



Original Article

Partner wealth predicts self-reported orgasm frequency in a sample of Chinese women

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Abstract

There has been considerable speculation about the adaptive significance of the human female orgasm, with one hypothesis being that it promotes differential affiliation or conception with high-quality males. We investigated the relationship between women's self-reported orgasm frequency and the characteristics of their partners in a large representative sample from the Chinese Health and Family Life Survey. We found that women report more frequent orgasms the higher their partner's income is. This result cannot be explained by possible confounds such as women's age, health, happiness, educational attainment, relationship duration, wealth difference between the partners, difference between the partners in educational attainment, and regional location. It appears consistent with the view that female orgasm has an evolved adaptive function.

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1. Introduction

Female orgasm in humans is a topic of continued debate and speculation but has relatively little solid empirical evidence (Dunn, Cherkas, & Spector, 2005; Meston, Levin, Sipski, Hull, & Heiman, 2004). Although there have been a multitude of definitions and physiologists, sexologists, doctors, and sociologists continue to debate the exact nature of the experience (Levin, 2004), there is general agreement that female orgasm is “a variable, transient peak sensation of intense pleasure, creating an altered state of consciousness, usually with an initiation accompanied by involuntary, rhythmic contractions of the pelvic striated circumvaginal musculature, often with concomitant uterine and anal contractions and myotonia that resolves the sexually induced vasocongestion (sometimes only partially), generally with an induction of well-being and contentment.” (Meston et al., 2004, p. 174).

The frequency of orgasm has been found to be an important component of sexual satisfaction, which in turn is a predictor of relationship satisfaction, for Chinese women (Parish et al., 2007). In American women, age and religiosity are negative predictors of orgasm frequency (Laumann, Gagnon, Michael, & Michaels, 1994; Meston et al., 2004), and the frequency of masturbatory orgasms but not orgasms with a partner increases with increasing education (Laumann et al., 1994). Twin evidence also suggests a moderate heritable component (Dunn et al., 2005). Beyond these, however, there is a relative paucity of evidence on the psychological and social factors influencing orgasmic function (Meston et al., 2004) since research has mainly focused on the physiological mechanisms involved (Levin & Wagner, 1985; Masters & Johnson, 1966).

Evolutionists have taken opposing positions on the function of female orgasm. On one hand, it has been seen as a functionless by-product of the ejaculatory response in males (Gould, 1987; Symons, 1979). An alternative view is that women's capacity for orgasm is an adaptation that serves to discriminate between males on the basis of their quality (Alcock, 1987; Smith, 1984; Thornhill, Gangestad, & Comer, 1995), leading to either enhanced conception

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probability (Baker & Bellis, 1993) or selective emotional bonding with high-quality sires (Alexander, 1979; Fisher, 1992; Hrdy, 1996). While there has been considerable debate surrounding these hypotheses, there are only a few studies that set out to test the predictions of adaptive versus by-product hypotheses.

If female orgasm is adaptively designed for discriminating male quality, then it should be more frequent in females paired with high-quality males. There is evidence consistent with such an effect in Japanese macaques, where females display the orgasm-like clutching reaction more often when mating with high-ranking males (Troisi & Carosi, 1998). Two studies on humans have also found comparable effects. Thornhill et al. (1995) found that young women reported copulatory orgasm more frequently if their partners were more symmetrical. Shackelford et al. (2000) found that women paired with more attractive males were more likely to report orgasm at their last intercourse than women paired with less attractive males. These studies are interesting but rely on modest samples ($n=86$ and 388) of student volunteers, which means that the ranges of ages and male qualities may be quite limited. They also found effects only of symmetry and physical attractiveness as proxies of male quality. In a larger population cross-section, other qualities such as income and height may prove to be important.

In this study, we investigated for the first time in a large population cross-section the relationship between women's self-reported orgasm frequency and the characteristics of their partners. The data are from the Chinese Health and Family Life Survey, which was a large-scale investigation of sexual attitudes, behavior, and sexually transmitted diseases in a nationally representative sample of the Chinese population, carried out in 1999–2000 (Parish et al., 2003; Parish, Laumann, & Mojola, 2007). For male quality, we investigated two parameters not only because they were available but also because previous population-level surveys have found them to be important determinants of male reproductive success. The first is income: Wealth is seen as desirable in potential partners by women all over the world (Buss, 1989), and studies in diverse populations have found that increasing wealth increases male marriage success (Borgerhoff Mulder, 1990; Fieder & Huber, 2007; Hopcroft, 2006; Nettle & Pollet, in press; Pollet & Nettle, 2008). Thus, other things being equal, richer men are preferred to poorer ones as mates.

