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Masturbation in Urban China

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Abstract This study examined the prevalence and sources of masturbatory practice in a nationally representative sample from China completed in the year 2000, with analysis of sources focused on 2,828 urban respondents aged 20–59. In this subpopulation, 13% (95% CI, 10–18) of women and 35% (CI, 26–44) of men reported any masturbation in the preceding year. Prevalence for people in their 20s was higher, and closer to US and European levels, especially for men. Particularly for women, masturbation not only compensated for absent partners but also complemented the high sexual interests of a subset of participants. For both women and men, practicing masturbation appeared to be a two-step process. In the first step, events such as sexual contact in childhood, early puberty, and early sex were related to sexualization and the "gateway event" of adolescent masturbation. In the second step, other factors, such as liberal sexual values and sexual knowledge, further increased the current probability of masturbation. Overall, the results suggest that masturbation is readily adopted even at more modest levels of economic and social development, that masturbation is often more than simply compensatory behavior for regular partnered sex, that masturbatory patterns are heavily influenced by early sexualization, and that a complex model is needed to comprehend masturbatory practice, particularly for women.

Keywords Masturbation · China · Sexualization · Social influence

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Introduction

There has been a spate of research on masturbation (Baker & Bellis, 1993; Bancroft, Herbenick, & Reynolds, 2003; Choi et al., 2000; Lipsith, McCann, & Goldmeier, 2003; Liu, 1997; LoPresto, Sherman, & Sherman, 1985; Oliver & Hyde, 1993; Renaud, Byers, & Pan, 1997; Shulman & Horne, 2003). With the exception of a small group of studies of Western societies (Haavio-Mannila, Kontula, & Rotkirch, 2002; Kontula & Haavio-Mannila, 2002; Laumann, Gagnon, Michael, & Michaels, 1994), however, there have been few large-scale or nationally representative studies on masturbation, especially in developing countries. Quantitative analysis on Asian countries is particularly limited, with the few exceptions based largely on local or regional samples (Choi et al., 2000; Renaud et al., 1997).

As the first nationally representative study of masturbation in urban China this article examined two questions—the relationship of masturbation to partnered sex and the social sources of masturbation. China's rapid shift in sexual beliefs and practices invites analysis of emerging patterns of masturbation (Evans, 1997; Farquhar, 2002; Farrer, 2000; Sha, Xiong, & Gao, 1994).

Perspectives on Masturbation

Much research on the correlates of sexual behavior has advocated multi-causal models subsuming biological and psychosocial factors (Bancroft, 1983, 2002; Hawton, 1987; Kaplan, 1974; Laumann et al., 1994; Lipsith et al., 2003; Riley, 1998; Udry, 1988). A similar broad range of influences has been investigated in studies of masturbation (Kontula & Haavio-Mannila, 2002; Laumann et al., 1994).

This broad approach was repeated in the present study and informed the two central questions outlined above.

Relationship to Partnered Sex: Compensatory or Complementary?

At least implicitly, both early (Kinsey, Pomeroy, & Martin, 1948; Kinsey, Pomeroy, Martin, & Gebhard, 1953) and more recent studies (Lipsith et al., 2003) have viewed sexuality as a result of fixed individual levels of sexual "drive" (Laumann et al., 1994). From this perspective, masturbation appears to be a suboptimal outlet for sexual tension, compensating for the lack of availability of either partnered sex or satisfactory partnered sex (Langstrom & Hanson, 2006). Empirical data suggest that masturbation may not have such a simple inverse relationship to partnered sex (Laumann et al., 1994). Also, in some societies, the relationships may be in flux, an example being the tendency for more recent generations of Western youth to view masturbation not as a second-best solution but as a relatively autonomous sexual act that can coexist with the availability of partnered sex (Dekker & Schmidt, 2002; Kontula & Haavio-Mannila, 2002).

If masturbation is compensatory, it can be expected to be more common among those with little access to satisfying partnered sex, e.g., no partnered sex of any kind, stable partner often absent, and unsatisfying sex with a stable partner. If complementary, masturbation would be unrelated to the availability of partnered sex. Moreover, if masturbation has a life of its own, it can be expected to be more common among more highly sexualized individuals, including those with multiple partners in the previous year, those who have more varied sexual practices with their stable partner, and those who report frequent thoughts about sex.

Social Origins

Life Trajectory: As with other sexual behavior, the social origins of masturbation are likely to begin with early sexualizing experiences, whose influences persist into adulthood (Browning & Laumann, 1997, 2003; Laumann, Browning, Rijt, & Gatzeva, 2003). Consistent with recent research in human development (Caspi et al., 2003; Shanahan & Hofer, 2005), "sexualization" is conceived here not as a simple outcome of individual-specific biological traits, but of a complex system of interacting biological and social processes. Kontula and Haavio-Mannila (2002) found that patterns of masturbation set early in the life course became a stable feature of sexual expression in adulthood, indicating perhaps that sexualization tends to become a self-sustaining pattern, an argument consistent, for women, with Kinsey et al.'s (1953) early observations. In the same 2002 study, early initiation into partnered sex (whether conceptualized as an indicator of hormonal levels or of social entrainment in a less inhibited sexual career) was associated with a greater propensity to masturbate in adulthood. Early pubertal development has been found to be correlated with higher levels of sexuality in adulthood (Belsky, Steinberg, & Draper, 1991; Moffit, Caspi, Belsky, & Silva, 1992), with both differential hormonal levels and different social environments arguably contributing to these patterns (Liao, Missenden, Hallam, & Conway, 2005; Udry, 1988). Though disagreeing on the exact mechanisms involved, studies agree that sexual contact during childhood or adolescence is correlated with an intensification of sexual behaviors in adulthood (Browning & Laumann, 1997, 2003; Laumann et al., 2003).

