Arch Sex Behav (2008) 37:912–924
DOI 10.1007/s10508-007-9287-8

ORIGINAL PAPER

Evaluation of the Female Sexual Function Index in a Population Based Sample from Finland

Katarina Witting · Pekka Santtila · Patrick Jern · Markus Varjonen · Ingrid Wager · Maria Höglund · Ada Johansson · Nina Vikström · N. Kenneth Sandnabba

Received: 4 May 2006 / Revised: 16 February 2007 / Accepted: 6 July 2007 / Published online: 12 March 2008

Abstract The factor structure and reliability of the Female Sexual Function Index (FSFI) was evaluated in a Finnish population based sample of 2,081 women, age 33–43 years. In addition, associations between female sexual function and age, psychological distress, alcohol use, hormone based contraceptives, child sexual abuse (CSA), and adult sexual abuse were examined. The results supported a six factor solution for the FSFI with high internal consistencies, in line with earlier research in clinical populations. Psychological distress was positively associated with every dimension of the FSFI except desire problems. Age was associated with fewer pain problems. Alcohol use was associated with every dimension of the FSFI, but the direction of the association depended on if it was drinking in general or in connection to intercourse. More drinking in general was related to fewer sexual function problems while drinking in connection to intercourse was related to more sexual function problems. No significant correlation was found between adult sexual abuse and sexual function but between CSA and lubrication, satisfaction, and pain problems. Usage of oral contraceptive pill was not significantly associated with sexual function. The use of hormone based intrauterine systems was significantly associated with less pain and more desire, arousal, and satisfaction. In conclusion, the study supports use of the FSFI for assessing sexual function not only in clinical samples but also in population based samples. The associations found between sexual function and other important variables showed the complexity of sexual function.

K. Witting (✉) · P. Santtila · P. Jern · M. Varjonen · I. Wager · M. Höglund · A. Johansson · N. Vikström · N. K. Sandnabba
Centre of Excellence for Behavior Genetics, Department of Psychology, Åbo Akademi University, 20500 Turku, Finland
e-mail: katarina.witting@abo.fi

Keywords Female Sexual Function Index · Desire · Arousal · Orgasm · Pain · Satisfaction

Introduction

Female sexual dysfunctions are associated with interpersonal, psychological, physiological, medical, social, and cultural factors (Basson, 2005; Salonia et al., 2004). They can be divided into subtypes and are characterized by a lack of or diminished sexual feelings of interest, fantasies, and thoughts or by problems becoming aroused, lubricated, or having an orgasm though adequately stimulated, or with feelings of pain in connection with intercourse (Lewis et al., 2004). According to published epidemiological studies, the prevalence estimate of having at least one sexual dysfunction in women is around 40% (Fugl-Meyer & Fugl-Meyer, 2002; Laumann, Paik, & Rosen, 1999; Lewis et al., 2004). However, studies vary in their estimates due to variations in data collection, sample types, time-frame, age span of the participants, and the use of different operational definitions of sexual dysfunctions (Basson et al., 2000).

Simons and Carey (2001) reported in their review of 52 articles published between 1990 and 2000 on sexual dysfunctions that 16% of these used the diagnostic criteria from the *Diagnostic and Statistical Manual of Mental Disorders* whereas as many as 33% did not provide an operational definition. Consequently, comparing different studies is difficult. Nonetheless, the prevalence rates appear to be high irrespective of the population studied, with low sexual desire (Abdo, Oliviera, Moreira, & Fittipaldi, 2004; Gruszecki, Forchuk, & Fisher, 2005; Kadri, Alami, & Tahiri, 2002; Laumann et al., 1999) or orgasmic problems (Ponholzer, Roehlich, Racz, Temml, & Madresbacher, 2005; Shokrollahi, Mirmohamadi, Mehrabi, & Babaei, 1999) being the most common type of

sexual dysfunction. In addition, according to DSM-IV-TR (American Psychiatric Association, 2000), comorbidity between different sexual dysfunctions is common, which is supported by findings of Fugl-Meyer and Fugl-Meyer (2002) and Meston (2003).

