no overlap between men and women among the most recent cohort. In addition, the changing composition over time within this group, where male predominance tends to decline for the most recent cohorts, is also found in both samples.

Likewise, a narrowing between the two genders over time appears in both analyses for *The benchmark* profile, indicating that this trajectory has become more gender-equal among the most recent birth cohorts, whereas in the past it tended to be female dominated. *The forerunners* and *Sexuality explorers* clusters instead diverge more markedly in the two samples. In our concluding discussion, we consequently focus on those findings that appear more robust when comparing the imputed and reduced sample analyses.

[10] Six clusters obtained through OM with constant substitution costs was also the best grouping solution in the reduced sample.

Table 3: Clusters of students' early sexual life courses. Students' absolute and percentage frequencies (by column) in the original, imputed sample (8,243 students) and in the reduced sample (7,262 students)

	Original sample		Reduced sample	
Cluster label	abs.v.	*%*	abs.v.	*%*
The benchmark	1,380	*16.7*	1,536	*21.2*
The forerunners	2,687	*32.6*	1,265	*17.4*
The late starters	757	*9.2*	1,172	*16.1*
Romantic love	1,186	*14.4*	665	*9.2*
Sexuality explorers	1,237	*15.0*	1,565	*21.6*
Sex without commitment	996	*12.1*	1,059	*14.6*
Total	**8,243**	***100.0***	**7,262**	***100.0***

7. Conclusion and discussion

The sexual behaviour and attitudes of young Italians have changed in number of ways over the last two decades: age at first intercourse has lowered, same-sex relationships have become more accepted, the number of sexual partners has increased. Moreover, men and women have increasingly come to resemble one another with regard, for example, to contraception, casual sex, and cheating (Minello et al. 2020).

In this paper, we identified and analysed romantic and sexual debut trajectories among a large sample of university students. Specifically, we looked at the sequencing and timing of three key events in the transition to adulthood - first romantic relationship, first non-complete sexual experience and first sexual intercourse - and discerned six clusters. These range, among others, from the casual sex of the *Sex without commitment* cluster, the precocious behaviour of *The forerunners* profile, to the postponement of partnering and sexual debut among *The late starters*. The various clusters reveal the variety of young people's sexual life courses in today's Italy, as well as how these different pathways have changed across cohorts and gender over the last two decades. Similar to findings from the United States (Boislard et al. 2016), our analyses show that (despite Italy being a very different cultural, social and normative context) traditionally male-specific and female-specific pathways to sexual debut have increasingly faded, replaced by a shortlist of different trajectories that involve both men and women. That said, and as has likewise been found in the US literature (among others, Wesche et al. 2017), a more traditional cluster (herein labelled *The late starters*) has a higher proportion of women, while the opposite is true of the *Sex without commitment* group. Crucially, the identification of these different pathways confirms the importance of employing a more holistic perspective, that goes beyond analyses of first intercourse or a focus on one 'typical' trajectory of

affective and sexual development. Indeed, such approaches risk being overly restrictive for accurately describing the contemporary complexity of youth's sexual life debut pathways.

Having identified various pathways characterizing young people's sexual life, we next analysed the effect of gender and birth cohort on the probability of being associated with a given trajectory. Our results point to the presence of both a double-standard system and an egalitarian system. That is, gender differences do appear in the affective and sexual development of young Italians. Indeed, having casual sex without being involved in a romantic relationship continues to be a male-dominated trajectory, as also observed in previous studies on the US (Wesche et al. 2017, Kahn and Halpern 2018). That said, while in the past this pathway concerned *most* young Italian men, today it involves but a minority of them. This result broadly aligns with prior work on gender differences in Italy (i.e., Billari and Ongaro 2004, Dalla Zuanna and Mencarini 2004), though the lower involvement of young men in this traditional male pattern represents a novel finding. Second, the most conservative pathway, namely *The late starters*, does not show any significant difference by gender. Even the typical female trajectory, *Romantic love*, where sexual debut is postponed until later in life, nowadays also concerns a non-negligible number of young men. This rather unexpected result suggests that it is not only women's sexual behaviour that has begun to resemble that of men's (i.e., lowering of the age at sexual debut), but also that men are converging towards behaviour formally considered to be typically female - thus confirming the findings of Minello et al. (2020).

As regards the evolution of these trajectories over time, there are signs that new behavioural patterns have emerged in recent years. Interestingly, this does not always concern more precocious sexual activity, as might be expected. That said, the precocious trajectories are indeed more common among the youngest birth cohorts (results related to *The forerunners*) while the more conservative pathways (i.e. *The late starters*) are more widespread among the oldest birth cohorts. Nevertheless, other pathways indicate a surprising diffusion over time, such as *Romantic love*, which shows a slight increasing trend among the recent birth cohorts.

