Parent-child communication about sex and romantic feelings: does having older siblings make a difference?

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Abstract

Parental involvement in sex education and the quality of parent-child communication about romantic feelings appear to have a protective effect on adolescent sexual behaviours. However, little research has been conducted on the role played by birth order in the level of parental involvement in sex education. This is the first study seeking to address if the quality of parent-child communication about sex and romantic sentiments differs according to whether respondents have—or do not have—older siblings in Italy. Hypotheses concerning the role of sibling gender composition have been tested in order to explain potential intervening mechanisms. Data were drawn from the Sexual and Emotional Life of Youths survey (SELFY), a cross-sectional survey conducted in 2000 and in 2017 on Italian university students (N = 12,265). Our findings identify later-born children as the least likely to confide in parents. Although boys are generally less likely to talk to parents than girls, respondent gender does not moderate the effect of birth order. Instead, sibling gender composition plays a role: having grown up with at least one same-gender sibling is associated with a lower communication with parents about intimate matters. This study suggests that growing up with siblings, namely with same-gender siblings, make a difference in parent-child communication and this should be considered while evaluating the role of parental involvement in adolescent sexual education.

Background and hypotheses

The family of origin, as the primary place of socialization, has a strong influence on young people’s sexual behaviour and emotional life (Furstenberg Jr., Moore, & Peterson, 1985; Miller, 1998; Morris, Silk, Steinberg, Myers, & Robinson, 2007) and parents, more than other household members, are powerful sources of influence in shaping the health-related conduct of adolescents (Eisenberg, Sieving, Bearinger, Swain, & Resnick, 2006).

The involvement of parents in topics related to sex and romantic feelings is a critical factor in the prevention of risky sexual behaviours of children, which often compromises their sexual health (Cheshire, Kaestle, & Miyazaki, 2019; Olusanya, 2018). Thus, parent-child communication is considered a powerful instrument for promoting health...
prevention programmes addressed at adolescents (Widman, Choukas-Bradley, Noar, Nesi, & Garrett, 2016). Reporting a parent as a main source of sex education has been associated with later ages at first sexual intercourse and with more frequent use of contraceptives (Crosby, Hanson, & Rager, 2009; D’Cruz et al., 2015; Elton, Palmer, & MacDowall, 2018; MacDowall et al., 2015). Parental monitoring and supervision were also consistently associated with a safe and healthy sexual debut (Chewning & Van Koningsveld, 1998; Feldman & Brown, 1993; Hogan & Kitagawa, 1985; Hutchinson, Jemmott, Jemmott, Braverman, & Fong, 2003; Rodgers, Rowe, & Harris, 1992; Rogers, Ha, Stormshak, & Dishion, 2015; Small & Luster, 1994). Indeed, by expressing their own values and beliefs regarding risks, parents play a critical role in conveying sexual information as part of their communication (Eisenberg et al., 2006; Widman et al., 2016). In addition, by providing open and honest communication about sexual health issues, parents offer a powerful model to be emulated by their children in their own eventual sexual relationships (Widman et al., 2016).

Several studies, mainly conducted in the United Kingdom (UK) and the United States (USA), have reported that the level and quality of parent-child communication about sexual affairs vary according to gender. For example, British girls are found to be three times as likely as boys in reporting a parent as their main source of sex education (Macdowall et al., 2006; Macdowall et al., 2015). A large body of theoretical and empirical studies demonstrated that mothers are more likely to talk with their children about sex topics than fathers are, and more frequently with daughters than with sons, while fathers prefer talking with sons (see reviews on the topic by Di Iorio, Pluhar, & Belcher, 2003, and Racz & McMahon, 2011). Also, the style of communication is different between mothers and fathers in talking to daughters or to sons (Byers, Sears, & Weaver, 2008; Nolin & Peterson, 1992; Whalen, Henker, Hollingshead, & Burgess, 1996). Among American college students, Darling and Hicks (1982) identified a double standard in parental discourse about sexuality: when talking with a son, parents tend to emphasize the positive side of sexual experience, while with girls they often underline the risks of sexual intercourse and moral disapproval. The effect of parental communication on children’s effective behaviour changes according to whether the parent speaks to a son or a daughter. For example, Moore, Peterson, and Furstenberg (1986) found that the probability of a daughter to have early sexual intercourse is reduced if she talked with parents on the topic, while it increases for a boy. Wilson and Koo (2010) found that mothers are generally more likely to talk to both their sons and their daughters about sex than fathers, and that mothers talk much more to their daughters than their sons. More surprisingly, they found that fathers were not more likely to talk to sons than daughters about any topic and that fathers were more likely to talk to daughters than sons about one topic: dating and relationships. Similar mixed findings have been registered in relation to adolescent contraceptive behaviours, while a positive effect of parent-child communication on avoiding risks of sexually transmitted infections (STIs) has been found for both daughters and sons. Overall, studies confirm that gender is an important factor that may influence parent-child communication about sexual topics and its effects (Di Iorio et al., 2003).