Values/Knowledge: Whether through the direct transmission of "cultural scenarios" of sexual appropriateness (Ellingson, Laumann, Paik, & Mahay, 2004) or indirectly by enabling the individual to consume media products carrying globalized or "modern" sexual scripts, higher education arguably increases the propensity to masturbate (Kontula & Haavio-Mannila, 2002). The individual's current sexual values, almost by definition, serve as indicators of internalized cultural scripts or norms defining appropriate sexual behavior, including, potentially, masturbation (Kontula & Haavio-Mannila, 2002; Sandfort, Bos, Haavio-Mannila, & Sundet, 1998). Qualitative and small-sample studies in China and Taiwan also indicate the persistence of the belief that excessive ejaculation, and particularly masturbation, causes *shenkui*, or a loss of virility and energy (So & Cheung, 2005). Additionally, anecdotal evidence suggests the recency of "rediscovery" of the clitoris and clitoral orgasms among Western women, an event connected with increased sexual liberalism stemming from the sexual revolution (Angier, 2000). Thus, knowledge of the clitoris, apart from indicating greater sexual knowledge, is also arguably a marker of more permissive sexual values.

Controls

Several background characteristics were controlled in the analysis, including region, age, and sexual dysfunctions. Arguably, sociocultural context, as proxied by area of current residence, may affect a person's understandings and modes of sexuality, whether by embedding him or her in a more sexually permissive peer network or by increasing exposure to globalized or "Westernized" media products. Age can also be important, not only in influencing hormone levels and vitality but also because it indexes differential experiences of cohorts who came of age at different times (Abbott, 2005; Ryder, 1965). Both popular literature and academic studies suggest that masturbation can be a route

for women to achieve orgasm and, implicitly, relieve sexual difficulties (e.g., Berman & Berman, 2005; Hite, 1976; Leiblum & Rosen, 2000; LoPiccolo & Lobitz, 1972; McMullen & Rosen, 1979; Meston, Levin, Sipski, Hull, & Heiman, 2004), a mechanism that may potentially apply to men as well.

In addition to these factors, several reflections of low social control were considered, such as drunkenness, smoking, and having had commercial sex over the preceding year. However, these effects failed to reach significance net of the other factors, and were therefore dropped in the final analysis.

Method

Participants

Data were from the 1999–2000 Chinese Health and Family Life Survey (CHFLS). With the exclusion of Tibet and Hong Kong, the sample was nationally representative of the adult population of China aged 20–64. Following standard procedures for complex samples (Levy & Lemeshow, 1999), the probabilistic sample was drawn from 14 strata and 48 primary sampling units (counties and city districts), with probabilities of selection proportional to population size at each of the four sampling steps down to the individual. Among the sampled individuals, 3,821 completed the interview, yielding a final response rate of 76%.

For comparison, prevalence was investigated for participants between ages 20 and 59 with complete data, in both the urban (2,828 responses about masturbation—1,434 for women and 1,394 for men) and rural subsamples (736 responses—365 for women and 371 for men). Since the study over-sampled urbanites, analysis of factors underlying masturbation was limited to the urban subsample. Those above 59 were excluded from analysis to avoid complications from increase in sexual dysfunctions with age (Laumann et al., 2005), and to facilitate comparison of Chinese masturbation prevalence against prevalence in the 1992 US National Health and Social Life Survey (NHSLS), which was limited to those below 60. Furthermore, the number of masturbation cases was very small for participants above 59, particularly among women, leading to concerns about attenuation of effects.

The interview included both initial face-to-face responses to an interviewer and later computerized portions allowing private response to sensitive questions. This article draws on the public use data set located at http://www.src.uchicago.edu/prc/chfls.php. In addition, age patterns of masturbation in urban China were compared against patterns in the US and Finland through reanalysis of raw data from Laumann et al. (1994) and Kontula & Haavio-Mannila (1995), respectively.

Procedure

Most interviewers were middle-aged social workers and researchers who were given one week's training in conducting interviews, and who remained with the project throughout the interview period of one year. Interviewers were matched by sex to participants. For the sake of privacy, interviews took place outside the homes of the participants, normally in a private room in a hotel in big cities and in a meeting facility in smaller locales. Oral and computer-entered consent was obtained prior to the hour-long interview. The first part of the interview that included basic demographic questions was a computer assisted face-to-face interview—the interviewers read out the questions from the computer to the participant and entered the answers into the computer. During the second part of the interview that included sensitive sexual behavior (and masturbation) questions, most participants had full control of the computer, i.e., they read and answered the questions themselves. In the urban subsample, only 12% of women and 7% of men needed consistent help with the computer in ways that would cause responses to be known to the interviewer. Institutional review boards at the University of Chicago and Renmin University approved the interview methods.

Measures

A computerized interview, based in part on the NHSLS, was pretested in China in three field trials.

Masturbation

Near the end of the interview, after many other potentially sensitive questions, participants were asked about masturbation. The wording of the questions was as follows for men: "Masturbation is a very common and normal human behavior. Most men have stimulated their own genitals (penis) to obtain sexual pleasure, orgasm and ejaculation. In the last 12 months, how often did you masturbate?" For women: "Masturbation is a very common and normal human behavior. Many women have used their hands or other things to stimulate their clitoris, genitals (vulva, pubis), or nipples, or tightened their legs to obtain sexual pleasure and orgasm. In the last 12 months, how often did you masturbate?" For the univariate and multivariate analyses (Table 2), responses were recoded into a dummy for any (1) or no (0) masturbation for the preceding year. These questions were then followed by a question on the age at which they had begun to masturbate.

To test item reliability, especially for sensitive questions like masturbation, 50 participants had repeat interviews

after an interval of 2 months. The question about masturbation frequency had an agreement value (kappa) of .76 when the same item was compared across the two separate interviews, while for age at first masturbation, the agreement value was .83, with both values significant at 95%. In other words, strength of agreement for both items was well within the "substantial" to "almost perfect" range (Landis & Koch, 1977).