A variety of self-administered questionnaires have been developed to assess female sexual function (for a review, see Daker-White, 2002). Notable among these is the Female Sexual Function Index (FSFI; Rosen et al., 2000). The FSFI is regarded as a "gold standard" measure of female sexual functioning (Daker-White, 2002) and has been widely used in a variety of selected samples (Aydin et al., 2006; Çayan, Bozlu, Canpolat, & Akbay, 2004; Masheb, Lozano-Blanco, Kohorn, Minkin, & Kerns, 2004; Nobre, Pinto-Gouveia, & Gomes, 2006; Salonia et al., 2005). To the best of our knowledge, the psychometric properties of the FSFI have not been examined in an unselected population sample. Consequently, the first aim of the present study was to evaluate the psychometric properties of a Finnish-language version of the FSFI in a representative sample of 33 to 43-year-old Finnish twins. Another aim was to investigate the associations between sexual function, as measured by FSFI, and factors which in prior research have been associated with female sexual problems, such as age, psychological distress, child and adult sexual abuse, alcohol use, and hormone based contraceptives.

Findings regarding the impact of age on female sexual function are somewhat inconsistent. Abdo et al. (2004) reported age to be associated with an increase in desire and orgasmic problems whereas pain seemed to decrease with age. In contrast, Laumann et al. (1999) found that the prevalence of sexual dysfunctions tended to decline with age, except for lubrication problems. According to Ponholzer et al. (2005), sexual desire was highest between 20 and 40 years and declined thereafter, pain and orgasm problems were most frequent in the youngest age group (20–40), while problems with lubrication increased significantly after 40 years of age.

An association between psychological distress and female sexual dysfunctions has been found in a number of studies. For example, depression has been linked to reduced desire and sexual satisfaction, pain during intercourse, more orgasmic problems, and reduced lubrication (Abdo et al., 2004; Dunn, Croft, & Hackett, 1999; Frohlich & Meston, 2002). In male and female patients with depression, but no sexual problems prior to the onset of the depression, up to 69% reported complaints of sexual problems, particularly reduced sexual desire (Bonierbale, Lancon, & Tignol, 2003). Similarly, elevated rates of sexual problems have been reported for women with panic disorder (Figueira, Possidente, Marques, & Hayes, 2001). Laumann et al. (1999) found that emotional or stress related problems were positively associated with sexual dysfunctions. In particular, traumatic experiences of both child and adult sexual abuse have often been considered to be risk factors for sexual dysfunctions. Several studies have linked child sexual abuse (CSA) to sexual difficulties in adulthood (e.g., Laumann et al., 1999; Najman, Dunne, Purdie, Boyle, & Coxeter, 2005; Rellini & Meston, 2006) and two extensive reviews reached this conclusion (Leonard & Follette, 2002; Loeb et al., 2002). Adult sexual abuse has been reported to be associated with both low desire and arousal (Laumann et al., 1999).

The use of alcohol has also been shown to relate to sexual function. Johnson, Phelps, and Cottler (2004) found that women who met the criteria for heavy alcohol use were more likely to report problems with inhibited orgasm and inhibited sexual excitement, but less likely to report problems with functional dyspareunia. Nevertheless, smaller amounts of alcohol may operate in a different way and George and Stoner (2000) concluded in their review of alcohol effects on sexual behavior that the individual's expectancies of the effects of alcohol on sexual function were of great importance. This is supported by the finding that, with alcohol intake, many women experience a subjective increase in sexual desire, arousal and pleasure, although physiological arousal is lowered (Beckman & Ackerman, 1995). Laumann et al. (1999), on the other hand, did not find any association between alcohol consumption and sexual function.

The literature has suggested an association between the use of the oral contraceptive pill (OCP) and sexual function. For example, Seal, Brotto, and Gorzalka (2005) compared the effect of sexual stimuli on sexual arousal in 16 women before and after the onset of OCP. They found that arousal significantly increased from baseline as a response to an erotic video pre-OCP onset but not post. However, a closer examination of the data showed that this was probably due to a greater variance after the onset of OCP. The side effects reported by these women also varied widely, suggesting that the effect of OCP on sexual function is highly individual. When considering the impact hormones have on sexual function, it is reasonable to assume that other hormone based contraceptives would be linked to sexual function.

Based on the above mentioned research findings, it was hypothesized that emotional distress, CSA, and adult sexual abuse would be associated with an increase in sexual problems. We did not have any a priori hypotheses about the relationships between sexual problems and age, alcohol, and the use of hormone based contraceptives, due to the equivocal findings from previous research on these factors.