Another source of variability as far as parent-child communication is concerned is the presence of siblings in the same household and the child’s birth order. According to a recent study conducted in the UK (Elton et al., 2018), first-born
children are significantly more likely to report parents as a source of sex education than later-born children. The varying psycho-social environment experienced by children of different birth order has been used as a possible explanation of these findings (Elton et al., 2018). For example, while first-born children have been described as being under pressure to conform to adults’ expectations and displaying behaviours that mirror their parents’ will, such as high self-responsibility (Baskett, 1985), later-born children have been shown to behave in the opposite way (Sulloway, 1996, 2007). First-born children have been described as more likely to report high levels of parental control and influence (Ng, Mofrad, & Uba, 2014), with parental discipline weakening from first-born to last-born (Hotz & Pantano, 2015). Moreover, parents tend to engage in different parenting strategies with children of different birth order (Hotz & Pantano, 2015) and siblings receiving more parental attention are expected to have more positive emotions towards the family compared with siblings receiving less parental attention (Bu & Sulloway, 2002). For the UK, Booth and Kee (2009) found that in the presence of more than one child, parents do not assign equal shares in the family’s educational resources and that the amount of resources devoted to each child decreases with birth order. Similar findings have been found for Italy, France (Ferrari & Dalla Zuanna, 2010), and Germany (Harkonen, 2012). Overall, the amount and quality of parent-child communication are influenced by the number of siblings. Indeed, the interaction between parents and children may be less intensive as the number of children increases since parental supervision and discipline may be harder to achieve with a greater number of children (Elton et al., 2018).

The presence of brothers and sisters within the same household plays an important role in moderating the level and quality of communication between a child and his/her parents. Interaction between siblings is an important mechanism by which adolescents socialize one another’s romantic relationship involvement and sexuality development. Having had a deep talk with siblings about sexual affairs is associated with a lower likelihood of having had an open conversation with parents on the same topic (Kowal & Blinn-Pike, 2004).

It is not just the presence and the number of siblings that must be considered as key agents in family dynamics, but also the gender constellation, with same-gender (older) siblings being more influential than opposite-gender siblings (McHale, Updegraff, & Whiteman, 2012; Widmer, 1997). The level of intimacy and the relational balance of power within sibling dyads is strongly dependent on their gender composition and since same-gender siblings are more likely to report access to shared life events than opposite-gender siblings, this contributes to increase their level of closeness. Having an older, same-gender sibling has been linked with a high probability of confiding in him/her and to use the sibling as a socializing agent of sexuality (Killoren & Roach, 2014; McHale et al., 2012; Rodgers & Rowe, 1988). Moreover, some research has argued that what has been considered a “same-gender effect” is better described as a “sister-effect” suggesting that a sisters’ dyad may be particularly important in the socialization of adolescent sexuality due to their greater levels of intimacy (Widmer, 1997).

In this paper, we address the topic of parent-child communication about sex and romantic feelings in Italy, exploring differences by birth order. We will also question if
and how parent-child communication changes according to gender composition of the offspring.

The specific aims of this paper are:

1. To investigate whether parental involvement in sex education and the quality of parent-child communication about romantic feelings differ according to the respondent’s birth order. We expect a lower involvement with later-born children than with first-born or only children (HP1).

2. To verify whether the above relationship is differentiated by gender: we expect that differences between being an only child or first-born and later-born are higher for male respondents (HP2).

3. To explore whether sib-ship gender composition contributes to explaining this difference. More specifically, the following hypotheses have been formulated:

- (HP3_1) Since a same-gender sibling may serve as a referent-person in confiding romantic feelings and sexual experiences, we hypothesize that individuals having only same-gender siblings or at least one same-gender older sibling are less likely to report of having had a deep communication with parents about sex and sentiments than those having only opposite-gender siblings.

- (HP3_2) Since dyads of sisters are more likely to provide socialization of adolescent sexuality, this effect is expected to be higher if the respondent is a girl (the “sister effect”).

This is the first study looking at the association between birth order and parent-child communication about sex and romantic feelings in Italy. Exploring the determinants of parental involvement in sex education may contribute to target effective preventive programmes aimed at promoting healthy sexual debut and behaviours over the life span (Miller & Whitaker, 2001). Indeed, with the aim of addressing the simultaneous role of family members as confidants about sexuality, this paper seeks to elucidate underestimated aspects of intimate communication between parents and children, related to birth order and sib-ship gender composition.

**Data and method**

**Data and analytic strategy**

Data are drawn from the Sexual and Emotional Life of Youths surveys (SELFY) that were carried out in 2000 and 2017 in 28 Italian universities, with the aim of drawing an updated picture of sexual and emotional opinions and behaviours among Italian university students attending Italian undergraduate courses in Economics and Statistics (Dalla Zuanna, Caltabiano, Minello, & Vignoli, 2019). About 5000 students in 2000 and 8000 in 2017 were surveyed using a self-completed questionnaire filled out in the classroom during a lecture. After the exclusion of incomplete and poorly filled out questionnaires, the sample survey consists of 12,604 cases (4762 individuals interviewed in 2000 and 7842 in 2017). Survey focus is on the emotional life of respondents, asking questions on first intercourse
determinants and on intercourse and sentimental relationship event history, along with personal, social, and family information. For both 2000 and 2017, the data were post-stratified at the macro-region level to obtain representative results at the national level. The analytic sample used in the current study comprises 12,265 students (48.19% men) on the basis of complete cases of the main variable of interest (3% of non-response).