Among the independent variables described below, a few had missing values replaced with 0s (or 1s with ordinal variables *sex damages men's health* and *gave partner oral sex*). They were as follows, with the number of substitutions in parentheses: *first masturbation* $\leq$ *age 19* (6), *childhood sexual contact* (2), and *sex damages men's health* (34). Next were *satisfaction with sex with partner* and *gave partner oral sex*, with substitutions (123 each) representing those who had a stable partner but no sex in the preceding year. Additionally, when the logic of the computer program judged that the respondent had no sex last year, the questions about *sexual difficulties* were skipped (258 substitutions for women and 206 for men) at the time of interview. The inclusion of the *stable partner*, *no sex* variable controlled for these last three sets of substitutions in the multivariate analysis. Finally, for three variables, missing values represented errors in the computer program in the middle of fieldwork: *frequent sexual ideations* (41), *puberty age* $\leq$ *13* (50) and *knowledgeable about clitoris* (45). For puberty and clitoral knowledge, regression based imputation was used.

Social Origins: Life Trajectory, Sexualization, Values, and Knowledge

The items (all based on self-reports) for sexualizing early life-course experiences included *first masturbation* $\leq$ *age 19; puberty* $\leq$ *age 13*; *childhood sexual contact* (*age* < *14*); *and age at first sex* < *21*, which, in the Chinese context, can be considered early (empirically for these data, this last value was between the 10th and 25th percentiles for both women and men aged 20 to 59, with a median at 23 for women and 24 for men). The specific question wording for childhood sexual contact was as follows: "Did someone have sexual contact with you before you turned age 14? "Sexual contact" here includes vaginal intercourse (sleeping with someone or making love), caressing as well as other ways of stimulating genitals/female breasts."

The indicators for values and knowledge were *education* $\geq$ *junior college* (denoting junior college and/or university education), *liberal sexual values* (*own*), *sex damages men's health*, and *knowledgeable about clitoris*. The effects for education were substantively the same for both genders in separate analysis using an ordinal variable indicating six levels of education. The dummy with a high cut point of "junior college or higher" was chosen to circumvent attenuation of the effect for men, due to mild collinearity (correlation = .43 in Model 7) with clitoral knowledge. *Sex damages men's health* was an ordinal variable indicating that the participant completely (1) or somewhat (2) disagreed or somewhat (3) or completely agreed (4) with the statement that too much sex damages men's health. *Liberal sexual values* was based on a summary index running from 1 to 4, combining the participant's responses to four statements: "It is okay for one to have sex just for pleasure with someone whom she/he is not in love with" (probing for hedonistic attitudes); "It is okay for one to have sex with someone other than her/his spouse after marriage;" "The married people who have sex with someone other than their spouse should all be punished;" and "It is moral for couples to have sex when they are dating before marriage." The alpha value for the combination of these four items was .56, admittedly somewhat lower than the "rule of thumb" of .70 (Nunnaly & Bernstein, 1994). This summary scale was then recoded into a dummy, with "liberal sexual values" arbitrarily coded as the most liberal fifth of all participants. In separate analysis using the original continuous scale, results were substantively similar among both women and men. As with education, a dummy with a high cut-point was chosen solely to avoid attenuation of the effect among men due to mild collinearity with other "values and knowledge" variables, especially "sex damages men's health" (correlation = .41 in Model 7).

Outlets

The indicators for sexual outlets other than masturbation were based on intercourse in the presence or absence of a stable partner over the preceding year: *no stable partner*, *sex* (indicating sex in the absence of a stable partner over the preceding year), *no stable partner*, *no sex*, and *stable partner*, *no sex*, with *stable partner*, *sex* as the reference. An additional dummy variable was included for *partner away* > *1 week* (indicating lengthy absences by the primary partner during the preceding year).

Current Behaviors and Relationship

A set of indicators was included for proximal correlates of masturbation, hypothesized as outcomes, along with masturbatory patterns, of life course processes. These included *frequent sexual ideations* (sexual thoughts a few times a week or more), *partners past year* $\geq$ 3 (indicating multiple partners over the preceding year), *satisfaction with sex with partner*, and *gave partner oral sex* (with the levels for this ordinal variable being never (1), sometimes (2), and often

(3)). Satisfaction with partnered sex was based on a summary index (running from 1 to 4) combining responses to the following four questions: "Does having sex with your current partner make you feel physically satisfied?" "Does having sex with your current partner make you feel emotionally satisfied?" "When having sex with your current partner, have you ever had a feeling of shame?" and "When having sex with your current partner, do you often feel thrilled?" Based on prior exploratory analysis that indicated a curvilinear pattern for women, this summary scale was recoded into dummy variables indicating *low* (least satisfied fifth of all participants) and *high satisfaction* (most satisfied fifth), with *moderate satisfaction* as the reference category.

Background Conditions

The first factor included in this set of controls for background conditions was *sexually liberal locale*. This factor was proxied by dummy variables for *somewhat* and *very liberal* locales, with *not liberal* as the reference category. "Very liberal" was arbitrarily coded as the most liberal fifth and "somewhat liberal" as the middle two-thirds of all communities, based on the mean of participants' self-reported liberal sex values for each community. To proxy *age*, dummy variables for *age 20–29*, *age 30–39* and *age 40–49* were included, with *age 50–59* as the reference category.

The indicator for the participant's sexual well-being was a dummy variable for experiencing any of four *sexual difficulties* for more than 2 months during the past year. For women, these were lack of arousal, pain during intercourse, vaginal dryness, and inorgasmia in intercourse. For men, the vaginal dryness item was substituted with difficulty in achieving or maintaining an erection during intercourse; the other items remained the same. Premature ejaculation was not included in the index variable for men due to the potential for a feedback effect, i.e., masturbation reducing premature ejaculation in men.