Our second independent variable is height: Several studies have found either a preference expressed by women for taller men or an actual increase in marriage success in taller-than-average men (Hensley, 1994; Mueller & Mazur, 2001; Nettle, 2002; Pawlowski, Dunbar, & Lipowicz, 2000) in Western populations. Little is known about male height and reproductive success in China. A recent study suggested that male height is not significantly positively related to offspring count, after controlling for potential confounds (Fielding et al., in press), yet height is generally positively related to health and socioeconomic

status in China as it is elsewhere (Chen, Campbell, Li, & Peto, 1990; Chen & Zhou, 2007; Samaras, Elrick, & Storms, 2003). Therefore, it is possible that height is a sought-after characteristic in a man for Chinese women as it is for women in Western populations.

If the adaptive view of female orgasm is correct, then we predict that women will report more frequent orgasms the richer their partners are and the taller their partners are. However, there is the danger that associations between partner characteristics and orgasm frequency might be due to confounding third variables. For example, the partners of richer men might be younger, be more educated, be physically healthier, or have higher levels of psychological well-being, or be more westernized, than partners of poorer men. In our analysis, therefore, we needed to control for a large number of potential confounding variables of this type.

2. Methods

The Chinese Health and Family Life Survey sampled 60 villages and urban neighborhoods chosen in such a way as to represent the full geographical and socioeconomic range of contemporary China excluding Hong Kong and Tibet. Eighty-three individuals were chosen at random for each location from official registers of adults aged between 20 and 64 years to target a sample of 5000 individuals in total. The response rate was around 75%. We only included in our analysis women with current male partners for whom no information was missing, leading to a sample of 1534 women.

The survey was carried out by structured computer-administered interview. In view of the sensitive nature of the questions, additional measures to ensure privacy were adopted (Parish et al., 2003). The interview took place away from each respondent's home, and for sensitive questions, the respondent could enter her responses directly into the computer.

The dependent variable we analyzed was self-reported orgasm frequency with current partner ("When having sex with your current partner, how often did you have an orgasm?"). There are five response categories, which we treated as an ordinal scale (1=*never*, $n=61$; 2=*rarely*, $n=182$; 3=*sometimes*, $n=762$; 4=*often*, $n=408$; 5=*always*, $n=121$).

Our two independent variables of interest, partner income and partner height, are based on the woman's report, not the partner's. However, for a subsample of 57 couples, the interrater reliability of respondent and partner reports has been calculated and is substantial (income, $\kappa>0.6$; height, $\kappa>0.48$) (Parish et al., 2003). Partner income was as directly reported for 90% of the respondents and was imputed from a categorical response for the remainder, as the respondents did not give an exact figure. Figures are in yuan; 1 yuan is worth around 15 U.S. cents at international currency conversion rates but closer to 50 U.S. cents in terms of local purchasing power (World Bank, 2006). Incomes higher

than 10,000 yuan were recoded as 10,000. Partner height was an estimate given in centimeters. Partner height and partner income were virtually uncorrelated ($r=0.06$).

Our control variables were the following: age (years, continuous); duration of current relationship (years, continuous); self-rated health (five categories); self-rated happiness (four categories); education (six categories); difference in income between partner and self (yuan, continuous); and difference in education between partner and self (based on the six education categories, continuous). In addition, it is possible that orgasm frequency, along with other sexual behavior variables, is influenced by degree of westernization (Parish et al., 2007). The control for education will partly deal with differing degrees of westernization; however, we also included the regional location within China (six categories) as different regions are westernized to differing extents. Table 1 shows a summary of all the variables and the categories of response available within them.

