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# Timing of Puberty and Sexuality in Men and Women

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We examined the relations among timing of puberty, timing of first experience of sexual arousal, strength of sex drive, and sexual attitudes and behaviors in 277 men (*M* age, 22.4 years) and women (M age, 21.8 years). Kinsey had suggested that earlier maturers have a stronger sex drive and, therefore, engage in a higher frequency of sexual behaviors (including same-sex contacts) than do later maturers. The purpose of this study was to test Kinsey's claim. Participants completed questionnaires on pubertal timing, timing of first experience of sexual arousal, sex drive in adulthood, sexual attitudes (e.g., sociosexuality or degree of comfort with casual sex), and sexual behaviors (e.g., lifetime number of sexual partners). Timing of puberty (i.e., emergence of secondary sex characteristics) was related to these variables for men but not for women. Timing of first sexual arousal was related to several aspects of adult sexuality in both sexes, but particularly in women. Earlier first sexual arousal was associated with having a higher sex drive, a less restricted sociosexual orientation, and with having had more sexual partners than was later first sexual arousal. Earlier first sexual arousal, but not timing of puberty, was related to sexual orientation for women only. We discuss classes of explanations for these results.

**KEY WORDS:** sex drive; sexual orientation; puberty; sexual arousal.

## INTRODUCTION

Kinsey found that early onset of puberty was related to increased "sexual outlet" (Kinsey's measure of sex drive) for men, but not for women (Kinsey, Pomeroy, & Martin, 1948; Kinsey, Pomeroy, Martin, & Gebhard, 1953). According to Kinsey et al. (1948), early puberty men begin masturbating earlier and masturbate more frequently than do later puberty men, engage in higher frequencies of pre-marital, marital, and extra-marital intercourse than do later puberty men, and engage in a higher frequency of same-sex sexual activities than do later puberty men (see Kinsey et al., 1948, pp. 297–326 for a thorough discussion). Kinsey et al. (1953) did not find the same relations among these variables in women: early puberty women did not masturbate earlier or more frequently than did later puberty women (pp. 152–153), they did not engage in more pre-marital (pp. 302–303), marital (p. 359), or extra-marital (p. 424) intercourse than did later puberty women, and they did not engage in more same-sex sexual contacts than did later puberty women (pp. 462–463). There was some evidence that early puberty women engaged in more pre-marital petting than did later puberty women (p. 246), but Kinsey et al. warned that these differences were slight and should be interpreted with caution.

### Timing of Puberty and Sexual Orientation

A sizeable proportion of the research following Kinsey et al.'s puberty findings has focused on the relation between timing of puberty and sexual orientation. For the most part, this body of work has borne out Kinsey et al.'s findings. Gay men appear to show morphological signs of puberty (such as facial, pubic, and armpit hair growth) at a significantly younger age than do heterosexual men (Blanchard & Bogaert, 1996; Bogaert & Friesen, 2002; Tripp, 1982; but see Savin-Williams, 1995, for

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an exception); they also appear to have sexual feelings (Manosevitz, 1970), and perhaps also their first sexual experiences (Bogaert, Friesen, & Klentrou, 2002), earlier than do heterosexual men. Women' sexual orientation, on the other hand, seems unrelated to the timing of puberty (Bogaert, 1998; Bogaert & Friesen, 2002; Bogaert et al., 2002; Tenhula & Bailey, 1998). In one study (Bogaert & Friessen, 2002), lesbian and bisexual women reported an earlier age of first sexual experience than did heterosexual women, but did not report an earlier age of puberty than did heterosexual women.

Two kinds of theories have attempted to account for the hypothesis that pubertal timing is related to sexual orientation. Storms' (1981) theory of erotic orientation development is based on homosexual-heterosexual differences in pubertal timing. Storms hypothesized that when children reach puberty, they begin to have sexual feelings, which they associate with members of their peer group. Whether their peer group is predominantly of the same sex or of mixed sexes depends, Storms argued, on pubertal timing. Early maturers are more likely to have predominantly same-sex friends during puberty than are later maturers (who are more likely than early maturers to have friends of both sexes); therefore, early maturers are more likely than later maturers to associate their emerging sexual feelings with members of the same sex, and thus to identify as homosexual (Storms, 1981; but see Bailey & Zucker, 1995, for their argument that peer-group makeup in childhood depends on whether the child is preheterosexual or prehomosexual and that, therefore, sexual orientation precedes puberty, rather than following it).

