Parental Separation, Parental Alcoholism, and Timing of First Sexual Intercourse

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Abstract

Purpose—We examined timing of first voluntary sexual intercourse as a joint function of parental separation during childhood and parental history of alcoholism.

Methods—Data were drawn from a birth cohort of female like-sex twins (*n*=569 African Ancestry [AA], *n*=3415 European or other Ancestry [EA]). Cox proportional hazards regression was conducted predicting age at first sex from dummy variables coding for parental separation and parental alcoholism. Propensity score analysis was also employed comparing intact and separated families, stratified by predicted probability of separation.

Results—Earlier sex was reported by EA twins from separated and alcoholic families, compared to EA twins from intact nonalcoholic families, with effects most pronounced through age 14. Among AA twins, effects of parental separation and parental alcoholism were largely nonsignificant. Results of propensity score analyses confirmed unique risks from parental separation in EA families, where consistent effects of parental separation were observed across predicted probability of separation. For AA families there was poor matching on risk-factors presumed to predate separation, which limited interpretability of survival-analytic findings.

Conclusions—In European American families, parental separation during childhood is an important predictor of early-onset sex, beyond parental alcoholism and other correlated risk-factors. To characterize risk for African Americans associated with parental separation, additional research is needed where matching on confounders can be achieved.

Keywords

sexual intercourse; parental separation or divorce; parental alcoholism; survival analysis; propensity score analysis

Introduction

Identification of risk-factors for early sexual intercourse is essential for informed design of programs to prevent teenage pregnancy [1,2]. Compared to teens delaying first sex until later adolescence, sexually active young teens are less likely to use condoms or other birth control [3], have on average more sexual partners, including multiple concurrent partners [4], and consequently are at increased risk of sexually transmitted infection and early pregnancy [5,6]. Teenage childbearing is in turn associated with a host of negative consequences to mothers and their children, with costs to society also documented [7].

Parental separation following divorce or nonmarital dissolution is a well-known predictor of sexual behavior during adolescence. Numerous studies find that children whose parents are no longer together report a younger age at first sexual intercourse than children from intact, two-parent families [8,9]. Although much of this research has been conducted with predominantly non-Hispanic Whites, there are a handful of studies reporting effects specific to minority families, including African Americans. For African American families, parental separation is likewise predictive of earlier first sex, especially among girls [10–12].

Sexual onset has received limited attention in research on children of alcoholics (COAs). In the few published reports, significant associations between parental alcohol misuse and early sex have been observed [13–15], albeit in samples where non-Hispanic White families again predominate. To our knowledge, there are no studies linking parental alcoholism and sexual activity in African American adolescents. Thus, it is unknown whether African American COAs are also at increased risk of early-onset sex, relative to African American children of nonalcoholic parents.

Whether the effects of parental separation on sexual timing are distinct from risks associated with parental alcoholism is also unknown. History of alcoholism is highly predictive of dissolution of reproductive relationships [16] and each increases risk of correlated problem behavior in offspring [17], notably early drinking and other substance use [18,19]. In the present paper, to identify unique risk from parental separation, we examined age at first voluntary sexual intercourse as a joint function of parental separation during childhood and parental alcoholism. For increased confidence in observed effects, we employed both survival and propensity score analyses conducted separately for African and European ancestry families.

Methods

Participants

Data were drawn from the Missouri Adolescent Female Twin Study [16,20], a prospective study of female like-sex twin pairs born July 1975-June 1985 identified from Missouri-state birth records [*N*=370 African American (AA), 1999 European or (in rare cases) Other Ancestry (EA) pairs]. A cohort-sequential sampling design was used, with initial cohorts of 13, 15, 17, and 19 year-old twins and their families recruited during the first two years of data-collection and continued recruitment of 13 year-olds in years three-four. In addition to baseline telephone interviews conducted with parents, all twin pairs were targeted for three waves of telephone interviews (Waves 1, 4 and 5, at median ages 15, 22 and 24, respectively). Subsamples of twins completed a brief one-year follow-up (Wave 2) and/or a three-year retest interview (Wave 3). For each wave, participants gave verbal consent (or assent if minors) following procedures approved by the institutional review board at Washington University. A detailed summary of response rates is provided elsewhere [16].