For the analysis, we employed ordinal regression using the PLUM (polytomous logit universal model) algorithm

Table 1
Descriptive statistics for the variables analyzed (frequencies or mean±S.D. values, as appropriate)

Male income (yuan)	986.69±1195.96
Male height (m)	1.71±0.059
Sexual relationship duration (years)	14.99±9.69
Age (years)	38.99±9.57
Difference in education (category)	−0.28±0.98
Difference in wealth (yuan)	−369.69±1070.81
Happiness	
Very happy	280
Relatively happy	1055
Not too happy	185
Very unhappy	14
Region	
Coastal South	319
Coastal East	331
Inland South	156
North	241
North East	279
Central West	208
Health	
Excellent	342
Good	582
Fair	461
Not good	139
Poor	10
Education	
No school	90
Primary	267
Lower middle	583
Upper middle	425
Junior college	125
University	44
Orgasm frequency (dependent variable)	
Always	121
Often	408
Sometimes	762
Rarely	182
Never	61

(Armstrong & Sloan, 1989; McCullagh, 1980). This is the appropriate technique for a dependent variable consisting of ranked outcome categories. Our analytical strategy was as follows: Model 1 included only partner income and partner height as independent variables, while model 2 omitted any independent variable not significant in model 1. In subsequent models, we added the control variables one at a time, with the order determined by trying all possible variables and using those that gave the best model fit. Variables were retained for subsequent models if they improved model fit. Model fit is ascertained using information from the Bayesian information criterion (BIC) and Akaike information criterion (AIC), which are higher-is-worse model fit statistics (Burnham & Anderson, 2004; Kuha, 2004). As a rule of thumb, one model generally has an unacceptably worse fit compared with another if that model scores more than 10 units higher in the AIC or BIC (Burnham & Anderson, 2004; Raftery, 1996).

Parameters for individual variables in the models were estimated by maximum log likelihood. The parameter estimates are logit coefficients (λ) that can be converted to odds ratios [$\exp(\lambda)$] for ease of interpretation. We also report the Nagelkerke R^2 for each model. This is a pseudo- R^2 measure giving an indication of the explained variance in orgasm frequency in each model (Nagelkerke, 1991). It should be borne in mind, however, that model selection is always based on model fit statistics such as AIC and BIC rather than Nagelkerke R^2 . For all analyses, there was absolute parameter and log likelihood convergence.

3. Results

The descriptive statistics for the variables in the models are summarized in Table 1, while the results of the ordinal regression models are summarized in Table 2. Model 1 tested whether partner income and partner height predicted orgasm frequency. Partner income proved to be a highly significant predictor of female orgasm frequency, while the estimate for partner height was not significant (although there was a trend, $.5 < p < .1$). The odds ratio for partner income [$\exp(\lambda)$] was 1.28. This means that an increase by 1 S.D. in partner income increases the odds of a positive shift by a category in orgasm frequency by a factor of 1.28.

Given that partner height was not a significant predictor at the 5% level, it was excluded from model 2, resulting in an improved model fit and a slightly increased parameter estimate for partner income (Table 2, model 2).

Model 3 additionally included self-reported happiness. This improved model fit (in comparison with model 1) and some parameter estimates for happiness were significant, with “very happy” women more likely to have a positive shift in orgasm frequency relative to “very unhappy” women (Table 2, model 3). However, partner income remained highly significant in this model, with the odds ratio [$\exp(\lambda)$] only slightly reduced at 1.26.