After a sample descriptive analysis (Table 1), four multivariate logistic regression models with and without interaction terms have been estimated in order to investigate whether having or not having older siblings and the sib-ship gender composition is associated to parent-child communication about (1) sex development, (2) STIs, (3) contraceptives, and (4) romantic feelings. We performed a two-step analysis. First, we tested the effect of birth order on the probability of having had a deep conversation with parents (HP1) and the moderating effect of gender (HP2). Full model coefficients estimates are reported in Table 2. Then, we concentrated on the sub-sample of respondents who are “later-born” children, that is, those with at least one older sibling \(N = 6,261\), and we deepened the analysis of the association between the different sib-ship gender composition (HP3_1) and parent-child communication, controlling again for the moderating effect of gender (HP3_2). The results are reported in Table 3. Predicted probabilities have been estimated from logistic regressions and have been reported in Figs. 1, 2, 3. Details on the variables included in the models are provided in the following section.

**Variables**

**Dependent variables**
Parental involvement in sex and sentimental education was assessed by identifying four outcome variables. Respondents were asked whether they had ever spoken with parents during their adolescence (14 to 18 years old) about (1) sexual development, (2) STIs, (3) contraceptive methods, and (4) romantic feelings.

The survey coded possible answers as follows: “never”, “in a superficial way”, and “in a deep way”. In order to capture a profound level of parental involvement in sex education, we created a dummy variable which takes value 1 if they reported having spoken with their parents in a deep way and 0 otherwise. Unfortunately, information about parent-child communication is not distinguished between mother and father. Thus, we cannot account for parental gender.

**Independent variables**
The key explanatory variable is birth order. The questionnaire does not exactly provide the birth order of all the children present in the family. We know the respondent’s date of birth and that of the first child born to the parents. In addition, the respondent is asked if he/she has older brothers or sisters. The variable was therefore dichotomized as first-born/only child versus later-born child.

Sib-ship gender composition: Among later-born respondents, we can distinguish the gender composition of the siblings-ship; thus, we included a variable accounting for whether the respondent was a later-born of same-gender siblings, of opposite-gender or of mixed-gender siblings.

Parent-child communication is correlated to a number of factors that we controlled for in all the models. Specifically, we included the respondent’s gender, age at the interview (18 to
Table 1 Distribution of the sample variables by birth order

| Variables                              | Total       | First-born child | Later born | p-value |
|----------------------------------------|-------------|------------------|------------|---------|
|                                        | N = 12,265  | N = 6,004        | N = 6,261  |         |
| **Dependent**                          | %           |                  |            |         |
| Having had a deep communication with parents (at least one of them) between ages 14-18 about: |             |                  |            |         |
| Sexual development                     | 20.78       | 24.17            | 17.43      | <0.001  |
| Sexually Transmitted Infections (STIs) | 19.72       | 22.17            | 17.15      | <0.001  |
| Contraceptive methods                  | 19.98       | 23.35            | 16.63      | <0.001  |
| Romantic Feelings                     | 23.32       | 26.07            | 20.67      | <0.001  |
| **Independent**                        | %, Mean (SD)|                  |            |         |
| Sibship gender composition             |             |                  |            |         |
| Later born of same-gender siblings     | 44.63       |                  |            |         |
| Later born of opposite-gender siblings | 43.06       |                  |            |         |
| Later born of mixed-gender siblings    | 12.31       |                  |            |         |
| Gender: Woman                          |             |                  |            |         |
| Man                                    | 48.19       | 49.67            | 46.72      | <0.01   |
| Age at the interview                   | 21.07 (1.47) | 21.06 (1.45)     | 21.08 (1.48) | <0.1   |
| Country of birth: Italy                |             |                  |            |         |
| Other                                  | 4.10        | 4.20             | 3.99       | >0.1    |
| Living in Southern Italy               | 40.75       | 35.44            | 45.66      | <0.001  |
| Lower secondary school’s grade         | 8.35 (1.22) | 8.41 (1.21)      | 8.29 (1.22) | <0.001  |
| Participation in religious groups (respondent 11-13 years old) |             |                  |            |         |
| Never                                  | 53.44       | 55.02            | 51.93      | <0.01   |
| Some times                             | 18.04       | 17.62            | 18.46      |         |
| Often                                  | 31.52       | 31.36            | 31.48      |         |
| Very often                             | 12.64       | 11.70            | 13.56      |         |
| Talk with friends about sex (respondent 11-13 years old) |             |                  |            |         |
| Never                                  | 53.59       | 53.48            | 53.76      | >0.1    |
| Some times                             | 37.66       | 37.94            | 37.40      |         |
| Often                                  | 6.66        | 6.43             | 6.84       |         |
| Very often                             | 2.11        | 2.15             | 1.99       |         |
| Family structure                       |             |                  |            |         |
| Parents divorced before respondent’s age of 13 | 5.58       | 6.60             | 4.59       | <0.001  |
| Mother educational level               |             |                  |            |         |
| up to lower-secondary level             | 31.23       | 28.27            | 34.14      | <0.001  |
| upper-secondary level                   | 49.33       | 51.07            | 47.69      |         |
| university or higher level              | 19.44       | 20.66            | 18.17      |         |
| Father educational level               |             |                  |            |         |
| up to lower-secondary level             | 33.34       | 32.08            | 34.66      | <0.001  |
| upper-secondary level                   | 46.40       | 48.13            | 44.69      |         |
| university or higher level              | 19.26       | 19.89            | 20.65      |         |
| Father’s job                           |             |                  |            |         |
| never worked                           | 0.88        | 0.98             | 0.77       | <0.001  |
| low-skilled                            | 36.02       | 36.66            | 35.46      |         |
| medium-skilled                         | 32.29       | 33.03            | 31.58      |         |
| high-skilled                           | 30.81       | 29.34            | 32.19      |         |
| Mother employment status (respondent 11-13 years old) |             |                  |            |         |
| Yes, employed                          | 33.15       | 29.99            | 36.15      | <0.001  |
| Distance in years from first born      | 1.90 (3.92) | 0 (0)            | 3.74 (4.80) |         |
| Mother’s age at time of respondent’s birth |             |                  |            |         |
| <25                                    | 14.40       | 22.68            | 6.45       | <0.001  |
| 25-30                                  | 38.81       | 44.90            | 32.89      |         |
| 30-35                                  | 19.40       | 15.36            | 23.39      |         |
| 35-40                                  | 17.38       | 9.43             | 25.11      |         |
| 40+                                    | 10.02       | 7.63             | 12.27      |         |
| Father’s age at time of respondent’s birth |             |                  |            |         |
| <25                                    | 3.59        | 6.08             | 1.23       | <0.001  |
| 25-30                                  | 27.17       | 38.64            | 16.08      |         |
| 30-35                                  | 22.43       | 22.95            | 21.98      |         |
| 35-40                                  | 28.11       | 19.99            | 35.98      |         |
| 40+                                    | 18.70       | 12.34            | 24.72      |         |
| Way to react to parental rules (respondent 16-18 years old) |             |                  |            |         |
| Accepting without discussing           | 19.87       | 20.65            | 19.75      | 0.05    |
| Seeking to negotiate more freedom      | 62.13       | 61.16            | 62.93      |         |
| Quitting                              | 17.99       | 18.79            | 17.32      |         |
| Survey                                 |             |                  |            |         |
| 2017                                   | 62.18       |                  |            |         |