Present analyses were based on parent interviews and Waves 1, 3, 4 and 5 twin interviews. Twins were selected if they had data on voluntary sexual intercourse and both parental separation and parental alcoholism described below. We excluded 11 twins (6 AA, 5 EA) reporting onset of voluntary sex prior to age 12 (on the presumption that sex at ages 11 and younger is likely to involve coercion even if reported as voluntary [21]), leaving a sample of 3984 twins (569 AA, 3415 EA) from 2088 families (304 AA, 1784 EA). Propensity score analyses were based in part on maternal ratings of alcohol problems and therefore limited to 1568 twin-families (187 AA, 1381 EA) with maternal data. At last assessment of voluntary sex, twins ranged in age from 15 (Wave1) to 29 (Wave 4) years. Additional sample characteristics are provided in Table S1, separately by race/ethnicity and presence/absence of parental separation and parental alcoholism.

Measures

Measures were drawn from telephone adaptations of the Semi-Structured Assessment of the Genetics of Alcoholism (SSAGA; [22,23]), a semi-structured diagnostic interview developed for the Collaborative Study on the Genetics of Alcoholism [24]. Parents completed the SSAGA-II, the DSM-IV update to the DSM-IIIR-based SSAGA. Twins completed the child or adolescent version of the SSAGA-II.

Timing of first sex—History of voluntary sexual intercourse, including age of onset, was assessed of twins aged 16 and older at Wave 1 and all twins at Waves 3 and 4. Twins were asked, "Have you ever had sexual intercourse (other than when you were forced)?" and for those responding affirmatively, "How old were you when you first had sexual intercourse (other than when you were forced)?" Youngest reported age at first voluntary sexual intercourse was coded for twins with multiple reports across assessment waves; however, youngest and first report were highly correlated (*r*=0.98, *p*<0.05). History of forced sexual intercourse during childhood was coded separately as sexual abuse and included among control variables described below.

Parental separation—Parental separation prior to twins' age 18 was coded from parent and Waves 1, 3, 4, and 5 twin interviews. Consistent with previous work [16,19], parental separation was defined as change in marital and/or cohabitation status for reasons of relationship dissolution. Twins' age at separation was coded from year parents' marriage ended or, if missing, age last lived with both parents. Age at separation in families where parental separation occurred prior to twins' first birthday was coded as a fraction of a year.

Parental alcoholism—History of parental alcoholism was coded from parent self-report, parent ratings of coparent, and twin ratings of each parent. Parent interviews included self-report assessment of lifetime history of DSM-IV alcohol dependence (AD), with AD symptoms experienced by the twins' biological coparent assessed using an adaptation of the Family History Assessment Module [25]. A probable diagnosis was coded for coparents without requiring 12-month clustering, as temporal clustering of coparent symptoms was not assessed. Twin ratings of parental alcoholism were drawn from Wave 4, when all twins were aged 18 or older. At Wave 4, twins were asked whether "drinking ever caused your biological (mother/father) to have problems with health, family, job or police, or other problems," an item that originated in the Family History Research Diagnostic Criteria [26] assessment, and whether they ever felt that their biological parent was an "excessive drinker." Endorsement of both problem and excessive drinking items was required to code a parent positive by twin report. Following earlier analyses [16,19], a parent was coded positive based on either self-report AD or any family history rating.

Control variables—A number of correlated risk-factors were included as control variables in survival analyses. Control variables were selected based on review of the literature and for consistency with prior research [19,27]. Among family background risks, we examined maternal age at twins' birth, maternal educational attainment, and offspring religious attendance during childhood. Dummy variables for twins' birth occurring before mother's age 20, between ages 20–24, and on/after age 35 were coded, with ages 25–34 comprising the reference group. Maternal education was coded from mother self-report and, if missing, twin report at Wave 5 (the only wave for which parental education was reported by twins). Dummy variables for mothers who dropped out of high school and those attending at least some college were computed, with reference to mothers completing high school only. Weekly or more religious attendance between the ages of 6–13 years was coded from twin self-report at Wave 4 and, if missing, parent report.