Table 2
Summaries of ordinal regression models

Model	1	2	3	4	5	6	7	8	9	10
Male wealth (1 S.D.)	0.243****	0.247****	0.23****	0.132**	0.198****	0.18****	0.224****	0.228****	0.27****	0.172****
Male height (1 S.D.)	0.082†	–	–	–	–	–	–	–	–	–
Happiness										
Very happy	–	–	1.09*	1.36**	1.10*	0.87†	0.73	1.08*	1.08*	0.84
Relatively happy	–	–	0.84†	1.05*	0.84†	0.61	0.52	0.84†	0.83	0.57
Not too happy	–	–	0.22	0.47	0.20	–0.02	0.05	0.22	0.22	–0.07
Very unhappy	–	–	0	0	0	0	0	0	0	0
Education										
No school	–	–	–	–1.50****	–	–	–	–	–	–
Primary	–	–	–	–0.52	–	–	–	–	–	–
Lower middle	–	–	–	–0.06	–	–	–	–	–	–
Upper middle	–	–	–	0.43	–	–	–	–	–	–
Junior college	–	–	–	0.29	–	–	–	–	–	–
University	–	–	–	0	–	–	–	–	–	–
Region										
Coastal South	–	–	–	–	0.69****	–	–	–	–	–
Coastal East	–	–	–	–	0.12	–	–	–	–	–
Inland South	–	–	–	–	0.15	–	–	–	–	–
North	–	–	–	–	0.09	–	–	–	–	–
North East	–	–	–	–	0.42*	–	–	–	–	–
Central West	–	–	–	–	0	–	–	–	–	–
Age woman (1 S.D.)	–	–	–	–	–	–0.38****	–	–	–	–
Health										
Excellent	–	–	–	–	–	–	1.64**	–	–	–
Good	–	–	–	–	–	–	1.66**	–	–	–
Fair	–	–	–	–	–	–	1.50*	–	–	–
Not good	–	–	–	–	–	–	1.04*	–	–	–
Poor	–	–	–	–	–	–	0	–	–	–
Education difference (1 S.D.)	–	–	–	–	–	–	–	0.07	–	–
Wealth difference (1 S.D.)	–	–	–	–	–	–	–	–	0.05	–
Relationship duration (1 S.D.)	–	–	–	–	–	–	–	–	–	–0.47****
<i>n</i> parameters	2	1	4	9	9	6	9	6	6	6
Nagelkerke <i>R</i> ²	0.019	0.017	0.035	0.095	0.053	0.074	0.053	0.036	0.035	0.076
–2LL	1868.1	405.55	752.4	1438.42	1623.27	2894.12	1366.09	1448.83	1887.57	2864.44
AIC	1872.1	407.55	760.4	1456.42	1641.27	2906.12	1384.09	1460.83	1899.57	2876.44
BIC	1882.77	412.89	781.73	1504.44	1689.29	2938.13	1432.11	1492.844	1931.58	2908.45

Parameter estimates are logit coefficients. –2LL indicates –2 log likelihood.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

**** $p < .0001$.

† $.1 < p < .05$ based on Wald test.

Model 3 cannot be further improved in terms of model fit by adding more control variables (Table 2, models 4–10; each additional variable introduced worsened the model fit by more than 650 units of AIC/BIC). In all of models 4–10, the estimates for male wealth remained highly significant and relatively unchanged (odds ratios from 1.14 to 1.31), while the effects of self-reported happiness varied according to which other variables were present in the analysis.

To summarize the results, increasing partner income had a highly significant positive effect on women's self-reported frequency of orgasm, and this effect remained robust when all the control variables were entered in the model. The effect can be visualized from Fig. 1, which is based on simple

associations between orgasm frequency and partner wealth without controlling for any other variable.

4. Discussion

In a large representative sample of the Chinese population, we found evidence that women's self-reported orgasm frequency increases with the income of their partner. The effect of partner income is not an artifact of female age, educational attainment, happiness, health, relationship duration, regional differences, and differences between partners in educational attainment and wealth. Thus, the predictions of the functional hypothesis of human female orgasm were