Statistical Analyses

Results were weighted in the analyses using *svy* methods in the STATA 9.0 statistical package, first using population weights that adjusted for the intentional oversampling of coastal and urban strata (with probabilities of selection proportional to population size within strata). After comparison of the resulting age distribution to census results for 2000, weights were adjusted by age to compensate for the smaller number of usable interviews of 20-to-29-year-olds. With these adjustments, the percentage distributions by age, education, and urban residence closely paralleled those in the national census. Standard errors were adjusted for sample stratification (sampling strata independently) and clustering (sampling individuals within each of 48 primary sampling units). The analysis presented below was limited to one subset of urban participants, those aged 20–59. (As noted above, for comparison, rural prevalence over the same age range is also reported). We also did analysis of frequency of masturbation. Because the conclusions from that analysis paralleled those reported here for any masturbation last year, we report only one set of results here.

Results

Prevalence for Urban and Rural Subsamples

Prevalence varied both by locale and age group (see Table 1). Among those aged 20–59, masturbating ever or in the last year was distinctly lower in the countryside for women: 4% (CI, 2–9) of rural versus 13% (CI, 10–18) of urban women reporting any masturbation in the last year. Among men in the same age range, rural prevalence was also lower but not significantly so, i.e., the confidence intervals for urban and rural prevalence overlapped. In urban areas, having ever-masturbated was more common among the young even though the young (those aged 20–29) had had fewer years to masturbate compared to the old (those aged 50–59). A separate unreported event-history analysis that took years of opportunity to masturbate into account confirmed these trends. The figures for age that masturbation began were meaningful only when a person was older than the typical age at which the 10th, 50th, or 90th percentile age was passed. For the available data points that remained in Table 1, the age at which masturbation began for those who reported the experience was largely constant across age groups. Also, among urban women, the frequency of masturbation did not change significantly across age groups. However, younger men were not only more likely to masturbate but also likely to masturbate with greater frequency compared to older age groups. A separate unreported analysis only for those men who masturbated during the year confirmed the conclusion that when they masturbated during the year, younger men masturbated more frequently.

Univariate Logistic Models for Urban Subsample

When logistic models controlling only for age were run for the 17 background conditions one-at-a-time (Table 2), significance was achieved at the $p < .05$ level for all but two conditions for women, and five for men (Table 2, columns 1 and 5). In separate tests of significance, for six of these conditions, the univariate effect was significantly stronger (at 5%) for women than for men, while the inverse was true for only one condition.

Table 1 Descriptive statistics for masturbation by region and age group: percentages and confidence intervals[a]

	Urban %					Rural %	Combined %
	20–29	30–39	40–49	50–59	20–59	20–59	20–59
Women							
Ever masturbated	26 (17,36)	21 (15,28)	11 (8,15)	8 (4,13)	18 (14,22)	7 (2,13)	10 (6,14)
Age began							
Percentiles[b]							
10th	14	15	14	14	14	16	15
50th	–[c]	22	22	20	20	20	20
90th	–[c]	30	30	34	34	34	33
Last year							
Any masturbation	22 (14,33)[b]	19 (13,26)	6 (4,9)	5 (2,8)	13 (10,18)	4 (2,9)	7 (5,10)
Frequency							
Several/week	3 (1,5)	4 (1,9)	1 (1,2)	1 (0,2)	2 (1,4)	2 (0,7)	2 (1,5)
Several/month	5 (3,6)	3 (1,9)	2 (1,5)	0 (0,1)	3 (2,5)	2 (1,4)	2 (1,4)
Several/year	16 (8,32)	14 (10,19)	5 (3,8)	6 (3,12)	11 (7,17)	3 (1,11)	6 (3,9)
Never	76 (64,85)	79 (73,84)	92 (88,95)	93 (87,97)	84 (78,88)	93 (89,95)	90 (88,92)
Men							
Ever masturbated	67 (54,77)	56 (42,69)	44 (37,51)	34 (29,39)	52 (45,59)	42 (29,54)	45 (36,54)
Age began							
Percentiles[b]							
10th	15	14	15	15	15	15	15
50th	18	18	18	17	18	18	18
90th	–[c]	22	24	21	22	23	22
Last year							
Any masturbation	57 (42,70)	34 (27,42)	26 (21,32)	14 (7,21)	35 (26,44)	30 (19,41)	31 (23,40)
Frequency							
Several/week	12 (9,16)	4 (2,7)	5 (3,9)	3 (1,10)	6 (4,10)	7 (4,12)	7 (5,10)
Several/month	11 (7,17)	11 (7,17)	6 (3,10)	2 (1,5)	8 (6,12)	9 (6,13)	9 (7,11)
Several/year	35 (24,47)	21 (17,27)	19 (14,25)	11 (6,19)	23 (16,31)	18 (7,37)	19 (11,31)
Never	42 (29,57)	64 (56,70)	70 (61,77)	84 (73,91)	63 (52,72)	66 (51,78)	65 (55,74)

Note: Confidence intervals in parentheses

[a] Prevalence was adjusted by sample weights and the confidence intervals by sample design (strata and primany sampling units)

[b] Subsample restricted to those reporting any masturbation over lifetime

[c] Omitted because many in cohort had not passed the usual age for this transition

Multivariate Logistic Models for Urban Subsample

Many of the same items were also significant in the multivariate results that considered the net effect of all background conditions taken together. There were two sets of multivariate results (Table 2): for women (Models 2–4) and for men (Models 6–8). In each set, the first results (Models 2, 6) included relationship items (partner's absence, satisfaction with sex with partner, and oral sex with partner) and because these factors applied only to participants in a married (98%) or in a cohabiting or other steady relationship (2%), these columns were based on fewer observations. The second set of results (Models 3, 7) were the simplest, omitting, for instance, current behavior and relationship items. When excluding relationship items, the third set of results (Models 4, 8) added the very strong influence of early masturbation (before age 19) and for women, the possible feedback effect of "knowledgeable about clitoris," i.e., women's attempts at masturbation leading to "discovery" of the clitoris (Kinsey et al., 1953).