Comorbid psychopathology in parents and twins was also examined. Histories of DSM-IV conduct disorder (CD) and major depressive disorder (MDD) in either parent were coded from parent self-report, with two dummy variables to distinguish affected parents from those with missing paternal and maternal self-report data. Parental smoking was coded from parent self- and coparent reports as well as twin report at Waves 1, 3, and 4. Among offspring psychopathologies, we examined history of DSM-IV inattention, hyperactivity, oppositional defiant disorder (ODD), CD, social anxiety disorder (SAD), MDD and a non-diagnostic measure of suicidality (ideation, plan or attempt). CD, SAD, MDD and suicidality, including ages of onset, were assessed by twin self-report at Waves 1, 3 and 4.

Inattention, hyperactivity and ODD were queried in the parent interview, with two dummy variables to distinguish affected twins from those with missing parent-report data.

Lastly, offspring histories of physical and sexual abuse prior to age 18 were examined. Abuse, including ages of onset, was assessed by twin self-report at Waves 1, 3, and 4. Twins who reported having been physically injured or hurt on purpose by an adult or reported physical abuse as a child were coded positive for physical abuse. Twins who reported forced sexual intercourse, sexual contact with a relative, sexual contact with non-relative more than 5 years older, or sexual molestation as a child were coded positive for sexual abuse.

Zygosity—Zygosity was coded from twins' responses to standard questions regarding similarity and the degree to which others confused them [28].

Analytic Strategy

Associations between timing of first sex and both parental separation and parental alcoholism were examined using individual-versus pair-level data, with standard errors and confidence intervals adjusted for non-independence in the statistical package STATA[29]. In descriptive analyses, cumulative failure curves were estimated using the Kaplan-Meier survivor function [30]. Kaplan-Meier log-rank tests were conducted to identify differences in equality of survivor functions by race/ethnicity and zygosity, the latter to identify potential limitations to the generalizability of twin data.

Cox proportional hazards (PH) regression was conducted predicting age at first sex from dummy variables coding for parental separation and parental alcoholism, without and with adjustment for control variables. Parental separation was modeled as a time-varying predictor to ensure onset before or at the same time as first sex. Intact families were right-censored at twins' age at last interview if younger than age 18, and in the case of parental death during childhood, right-censored at twins' age when their parent(s) died. Parental alcoholism was modeled as time-invariant given age of AD onset is available by parent self-report only. Control variables with ages of onset (offspring CD, SAD, MDD, suicidality, and physical and sexual abuse) were included as time-varying predictors in adjusted models. The Efron approximation [31] was applied for survival ties. To examine potential violation of the PH assumption, such as might be the case if the effects of parental separation or parental alcoholism differ for earlier versus later age periods, the Grambsch and Therneau test of Schoenfeld residuals [32] was employed, with age-interactions modeled to correct observed violations [33].

Propensity score analysis (PSA; [34,35]) was conducted comparing separated and intact families stratified by predicted probability of separation. PSA is an increasingly popular statistical technique to reduce bias from confounders where groups are matched on a range of predictors. To the extent that intact and separated families are observed to be well-matched, our confidence in results of survival-analytic comparisons is increased. Where matching is less successful, our confidence in such comparisons is reduced.

Following earlier work [19], predicted probabilities of separation were derived from logistic regression models predicting parental separation from parental alcoholism and other family

background variables presumed to predate separation. To reduce bias associated with missing data from fathers [16], we limited predictors to those available by mother report, specifically, mother self-report AD symptoms and mother report of coparent alcohol problems. Additional predictors included maternal age at twins' birth, paternal education, maternal smoking, and two-way interactions between parental alcohol problems and (i) maternal age at twins' birth and (ii) paternal education. Note that paternal rather than maternal education was modeled for purposes of PSA as paternal education was more strongly predictive of separation. Maternal history of smoking was likewise modeled rather than either parent history of smoking.

From resulting propensity scores, a 5-level categorical variable was computed with each level containing approximately 20% of the propensity score distribution. Associations between parental separation and (i) family background characteristics and (ii) early-onset sex (defined as sex by age 15) were examined within quintiles, the latter conditional on successful matching on family background. Since PSA was conducted at the level of the family, statistical tests for associations with twin outcomes were adjusted for familial clustering.