By contrast, the neuroendocrine theory of sexual orientation (Ellis & Ames, 1987; Meyer-Bahlburg, 1984) describes neurohormonal events that occur during fetal development (rather than during postnatal development), and relates these events to later sexual behaviors, including sexual orientation (e.g., Bogaert & Friesen, 2002; Ellis & Ames, 1987; Meyer-Bahlburg, 1984; Meyer-Bahlburg et al., 1995; Tenhula & Bailey, 1998). This theory argues that sexual orientation depends on degree of androgenization of the fetal brain: more androgenization results in a sexual orientation towards women, and less androgenization results in a sexual orientation towards men. Timing of onset of puberty appears also to be related to prenatal hormonal events (e.g., Thomas & Rebar, 1989). Tenhula and Bailey (1998) argued that, given that both pubertal timing and sexual orientation seem to be affected by prenatal hormonal events, and given that each shows a well-documented gender difference, it would make sense for a relation to exist between pubertal timing and sexual orientation. Their argument (supported for men but not for women, Tenhula & Bailey, 1998) is that gays and lesbians have sex-atypical sexual orientations, and therefore might also have sex-atypical pubertal onsets (i.e., with gay men having a more feminine, early-onset puberty, and lesbians having a more masculine, late-onset puberty), due to similar neurodevelopmental events.

Note that the learned associations (Storms, 1981) and neuroendocrine theories (Ellis & Ames, 1987; Meyer-Bahlburg, 1984) of sexual orientation require different age-gaps between early and late maturers. Storms' theory would seem to require several months to a year's difference in timing of puberty; the gap would have to be wide enough to permit a reorganization of the make-up of late maturers' peer groups. Many of the results reviewed above are on the order of one to three months, which does not seem sufficiently long for this type of reorganization. The neuroendocrine theories, by contrast, make no claims about the magnitude of heterosexual-homosexual differences in pubertal timing: they suggest only that some difference should exist.

## Timing of Puberty and Sex Drive

Few researchers have followed up Kinsey's broader suggestion that timing of puberty predicts strength of sex drive. However, several researchers (most prominently Udry and his colleagues) have examined the relation between timing of puberty and initiation of sexual behaviors. The results of these studies have been suggestive, but equivocal.

Udry and Billy (1987), for example, examined the determinants of initiation of sexual intercourse in young men and women (aged 11–17). They found that White men's initiation of intercourse was related primarily to hormonal events associated with puberty, that White women's initiation of intercourse was related primarily to social controls (e.g., religiosity) and was *unrelated* to hormonal events, and that Black women's initiation was related primarily to pubertal development. Thus, for men and for Black women, timing of puberty was related to sexual behaviors, but for White women, sociocultural factors were more important in determining sexual behaviors than was timing of puberty. The picture for women continued to be equivocal in later research. For example, Halpern, Udry, and Suchindran (1997) found that changes in testosterone level in post-menarcheal girls (mean age, 13.8) were related to initiation of sexual intercourse, but, again, attendance at religious services acted as a social control in postponing initiation of sexual intercourse for White, but not for Black, girls.

The story for men is somewhat less hazy than it is for women, but it is, again, equivocal. In a longitudinal study of 7th and 8th grade boys, Halpern, Udry, Campbell, and Suchindran (1993) found that pubertal onset was significantly related to increases in sexual ideation and sexual behaviors, and with initiation of intercourse. However, Mazur, Halpern, and Udry (1994) reported later that 10th and 11th grade boys' sexual behaviors were better explained by appearance (dominance and attractiveness) than by timing of pubertal development. Furthermore, in another study, Halpern, Udry, Campbell, and Suchindran (1994) reported that attendance at religious services interacted with testosterone levels to predict sexual behaviors in boys aged 12.5 to 16 years.

Other studies have also had difficulty telling the story of how pubertal onset and sexual behavior are related. For example, Flannery, Rower, and Gulley (1993) asked 10 to 16 year-old boys and girls how "intimate" they had been with members of the other gender (measured on a Guttman scale ranging from "kissed or held hand" to "sexual intercourse"). Earlier puberty boys and girls reported having had sexual/romantic experiences of a more intimate nature than did later puberty boys and girls, although the relationship for boys was (unexpectedly, and contrary to the Udry and Kinsey findings) weaker than that for girls, especially when the data were controlled for age. Moreover, Savin-Williams (1995) reported that recalled pubertal timing was significantly associated with frequency of orgasm during junior high school for his sample of gay and bisexual men, but not with frequency of orgasm during high school, or with number of lifetime male and female sex partners. These data are contrary to Kinsey et al.'s (1948) data, which suggested that earlier puberty was related to more frequent masturbation, more frequent orgasms, and more lifetime sex partners throughout the individual's lifetime.