As the first row of Table 2 shows, masturbation often began early and early masturbation was highly related to later masturbation. Specifically, 9% of all women reported masturbating by age 19, and more detailed tabulations showed that when early and recent masturbation behavior was compared only 10–15% of women had either taken up or abandoned masturbation in the intervening period. Similarly, among men, 40% had masturbated by age 19 and in

Table 2 Survey-weighted means and logistic models for masturbation in urban sample aged 20–59 years

	Means		Odds ratios: women				Odds ratios: men			
	Women	Men	Univar.	Multivariate			Univar.	Multivariate		
	(a)	(b)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Life trajectory, sexualization										
First masturbation age ≤ 19	.08	.36	35.80$^{**\wedge}$ (7.50)	–[a]	–[a]	54.08$^{**\wedge}$ (8.73)	8.13** (17.62)	–[a]	–[a]	7.67** (14.68)
Childhood sexual contact	.03	.06	3.79* (2.55)	6** (2.77)	4.10** (3.04)	1.13 (.17)	2.37** (4.89)	1.87† (1.77)	1.60* (2.39)	1.25 (.58)
Puberty age ≤13	.25	.06	1.68** (3.00)	1.54 (1.57)	1.70** (2.78)	1.64† (2.00)	2.64** (6.73)	1.93† (2.00)	2.45** (3.48)	1.88* (2.17)
Age at first sex <21	.14	.14	1.87* (2.23)	1.53 (1.59)	1.87* (2.27)	1.39 (1.05)	1.70* (2.55)	1.34 (1.27)	1.88* (2.67)	1.28 (1.28)
Values, knowledge										
Education ≥ junior college	.13	.18	2.20** (4.64)	2.01* (2.37)	2.28** (4.01)	1.59† (1.73)	1.51* (2.41)	1.21 (1.38)	1.41** (3.15)	1.03 (.21)
Liberal sexual values (own)	.07	.32	2.27** (4.26)	1.44 (1.32)	1.71* (2.20)	1.05 (.15)	1.56** (3.60)	1.44** (2.95)	1.46** (3.26)	1.05 (.31)
Sex damages men's health	3.19	3.35	1.14 (1.20)	1.19 (1.25)	1.05 (.40)	1.14 (.94)	.86** (2.92)	.88* (2.10)	.89* (2.40)	1.01 (.19)
Knowledgable about clitoris	.36	.54	3.31$^{**\wedge}$ (6.34)	–[b]	–[b]	2.69** (6.19)	1.66* (2.73)	1.74* (2.70)	1.72** (3.13)	1.43 (1.68)
Outlets, opportunity										
Stable partner: (ref: yes, sex)	.80	.84	1.0	–[c]	*1.0*	*1.0*	*1.0*	–[c]	*1.0*	*1.0*
No stable partner, sex	.02	.03	2.75 (1.17)	–[c]	2.98 (1.18)	6.79* (2.13)	1.73 (1.28)	–[c]	2.03 (1.52)	3.16* (2.53)
No stable partner,no sex	.13	.10	.31$^{**\wedge}$ (3.11)	–[c]	.41† (1.78)	.46† (1.84)	1.66 (1.39)	–[c]	2.54$^{**\wedge}$ (3.17)	1.97$^{*\wedge}$ (2.05)
Stable partner, no sex	.05	.03	.50 (1.39)	.91 (.17)	.58 (1.11)	.14 (1.49)	.40† (1.77)	.44 (1.50)	.47 (1.48)	.58 (1.04)
Partner away >1 week	.20	.11	1.82* (2.21)	1.82* (2.10)	–[d]	–[d]	2.86** (5.88)	2.29** (3.94)	–[d]	–[d]
Current behaviors, relationship										
Frequent sexual ideations	.31	.59	3.05$^{**\wedge}$ (5.47)	2.24$^{**\wedge}$ (3.82)	–[e]	2.27$^{**\wedge}$ (3.24)	1.18 (1.02)	1.11 (.70)	–[e]	1.12 (.55)
Partners past year ≥ 3	.01	.11	8.84$^{**\wedge}$ (3.25)	6.39$^{*\wedge}$ (2.74)	–[e]	6.34† (1.89)	1.84** (3.64)	1.44† (1.94)	–[e]	1.08 (.41)
Satisfaction w. sex										
w. partner (ref: moderate)	.58	.52	1.0	1.0	–[d]	–[d]	1.0	1.0	–[d]	–[d]
Low satisfaction	.25	.10	.95 (.15)	.85 (.69)	–[d]	–[d]	1.62$^{*\wedge}$ (2.41)	1.55$^{\dagger\wedge}$ (2.03)	–[d]	–[d]
High satisfaction	.17	.38	.65 (.91)	.35* (2.26)	–[d]	–[d]	.92 (.45)	.88 (.52)	–[d]	–[d]
Gave partner oral sex	1.27	1.28	3.37$^{**\wedge}$ (6.38)	3.55$^{**\wedge}$ (7.92)	–[d]	–[d]	1.36 (1.45)	1.03 (.15)	–[d]	–[d]
Background conditions										
Sexually lib. locale (ref: not)	.16	.15	1.0	1.0	1.0	1.0	1.0	1.0	1.0	*1.0*
Somewhat	.66	.65	.89 (.37)	.91 (.22)	.92 (.22)	.78 (.76)	1.13 (.49)	1.47† (1.86)	1.28 (1.01)	1.30 (.78)
Very liberal	.18	.20	1.59* (2.24)	1.35 (1.09)	1.45† (1.87)	1.20 (.66)	1.61† (1.72)	1.93* (2.13)	1.63† (1.73)	1.77 (1.66)
Age (ref 50–59)	.16	.19	1.0	1.0	1.0	*1.0*	1.0	1.0	1.0	*1.0*
Age 20–29	.31	.29	5.71** (4.81)	3.05† (1.83)	6.04** (3.44)	3.64* (2.46)	7.99** (10.21)	4.45** (7.98)	5.10** (8.35)	5.15** (5.79)
Age 30–39	.27	.27	4.55** (3.91)	2.56† (1.87)	4.41** (3.64)	3.61** (3.29)	3.17** (4.21)	2.52** (4.38)	2.71** (4.99)	2.48** (2.91)
Age 40–49	.26	.25	1.30 (.67)	.84 (.37)	1.35 (.71)	1.05 (.09)	2.15** (2.99)	1.94** (3.17)	2.27** (3.57)	2.40** (3.67)