Source: SELFY (2000 and 2017)

Note: p value refers to the \( \chi^2 \) test for categorical variables and to two-sample t test for continuous variables. SD standard deviation.
Table 2 Estimated coefficients of logistic regression models for the probability to have a deep communication with parents on sexual and romantic topics—ALL students

| Variable | (1) Sexual Development | (2) NTH | (3) Contraceptive practice | (4) Romantic Feelings |
|----------|------------------------|---------|--------------------------|---------------------|
|          | (B)                    | (SE)    | (B)                      | (SE)               |
| Later born (ref: first-born child) | 0.294*** | (0.070) | 0.154*** | (0.076) | 0.2790** | (0.071) | 0.2394*** | (0.077) |
| Male (ref: female) | 0.476** | (0.070) | 0.178 | (0.072) | 0.2000** | (0.070) | 0.2132*** | (0.070) |
| Later born (ref: last-born) | 0.366    | (0.101) | 0.002 | (0.101) | 0.078    | (0.099) | 0.168    | (0.096) |
| Age at the interview | 0.037** | (0.017) | 0.071 | (0.017) | 0.029    | (0.018) | 0.174*** | (0.017) |
| Country of birth (ref: Italy) | 0.273*** | (0.042) | 0.228 | (0.032) | 0.185    | (0.039) | 0.279    | (0.037) |
| Living in Southern Italy (ref: yes) | 0.408*** | (0.056) | 0.134*** | (0.054) | 0.403*** | (0.055) | 0.388    | (0.051) |
| Lower secondary school’s grade | 0.025 | (0.007) | 0.057*** | (0.007) | 0.069*** | (0.007) | 0.058    | (0.007) |
| Participation in religious groups (ref: none) | 0.090 | (0.009) | 0.132* | (0.008) | 0.091    | (0.009) | 0.054    | (0.008) |
| Often (ref: never) | 0.199** | (0.059) | 0.115* | (0.057) | 0.015    | (0.057) | 0.147** | (0.067) |
| Very often (ref: never) | 0.307    | (0.062) | 0.152** | (0.054) | 0.034    | (0.054) | 0.156** | (0.052) |
| Worked (ref: never) | 0.286*** | (0.050) | 0.102* | (0.045) | 0.191* | (0.046) | 0.286*** | (0.052) |
| Ever (ref: never) | 0.352* | (0.193) | 0.235 | (0.186) | 0.016    | (0.198) | 0.060    | (0.196) |

Source: SELFY (2000 and 2017)
Note: N = 12,160. Log-odds (B) and standard error (SE) *p < 0.1, **p < 0.05, ***p < 0.01. Respondents reporting “never-work” fathers have been excluded from the analyses