Note that none of these studies measured sex drive: they associated puberty (and the hormonal events associated with puberty) with sexual behaviors (and, for the most part, with partnered sexual behaviors). Frequency of partnered sexual behaviors, despite being correlated with sex drive, is by no means perfectly related to sex drive (Ostovich & Sabini, 2004). No matter how much a person desires to engage in partnered sexual behaviors, that person will not be able to engage in them without a willing partner. Thus, it is important to extend these results, if possible, to sex drive, as measured by a scale that does not confuse the desire to engage in sexual behaviors with the ability to persuade others to engage in sexual behaviors. As far as we have been able to determine, no such study has yet been carried out.

## Aims of the Current Study

### *Sex Drive and Puberty*

The purpose of this study was to examine how sex drive was related to timing of puberty. We hoped to clarify the nature of the relation between sex drive and pubertal timing for both men and women, and thereby to confirm (or disconfirm) Kinsey's hypothesis that the relations he found between pubertal timing and sexual behaviors reflected differences in sex drive.

A second aim of this study was to extend these findings to timing of first experience of sexual arousal ("first sexual arousal"). First sexual arousal, we expected, would be related to timing of puberty, and might act as a marker of onset of sexual maturity. We asked whether first sexual arousal might be a better predictor of sexual behavior and attitudes in women than morphological puberty.

We expected the following relations to emerge: Sex drive, lifetime number of sexual partners, and virginity status should be significantly related to timing of puberty and timing of first sexual arousal. Those with earlier puberty or earlier first sexual arousal should report a higher sex drive, more lifetime sex partners, more frequent intercourse, and should be less likely to report being virgins than should those with later puberty or later first sexual arousal.

### *Sociosexual Orientation and Puberty*

Sociosexual orientation reflects a person's willingness to engage in casual sex: sociosexually restricted individuals require feelings of love and commitment before having sex with a romantic partner, whereas sociosexually unrestricted individuals are comfortable having intercourse without feelings of love or commitment. Not surprisingly, restricted individuals tend to report fewer sexual encounters, and to predict that they will have fewer future sexual encounters, than do individuals with an unrestricted sociosexual orientation (e.g., Simpson & Gangestad, 1991).

We have reported elsewhere a strong relationship between sex drive and sociosexual orientation for both men and women: the higher an individual's sex drive, the less restricted their sociosexual orientation (Ostovich & Sabini, 2004). Based on those data, and on Kinsey et al.'s (1948) hypothesis that timing of puberty predicts strength of sex drive, we predicted that earlier maturers (who should be high in sex drive) will have adopted a more unrestricted sociosexual orientation than later maturers

(who should be lower in sex drive). If this hypothesis is supported, then it would seem reasonable to conclude that, at least to some degree, sociosexual orientation is influenced by factors present at the time of onset of puberty or first experience of sexual arousal.

*Masculinity, Femininity, and Puberty*

Degree of gender-atypicality has been studied extensively with regard to lifetime number of sexual partners and especially with regard to sexual orientation (e.g., Bailey, Miller, & Willerman, 1993; Bailey, Nothnagel, & Wolfe, 1995; Bailey & Zucker, 1995). Bailey and Zucker (1995) have demonstrated that childhood gender-atypicality is a good predictor of adult sexuality for men and for women, but especially for men. If sexual orientation and pubertal timing are linked in the way that Bailey and Tenhula (1998) hypothesized, then we should expect earlier maturing men not only to be higher in sex drive and more likely to report attraction towards the same sex than should later maturing men, but also to be more feminine (gender-atypical) than later maturing men. By the same token, earlier maturing women should not only be higher in sex drive and more attracted to the same sex than later maturing women, but should also be more masculine than later maturing women.

## METHOD

### Participants

We used fliers, newspaper advertisements, and the University of Pennsylvania's psychology subject pool message board to recruit participants. We advertised the study as a study of "personality and behavior" in order to avoid some of the more serious problems associated with volunteer bias in sexuality research (see Trivedi & Sabini, 1998). No participants dropped out of this study when they discovered the focus of our research, although they were given the opportunity to do so. Participants not recruited through the subject pool ($n = 96$) were compensated for their participation with gift certificates to Barnes and Noble Booksellers, whereas participants from the subject pool ($n = 181$) received one research credit in exchange for their participation.

The participants were 129 men and 148 women. Men ranged in age from 18 to 54 years, with a mean age of 22.4 ($SD = 6.3$); women ranged in age from 18 to 48 years, with a mean age of 21.8 ($SD = 5.5$). The participants were 58.8% White, 27.0% Asian or Asian-Indian, 4.3% Black, 3.2% Hispanic, and 6.7% "Other." The participants' religious affiliations were: 26.3% claimed no religious affiliation; 20.6% were Catholic; 20.1% were other Christian; 19.2% were Jewish; 5.8% were Hindu; and 2.2% were Muslim.