Table 2 continued

	Means		Odds ratios: women				Odds ratios: men			
	Women	Men	Univar.	Multivariate			Univar.	Multivariate		
	(a)	(b)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sexual difficulties	.16	.11	2.09** (3.16)	1.76* (2.40)	1.81* (2.23)	2.88** (3.54)	1.53 (1.29)	1.57 (1.16)	1.71 (1.65)	1.82* (2.26)
Observations	≤1434	≤1394	≤1434	1232	1434	1434	≤1394	1224	1394	1394

Note: "Univariate odds ratios" (ORs) in columns 1 and 5 are adjusted ORs, based on logistic regression models controlling participant's age only. Models 2 and 6 for participants with a stable partner over preceding year. Means and univariate ORs for variables added in models 2 and 6 also for those with stable partner

[a] Omitted because much of the effect of early life trajectory is mediated through an early age at first masturbation

[b] Omitted because of potential feedback effects from masturbation to knowledge of clitoris

[c] Not applicable because this analysis restricted to participants with a stable partner

[d] Omitted because applicable only to participants with a stable partner

[e] Omitted so as not to obscure many of the effects of early sexualization

t statistics in parentheses †$p < .10$; *$p < .05$; **$p < .01$; ^ effect significantly different at $p < .05$ when compared to OR in equivalent model for other gender

more detailed tabulations between two- and three-tenths of these men had abandoned masturbation by the most recent year. These modest rates of change between early and recent behavior helped produce the highly significant odds ratios for early masturbation in the final columns for both women and men.

Life Trajectory, Sexualization, Values, and Knowledge

This set of factors indexed biological transitions and/or eroticizing social experiences early in the life course (with the argument being that early transitions, specifically early puberty, early masturbation, early first intercourse, and sexual contact in childhood, lead to increased likelihood of masturbation in later years), as well as current values and sexual knowledge.

Among women (Model 3 in Table 2), childhood sexual contact (OR = 4.10), early puberty (OR = 1.70), and first sex before age 21 (OR = 1.87), all significantly increased current likelihood of masturbation, consistent with conjectures about paths to eroticization. First masturbation before age 19, conceived as a strong mediating factor and added only in Model 4, greatly increased the likelihood of masturbation (OR = 54.08). Among the values and knowledge items, junior college and/or university education (OR = 2.28 in Model 3) and liberal sexual values (OR = 1.71) had significant effects. Correct identification of the clitoris, added in Model 4, had a significant positive effect (OR = 2.69).

For men (as per Model 7 in Table 2), childhood sexual contact (OR = 1.60), early puberty (OR = 2.45), and first sex before age 21 (OR = 1.88) had the expected effects. Also, in Model 8, first masturbation before age 19 had a significantly positive effect (OR = 7.67). Of the factors indexing values and knowledge, junior college and/or university education (OR = 1.41 in Model 7), liberal sexual values (OR = 1.46), agreeing with the statement that too much sex damages men's health (OR = .89), and correct identification of the clitoris (OR = 1.72), all had the expected effects.

Outlets

The variables in this cluster indexed availability of partnered sex. Women who lacked a stable partner but had intercourse during the year reported more masturbation (OR = 6.79, Model 4) than those in the reference category (women having a stable partner and sex), while the inverse was true for women with neither a stable partner nor sex (OR = .41, Model 3). Additionally, in Model 2, among women with a stable partner, his absence for periods over a week during the year was correlated with more masturbation (OR = 1.82).

For men, relative to the reference group of having sex with a spouse or other steady partner, masturbation reports were elevated when the man had neither a stable partner nor intercourse (OR = 2.54 in Model 7), with intercourse in the absence of a stable partner also reaching significance in Model 8 (OR = 3.16). Additionally in Model 6, absence of his stable partner (OR = 2.29) elevated masturbation reports.

Current Behaviors and Relationship

This set of factors comprised proximal correlates of masturbation. Since the relationship items (satisfaction in sex, oral sex) required the presence of a long-term partner, they were included only in Model 2 for women and Model 6 for men. For women (Model 4), thinking about sex often (OR = 2.27) and multiple partners (OR = 6.34) both elevated masturbation reports. Also in Model 2, among women with a stable partner, giving her partner oral sex (OR = 3.55) elevated reports of masturbation, while high satisfaction with partnered sex had the opposite effect (OR = .35) relative to moderately satisfied women. For men, multiple partners (OR = 1.44, Model 6) and low satisfaction with sex (OR = 1.55) had modest correlations with masturbation.

Background Conditions

These items at the bottom of Table 2 were included in all models. For women, as per Model 3, living in a sexually very liberal community elevated masturbation reports (OR = 1.45). Additionally, age had the expected correlation with masturbation, with age groups 20–29 (OR = 6.04) and 30–39 (OR = 4.41) both significantly more likely to masturbate than the reference group, age 50–59. Finally, experiencing sexual difficulties over the preceding year significantly increased women's likelihood of masturbation (OR = 1.81).

For men, current residence in a "very liberal locale" (OR = 1.63, Model 7) significantly elevated masturbation, with even a "somewhat liberal locale" (OR = 1.47) reaching significance in model 6 for those with a stable partner. Additionally, in Model 7, men in age groups 20–29 (OR = 5.10), 30–39 (OR = 2.71), and 40–49 (2.27) all reported more masturbation than men in the reference category (age 50–59). Finally, in Model 8, experience of sexual difficulties (OR = 1.82) also elevated men's masturbation reports.