Results

History of voluntary sexual intercourse was reported by 84% and 77% of AA and EA twins, respectively, with AA twins younger on average at first sex ($M[SD]$=16.85[2.57] years) than EA twins ($M[SD]$=17.43[2.51] years, log-rank X^2_1=32.22, p<0.0001). Seventy-four percent and 38% of parents of AA and EA twins had separated, with AA twins younger at parental separation ($M[SD]$=3.64[4.85] years) than EA twins ($M[SD]$=5.89[5.07] years, log-rank X^2_1=415.44, p<0.0001). Either or both parents were more likely to be coded positive for alcoholism in AA compared to EA families (41% versus 35%, X^2_1=8.58, p<0.05).

Differences by zygosity were significant in EA families only, where dizygotic (DZ) twins were at increased likelihood of sexual onset compared to monozygotic (MZ) twins (log-rank X^2_1=4.37, p<0.05). Differences in parental alcoholism by zygosity were also significant in EA families, where more parents of DZ twins were coded positive for alcoholism compared to MZ twins (37% versus 34%, X^2_1=4.47, p<0.05). Although zygosity was unrelated to parental separation in either AA or EA families, given differences in EA families, zygosity was included as an additional covariate in adjusted Cox regression models.

Survival Analyses

Hazard ratios from unadjusted and adjusted Cox regression models predicting timing of first sex are shown in Tables 1 and 2 for AA and EA twins, respectively. Among AA twins, effects of parental separation and parental alcoholism were nonsignificant with a single exception: in covariate-adjusted models, AA twins from alcoholic intact families were at 8.61 times increased likelihood of sexual onset (thus, earlier first sex) from age 21 onwards, compared to AA twins from nonalcoholic intact families. Here a violation in the PH assumption was observed, such that modeling of an age interaction (i.e., separate risk periods of birth through age 20 and from age 21 onwards) was necessary.

Among EA twins, those from separated alcoholic families were at highest risk compared to twins from intact nonalcoholic families. Effects were most pronounced during early and middle adolescence, where age-interactions were necessary to correct for PH violations. In unadjusted models, EA twins from separated alcoholic families were at 6.17 times increased likelihood of sexual onset through age 14, and over 2 times increased likelihood over ages 15–17. Risk associated with intact alcoholic families and separated nonalcoholic families were also elevated. EA twins from intact alcoholic families were at over 3 times increased likelihood of sexual onset through age 14, and 1.53 times increased likelihood over ages 15–17. Parental separation in the absence of parental alcoholism was associated with over 3 times increased likelihood of sexual onset through age 14, and 1.81 times increased likelihood over ages 15–17. Reduced effects of parental separation and parental alcoholism were observed in covariate-adjusted models, with risk to EA twins through age 14 significant across risk-group.

Propensity Score Analyses

Results of multivariate logistic regressions for the PSA are shown in Tables S2 and S3 for AA and EA families, respectively. Within-quintile comparisons of AA family background characteristics are presented in Table 3. Among AA families, prevalence of parental separation ranged from 39% (0–20%ile of propensity score distribution) to 100% (>80%ile). In the highest quintile of predicted probability of separation (>80%ile), there were no AA intact families; however, it is in this quintile that paternal and maternal alcoholism are over-represented, as are mothers who gave birth as teens. Given poor matching of AA families, within-quintile comparisons of offspring early sexual onset by parental separation were not conducted.

Within-quintile comparisons of EA family background characteristics are presented in Table 4. Among EA families, prevalence of parental separation ranged from 10% (0–20%ile of propensity score distribution) to 77% (>80%ile). Prevalence of parental alcoholism increased across quintile, as did prevalence of maternal smoking, mothers who gave birth as teens, and fathers who left school before grade 12. Although there was questionable matching on paternal alcoholism in the >80%ile families, where alcoholic fathers were over-represented, intact and separated EA families were well-matched overall and thus we proceeded with comparisons of EA offspring.

As shown in Table 5, parental separation in EA families predicted earlier first sex across predicted probability of separation, with the exception of the lowest quintile (0–20%ile), where statistical power was especially limited. In the highest quintile, for example, 21% of offspring from separated families reported voluntary sex by age 15, compared to 6% of offspring from intact families at similarly high risk of parental separation. Because of imperfect matching on paternal alcoholism in the highest quintile, follow-up logistic regression analyses were conducted controlling for paternal alcoholism, and comparable effects of parental separation were observed ($p<0.05$).