### Measures

*Puberty*

We constructed a Puberty Questionnaire based on morphological changes that occur when men and women reach puberty. Both men and women were asked the following two questions, scored to the nearest half-year:

1. How old were you when you first noticed armpit hair growth?
2. How old were you when you first noticed pubic hair growth?

Additionally, men were asked "how old were you when you first noticed facial hair growth?" Women were asked two additional questions:

1. How old were you when you first noticed breast development?
2. How old were you when you had your first period?

Scores on these items were averaged to create a single "puberty" score. Coefficient alpha was .81 for both men and women.

*First Sexual Arousal*

We used the following single item to assess timing of first experience of sexual arousal: "How old were you were you first experienced sexual desire?" scored to the nearest half-year.

*Sex Drive*

The Sex Drive Questionnaire (SDQ) is a measure of sex drive consisting of four items meant to assess the strength of respondents' sex drive without necessitating that respondents have a romantic or sexual partner in order to be classified as high in sex drive:

1. How often do you experience sexual desire? (scored on a 7-point Likert scale from *never* to *several times a day*).
2. How often do you orgasm in the average month? (scored on a 6-point Likert scale from *never* to *several times a day*).

3. How many times do you masturbate in the average month? (scored on a 6-point Likert scale from*never* to *several times a day*).
4. How would you compare your level of sex drive with that of the average person of your gender and age? (scored on a 7-point Likert scale anchored by *very much lower* and *very much greater*).

We converted scores on these items into $z$-scores because of scaling differences.

Coefficient alphas for the SDQ were .79 for men, and .83 for women. The scale consisted of one factor that accounted for 62.8% of the variance in men' scores, and 66.3% of the variance in women' scores, and had a good test-retest reliability over a six- to eight-week period (for men, $r(70) = .91$, $p < .001$; for women, $r(103) = .90$, $p < .001$; see Ostovich, 2004, for details on the psychometric properties of the SDQ).

*Sexual Orientation*

We measured sexual orientation using the following question, adapted from Kinsey et al. (1948, p. 638–641, 647, and 650): "To whom are you sexually attracted?" Responses were measured on a 7-point Likert scale ranging from 0 (*exclusively attracted to the other sex*) to 6 (*exclusively attracted to the same sex*), with 3 as our midpoint (*equally attracted to both sexes*). Sexual orientation of our male participants was as follows: 90.7% scored a 0 or 1 (exclusively or mostly attracted to the other sex, or "heterosexual"); 7.0% scored a 5 or 6 (exclusively or mostly attracted to the same sex, or "gay"); and the remaining 2.3% scored a 2, 3, or 4 ("bisexual"). Female participants' sexual orientation was: 84.4% "heterosexual"; 8.1% "lesbian"; 7.5% "bisexual." We also asked participants whether they were virgins; the majority of our participants reported that they were not virgins (75.2% of males and 63.3% of females reported that they were sexually experienced, respectively).

*Frequency of Intercourse*

Participants' frequency of intercourse was measured using the following item: "How many times do you have sexual intercourse in the average month?" This item was scored on a 6-item Likert scale from *never* to *several times a day*.

*Lifetime Number of Sexual Partners*

Participants were asked "How many different sexual partners have you had in your lifetime?"

*Sociosexuality*

We used Simpson and Gangestad's (1991) Sociosexual Orientation Inventory (SOI) to assess participants' degree of sexual restraint. Items on the SOI include questions about number of different partners during the past year, number of different partners respondents foresee having during the next five years, number of "one-night stands," frequency of fantasizing about partners other than the respondent's regular partner, and attitudes about the morality and appeal of having sex with someone whom one does not love. These items were scored on different scales (some items are scored on 8- or 9-point Likert scales, some items are free-form), and thus responses were converted to z-scores for data analysis purposes. Coefficient alpha for the SOI was .77 for men and .83 for women.

*Masculinity and Femininity*

Bailey et al.'s (1996) seven-item Childhood Gender Nonconformity scale (coefficient alphas .78 for men and .87 for women) assessed the degree to which subjects had behaved like the other gender during childhood (e.g., the degree to which young boys had been "sissies" and young girls had been "tomboys"). Items include questions such as "As a child (age 12 and below) I was called a "tomboy"[female version]/"sissy"[male version] by my peers" and "As a child I preferred playing with boys rather than girls [female version]/playing with girls rather than boys [male version]." Bailey et al.'s (1996) eight-item Continuous Gender Identity scale, by contrast, assessed how masculine or feminine participants currently feel and behave (coefficient alphas .78 for men and .76 for women). Example items are "I feel like part of me is male and part of me is female" and "People think I should act more feminine [female version]/masculine [male version] than I do."