Discussion

Prevalence in Other Societies

Comparison of masturbation across societies is fraught with difficulty: varying question wording, other methodological differences, and differential sensitivity of the topic in the populations being studied (Bradburn, Sudman, Blair, & Stocking, 1978; Halpern, Udry, Suchindran, & Campbell, 2000). With that caution in mind, we could compare prevalence in the US and Finland, for which we had raw data from large national probability samples in 1992 (raw data from Laumann et al., 1994, and Kontula & Haavio-Mannila, 1995). Among women aged 20–59, prevalence for masturbation in the last year in urban China, the US, and Finland, was 13% (95% CI, 10–18), 39% (CI, 36–43) and 43% (CI, 40–46), respectively. Among men, prevalence was 35% (CI, 26–44), 61% (CI, 57–65), and 59% (CI, 56–62). For women in their 20s, prevalence levels for urban China, the US, and Finland, were 22% (CI, 14–33), 40% (CI, 35–45), and 62% (CI, 55–68), respectively. For young men, the levels were 57% (CI, 42–70), 63% (CI, 57–68), and 72% (CI, 66–77). Thus, among young men, the confidence intervals for urban Chinese men already overlapped US levels and were not that far behind the level in Finland.

Compensatory or Complementary Masturbation Patterns

The article began with two questions, the first being whether masturbation was compensatory or complementary to partnered sex. A compensatory pattern would be one with elevated masturbation among those with inadequate partnered sex. A complementary pattern would find masturbation both insensitive to partner availability and more common among those with other indicators of sexualization (e.g., early puberty, early first sex, and many partners in the last year). Some of the urban results (Table 2) were consistent with a "compensatory" interpretation. Specifically, masturbation was more common when there was no stable sex partner or when partnered sex was less satisfying (among men) and when the spouse or steady partner was often away during the preceding year (women and men), and less common when a woman was highly satisfied with sex with her husband or other stable partner. However, other results were consistent with a "complementary" interpretation. Among women, intercourse in the absence of a stable partner raised the likelihood of masturbation (relative to those with a stable partner as well as sex). Masturbation was also more common when the participant reported childhood sexual contact, early puberty, early first sex, high education, liberal sexual values, frequent sexual thoughts, multiple sexual partners, and oral sex. This list was particularly long for women, with women's but not men's masturbation linked to frequent thoughts of sex and to varied sexual practices such as oral sex. Thus, on balance, in the list of items used in this analysis, masturbation seemed at least as often to complement partnered sex as to just be a mechanism compensating for inadequacies in partnered sex. Particularly

among women, past and current experiences that suggested more sexualization were also related to higher reports of masturbation.

Several indicators have emerged, both from the data and in the popular media, that Chinese women are developing an autonomous sense of sexuality, i.e., taking responsibility for their own sexual fulfillment. For instance, in a separate analysis, more than 20% of urban Chinese women below age 60 consumed sexually explicit material over the preceding year, as compared with 4% of US women in the NHSLS who consumed pornographic textual material and 11% who consumed pornographic movies or videos (Laumann et al., 1994). Media reports indicate that when the first Chinese edition of the classic women's guide to sexual health, *Our Bodies, Ourselves*, was published in 1998, the first print run sold out within just 20 days (Boston Globe, 1998). Ethnographic studies also indicate a trend toward sexual independence among Chinese women, at least in the more economically developed regions of the country (Farrer, 2000). However, the same studies also suggest that social norms still proscribe a pleasure-oriented view of sexuality for both genders. In our urban sample, for instance, over 90% of participants disagreed with the view that intercourse could be for pleasure only, i.e., involving neither love for the partner nor procreational goals. These indicators suggest that Chinese women, at least in some sections of society, are actively attempting to renegotiate their sexuality, in a sociocultural environment that is still largely puritanical. It is speculated that masturbation may be a relatively easy means to such "self affirmation," especially since it does not require the cooperation of a partner.

Social Origins of Masturbation

The second question motivating these analyses was about the social origins of masturbation, with the specific question being whether one could find a series of early life events and current beliefs that were correlated with more masturbation. The answer to this question is "yes." For both men and women, higher probabilities of masturbating were linked to childhood sexual contact, early puberty, early first sex, more education, more liberal sex values, and knowledge of clitoral anatomy, though of course, for women, the last relation was arguably as much a consequence as a cause of masturbation. For men, acceptance of the notion that too much sex damages men's health was correlated with less masturbation. Moreover, later masturbation was related to early masturbation before age 19. Indeed, many of the early life influences may flow through early masturbation, for when early masturbation was included into the final equations for both women and men (Models 4, 8 in Table 2), most of these early experiences lost significance. Given the cross-sectional nature of the data and the possibility of bias in recalling early life events, however, this last conclusion remains tentative.

Several robustness checks were performed on these results. One was to check whether education was only serving as a proxy for income, which in turn might have provided more freedom of sexual expression. When income was added to the equations along with education, the effect of education was not reduced in magnitude for either men or women, implying that education had an effect on its own. Additionally, when the final equations (Models 4, 8) were run for both genders with clitoral knowledge, frequent sexual ideations, and multiple partners excluded, the loss of significance for early life experiences still remained, suggesting that this loss was indeed due to the strong mediating effect of early masturbation. Finally, multinomial logit equations were used to check for differential effects of covariates across frequency-thresholds of masturbation to test whether frequent masturbation (a few times a week or more) was a qualitatively different phenomenon from occasional masturbation (a few times a year). While effects varied somewhat across these thresholds, the differences in the odds ratios across thresholds for the individual predictors largely failed to reach significance.

Other Mechanisms

Finally, several background characteristics were controlled in the analysis. First, it was argued that sociocultural context, as proxied by area of current residence, might affect a person's understandings and modes of sexuality, whether by embedding him/her in a more sexually permissive peer network or by increasing exposure to globalized or "Westernized" media products. Net of other background conditions, the effects of liberal locale were stronger for men than for women.