Table 3 Estimated coefficients of logistic regression models for the probability to have a deep communication with parents on sexual and romantic topics—later-born students

| Variable | (1) Sexual Development | (2) NTH | (3) Contraceptive practice | (4) Romantic Feelings |
|----------|------------------------|---------|--------------------------|---------------------|
|          | (B)                    | (SE)    | (B)                      | (SE)               |
| Later born of same gender siblings (ref: later born of opposite gender siblings) | 0.140 | (0.067) | 0.115 | (0.108) | 0.170 | (0.107) | 0.092 | (0.091) |
| Later born of opposite gender siblings | 0.276** | (0.074) | 0.224 | (0.083) | 0.300** | (0.102) | 0.276** | (0.111) |
| Male (ref: female) | 0.512*** | (0.118) | 0.131 | (0.113) | 0.272*** | (0.133) | 0.350*** | (0.119) |
| Later born of same gender siblings (ref: later born of opposite gender siblings) | 0.191 | (0.091) | 0.168 | (0.127) | 0.164 | (0.138) | 0.158 | (0.157) |
| Later born of opposite gender siblings (ref: later born of same gender siblings) | 0.307 | (0.236) | 0.326 | (0.336) | 0.323 | (0.353) | 0.319 | (0.359) |

Source: SELFY (2000 and 2017)
Note: N = 6213. Log-odds (B) and standard error (SE) *p < 0.1, **p < 0.05, ***p < 0.01. The estimates are fully adjusted for the covariates as reported in Table 1. Respondents reporting “never-work” fathers have been excluded from the analyses
explicitly talking about sex?”. Possible answers were “never”, “sometimes”, “often”, and “very often”.

The characteristics of the family of origin were measured through a set of variables referring to when the child was 13 years old. First of all, we considered whether parents were divorced or not. Indeed, union dissolution is often associated with the risky behaviours of children, since it implies reduced parental control and lower mentoring of children’s socialization to sexuality (McLanahan & Bumpass, 1988). As for indicators of the household socio-economic status, we included the mother’s and father’s educational levels and the father’s job. The educational level was categorized as: “up to lower-secondary level” (no title, elementary school, lower-secondary school); “upper-secondary level” (upper-secondary courses lasting from 2/3 to 5 years), and “university or higher level” (university and post-university degree). The father’s job includes the following categories: “never worked”, “low-
skilled” (unskilled manual worker, lower-grade routine non-manual employee, lower-grade military officer), “medium-skilled” (skilled manual worker, higher-grade routine non-manual employee, teacher, self-employed with or without employees), or “high-skilled” (entrepreneur, manager, professional with or without employees, higher-grade military officer). The level of communication of parents with adolescent children might be related to time spent with them at home; thus, we controlled for whether the mother was employed when the respondent was 13 years old (“not employed” or “employed”). Since the date of births of each sibling is not available, but only that of the parent’s first child, we added a variable accounting for the time spacing between the respondent’s birth and that of his/her oldest brother or sister, that is the birthday of the first child born to the student’s parents. We assume that the longer this time interval, the greater the distance between parents and the younger children in terms of communication (Ferrari & Dalla Zuanna, 2010; Merllié & Monso, 2007). Even the parents’ age matters: the capacity of parents to take care of children (Juster, 1985; Walter, 1986), to relate to them (Heuvel, 1988) and to spend time with them (Sayer, Gauthier, & Furstenberg Jr., 2004) decreases with age. This negative effect could be counterbalanced by the economic advantage to have relatively old parents. In fact, older parents generally have higher economic resources compared with younger ones since socio-economic situations tend to improve over the life course and this is a potential advantage for children in terms of material resources available (Powell, Steelman, & Carini, 2006). Thus, we controlled for the mother’s and father’s age at the time of the respondent’s birth. The variable includes four age classes: under 25, 26–30; 31–35; 36–40; over 40. Finally, since birth-order differences in the level of communication with parents between age 14 and 18 may strongly be correlated to the overall quality of the relationship with them, especially in terms of how they react to the restrictions set forth by parents (Malacane & Beckmeyer, 2016; Wilson, Dalberth, Koo, & Gard, 2010), we controlled for how students
reported about their usual way to react to parental rules: 1 = “seeking to negotiate more freedom”; 2 = “accepting without discussing”; 3 = “quarrelling”.

As said above, the data came from two successive cross-sectional surveys carried out in 2000 and 2017. We pooled the two surveys and introduced a dummy variable in the model indicating whether the respondent was interviewed in 2000 or in 2017. Thus, we verified whether the level of parent-child communication regarding sexual matters has changed over time as in other countries (Tabak et al., 2012) or whether it is substantially stable as suggested by previous analyses of these same data (Dalla Zuanna et al., 2019).

Results
Descriptive statistics
Descriptive statistics are reported in Table 1, revealing meaningful differences between the two groups of respondents: first-born/only child ($N = 6004$) versus later-born children ($N = 6261$). Later-born students, almost half of whom have same-gender siblings, display lower levels of communication with parents about sexual development, STIs, contraceptive methods, and romantic feelings than first-born/only child students ($\chi^2$ $p$ value < 0.001).