Lastly, even if the double-standard system seems to persist in Italy in some trajectories, the differences between the sexes have narrowed over time. In particular, both the relatively female- (*The benchmark* and *Romantic love*) and male- (*Sex without commitment*) specific profiles have moved towards greater gender equality over time. In sum, a changing relationship in the association between gender and pathways of affective and sexual development has emerged in the last two decades, with decreasing differences between men and women (Minello et al. 2020).

We conclude with two important considerations. First, our findings show a clear need to consider not only first sexual intercourse, but also other key life-course events in young sexual development, such as first romantic relationship and non-complete sexual experiences. Second, our

results highlight the fact that concentrating on just one 'typical' trajectory of affective and sexual development may fail to capture the complexity of sexual debut pathways. Indeed, a more comprehensive perspective that looks at the multiple trajectories of romantic and sexual development may paint a more accurate picture. In this paper, we endeavour to fill this gap for Italy, a country that has been relatively under-studied in this respect. Though often identified with a double-standard system, we show that among the more recent cohorts, certain elements of a gender-equality system have emerged in the romantic and sexual trajectories of young Italian men and women.

Acknowledgements

Valentina Tocchioni acknowledges the financial support provided by the "The Great Demographic Recession - GDR" PRIN project funded by the Italian Ministry of Education, University, and Research under the PRIN 2017 research grant agreement n° 2017W5B55Y_003 (PI: Daniele Vignoli).

References

Aassve, A., Billari, F. C., and Piccarreta, R. (2007). Strings of adulthood: A sequence analysis of young British women's work-family trajectories. *European Journal of Population 23*(3): 369-388.

Abbott, A. (1995). Sequence analysis: New methods for old ideas. *Annual review of sociology 21*(1): 93-113.

Bajos, N., Bozon, M., Beltzer, N., Laborde, C., Andro, A., Ferrand, M., Goulet, V., Laporte, A., Le Van, C-, Leridon, H., Levinson, S., Razafindratsima, N., Toulemon, L., Warszawski, J., and Wellings, K. (2010). Changes in sexual behaviours: from secular trends to public health policies. *AIDS* 24 (8): 1185-1191.

Barbagli, M., Dalla Zuanna, G. and Garelli, F. (2010). *La sessualità degli italiani*. Bologna: Il Mulino.

Billari F. C., and Ongaro F. (2004) First stages in partnership history and in sexual experiences. In: Dalla Zuanna, G. and Crisafulli, C. (eds.). *Sexual behaviour of Italian students*. Messina: Dipartimento Statistico, Università di Messina: 107-124.

Boislard M-A, Van de Bongardt D, and Blais M. (2016). Sexuality (and Lack Thereof) in Adolescence and Early Adulthood: A Review of the Literature. *Behavioral Sciences* 6(1):8. https://doi.org/10.3390/bs6010008

Boislard, M. A. P., and Poulin, F. (2011). Individual, familial, friends-related and contextual predictors of early sexual intercourse. *Journal of Adolescence 34:* 289–300.

Bongaarts J., Mensch B.S., and Blanc A.K. (2017) Trends in the age at reproductive transitions in the developing world: The role of education. *Population Studies* 71(2): 139-154. DOI: 10.1080/00324728.2017.1291986

Bozon, M. (2003). At what age do women and men have their first sexual intercourse? World comparisons and recent trends. *Population & Societies*: 1-4.

Bozon M., and Kontula O. (2014). Sexual initiation and gender in Europe: A cross-cultural analysis of trends in the twentieth century. In: Hubert M., Bajos N. and Sandfort T. (eds.) *Sexual behaviour and HIV/AIDS in Europe: comparisons of national surveys*. London: Routledge: 37-67.

Brückner H., and Mayer K.U. (2005). De-Standardization of the Life Course: What it Might Mean? And if it Means Anything, Whether it Actually Took Place? *Advances in Life Course Research* 9: 27-53. https://doi.org/10.1016/S1040-2608(04)09002-1.

Caltabiano M. (2007). Interdependent event history for the study of the determinants of the onset of affective and sexual life. In: Billari F.C., Caltabiano M., and Dalla Zuanna G. (eds). *Sexual and affective behaviour of students. An international research*. Padova: Cleup Editrice: 273-294.

Caltabiano, M., Castiglioni, M., and De Rose, A. (2020). Changes in the sexual behaviour of young people: Introduction. *Genus* 76:1. https://doi.org/10.1186/s41118-020-00107-1

Caltabiano, M., Dalla Zuanna, G., and Rosina, A. (2006). Interdependence between sexual debut and church attendance in Italy. *Demographic Research* 14: 453-484.

Caltabiano, M. (2013). Le trasformazioni della vita sessuale. In: AISP - Associazione Italiana per gli Studi di Popolazione. *Rapporto sulla popolazione: sessualità e riproduzione nell'Italia contemporanea*. Bologna: Il Mulino.