## Procedure

Participants completed questionnaires in private, either in our laboratory ($n = 198$) or on the World Wide Web ($n = 79$). All participants were screened for age (no one under age 18 was allowed to participate), and the Web version of the survey was password protected, so that only screened participants were able to access it. Laboratory participants brought a piece of identification with them, and their age was confirmed prior to participation; Web participants were asked their age before being sent the Web version's URL.

**Table I.** Means and SDs for Each Variable as a Function of Sex

| Variable | Men | | Women | | $t$ | Cohen's $d$ |
|---|---|---|---|---|---|---|
| | M | SD | M | SD | | |
| Puberty (in years) | 13.13 | 1.50 | 11.92 | 1.27 | $t_{(255)} = 7.02$, $p < .001$ | .88 |
| First sexual arousal (in years) | 11.17 | 2.88 | 12.60 | 3.04 | $t_{(269)} = -3.98$, $p < .001$ | .49 |
| Sex drive | 0.45 | 0.63 | −0.40 | 0.80 | $t_{(263.9)} = 9.54$, $p < .001$ | 1.20 |
| SOI full | 0.35 | 0.70 | −0.27 | 0.62 | $t_{(253)} = 7.52$, $p < .001$ | .95 |
| SOI attitude | 0.49 | 0.69 | −0.38 | 0.71 | $t_{(264.9)} = 9.34$, $p < .001$ | 1.15 |
| Number of partners | 4.43 | 8.87 | 2.71 | 6.35 | $t_{(272)} = 1.86$, $p = .063$ | .23 |
| Intercourse | 2.33 | 1.32 | 2.17 | 1.40 | $t_{(271)} = 1.01$, $p > .1$ | .12 |
| Childhood gender | 6.08 | 1.06 | 5.02 | 1.60 | $t_{(255.6)} = 6.51$, $p < .001$ | .81 |
| Adult gender | 5.66 | 1.08 | 5.37 | 1.14 | $t_{(270)} = 2.13$, $p < .04$ | .26 |
| Sexual orientation | 0.52 | 1.40 | 0.88 | 1.59 | $t_{(275)} = -1.98$, $p < .05$ | −.24 |

*Note*. We used Levene's test for equality of variances, and corrected the following tests for unequal variance: sex drive, SOI-attitude, childhood gender. Scores on the following scales were $z$-scores, and thus have a range of −1.0 to +1.0: Sex Drive, SOI Full, SOI Attitude. Scores on Childhood and Adult Gender have a range of 7 and 8 to 49 and 56, respectively. Sexual Orientation was scored from 0 to 6.

Laboratory participants arrived individually. Upon arrival, they read and signed a consent form, and then were left alone to complete the questionnaires. In order to reinforce participants' feeling of anonymity, we asked them to place completed questionnaires in an unmarked envelope, and to place that envelope into a sealed box, through a slot cut into its top. We assured them that we would not open the box until we had collected data from all of our participants. Participants received their compensation and a debriefing form after completion of the study. Web participants read the same consent form, and completed the same questionnaires as did lab participants, but they received their compensation and debriefing through the mail.

## RESULTS

Our data were for the most part negatively-skewed. Therefore, we used Spearman's Rank correlation for all results reported here. Please refer to Table I for means and sex differences on all variables reported below, and to Table II for correlational results.

Preliminary analyses showed that the responses of laboratory and Web participants were similar; therefore, their data were combined.

### Puberty and First Sexual Arousal[3]

Significant sex differences emerged for timing of puberty and for timing of first sexual arousal. Women reported having reached morphological puberty significantly earlier than did men (by 1.2 years, $t(255) = 7.0$, $p < .001$, Cohen's $d = .88$), whereas men reported having experienced their first sexual arousal significantly earlier than did women (by 1.4 years, $t(269) = -3.98$, $p < .001$, Cohen's $d = -.49$). Furthermore, first recalled sexual arousal in men occurred, on average, 1.9 years before puberty ($M_{\text{first sexual arousal}} = 11.2$ years, $SD = 2.9$; $M_{\text{puberty}} = 13.1$ years, $SD = 1.5$; paired $t(118) = -7.8$, $p < .001$, Cohen's $d = -.82$). By contrast, first recalled sexual arousal in women occurred, on average, 0.7 years after puberty ($M_{\text{first sexual arousal}} = 12.6$ years, $SD = 3.0$; $M_{\text{puberty}} = 11.9$ years, $SD = 1.3$; paired $t(134) = 3.2$, $p = .002$, Cohen's $d = .30$). Finally, timing of puberty and timing of first sexual arousal were significantly correlated for both sexes. The correlation for men was $r_{(119)} = .46$, $p < .001$; the correlation for women was $r(135) = .47$, $p < .001$. For both sexes, the earlier the onset of puberty, the earlier the experience of first sexual arousal.