Men represent 48.2% of the sample and the mean age of respondents is about 21 years old. About 96% of the sample is composed of students born in Italy and 41% live in the South. The final lower-secondary school grade for later-born students was significantly lower on average than for first-born/only child students, but respondents with older siblings participated in religious groups (when 11–13 years old) and reported to seek to negotiate more freedom from parents’ rules more often than the first-born/only children. Only about 6% of the students enrolled in the study have experienced parental divorce during their childhood and the prevalence is slightly higher among first-born/only children. Most respondents reported having parents with an upper-secondary level of education, but the percentage is significantly lower among students with older siblings. Instead, we observe a slightly higher prevalence of later-born students whose fathers had a high-skilled job (32.1%) compared with first-born/only child students (29.3%, $\chi^2$ $p$ value < 0.001). Statistically, significant differences based on birth order have been also found for the mother’s employment status, with later-born students more often reporting working mothers ($\chi^2$ $p$ value < 0.001). The proportion of those having parents who were aged 35+ when they were born is significantly higher among later-born students compared with first-born/only child students ($\chi^2$ $p$ value < 0.001).

The association between birth order and parent-child communication
Table 2 displays the results from multivariate logistic regression models testing the association between the birth order and the level of communication with parents about, respectively, sexual development (model 1), STIs (model 2), contraceptive methods (model 3), and romantic feelings (model 4). Net of socio-economic and demographic characteristics, the association between birth order and having had deep communication with parents about sexual development, STIs, contraceptive methods, and romantic feelings was statistically significant and negative in sign as expected (HP1).

\[\text{Since the frequency of “never worked” fathers is very low (0.88%), these cases have been dropped out from the following regression analysis although a check has shown that their inclusion did not change the results (available upon request).}\]
In order to ease the interpretation of results, we computed the predicted probabilities (Fig. 1) for an individual to have had a deep conversation with parents on each specific topic. Compared with first-born/only child students, being a later-born child reduces the probability of having had a deep communication with parents about sexual development by 4.5 percentage points ($p$ value < 0.01); that of talking about STIs by 2.3 percentage points ($p$ value < 0.01), and the probability of having had a deep communication with parents about contraceptive methods and romantic feelings by 3.5 and 4.1 percentage points, respectively ($p$ value < 0.01).

Parent-child communication is also highly differentiated by gender, with boys significantly less likely than girls to talk with parents about sexual development, contraceptive methods, and romantic feelings. Figure 2 shows the predicted probabilities of a deep communication with parents on different topics based on the respondent’s gender. The boys’ probability of having had a deep communication with parents about sexual development is about 12 percentage points lower than girls ($p$ value < 0.01); to have discussed contraceptive methods with parents is about 4 percentage points lower than for girls ($p$ value < 0.01); concerning romantic feelings, the difference in terms of probability between men and women is even higher, with men being about 14 percentage points less likely to turn to parents as confidants during adolescence ($p$ value < 0.01). Finally, our analyses did not show any statistically significant difference in the probability to have had a deep communication with parents about STIs between men and women ($p$ value > 0.1).

In order to test the hypothesis that the effect of having older siblings on the level of communication with parents is not the same for girls and for boys (HP2), we included an interaction term between birth order and gender. This term is not statistically significant in any model ($p$ value > 0.1) showing that gender did not moderate the association between birth order and the outcomes. Thus, our second hypothesis (HP2) is not confirmed.

Table 2 includes the results for the socio-demographic correlates and other control variables included in the logistic regression model, one for each of the topics of conversation considered. Many of the effects are in line with our expectations, while others are quite unexpected and will deserve further studies. Overall, the odds of having had a deep communication with parents about sexual development and romantic feelings decrease with respondent’s age is lower if the respondents were resident in the South of Italy and if secondary school performance was low (significantly so only for the models on talking about STIs and contraceptive methods). Having regularly participated at religious groups in the pre-adolescence period was positively associated with having had deep talks with parents later in life about sexual development, STIs, and romantic feelings but not about contraceptive methods, suggesting that students raised within a religious context were more likely to have learned an open way to talk about sexuality with adults. Also, having often talked about sex with friends in the pre-adolescence period (age 11 to 13) was positively associated with confidence with parents in the following years (14 to 18), which is a somewhat unexpected result. Contrary to our expectations, parental union dissolution before the age of 13 was positively associated with a

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2Figures of predicted probability and their 95% confidence intervals (CI) have been reported in Appendix Table 4. In Table 5, the average marginal effects (AMEs) are reported. The AME of each covariate represents the percentage points change in the predicted probability of having had a deep communication with parents about sex and romantic feelings for key independent variables, averaged across the values of the other covariates.
deep communication with parents around each topic considered. The mother’s high level of education showed positive and statistically significant effects on deep communication with adolescent children and the same held for the father’s high-skilled job, suggesting a positive association between the parents’ socio-economic status and their ability to communicate with their children. Parental age was not always significant but when it was, the direction of the effect is the expected one: the older the parent, the lower the odds of talking with their children about sex and romantic feelings. The mother’s age seems to count more in this respect. As expected, if the respondent used to quarrel with parents as a reaction to their rules and restrictions when he/she was adolescent, the odds of involving them in discussions about sex and feelings were reduced. This result confirms that the quality of the relationship with parents plays a fundamental role in providing a solid base from which to have a deep communication.