Carpenter, L. (2015) Studying Sexualities from a Life Course Perspective. In: DeLamater J., Plante R. (eds). *Handbook of the Sociology of Sexualities. Handbooks of Sociology and Social Research.* Cham: Springer. https://doi.org/10.1007/978-3-319-17341-2_5

Castiglioni, M. (2004). First sexual intercourse and contraceptive use in Italy. In: Dalla Zuanna, G. and Crisafulli, C. (eds.). *Sexual behaviour of Italian students*. Messina: Dipartimento Statistico, Università di Messina: 19-39.

Collins, W. A., Welsh, D. P., and Furman, W. (2009). Adolescent romantic relationships. *Annual Review of Psychology* 60: 631–652. doi:10.1146/annurev.psych.60.110707.163459.

Connolly, J., and McIsaac C.M. (2009). Romantic relationships in adolescence. In: Lerner, R. and Steinberg, L. (Eds.), *Handbook of adolescent psychology*, Vol. 2. New York: John Wiley and Sons: 104-151.

Coppola, L. (2007). Determinants of age at first intercourse. A comparison between nine countries. In: Billari F.C., Caltabiano M., and Dalla Zuanna G. (eds). *Sexual and affective behaviour of students. An international research*. Padova: Cleup Editrice: 251-272.

Crawford, M., and Popp, D. (2003). Sexual double standards: a review and methodological critique of two decades of research. *Journal of Sex Research* 40: 13–26.

Dalla Zuanna, G., and Crisafulli, C. (2004). *Sexual behaviour of Italian students*. Messina: Dipartimento Statistico, Università di Messina.

Dalla Zuanna G., and Mencarini L. (2004). The gender sex ballet. Dynamics of sexual behaviour within young Italian couples. In: Dalla Zuanna G., and Crisafulli C. (eds.). *Sexual Behaviour of Italian Students*. Messina: Dipartimento Statistico, Università di Messina: 321-340.

Dalla Zuanna, G., Caltabiano, M., Minello, A., and Vignoli, D. (2019). Catching up! The sexual opinions and behaviour of Italian students (2000-2017). Firenze: Università di Firenze (DiSIA Working Paper Series no. 2019/02).

Dalenber W.G., Timmerman M. C., and van Geert P.L.C. (2018). Dutch adolescents' everyday expressions of sexual behaviour trajectories over a 2-Year period: a mixed-methods study. *Archives of Sexual Behaviour* 47(6): 1811-1823.

De Graaf, H., and Rademakers, J. (2006). Sexual development of prepubertal children. *Journal of Psychology & Human Sexuality* 18(1): 1–21. doi:10.1300/J056v18n01_01.

De Graaf, H., Vanwesenbeeck, I., Meijer, S., Woertman, L., and Meeus, W. (2009). Sexual trajectories during adolescence: Relation to demographic characteristics and sexual risk. *Archives of Sexual Behavior* 38: 276–282.

Devillanova, C., Raitano, M., and Struffolino, E. (2019). Longitudinal employment trajectories and health in middle life. *Demographic Research 40*: 1375-1412.

Elder G.H. (1988). The life course as developmental theory. *Child Development* 69: 1-12

Ethier, K.H., Kann, L., and McManus, T. (2018). Sexual Intercourse Among High School Students – 29 States and United States Overall, 2005–2015. Morbidity and Mortality Weekly Report 66(51-52): 1393–1397. doi: 10.15585/mmwr.mm665152a1

Forste R., and Haas, D. W. (2002). The transition of adolescent males to first sexual intercourse: anticipated or delayed?. *Perspective on Sexual and Reproductive Health* 34:184−190

Furman, W., and Shaffer, L. (2003). The role of romantic relationships in adolescent development. In: Florsheim, P. (Ed.), *Adolescent romantic relations and sexual behavior: Theory, research, and practical implications*. Mahwah: Erlbaum: 3–22.

Gabadinho, A., Ritschard, G., Müller, N. S., and Studer, M. (2011). Analyzing and visualizing state sequences in R with TraMineR. *Journal of Statistical Software* 40(4): 1–37.

Hansen, B. T., Kjær, S. K., Arnheim-Dahlström, L., Liaw, L.-L., Juul, K. E., Thomsen, L. T., Frederiksen, K., Elfström, K. M., Munk, C., Nygård, M. (2020) Age at first intercourse, number of partners and sexually transmitted infection prevalence among Danish, Norwegian and Swedish women: estimates and trends from nationally representative cross-sectional surveys of more than 100 000 women. *Acta obstetricia et gynecologica Scandinavica* 99(2): 175-185

Haydon, A.A., Herring, A.H., Prinstein, M.J., and Halpern C.T. (2012). Beyond Age at First Sex: Patterns of Emerging Sexual Behavior in Adolescence and Young Adulthood. *Journal of Adolescent Health* 50(5):456-463. https://doi.org/10.1016/j.jadohealth.2011.09.006

Inchley J., Currie D., Young T., Samdal O., Torsheim T., Augustson L., Mathison F., Aleman-Diaz A., Molcho M., Weber M., and Barnekow V. (eds). (2016). *Growing up unequal: gender and socioeconomic differences in young people's health and well-being. Health behavior in school-aged children (HBSC study): international report from the 2013/2014 survey*. Copenhagen: WHO Regional Office for Europe.