Discussion

We examined age at first voluntary sexual intercourse in a birth cohort of African and European ancestry female twins, employing both survival-analytic and propensity score approaches to identify unique effects of parental separation above and beyond parental alcoholism and other correlated risk-factors. Consistent with prior research [9], in families of European ancestry, risk associated with parental separation was observed throughout adolescence in Cox regression models. Although likelihood of sexual onset was highest in separated alcoholic families, compared to intact nonalcoholic families, twins of nonalcoholic parents who separated also reported earlier first sex even controlling for sociodemographic characteristics, parent and offspring psychopathology, and childhood abuse. Results of propensity score analyses comparing intact and separated families matched on predicted probability of parental separation largely confirmed the specificity of risk from parental separation. Parental separation was associated with early-onset sex across quintile of predicted probability of separation. Likewise, twins whose parents remained together were at reduced risk even in the highest quintile of predicted probability of parental separation, where we observed increased rates of parental alcoholism in both intact and separated families.

In contrast, in twins of African ancestry, no significant association between parental separation and timing of first sexual intercourse was observed in Cox analyses. Although it is possible that parental separation is unrelated to sexual timing, intact and separated African American families were poorly matched on family background characteristics highly predictive of separation, notably parental alcoholism. Poor matching was especially evident in the highest risk quintile, where no families remained intact, but parental alcoholism was over-represented. Together, such findings raise questions regarding the interpretability of survival-analytic results presented herein and thus the validity of between-family contrasts of intact and separated African American families reported in the broader literature. Thus, we are hesitant to draw substantive conclusions on what appear to be inappropriate comparisons.

Clearly, there is a need for alternative methodologies to examine effects of parental separation in African American families, and particularly approaches where matching on risks upstream of separation, especially parental alcoholism, can be achieved. In the present study, statistical power is limited due to our much smaller sample of African relative to European ancestry twin-families. However, between-family matching in samples of sufficient size, where parental alcoholism and other pertinent risk-factors are also assessed, should be pursued. Another approach is to employ within-family matching, for example, comparing timing of first sex in children of siblings or twins discordant for separation or divorce. Within-family matching provides powerful control of unmeasured confounds in the parental generation. While such studies exist (e.g.,[36,37]), to our knowledge none report effects of parental separation specific to African American families.

Limitations

The present study has a number of strengths, including representative sampling of twin-families and assessment of voluntary sexual onset through young adulthood. However,

findings should be considered in light of limitations beyond aforementioned reduced statistical power. With respect to measurement, we used lifetime history of parental alcoholism as age of onset was not available by coparent or twin report. Although previous research supports temporal primacy of parental alcoholism relative to separation in the current sample [16], if parents no longer meet diagnostic criteria, risk to offspring of chronically dependent parents will be underestimated. In addition, mechanisms underlying observed associations, at least in European ancestry families, were not examined. Lax or inconsistent monitoring and presence of a stepparent are each predictive of early sex [9] and are also more prevalent in separated families compared to families where parents remain together [38]. Deviant peer association may also play a role (e.g., [39,40]). Examination of potential mediators including parenting and peer influences will be an important focus of future studies. Lastly, analyses were limited to female twins and their families and may be of reduced generalizability without extension to male and non-twin samples.

Conclusion

In European American families, parental separation during childrearing years confers unique risk for early-onset sexual intercourse apart from parental alcoholism, findings supported in both survival and propensity score analyses. While European American children of separated parents appear to be at high risk, and thus a potential focus of targeted pregnancy prevention, we know little regarding effects, if any, of parental separation on African American children. Only with better methods, where matching on unmeasured confounds is successful, can we trust results of regression-based analyses comparing intact and separated African American families, and only then can such findings inform culturally-appropriate prevention.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Acknowledgments

Abbreviations

AA	African Ancestry
EA	European or other Ancestry
AD	Alcohol Dependence
CD	Conduct Disorder
COA	Children of Alcoholics
DSM	Diagnostic and Statistical Manual of Mental Disorders

DZ	Dizygotic
MDD	Major Depressive Disorder
MZ	Monozygotic
ODD	Oppositional Defiant Disorder
PH	Proportional Hazards
PSA	Propensity Score Analysis
SAD	Social Anxiety Disorder
SSAGA	Semi-Structured Assessment of the Genetics of Alcoholism

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Implications and Contribution

Identifying risk-factors for early sexual activity is essential for targeted prevention of teenage pregnancy. In European Americans, parental separation predicted younger age at first voluntary sex controlling for highly correlated other risks. Additional research with matching on confounders is needed to characterize risk for African Americans associated with parental separation.