Finally, the year-of-survey term was significant whichever topic is considered ($p < 0.1$ for sexual development and $p < 0.01$ for the other topics), suggesting that parent-child communication about sex and feelings has changed in the last 17 years. However, the sign is varying: the odds of talking with parents about sexual development and sexually transmitted diseases have reduced between the surveys 2000 and 2017, while the odds of talking with parents about contraceptive methods and romantic feelings have increased. We will further discuss these results in the concluding section of this paper.

The role of the sib-ship gender composition

Focusing on the sub-sample of students who were later-born children, that is, those who declared having older living brothers or sisters at the time of the interview, we explored possible differentials arising from sib-ship gender composition. Results reported in Table 3 and Fig. 3 show that compared with later-born opposite-gender siblings, those growing up with older same-gender siblings were less likely to have had a deep talk with parents, but only as for contraceptive methods (significance at 10% level). On average, the probability of having had a deep communication with parents about contraception among students with same-gender siblings was about 2 percentage points lower ($p$ value < 0.1) than among those who are later-born of only opposite-gender brothers/sisters. Also, students with mixed-gender older siblings showed a significantly lower probability than students who have only opposite-gender siblings to have had a deep communication with parents about sexual development, contraceptive methods, and romantic feelings ($p$ value < 0.01). Thus, our hypothesis that having at least one older sibling of own gender prevents children from having a deep communication with parents on sexual affairs and romantic feelings (HP3_1) cannot be refused. Even in this case, the respondent’s gender does not significantly moderate the role of sib-ship gender composition: the interaction term between these two variables is not statistically significant in any model. Thus, our last hypothesis (HP3_2), namely the stronger effects of having older, same-gender siblings for girls than for boys—the “sister effect”—is not verified.

Discussion

The first aim of this paper was to explore whether birth order is related to the level of communication with parents about sexual matters and romantic feelings among Italian

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3The effects of the socio-demographic and other control factors are practically the same as those reported in Table 2 for the whole sample. Thus, in Table 3, we only reported coefficients of interest adjusted for the other covariates.
university students. Our findings contribute to previous work by identifying later-born students as significantly less likely than first-born/only children to enter into a deep communication with parents about sexual development, STIs, contraceptive methods, and romantic feelings. According to existing evidence from other European countries, these results demonstrate important disparities in family involvement in sex education, probably due to an increasing dilution of parental time and resources as the number of children increases (Elton et al., 2018; Ferrari & Dalla Zuanna, 2010; Harkonen, 2012; Pasqualini et al., 2019). The number of siblings could even intensify the proven effect that birth order has on parent-child interactions, since parental time must be distributed more widely and because parental supervision and discipline may be harder to achieve with a greater number of children. Unfortunately, we cannot account for the exact number of children born to parents of our respondents.

Overall, our results also confirm that girls are more likely than boys to talk about “certain” matters with parents (Di Iorio et al., 2003). However, the hypothesis of a moderating role of gender in birth-order effect is not confirmed.

As a second aim, we were interested in further exploring birth-order effects by accounting for the sib-ship gender composition. First, we hypothesized that most of the effect found of being a later-born (vs being a first-born/only child) was due to the fact of being a later-born child with same-gender siblings. Our analyses support the hypothesis by showing that later-born children with at least one same-gender sibling were overall less likely to have had a deep communication with parents compared with students who only had opposite gender older siblings. This finding is in line with prior work showing that having an older same-gender sibling increases the likelihood of referring to siblings as a source of information and as a confidant for romantic affairs by, therefore, decreasing the parental involvement in sex education (Killoren & Roach, 2014).

We also hypothesized that the above effect was moderated by the respondent’s gender, that is we expected that the difference between having same-sex siblings and having opposite-sex siblings was more important among girls than boys (Kowal & Blinn-Pike, 2004). However, this “sister effect” did not emerge in our analysis based on a sample of Italian university students.

Our estimates draw an interesting picture of changes that occurred in young people’s communication with parents about sex and romantic feelings over the last 20 years in Italy. Controlling for the other covariates, the probability of turning to parents as a source of information about sexual development and STIs slightly decreased over time, while the probability of having had a deep communication with parents about contraceptives and romantic feelings during adolescence increased. These results should be looked at as a sign of the changing times: in 2000, the survey was carried out in a historical period of great concern for young people’s health due to the spread of sexually transmitted diseases, especially HIV. Many campaigns were in place in Italy to encourage young people to avoid risky behaviours and to increase the use of condoms. It is reasonable to think that conversations with parents were also strongly oriented to these issues. Over time, the alarm of public opinion has somewhat subsided, although this less concern is not supported by scientific and epidemiological evidence, that, instead, documents a persistently high incidence of HIV and STIs in the young population (ECDC, 2018). Meanwhile, the intergenerational discourses have shifted to the domain of feelings and contraceptive choices.