Inchley J, Currie D, Budisavljevic S, Torsheim T, Jåstad A, Cosma A et al., eds. (2020). Spotlight on adolescent health and well-being. Findings from the 2017/2018 Health Behaviour in School-aged Children (HBSC) survey in Europe and Canada. International report. Volume 2. Key data. Copenhagen: WHO Regional Office for Europe.

Joyner, K., and Campa, M. (2006). How do adolescent relationships influence the quality of romantic and sexual relationships in young adulthood. In: Crouter, A. C. and Booth, A. (Eds.). *Romance and sex in adolescence and emerging adulthood: Risks and opportunities*. Mahwah: Lawrence Erlbaum Associates: 93-101.

Kahn, N. F., and Halpern, C. T. (2018). Associations between patterns of sexual initiation, sexual partnering, and sexual health outcomes from adolescence to early adulthood. *Archives of sexual behavior* 47(6): 1791-1810.

Lewis, R., Marston, C., and Wellings, K. (2013). Bases, Stages and 'Working your Way Up': Young People's Talk about Non-Coital Practices and 'Normal' Sexual Trajectories. *Sociological Research Online 18*(1): 233–241. https://doi.org/10.5153/sro.2842

Lewis R., Tanton C., Mercer C.H., Mitchell K.R., Palmer M., Macdowall W., and Wellings K. (2017). Heterosexual Practices Among Young People in Britain: Evidence From Three National Surveys of Sexual Attitudes and Lifestyles. *Journal of Adolescent Health* 61(6): 694-702. https://doi.org/10.1016/j.jadohealth.2017.07.004.

Manlove J., Wildsmith E., Ikramullah E., Terry-Humen E., Schelar E. (2012). Family environments and the relationship context of first adolescent sex: Correlates of first sex in a casual versus steady relationship. *Social Science Research* 41: 861–875.

Martinez, G., Copen, C.E., Abma, J.C. (2011). Teenagers in the United States: sexual activity, contraceptive use, and childbearing, 2006–2010 National Survey of Family Growth. Data From the National Survey of Family Growth. Washington: National Center for Health Statistics (Vital and Health statistics 23(31)).

Minello A., Caltabiano M., Dalla Zuanna G., and Vignoli D. (2020). Catching up! The sexual behaviour and opinions of Italian students (2000–2017). *Genus* 76: 16.

Moilanen, K. L., Crockett, L. J., Raffaelli, M., and Jones, B. L. (2010). Trajectories of sexual risk from middle adolescence to early adulthood. *Journal of Sex Research 20:* 114–139.

O'Sullivan, L.F., Cheng, M.M., Harris, K.M., and Brooks-Gunn, J. (2007). I Wanna Hold Your Hand: The Progression of Social, Romantic and Sexual Events in Adolescent Relationships. *Perspectives on Sexual and Reproductive Health* 39(2): 100–107. doi: 10.1363/3910007

Olmstead, S.B. (2020), A Decade Review of Sex and Partnering in Adolescence and Young Adulthood. *Journal of Marriage and the Family* 82: 769-795. https://doi.org/10.1111/jomf.12670

Parkes A., Henderson M., Wight, D., and Nixon C. (2011). Is parenting associated with teenagers' early sexual risk-taking, autonomy and relationship with sexual partners? *Perspectives on Sexual and Reproductive Health* 43(1):30–40, doi: 10.1363/4303011

Raab, M., and Struffolino, E. (2020). The heterogeneity of partnership trajectories to childlessness in Germany. *European Journal of Population* 36(1): 53-70.

Rauer, A. J., Pettit, G. S., Lansford, J. E., Bates, J. E., and Dodge, K. A. (2013). Romantic relationship patterns in young adulthood and their developmental antecedents. *Developmental Psychology 49*(11): 2159–2171. https://doi.org/10.1037/a0031845

Regan, P. C., Durvasula, R., Howell, L., Ureño, O., and Rea, M. (2004). Gender, ethnicity, and the developmental timing of first sexual and romantic experiences. *Social Behavior & Personality* 32(7): 667–676.