The next set of controls was for participant's age, a factor that could affect masturbation not only through hormone levels and vitality but also through younger cohorts growing up in more sexually liberal environments. To recall, analysis was restricted to those 20–59 to avoid complications from increase in sexual dysfunctions with age, to facilitate comparison of masturbation prevalence against the US NHSLS study, and because of concerns that fewer cases among older groups would lead to attenuation of effects. Particularly among women, comparisons to US and Finnish age patterns suggested a cohort effect. In the US in 1992 among both men and women, the sharpest break in levels of masturbation over the preceding age group was between people in their 50s versus those at younger ages or, in cohort terms, between those who reached maturity in the 1950s versus in the 1960s, 1970s, and 1980s (reanalysis of US raw data; also Laumann et al., 1994; Laumann & Youm, 2001). In the US, therefore, it is those who grew up after the US sexual

revolution who were more prone to autoeroticism. This same break in masturbation levels, with the cohort which came of age during the sexual revolution, was only slightly less sharp for previous-year masturbation among women and men in Finland in 1992 (reanalysis of Finnish raw data), and was even sharper for lifetime masturbation among Finnish women (Kontula & Haavio-Mannila, 1995). In China, the new sexual awakening only began in the early 1980s and accelerated in the 1990s (Evans, 1997; Farquhar, 2002; Farrer, 2000; Sha et al., 1994). Consistent with this late arrival, in China the sharp break in urban women's masturbation levels was not between women in their 50s and those younger but between women in their 40s and those who came of age in the next two decades, and particularly among the youngest cohort who came of age in the 1990s. Or, in short, age/cohort patterns in urban China and the West were consistent with a strong learning process in patterns of masturbation.

Finally, the results suggested a close positive relation between women's masturbation and their reports of persistent sexual difficulties. This pattern was consistent with women turning to masturbation when they had persistent sexual problems, with this recourse possibly providing some relief. However, this positive correlation also suggested that masturbation did not cure women's sexual difficulties. These results were somewhat surprising in light of the extensive literature on the therapeutic value of "directed masturbation" in alleviating women's dysfunctions in partnered sex (LoPiccolo & Lobitz, 1972; Meston et al., 2004), although it should be noted that this literature strongly advocates simultaneous treatment of the male partner as well. In contrast, masturbation as a solitary act, in response to existing difficulties, may arguably make women more dependent on self-pleasure and even less responsive to partnered sex, especially if the partner remains insensitive to her needs. Finally, since our sexual difficulty items may simply have tapped problems that would not meet the medical criteria for "sexual dysfunctions," these arguments remain tentative.

There were several aspects of individual personality, which could perhaps differentially influence the propensity to masturbate, for which there were no suitable indicators in the Chinese data. In a recent study, for instance, Lippa (2004) found self-directed sexual desire (including the desire to masturbate) to be strongly correlated with personality traits like extraversion among men, and conscientiousness, masculine occupational preferences, and self-ascribed masculinity among both genders. Such linkages could not be investigated in the present study.

Overall, the results suggested a bimodal pattern, particularly for women. Masturbation had a complementary relation with partnered sex for some arguably eroticized people, with eroticization suggested both by current patterns such as frequent sexual ideations, multiple partners during the year, and giving one's partner oral sex and by sexualizing early life course experiences. Masturbation was more compensatory for others, as suggested by the negative correlation with high satisfaction with sex and positive correlation with absence of the long-term partner. While exhibiting some similar patterns, men's masturbation was in some ways simpler. Specifically, men's patterns were less often and less strongly linked to background conditions.

Limitations

The analysis presented here suffered from several limitations. First, the prefatory remark in the masturbation question that masturbation was a "very common and normal human behavior" may have inadvertently affected item validity by overly "normalizing" masturbation. Alternately, the sensitivity of the masturbation question could have led to underreporting, particularly among older and less educated individuals, thereby distorting not only comparisons to other countries but also among different subgroups in the sample. Due to a lack of suitable indicators, some personality traits previous studies have linked to masturbation could not be included in the analysis. Additionally, the analysis controlled only a small set of background conditions, adding to the potential for spurious relationships. These were cross-sectional data, making it impossible to completely segregate strong feedback effects (e.g., from women's masturbation to clitoral knowledge and from masturbation to liberal sexual values). For similar reasons, as also potential bias in recalling early life events, only tentative inferences could be drawn about the channeling of the sexualization process through early masturbation. The same was true for arguments about the inefficacy of masturbation in relieving women's sexual difficulties. Cell sizes were small for some of the categories included, especially childhood sexual contact and forced sex, which made it difficult to reliably distinguish "signal" from "noise." Given the under-sampling of villages, few rural population sampling units and small cell sizes, rural participants could not be included in the analysis. Those over age 59 were also excluded for similar reasons, as also to avoid complications from increase in sexual dysfunctions with age, and to facilitate comparisons of masturbation prevalence with other societies. Hence, the mechanisms involved in masturbation among these groups remain unexplored.

Summary

Data from a nationally representative sample suggest that early in the social and economic development process, masturbation can become an important sexual outlet for a

significant portion of the population. In urban China by the year 2000, while masturbation prevalence among the older cohorts remained modest, prevalence among younger cohorts had begun to approach prevalence in the developed West, at least among men. Moreover, even at an early stage of sexual liberalization, masturbation was not just compensating for the absence of partnered sex. Instead, masturbation was often complementary to partnered sex, at least among more sexualized individuals who reported early sexual experiences and frequent thoughts of sex. Particularly for urban women, the pattern of masturbation was bimodal, with a group of more eroticized people for whom masturbation complemented an already active partnered sex life and another group for whom masturbation compensated either for the absence of a steady partner or a less satisfactory sex life with that partner. One of the striking patterns in the results was the two-step process by which a wide array of conditions appeared to shape masturbation practices. The process of influence seems to have begun with early sexualization (through mechanisms such as childhood sexual contact, early puberty and early first sex) which was often related to masturbation during the teenage years. Indeed, many or most adults who masturbated started masturbating as teenagers, and it was possibly through this "gateway event" of early masturbation that early life course experiences shaped adult masturbation. A series of other factors, such as liberal sexual values and sexual knowledge, then increased the current probability of masturbation. In short, the results suggest that masturbation emerges quickly as a sexual outlet and that explaining the phenomenon requires a comprehensive model of background factors, particularly for women.

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