Students residing in the South appears less involved with parents in deep communication, especially about sexual development, STIs, and contraceptive methods: even
controlling for level of education and household socio-economic status, the cultural resistance of southern Italian parents to talk about “certain things” with their children remains (Barbagli & Kertzer, 1990; Impicciatore & Dalla Zuanna, 2006). Among parental characteristics, the most astonishing result was that related to divorce: contrary to our expectation, based on a rich sociological literature, parental divorce does not interrupt the dialogue with children on issues of sexuality and romantic feelings, but rather communication on these matters seems to intensify. Although parental divorce is often associated with reduced parental control and low parental mentoring of children’s socialization of sexuality, our results suggest that the mechanism by which the parent-child communication changes after parental divorce needs to be further explored. What is really important is the quality of the relationship between parents and children: in fact, we found an important impact of the way young people reacted to the impositions of parents when they were teenagers on the subsequent dialogue on intimate matters.

Contrary to our expectations, we found a positive association between trust with peers and that with parents on sexual matters and romantic feelings. It should be noted that we considered friends during pre-adolescence and not the current ones, so we could not expect a substitution effect but rather an indicator of the respondent’s ability to open up and communicate on intimate subjects. In the same direction, we interpreted the result of the positive association between participation in religious groups when 11 to 13 years old and communication with parents. These findings support the evidence that connectedness, that is the emotional attachment and commitment a child makes to social relationships in the family, peer group, school, etc., is a good predictor of healthy sexual behaviour for youth (Markham et al., 2010).

Some specific limitations of this work must be acknowledged. By the study design, the sample is highly selective since it was collected from university students of selected faculties (Economics and Statistics) and thus evidences are non-representative of the entire Italian youth population. Moreover, we were neither able to differentiate between first-born and only child, or between middle children and last-born children, nor control for the gender of the parents involved in the talking. These gaps in the dataset prevented us from controlling for the number of siblings and for which parent the respondent had deeper communication with about sex and romantic feelings.

We must also underline that both the theoretical and empirical research on this topic is rather scarce and not very updated. Furthermore, prior research mostly focused on the Anglo Saxon and American contexts, and no previous study has been conducted so far on Italy.

This study has the merit of adding content to prior research investigating the determinants of parental involvement in sex education by providing empirical evidence on the Italian case. Moreover, using two comparable waves, we were able to contribute to elucidating changes in family involvement about sexual issues over time.

Despite the undoubted limitations of this research, we wish to underline the possible impact of our results for the policy: there is a general consensus on the importance to enhance the quality of parental involvement in sex and romantic relationship education of their children, which could help to properly elaborate family-based interventions aimed at promoting adolescent health and education (Miller & Whitaker, 2001; WHO, 2015). Our study suggests that an effective assessment of the quality of parent-child communication in these programmes should take into account the non-negligible role played by siblings.
## Appendix

### Table 4: Predicted Probabilities

| Variable                      | (Column) (Row) | (Column) (Row) | (Column) (Row) | (Column) (Row) |
|-------------------------------|----------------|----------------|----------------|----------------|
|                               | Birth order    | Male           | Female         | Male           |
|                               | Pred. Prob.    | 95% CI         | Pred. Prob.    | 95% CI         | Pred. Prob.    | 95% CI         | Pred. Prob.    | 95% CI         |
| First born/only child         | 0.25           | (0.23 - 0.26)  | 0.20           | (0.19 - 0.21)  | 0.21           | (0.20 - 0.22)  | 0.20           | (0.19 - 0.22)  |
| Same sex                      | 0.18           | (0.17 - 0.19)  | 0.18           | (0.17 - 0.19)  | 0.17           | (0.16 - 0.19)  | 0.17           | (0.16 - 0.19)  |

Source: SELFY (2000 and 2017)

Note: N = 12,160 for hypothesis 1 and 3. N = 6,213 for hypothesis 3; Predicted probabilities with 95% Confidence Intervals (CI). *p < 0.1, **p < 0.05, ***p < 0.01

### Table 5: Fully Adjusted Average Marginal Effects for Predicted Probabilities

| Variable                      | (Column) (Row) | (Column) (Row) | (Column) (Row) | (Column) (Row) |
|-------------------------------|----------------|----------------|----------------|----------------|
|                               | Male           | Female         | Male           | Female         |
|                               | AME, SE        | AME, SE        | AME, SE        | AME, SE        |
| Late born (ref. First born/only child) | -0.041 *** | (0.009)        | -0.069 *** | (0.009)        | -0.040 *** | (0.009)        |
| Same sex                      | -0.019 *** | (0.009)        | -0.021 *** | (0.009)        | -0.023 *** | (0.009)        |
| Same sex                      | -0.018 *** | (0.009)        | -0.019 *** | (0.009)        | -0.017 *** | (0.009)        |

Source: SELFY (2000 and 2017)

Note: N = 12,160 for hypothesis 1 and 3. N = 6,213 for hypothesis 3; Average Marginal Effects (AMEs) with standard errors (SE). *p < 0.1, **p < 0.05, ***p < 0.01
Authors’ contributions

MP conceived the study, performed the statistical analysis, and drafted the manuscript for the background, the empirical strategy and the results sections. ADR participated in the research design and drafted the manuscript for the data, methods, discussions, and conclusion sections. All the authors declare that they read and approved the final manuscript.

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Availability of data and materials

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

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