Reese B.M., Choukas-Bradley S., Herring A.H., and Halpern C.T. (2014). Correlates of Adolescent and Young Adult Sexual Initiation Patterns. *Perspectives on Sexual and Reproductive Health* 46(4): 211-221. https://doi.org/10.1363/46e2214

Roche, J.P., and Ramsbey. T.W. (1993). Premarital Sexuality: A Five-Year Follow-Up Study of Attitudes and Behavior by Dating Stage. *Adolescence* 28: 67-80.

Smith, E.A., Udry, J.R. (1985). Coital and non-coital sexual behaviors of white and black adolescents. *American Journal of Public Health* 75(10): 1200-1203.

Studer, M. (2013). WeightedCluster Library Manual: A practical guide to creating typologies of trajectories in the social sciences with R. Geneva: University of Geneva (LIVES Working Papers 24). DOI: http://dx.doi.org/10.12682/lives.2296-1658.2013.24.

Studer, M., and Ritschard, G. (2016). What matters in differences between life trajectories: A comparative review of sequence dissimilarity measures. *Journal of the Royal Statistical Society. Series A (Statistics in Society)* 481-511.

Tolman, D. L., and McClelland, S. I. (2011). Normative sexuality development in adolescence: A decade in review, 2000–2009. *Journal of Research on Adolescence* 21: 242–255. doi:10.1111/j.1532-7795.2010.00726.x.

Thornton A. (1990). The courtship process and adolescent sexuality. *Journal of Family Issues* 11: 239-273.

Twenge, J.M., Sherman, R.A. and Wells, B.E. (2017). Sexual Inactivity During Young Adulthood Is More Common Among U.S. Millennials and iGen: Age, Period, and Cohort Effects on Having No Sexual Partners After Age 18. *Archives of Sexual Behavior* 46: 433–440. https://doi.org/10.1007/s10508-016-0798-z

van de Bongardt D., de Graaf H., Reitz E., and Dekovi M. (2014). Parents as moderators of longitudinal associations between sexual peer norms and Dutch adolescents' sexual initiation and intention. *Journal of Adolescent Health* 55: 388-393.

van de Bongardt D., Yu R., Deković M. and Meeus W.H.J. (2015). Romantic relationships and sexuality in adolescence and young adulthood: The role of parents, peers, and partners, European *Journal of Developmental Psychology* 12(5): 497-515, DOI: 10.1080/17405629.2015.1068689

Van Oss Marín, B., Kirby, D. B., Hudes, E. S., Coyle, K. K., and Gómez, C. A. (2006). Boyfriends, girlfriends and teenagers' risk of sexual involvement. *Perspectives on Sexual and Reproductive Health 38*: 76–83.

Vasilenko S.A., Kugler K.C., Butera N.M, and Lanza S.T. (2015). Patterns of Adolescent Sexual Behavior Predicting Young Adult Sexually Transmitted Infections: A Latent Class Analysis Approach. *Archives of Sexual Behavior* 44: 705–715. https://doi.org/10.1007/s10508-014-0258-6

Wesche, R., Lefkowitz, E.S. and Vasilenko, S.A. (2017). Latent Classes of Sexual Behaviors: Prevalence, Predictors, and Consequences. *Sexuality Research and Social Policy* 14**:** 100–111. https://doi.org/10.1007/s13178-016-0228-y

White, C. N., and Warner, L. A. (2015). Influence of family and school-level factors on age of sexual initiation. *Journal of Adolescent Health* 56: 231–237. doi:10.1016/j.jadohealth.2014.09.017.

Widmer E.D., and Ritschard G. (2009). The de-standardization of the life course: Are men and women equal? *Advances in Life Course Research* 14(1-2): 28-39, https://doi.org/10.1016/j.alcr.2009.04.001

Williams, T., Connolly, J., Cribbie, R., (2008). Light and Heavy Heterosexual Activities of Young Canadian Adolescents: Normative Patterns and Differential Predictors. *Journal of Research on Adolescence* 18(1): 145-172. doi.org/10.1111/j.1532-7795.2008.00554.x

Zimmer-Gembeck, M. J., Siebenbruner, J., and Collins, W. A. (2004). A prospective study of intraindividual and peer influences on adolescents' heterosexual romantic and sexual behavior. *Archives of Sexual Behavior 33: 381–394.*

Appendix

Table A1: Estimated model coefficients of the multinomial logistic regressions on the probability of belonging to a specific trajectory (for compactness we reported Model *A*, *E*, *F*).