### Sex Drive

Timing of puberty and current sex drive were not significantly correlated for women; however, a non-significant trend emerged between these variables for men, replicating Kinsey et al. (1948).[4] The earlier men's puberty, the higher was their sex drive. Timing

[3] In a separate study, we measured the test-retest reliability of the puberty and first sexual arousal measures over a two- to three-month time period. Test-retest scores for the puberty scale were adequate for men ($r(68) = .69$, $p < .001$) and high for women ($r(101) = .90$, $p < .001$). Test-retest scores on the first sexual arousal scale were adequate for men ($r(11) = .63$, $p < .04$) and for women ($r(37) = .70$, $p < .001$).

[4] We tested for sex differences between all of the correlations reported here. Unless otherwise reported, these sex differences were non-significant.

**Table II.** Spearman Rank Correlations for Relations Between Puberty and Sexuality, and Between First Sexual Arousal(FSA) and Sexuality.

| | Men | | Women | |
|---|---|---|---|---|
| | Puberty | FSA | Puberty | FSA |
| SDQ | −.17*** | −.24* | −.12 | **−.26**** |
| SOI Full | .11 | −.17*** | .03 | −.26** |
| SOI Attitude | .17*** | −.12 | −.02 | **−.30**** |
| Virginity | −.12 | −.10 | −.06 | −.07 |
| Intercourse | −.14 | −.08 | −.12 | −.11 |
| Childhood Gender | .01 | −.09 | −.01 | −.03 |
| Adult Gender | −.01 | .21* | −.10 | −.05 |
| Sexual Orientation | .04 | −.07 | −.10 | −.18* |

*Note*. The significance level for the tests reported here, using the Bonferroni adjustment, should be $p < .002$. Using this adjustment, only the correlations in bold type would be significant. *Ns* for men ranged from 122–127; *N*s for women ranged from 140–143.
$^{*}p < .03$. $^{**}p < .003$. $^{***}p$s = .06–.075.

of first sexual arousal was significantly correlated with sex drive for both sexes. The earlier their first sexual arousal, the higher was men's and women's current sex drive.

We computed partial correlations among scores on the SDQ, timing of puberty, and timing of first sexual arousal. The relation between SDQ and puberty, controlling for timing of first sexual arousal, was non-significant for both sexes ($r(114) = -.08$ for men, and $r(126) = -.04$ for women); the marginally significant correlation between timing of puberty and sex drive for men disappeared once timing of first sexual arousal had been controlled for. The relation between SDQ and timing of first sexual arousal, controlling for timing of puberty, was non-significant for men ($r(114) = -.07$) and significant for women ($r(126) = -.22$, $p = .01$). Timing of first sexual arousal, then, is related to strength of sex drive for women, even when controlling for timing of puberty.

## Sociosexuality

Timing of first sexual arousal and scores on the SOI were significantly related for women, and were non-significantly related for men. The earlier participants' first sexual arousal, the less sociosexually restricted they were. Timing of puberty and SOI were not significantly related for either sex.

The SOI has several behavior-based items, in which performance of the behavior depends on the respondent's ability to have a sexual partner. We removed those behavioral items from the scale, creating an attitude-based subscale of the SOI (coefficient alpha .74 for men and .79 for women), and correlated scores on that subscale with timing of puberty and timing of first sexual arousal. We found a marginally significant correlation between SOI-attitude and timing of puberty for men, and a significant correlation between SOI-attitude and timing of first sexual arousal for women (the sex difference for the latter correlation was significant, $Z = 2.17$, $p = .03$).

To address the question of how puberty or first sexual arousal affect SOI, we calculated partial correlations of the timing variables with SOI-attitude. The relation between SOI-attitude and puberty, controlling for timing of first sexual arousal, was significant for men ($r(114) = .24$, $p = .01$) and nonsignificant for women ($r(126) = .10$). Timing of puberty, then, was related to sociosexual attitudes for men (the earlier the puberty, the more restricted the sociosexual attitudes), even when controlling for timing of first sexual arousal. The relation between SOI-attitude and timing of first sexual arousal, controlling for timing of puberty, was non-significant for men ($r(114) = -.15$) and significant for women ($r(126) = -.30$, $p < .001$). Timing of first sexual arousal, then, was related to sociosexual attitudes for women (the earlier the first sexual arousal, the less restricted the sociosexual attitudes), even when controlling for timing of puberty.