Table 1

Hazard Ratios (and 95% Confidence Intervals) from Cox Regression models predicting timing of first voluntary sexual intercourse from parental separation and parental alcoholism in African ancestry twins, unadjusted and adjusted for family background, offspring psychopathology, and childhood risk-factors.

	Alcoholic/Separated		Alcoholic/Intact		Nonalcoholic/Separated	
	Unadjusted (n = 190)	Adjusted (n = 171)	Unadjusted (n = 46)	Adjusted (n = 42)	Unadjusted (n = 231)	Adjusted (n = 207)
Risk period						
< 21	1.35 (0.98 – 1.86)	0.95 (0.68 – 1.34)	1.39 (0.94 – 2.05)	1.22 (0.78 – 1.89)	1.19 (0.88 – 1.62)	0.95 (0.69 – 1.31)
21	⊥	⊥	⊥	8.61 (3.57 – 20.76)	⊥	⊥

Note. Reference group = nonalcoholic, intact families. Where brackets are shown, reported risk is equivalent across risk periods (age in years).

Table 2

Hazard Ratios (and 95% Confidence Intervals) from Cox Regression models predicting timing of first voluntary sexual intercourse from parental separation and parental alcoholism in European ancestry twins, unadjusted and adjusted for family background, offspring psychopathology, and childhood risk-factors.

	Alcoholic/Separated		Alcoholic/Intact		Nonalcoholic/Separated	
	Unadjusted (n = 736)	Adjusted (n = 690)	Unadjusted (n = 463)	Adjusted (n = 442)	Unadjusted (n = 541)	Adjusted (n = 511)
Risk Period						
< 15	6.17 (4.45 – 8.53)	3.71 (2.59 – 5.32)	3.06 (2.05 – 4.57)	2.25 (1.46 – 3.45)	3.21 (2.15 – 4.80)	2.51 (1.66 – 3.80)
15–17	2.02 (1.77 – 2.32)	⊤	1.53 (1.29 – 1.83)	⊤	1.81 (1.53 – 2.15)	1.48 (1.24 – 1.77)[a]
18–20	⊥	1.47 (1.25 – 1.72)	1.10 (0.87 – 1.40)	1.15 (0.97 – 1.35)	1.31 (1.02 – 1.69)	1.17 (0.90 – 1.52)[a]
21	1.03 (0.58 – 1.82)	⊥	⊥	⊥	⊥	⊥

Note. Reference group = nonalcoholic, intact families. Where brackets are shown, reported risk is equivalent across risk periods (age in years).

[a] Post-hoc test equating hazard ratios across risk periods did not show significant heterogeneity (*p* > 0.05), but the proportional hazards assumption was violated and thus an age interaction was modeled with separate hazard ratios reported.

Table 3

Family background characteristics of intact and separated African ancestry families, by quintile of predicted probability of parental separation.

| | Predicted Probability of Parental Separation | | | | | | | | | |
| | 0–20%ile | | 21–40%ile | | 41–60%ile | | 61–80%ile | | >80%ile | |
	Intact (n = 22)	Separated (n = 14)	Intact (n = 12)	Separated (n = 20)	Intact (n = 12)	Separated (n = 33)	Intact (n = 4)	Separated (n = 31)	Intact (n = 0)	Separated (n = 39)
Paternal alcoholism, n (%)	6 (27)	1 (7)	1 (8)	1 (5)	0	1 (3)	0	3 (10)	--	18 (46)
Maternal alcoholism, n (%)	0	0	0	0	0	0	0	0	--	9 (23)
Maternal smoking, n (%)	17 (77)	10 (71)	8 (67)	12 (60)	9 (75)	23 (70)	2 (5)	18 (58)	--	24 (62)
Maternal age at twins' birth[a], n (%)										
< 20	1 (5)	0	0	1 (5)	1 (8)	2 (6)	1 (25)	10 (32)	--	17 (44)
20–24	2 (9)	4 (29)	5 (42)	8 (40)	6 (50)	10 (30)	1 (25)	15 (48)	--	11 (28)
35	1 (5)	1 (7)	0	0	1 (8)	2 (6)	0	1 (3)	--	0
Paternal educational attainment[b], n (%)										
< 12 years	2 (9)	0	3 (25)	8 (40)	2 (17)	5 (15)	1 (25)	6 (19)	--	9 (23)
13 years	17 (77)	13 (93)	8 (67)	9 (45)	0	2 (6)	0	1 (3)	--	13 (33)