	Model *A*			**Model *E***			**Model *F***		
	coef	std error	p-value	coef	std error	p-value	coef	std error	p-value
The benchmark									
Gender (ref. Male)									
Female	0.387	0.067	0.000	0.211	0.071	0.003	0.557	0.175	0.001
Birth cohort (ref. 1975-1979)									
1980-1981	-0.038	0.110	0.732	-0.046	0.112	0.684	0.123	0.186	0.506
1991-1995	-0.346	0.108	0.001	-0.174	0.112	0.121	0.075	0.172	0.662
1996-1997	-0.218	0.097	0.024	-0.060	0.101	0.551	0.213	0.160	0.184
Final score at lower secondary				0.082	0.032	0.010	0.080	0.032	0.012
High school (ref. Lyceum)									
Technical				0.028	0.076	0.707	0.024	0.076	0.750
Vocational				0.027	0.208	0.897	0.014	0.209	0.946
Unknown				-0.052	0.386	0.893	-0.050	0.386	0.897
Disco attendance (ref. No)									
Yes				-0.764	0.135	0.000	-0.768	0.135	0.000
Smoke (ref. No)									
Yes				-1.440	0.376	0.000	-1.428	0.376	0.000
Mass attendance (ref. Never)									
Sometimes in a year				0.063	0.120	0.602	0.063	0.120	0.597
Once a month				-0.041	0.146	0.777	-0.040	0.146	0.784
Two-three times a month				0.253	0.122	0.038	0.252	0.122	0.038
Once a week or more				0.578	0.118	0.000	0.574	0.118	0.000
Unknown				0.264	0.279	0.344	0.267	0.279	0.339

Parental education (ref. Lower secondary at most)									
Upper secondary				-0.385	0.091	0.000	-0.383	0.091	0.000
Tertiary				-0.288	0.105	0.006	-0.283	0.105	0.007
Unknown				0.015	0.401	0.971	0.017	0.401	0.965
Mother's work (ref. No)									
Yes				-0.068	0.076	0.367	-0.068	0.076	0.373
Unknown				-0.387	0.221	0.080	-0.386	0.221	0.081
Parental marital status (ref. Married parents)									
Cohabiting parents				-0.236	0.299	0.429	-0.238	0.298	0.424
Separated parents				-0.416	0.180	0.020	-0.418	0.180	0.020
Unknown				0.028	0.237	0.907	0.029	0.237	0.902
Macro-area of residence (ref. North)									
Centre				-0.037	0.089	0.680	-0.040	0.089	0.658
South				-0.110	0.080	0.170	-0.112	0.080	0.162
Abroad				0.515	0.340	0.129	0.506	0.340	0.137
Unknown				-0.033	0.468	0.945	-0.030	0.468	0.949
Gender * Birth cohort									
Female*1980-1981							-0.265	0.234	0.257
Female*1991-1995							-0.424	0.224	0.059
Female*1996-1997							-0.461	0.203	0.023
Constant	-1.079	0.137	0.000	-1.358	0.313	0.000	-1.345	0.320	0.000
The forerunners (base outcome)									
The late starters									
Gender (ref. Male)									
Female	0.088	0.083	0.291	-0.126	0.088	0.152	-0.057	0.194	0.767
Birth cohort (ref. 1975-1979)									
1980-1981	-0.189	0.131	0.147	-0.199	0.133	0.135	-0.239	0.203	0.240
1991-1995	-0.708	0.132	0.000	-0.528	0.138	0.000	-0.503	0.194	0.009
1996-1997	-0.443	0.114	0.000	-0.257	0.120	0.033	-0.192	0.173	0.267

Final score at lower secondary	0.126	0.040	0.001	0.125	0.040	0.002
High school (ref. Lyceum)						
Technical	0.174	0.093	0.062	0.172	0.093	0.065
Vocational	0.208	0.254	0.411	0.201	0.254	0.428
Unknown	-0.343	0.552	0.534	-0.347	0.552	0.529
Disco attendance (ref. No)						
Yes	-1.168	0.201	0.000	-1.171	0.201	0.000
Smoke (ref. No)						
Yes	-1.794	0.593	0.002	-1.792	0.593	0.003
Mass attendance (ref. Never)						
Sometimes in a year	-0.290	0.144	0.044	-0.289	0.144	0.045
Once a month	-0.412	0.182	0.024	-0.412	0.182	0.024
Two-three times a month	-0.098	0.146	0.504	-0.097	0.146	0.506
Once a week or more	0.353	0.137	0.010	0.352	0.137	0.010
Unknown	-0.136	0.351	0.697	-0.135	0.351	0.699
Parental education (ref. Lower secondary at most)						
Upper secondary	-0.492	0.109	0.000	-0.490	0.109	0.000
Tertiary	-0.472	0.129	0.000	-0.470	0.129	0.000
Unknown	-0.020	0.456	0.964	-0.017	0.456	0.969
Mother's work (ref. No)						
Yes	-0.158	0.093	0.090	-0.158	0.093	0.091
Unknown	0.052	0.235	0.824	0.056	0.235	0.813
Parental marital status (ref. Married parents)						
Cohabiting parents	0.068	0.336	0.841	0.066	0.336	0.845
Separated parents	-0.295	0.220	0.180	-0.292	0.220	0.185
Unknown	0.224	0.277	0.418	0.227	0.277	0.412
Macro-area of residence (ref. North)						
Centre	-0.066	0.109	0.546	-0.067	0.109	0.537
South	-0.276	0.101	0.006	-0.276	0.101	0.006
Abroad	0.973	0.363	0.007	0.968	0.363	0.008