We also calculated partial correlations of the timing variables with SOI-attitude holding sex drive constant. For males, timing of first sexual arousal was unrelated to SOI-attitude, holding sex drive constant ($r(119) = -.04$), but timing of puberty was related to SOI-attitude, holding sex drive constant ($r(113) = .24$, $p = .01$). Later puberty men were more sociosexually restricted than were earlier puberty men.

The pattern was different for females. Although there was a significant first-order correlation between SOI-attitude and timing of first sexual arousal ($r(132) = -.30$, $p = .003$), the partial correlation of timing of first sexual arousal with SOI-attitude, holding sex drive constant was half as large ($r(131) = -.15$, $p = .09$). The partial correlation of timing of puberty with SOI-attitude, holding sex drive constant was, as was the first-order correlation, non-significant ($r(125) = .06$).

## Virginity

Men were significantly more likely than were women to report being a virgin, $\chi^2(1, n = 276) = 4.56$, $p = .03$. No significant correlations emerged for men or for women between virginity status and either timing of puberty or timing of first sexual arousal.

## Lifetime Number of Sexual Partners

We calculated partial correlations between participants' lifetime number of sexual partners and their age

at puberty and at first sexual arousal, controlling for current age. Timing of puberty was not significantly correlated with number of partners for men ($r(127) = -.08$) or women ($r(141) = -.12$), but timing of first sexual arousal was significantly correlated with number of partners for both sexes (men's $r(127) = -.22$, $p = .01$; women's $r(141) = -.21$, $p = .01$). The earlier the first sexual arousal, the more partners men and women had, controlling for current age.

### Frequency of Intercourse

There was no evidence of a relation between timing of puberty and frequency of intercourse, or between timing of first sexual arousal and frequency of intercourse, for either sex.

### Masculinity and Femininity

We found no relations between timing of puberty or timing of first sexual arousal and scores on the Childhood Gender Nonconformity scale for either men or women. The same was true for scores on the Continuous Gender Identity (CGID) scale, except for the correlation between first sexual arousal and CGID for men. The earlier men's first experience of arousal, the more likely was their gender identity to include feminine qualities.

### Sexual Orientation

The correlation between timing of first sexual arousal and sexual orientation was significant for women, but not for men; sexual orientation was not significantly correlated with timing of puberty for either sex. The earlier a woman's first experience of sexual arousal, the more likely she was to report that she was attracted to other women. We split participants into groups based on their sexual orientation scores, and compared the ages of first sexual arousal for men and women with scores under 2 (little to no attraction to the same sex; "heterosexual") on the Kinsey rating scale and scores 2 or above (some to exclusive attraction to the same sex; "gay" and "lesbian") on the Kinsey rating scale. Mean age of first sexual arousal for heterosexual women was 12.8 years ($SD = 3.1$); mean age of first sexual arousal for lesbians was 11.5 years ($SD = 2.4$). This difference was significant, $t(34.8) = 2.2$, $p = .03$, Cohen's $d = .47$. We also found a significant difference in age of puberty for heterosexual women versus lesbians, $t(33.5) = 2.4$, $p = .02$, Cohen's $d = -.50$. Mean age of puberty was 11.4 years ($SD = 1.1$) for lesbians, and 12.0 years ($SD = 1.3$) for heterosexual women. There were no significant differences in age of first sexual arousal or age of puberty for gay versus heterosexual men.

## DISCUSSION

We begin our discussion with an obvious limitation of our data: they are retrospective. Adult sexuality may affect one's memories of childhood and adolescent sexuality. Those with a higher sex drive, for example, might recall having "always" felt sexually aroused, and thus might mistakenly report an earlier first experience of sexual arousal than those with a lower sex drive, thus accounting for our correlations between age of first sexual arousal and adult sex drive. (Though such an account would be hard-pressed, one would think, to account for the complex relations we found among recalled ages of first sexual arousal, recalled ages of puberty, adult sex drive, and gender.) Obviously, prospective research on sexuality would solve this "chicken and egg" problem – but prospective research on sexuality, especially prospective research that addresses pre-pubescent sexuality, is difficult to arrange, for practical, ethical, and political reasons. Thus, though we acknowledge the possibility that our results might to some degree be the product of mistaken memories, we proceed to interpret the results as if they, at least to some degree, reflect accurate memories.

### Timing of Puberty, Timing of First Sexual Arousal, and Sex Drive

Our data on the relations among timing of puberty, sex drive, and sexual behavior replicate the findings of Kinsey et al. (1948, 1953). The earlier men's puberty, the higher their sex drive, though the puberty results were only borderline-significant ($p$-values ranged between .04 and .08). Like Kinsey et al. (1953), we were unable to find any relations between timing of puberty and women's sexual attitudes and behaviors. However, we were able to identify several significant relationships between timing of first sexual arousal (a variable that Kinsey did not explicitly measure) and sex drive, sexual attitudes, and sexual behaviors in both sexes.