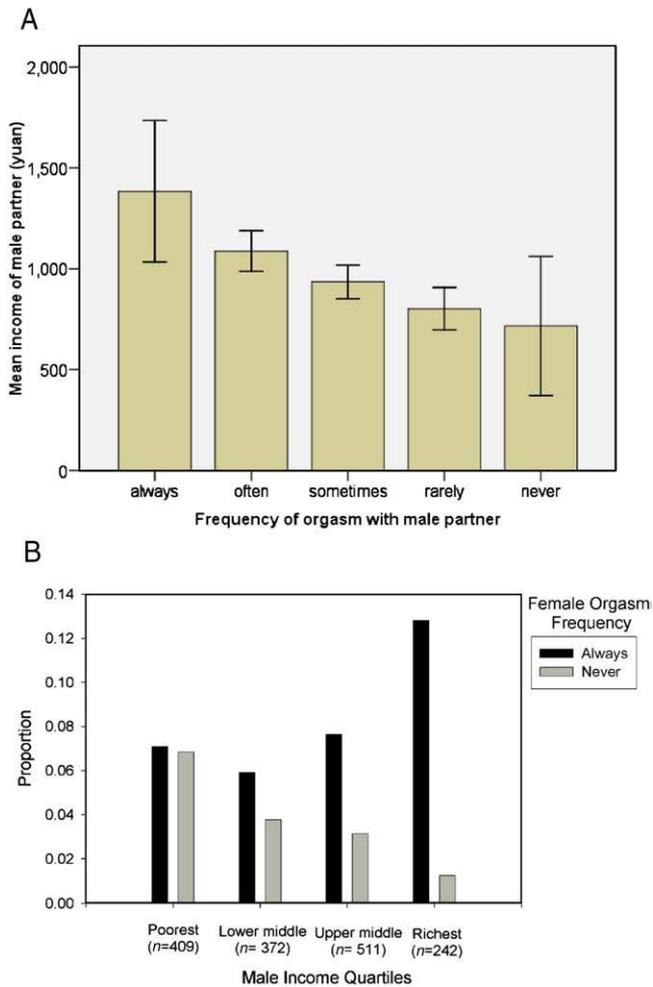


Fig. 1. Relationship between partner income and self-reported orgasm frequency illustrated in two ways. (A) Mean and 95% confidence interval values of partner income for women reporting different frequencies of orgasm. (B) Proportion of women reporting orgasm frequency as “never” or “always” by quartile of partner income.

met with respect to partner income but not partner height. One potential explanation for this is that there is no strong positive relationship between male height and reproductive success in contemporary China (Fielding et al., in press); thus, apparently, male height is not a sought-after characteristic in this population.

There are three possible interpretations of how the effect for partner income arises. First, the results might be an artifact of reporting bias. Reporting bias can act in two ways, either by women with frequent orgasms overestimating their partner’s income or by women with high-quality mates overreporting their orgasm frequency. These possibilities are difficult to exclude from data of this kind (Shackelford et al., 2000). However, self-report is the only practical source of data on human female orgasm in large samples and is normally taken at face value in this literature (Dunn et al., 2005; Meston et al., 2004; Thornhill et al., 1995). While we cannot rule out reporting bias, we note that the interviews took place away

from the respondents’ home, without their partner present and with the respondents able to input their responses directly into the computer if they so wished (Parish et al., 2003). Thus, the perceived anonymity and confidentiality were high.

Second, there may be assortative mating of desirable men with women susceptible to be highly orgasmic. There is a heritable component to female orgasmic function (Dunn et al., 2005), but nothing is known about whether there are genetic correlations with other phenotypic attributes that might be involved in mate choice. If there were assortative mating, this would be consistent with an evolved function for female orgasm, albeit a different one from that discussed so far, in terms of signaling female quality. However, we note that the data show that the more frequent orgasms of women paired to high-income men are not explicable by those women being healthier or happier overall.

The third interpretation is that more desirable mates cause women to experience more orgasms. This is the interpretation most consistent with the functional view of the human female orgasm discussed in Section 1. Given that orgasmic function can be influenced by desire to conceive (Singh, Meyer, Zambarano, & Hurlbert, 1998) and by phase of the menstrual cycle (Matteo & Rissman, 1984) and that it is closely tied to sexual satisfaction (Parish et al., 2007), it is plausible that it would also be enhanced by sought-after partner characteristics. Interpreted in this way, our results confirm on a much larger scale the conclusions drawn from samples containing predominantly students (Shackelford et al., 2000; Thornhill et al., 1995). However, Shackelford et al. (2000) investigated only rated physical attractiveness, while Thornhill et al. (1995) found an effect of partner physical symmetry but no effect of partner financial prospects. We were not able to replicate the findings with regard to physical symmetry and attractiveness since these data were not gathered in the Chinese Health and Family Life Survey, and the differing conclusion with regard to financial status may stem from the modest size and limited range of financial status in their data. However, we do not know the specific proximate mechanisms behind the relationship between male financial status and female orgasm frequency. Moreover, we cannot definitively rule out a by-product explanation: it remains possible that wealth relates to other traits that do not serve any adaptive function and hence give rise to a spurious relationship between male wealth and female orgasm frequency. At face value, however, these data appear consistent with a functional view of the human female orgasm.

The data produced so far, while apparently consistent with an adaptive role for female orgasm, are far from definitive. Moreover, even if consistent with an adaptive role for female orgasm, these data do not allow conclusive testing between two alternative proposed functions—namely, that female orgasm differentially promotes emotional bonding with high-quality males or that it differentially promotes conception with such males under conditions of sperm competition (Smith, 1984; Thornhill et al., 1995). Income is both an indicator of value as a long-term investing partner and

potentially an indicator of underlying genetic characteristics, so either hypothesis could predict that it would be important. Further research is needed to elucidate which of these, or if both, would be the most important function of the human female orgasm. In addition, a more thorough investigation into the proximal mechanisms relating to orgasm frequency, as well as demonstrating a close relationship between female orgasm frequency and tangible fitness benefits, is necessary in order to completely rule out a by-product explanation for the human female orgasm.

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