Unknown				0.551	0.457	0.228	0.547	0.457	0.231
Gender * Birth cohort									
Female*1980-1981							0.062	0.268	0.817
Female*1991-1995							-0.053	0.269	0.845
Female*1996-1997							-0.136	0.233	0.559
Constant	-1.025	0.162	0.000	-1.224	0.382	0.001	-1.377	0.383	0.000
Romantic love									
Gender (ref. Male)									
Female	0.291	0.071	0.000	0.144	0.074	0.050	0.649	0.216	0.003
Birth cohort (ref. 1975-1979)									
1980-1981	0.088	0.131	0.502	0.120	0.133	0.365	0.431	0.224	0.055
1991-1995	0.194	0.121	0.110	0.298	0.125	0.017	0.627	0.203	0.002
1996-1997	0.384	0.111	0.001	0.492	0.115	0.000	0.876	0.193	0.000
Final score at lower secondary				0.044	0.033	0.185	0.042	0.033	0.213
High school (ref. Lyceum)									
Technical				0.142	0.079	0.072	0.138	0.079	0.080
Vocational				-0.024	0.221	0.913	-0.034	0.221	0.877
Unknown				-0.570	0.499	0.253	-0.572	0.499	0.251
Disco attendance (ref. No)									
Yes				-0.349	0.122	0.004	-0.351	0.122	0.004
Smoke (ref. No)									
Yes				-0.569	0.261	0.029	-0.559	0.261	0.032
Mass attendance (ref. Never)									
Sometimes in a year				0.158	0.123	0.201	0.159	0.123	0.198
Once a month				0.084	0.149	0.574	0.086	0.149	0.562
Two-three times a month				0.300	0.127	0.018	0.300	0.127	0.018
Once a week or more				0.552	0.123	0.000	0.547	0.123	0.000
Unknown				0.432	0.280	0.123	0.435	0.280	0.121
Parental education (ref. Lower secondary at most)									
Upper secondary				-0.156	0.097	0.108	-0.154	0.097	0.113

Tertiary				-0.276	0.114	0.016	-0.271	0.114	0.018
Unknown				-0.332	0.446	0.457	-0.331	0.446	0.458
Mother's work (ref. No)									
Yes				0.002	0.080	0.983	0.002	0.080	0.979
Unknown				0.059	0.200	0.769	0.059	0.200	0.768
Parental marital status (ref. Married parents)									
Cohabiting parents				-0.148	0.298	0.619	-0.149	0.297	0.616
Separated parents				-0.207	0.174	0.234	-0.211	0.174	0.226
Unknown				-0.029	0.240	0.903	-0.027	0.240	0.911
Macro-area of residence (ref. North)									
Centre				0.003	0.098	0.974	0.001	0.098	0.990
South				0.241	0.084	0.004	0.239	0.084	0.005
Abroad				0.750	0.351	0.033	0.729	0.351	0.038
Unknown				0.928	0.375	0.013	0.933	0.375	0.013
Gender * Birth cohort									
Female*1980-1981							-0.476	0.279	0.088
Female*1991-1995							-0.525	0.257	0.042
Female*1996-1997							-0.627	0.238	0.009
Constant	-1.494	0.151	0.000	-1.938	0.332	0.000	-2.094	0.350	0.000
Sexuality explorers									
Gender (ref. Male)									
Female	0.027	0.070	0.699	-0.093	0.073	0.205	0.187	0.168	0.265
Birth cohort (ref. 1975-1979)									
1980-1981	0.234	0.107	0.028	0.233	0.108	0.031	0.278	0.165	0.092
1991-1995	-0.864	0.117	0.000	-0.710	0.120	0.000	-0.432	0.166	0.009
1996-1997	-0.504	0.099	0.000	-0.374	0.103	0.000	-0.157	0.150	0.295
Final score at lower secondary				0.024	0.033	0.468	0.023	0.033	0.491
High school (ref. Lyceum)									
Technical				-0.029	0.078	0.708	-0.036	0.078	0.646
Vocational				-0.207	0.227	0.363	-0.226	0.228	0.321