Men with an earlier first sexual arousal had a higher sex drive, had more sexual partners, were more feminine, and also had a less restricted sociosexual orientation than did men with a later experience of first sexual arousal. Women with an earlier experience of first sexual arousal

had a higher sex drive, a less restricted sociosexual orientation, more sexual partners, and more sexual interest in members of the same sex than did women with a later experience of first sexual arousal. For men, partial correlations controlling for timing of first sexual arousal in the relationship between puberty and sex drive (and controlling for timing of puberty in the relationship between first sexual arousal and sex drive) reduced these correlations essentially to zero. This suggests that, for men, these two timing variables are markers of the same mechanism. But there does not appear to be a single mechanism for women. For them, timing of first sexual arousal is linked to adult sex drive both using first order correlations and when controlling for timing of puberty, but timing of puberty is *not* linked to the timing of first sexual arousal, either at first order or after controlling for timing of first sexual arousal.[5]

### Timing of Puberty, Timing of First Sexual Arousal, and Sexual Orientation

Lesbians' first sexual arousal occurred 1.3 years before heterosexual women' first sexual arousal, an age gap wide enough to support Storms' (1980) developmental theory of sexual orientation. The "first sexual arousal" findings for women were in almost all cases of greater magnitude than were the analogous findings for men (but, the sexual orientation findings for men should be interpreted with caution due to the very low number of gay men in our sample).

### Timing of Puberty, Timing of First Sexual Arousal, and Sociosexual Orientation

Our first-order correlations between timing of puberty and sex drive, and between timing of puberty and sociosexual orientation for males suggest that having an earlier puberty was associated with having not only a relatively intense adult sex drive, but also with choosing a relatively unrestricted sociosexual orientation. However, our partial correlations, controlling for variance due to sex drive in the correlation between timing of puberty and sociosexual orientation, revealed an unexpected reversal in the relationship between timing of puberty and sociosexual orientation: Holding sex drive constant, later puberty men had less restricted sociosexual attitudes than did earlier puberty men. This suggests that whatever mechanism controls the timing of puberty has some link with the mechanism that controls adult sex drive and sociosexual orientation. But it also suggests that there might be some second, separate mechanism that links later puberty with an unrestricted sociosexual orientation. Further research will be needed to look for that second mechanism.

For women, timing of first experience of sexual arousal was related to several aspects of adult sexual attitudes and behaviors. When we controlled for sex drive in the correlation between timing of first sexual arousal and sociosexual orientation, the magnitude of the correlation between first sexual arousal and SOI dropped by half, suggesting than whatever mechanism controls timing of first sexual arousal in women affects sociosexual orientation via sex drive.

Simpson and Gangestad (1991) have theorized that sociosexual orientation is a frequency-dependent adaptation in which sociosexually unrestricted women (for example) benefit in an environment in which most women are sociosexually restricted: sociosexually unrestricted women in a predominantly restricted female population trade the resources they might gain through a committed love relationship for the good genes they can gain through uncommitted sexual intercourse with genetically superior men.

There are two ways to interpret the frequency-dependent notion. One way is to imagine that all women have genes that dictate a contingent strategy: in an environment rich with other women pursuing resources, pursue genes; in an environment that has a substantial number of gene pursuers, on the other hand, pursue resources. The other interpretation is that most women have non-contingent resource-pursuing genes, but some women non-contingent gene-pursing genes. The fact that one can (arguably) predict sociosexual orientation by age 12.6 (average age of first experience of sexual arousal) suggests the latter interpretation to us.

Of course, it is possible that some aspect of socialization that occurs earlier than 12.6 years affects both age of first sexual arousal and subsequent sexual attitudes and behaviors. Some researchers have called attention to father absence as such a possibility. Belsky, Steinberg, and Draper (1991), Ellis, McFadyen-Ketchum, Dodge, Pettit, and Bates (1999), and Quinlan (2003) have each proposed that the types of families in which children, particularly girls, are raised affects their later reproductive choices. For example, Quinlan (2003) found, in a sample of 10,847 American women, that women whose parents had separated by the time they were six years of age, and whose fathers no longer played a large (or any) role in their upbringing, were at two-times greater risk of early menarche, at four-times greater risk of early sexual

[5]Thus, there is a sex difference in how these two timing variables are liked to sex drive, even though the correlations between them are almost identical for each sex (.46 vs .47).

intercourse, and two-and-a-half times greater risk of early pregnancy relative to women whose parents did not separate. Unfortunately, we did not ask our respondents about father presence or absence, and cannot comment on whether father absence is related to early puberty and/or heightened sexuality. Future research should address this issue.

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