Note. Within quintile, intact and separated families do not differ significantly.

[a] Reference group = ages 25–34.

[b] Reference group = 12 years.

Table 4

Family background characteristics of intact and separated European ancestry families, by quintile of predicted probability of parental separation.

	Predicted Probability of Parental Separation									
	0–20%ile		21–40%ile		41–60%ile		61–80%ile		>80%ile	
	Intact (n = 245)	Separated (n = 26)	Intact (n = 220)	Separated (n = 44)	Intact (n = 218)	Separated (n = 82)	Intact (n = 151)	Separated (n = 125)	Intact (n = 62)	Separated (n = 208)
Paternal alcoholism, n (%)	6 (2)	0	6 (3)	1 (2)	20 (9)	5 (6)	32 (21)	28 (22)	36 (58)	152 (73)[*]
Maternal alcoholism, n (%)	5 (2)	0	2 (1)	2 (5)[†]	2 (1)	0	5 (3)	3 (2)	8 (13)	37 (18)
Maternal smoking, n (%)	40 (16)	4 (15)	102 (46)	31 (70)[*]	124 (57)	49 (60)	117 (77)	84 (67)[†]	55 (89)	168 (81)
Maternal age at twins' birth[a], n (%)										
<20	1 (<1)	0	0	1 (2)	1 (<1)	0	12 (8)	14 (11)	15 (24)	51 (25)
20–24	11 (4)	0	47 (21)	2 (5)[*]	67 (31)	29 (35)	60 (40)	53 (42)	19 (31)	73 (35)
35	49 (20)	5 (19)	13 (6)	3 (7)	5 (2)	1 (1)	4 (3)	4 (3)	3 (5)	3 (1)
Paternal educational attainment[b], n (%)										
<12 years	2 (1)	1 (4)	3 (1)	2 (5)[*]	8 (4)	3 (4)	37 (25)	27 (22)	15 (24)	58 (28)
13 years	231 (94)	24 (92)	168 (76)	39 (89)[*]	79 (36)	30 (37)	35 (23)	24 (19)	9 (15)	33 (16)

Note. Within quintile, intact and separated families differ significantly at

[*] $p < .05$,

[†] $p < 0.10$.

[a] Reference group = ages 25–34.

[b] Reference group = 12 years.

Table 5

Prevalence of voluntary sexual intercourse by age 15 in European ancestry offspring from intact and separated families, by quintile of predicted probability of parental separation

	Predicted Probability of Parental Separation									
	0–20%ile		21–40%ile		41–60%ile		61–80%ile		>80%ile	
	Intact (*n* = 484)	Separated (*n* = 51)	Intact (*n* = 438)	Separated (*n* = 87)	Intact (*n* = 430)	Separated (*n* = 162)	Intact (*n* = 298)	Separated (*n* = 248)	Intact (*n* = 122)	Separated (*n* = 407)
Early sex, *n* (%)	14 (3)	4 (8)	15 (3)	11 (13)	27 (6)	22 (14)	20 (7)	33 (13)	7 (6)	84 (21)

Note. Within quintile comparisons of separated and intact families: 0–20%ile Odds Ratio (OR) (and 95% Confidence Interval [CI]) = 2.86 (0.75 – 10.94); 21–40%ile OR = 4.08 (1.62 – 10.27); 41–60%ile OR = 2.35 (1.20 – 4.58); 61–80%ile OR = 2.13 (1.14 – 4.01); and >80%ile OR = 4.27 (1.73 – 10.56) and OR = 4.25 (1.74 – 10.38), the latter controlling for parental alcoholism.