Unknown	-0.452	0.440	0.304	-0.446	0.440	0.311
Disco attendance (ref. No)						
Yes	-0.486	0.125	0.000	-0.497	0.125	0.000
Smoke (ref. No)						
Yes	-0.399	0.245	0.103	-0.384	0.245	0.116
Mass attendance (ref. Never)						
Sometimes in a year	-0.030	0.127	0.814	-0.024	0.127	0.850
Once a month	0.192	0.146	0.189	0.196	0.146	0.179
Two-three times a month	0.267	0.127	0.035	0.271	0.127	0.033
Once a week or more	0.486	0.123	0.000	0.483	0.123	0.000
Unknown	0.338	0.281	0.229	0.347	0.282	0.217
Parental education (ref. Lower secondary at most)						
Upper secondary	-0.148	0.095	0.120	-0.146	0.095	0.126
Tertiary	-0.213	0.112	0.056	-0.208	0.112	0.063
Unknown	0.009	0.443	0.985	0.012	0.443	0.979
Mother's work (ref. No)						
Yes	-0.095	0.078	0.223	-0.093	0.078	0.234
Unknown	-0.193	0.219	0.379	-0.192	0.219	0.380
Parental marital status (ref. Married parents)						
Cohabiting parents	-0.084	0.312	0.788	-0.096	0.313	0.759
Separated parents	-0.423	0.194	0.029	-0.421	0.194	0.030
Unknown	-0.249	0.279	0.372	-0.244	0.279	0.381
Macro-area of residence (ref. North)						
Centre	-0.152	0.093	0.102	-0.157	0.093	0.091
South	-0.115	0.083	0.164	-0.118	0.083	0.155
Abroad	-0.064	0.426	0.881	-0.052	0.427	0.903
Unknown	-0.148	0.524	0.777	-0.152	0.524	0.772
Gender * Birth cohort						
Female*1980-1981				-0.077	0.218	0.723
Female*1991-1995				-0.595	0.240	0.013

Female*1996-1997							-0.413	0.202	0.041
Constant	-0.503	0.137	0.000	-0.440	0.320	0.170	-0.681	0.323	0.035
Sex without commitment									
Gender (ref. Male)									
Female	-0.270	0.076	0.000	-0.336	0.079	0.000	-0.370	0.179	0.039
Birth cohort (ref. 1975-1979)									
1980-1981	-0.504	0.130	0.000	-0.497	0.131	0.000	-0.370	0.178	0.038
1991-1995	-0.271	0.114	0.017	-0.162	0.118	0.169	-0.147	0.155	0.340
1996-1997	-0.397	0.106	0.000	-0.291	0.110	0.008	-0.369	0.149	0.013
Final score at lower secondary				0.017	0.035	0.621	0.020	0.035	0.578
High school (ref. Lyceum)									
Technical				0.032	0.084	0.708	0.035	0.084	0.680
Vocational				0.280	0.207	0.177	0.291	0.208	0.161
Unknown				0.076	0.399	0.849	0.074	0.399	0.852
Disco attendance (ref. No)									
Yes				-0.102	0.119	0.390	-0.097	0.119	0.414
Smoke (ref. No)									
Yes				-0.559	0.261	0.033	-0.566	0.262	0.030
Mass attendance (ref. Never)									
Sometimes in a year				-0.161	0.122	0.188	-0.164	0.122	0.180
Once a month				-0.021	0.146	0.884	-0.026	0.146	0.859
Two-three times a month				0.044	0.126	0.729	0.042	0.126	0.739
Once a week or more				0.115	0.124	0.353	0.116	0.124	0.347
Unknown				-0.001	0.305	0.997	-0.006	0.306	0.985
Parental education (ref. Lower secondary at most)									
Upper secondary				-0.285	0.102	0.005	-0.290	0.102	0.005
Tertiary				-0.304	0.119	0.010	-0.308	0.119	0.009
Unknown				0.235	0.397	0.554	0.235	0.397	0.553
Mother's work (ref. No)									
Yes				-0.140	0.085	0.098	-0.141	0.085	0.096

Unknown				0.320	0.191	0.094	0.312	0.191	0.102
Parental marital status (ref. Married parents)									
Cohabiting parents				-0.225	0.311	0.470	-0.224	0.311	0.472
Separated parents				-0.497	0.200	0.013	-0.501	0.200	0.012
Unknown				-0.136	0.255	0.593	-0.140	0.255	0.583
Macro-area of residence (ref. North)									
Centre				0.054	0.099	0.586	0.057	0.099	0.565
South				-0.095	0.090	0.292	-0.094	0.090	0.295
Abroad				-0.154	0.473	0.745	-0.148	0.473	0.754
Unknown				0.527	0.409	0.197	0.532	0.408	0.192
Gender * Birth cohort									
Female*1980-1981							-0.276	0.263	0.295
Female*1991-1995							-0.014	0.232	0.954
Female*1996-1997							0.216	0.213	0.311
Constant	-0.290	0.145	0.046	-0.046	0.337	0.891	-0.392	0.336	0.243

Note: The most numerous cluster, *The Forerunners*, has been chosen as the base outcome.