Method

Participants

The present report was based on the Genetics of Sexuality sample, which is a population-based sample of Finnish twins

between 33 and 43 years of age (female $M = 37.54$ years, $SD = 2.91$). This upper limit for the age range was chosen since it is reasonable to assume that the women would be premenopausal. The majority of the women were married ($n = 1170$, 56.2%) or engaged ($n = 501$, 24.1%). The rest were widowed ($n = 9$, 0.4%), divorced ($n = 280$, 13.5%), single ($n = 134$, 6.4%), dating one person ($n = 323$, 15.5%), or dating several persons ($n = 48$, 2.3%). The categories were not exclusive of each other, that is, the same woman could report that she was both divorced and (re-) married. At least some interest in members of the same sex during the preceding 12 months was reported by 152 (7.3%) women. The mean age at first sexual intercourse was 17.81 years. Six (0.3%) women had never had sex.

The sample was created from data given by the Central Population Registry of Finland. Finnish speaking twin pairs currently residing in Finland were sampled according to their date of birth from the end of 1971 backwards until 2,000 male–male, 2,000 female–female, and 1,000 opposite-sex pairs had been identified. This resulted in a potential sample of 10,000 individuals, representative of the Finnish population of this age range, to which a questionnaire was sent by post. Of these, 20 (10 intended for female individuals) were sent back by the postal officials or relatives of the participants as they had recently moved or died resulting in 9,980 reached individuals. Questionnaires were returned by 2,267 females resulting in a response rate of 45%; of these, 22 questionnaires were discarded as they were incompletely filled in. The females who reported no sexual activity during the past 4 weeks (164 women) were excluded from the analyses. This resulted in a total sample of 2,081 individuals. The co-twins from the same pair were randomly assigned to be in different groups, Twin 1 and Twin 2 group respectively (see Analyses for the rationale for this procedure). That is, the grouping of the twins was not based on birth order. The Twin 1 group consisted of 1,058 individuals and the Twin 2 group consisted of 1,023 individuals.

Procedure

The questionnaire, with a paid return envelope, was sent in the beginning of 2005. Reminder letters were sent after a few weeks, followed again after another few weeks by a second posting of the questionnaire. The cover letter outlined that the study was voluntary and completely anonymous as the questionnaire covered highly sensitive topics as number of sexual contacts, cross-dressing, and sexual interest in children. In order to be able to pair each twin with their co-twin, their sex, age, status as first- or second-born twin, number of years cohabiting with the co-twin, and number of siblings besides the twin brother or sister as well as three specially created questions (what were the two first letters of their mother's name, what were the two last letters of their father's name, and in which month they were born) were used. In order to participate in a lottery of 1,000 €, the participants sent their contact information by an e-mail or a letter separate from their return envelope containing the questionnaire. The research plan was approved by the Ethics Committee of the Department of Psychology at Åbo Akademi University.

Measures

Female Sexual Function Index

The FSFI (Rosen et al., 2000) was used to investigate problems with sexual functioning during the past 4 weeks. The FSFI is a 19-item self report questionnaire that measures six dimensions of female sexual functioning: desire, arousal, lubrication, orgasm, satisfaction, and pain. Response options were on a Likert-type scale ranging from 1 to 5 for items 1, 2, 15, and 16. For all other items, the range was from 0 to 5 with the supplementary option "no sexual activity." In addition to the separate domain scores, the FSFI provides an overall score for sexual functioning (hereafter, this full scale score will be called Total-FSFI). The instrument was originally validated in a study of 128 women clinically diagnosed with sexual arousal disorder and 131 age-matched nonclinical controls. The questionnaire was shown to have both a high test–retest reliability for each of the individual domains ($r = .79$–$.86$) and a high degree of internal consistency (Cronbach's α of .82 and higher). Significant differences were found between the patient and the control groups on each of the dimension scores ($p \leq .001$). Additional support for the discriminant validity of FSFI has been reported in subsequent studies (Masheb et al., 2004; Meston, 2003). The questionnaire was psychometrically further evaluated by Wiegel, Meston, and Rosen (2005) and a diagnostic cut-off score was developed for differentiating women with and without sexual dysfunction. This optimal cut-off point was found to be a Total-FSFI score of 26.55. We decided to use this cut-off score in order to estimate the portions of participants with sexual dysfunction. There were no cut off limits available for the different subscales of the questionnaire. Low scores on FSFI indicate more problems with sexual functioning and high scores indicate fewer problems with sexual functioning. We added the response option "no partner" to question 15: "Over the past 4 weeks, how satisfied have you been with your sexual relationship with your partner?" which, analogous with the response options of other questions, was given the value of zero.

The original questionnaire was first translated into Finnish by an experienced Finnish speaking sex researcher with a PhD in psychology as well as an MSc exam from a British university. Thereafter, it was back-translated into English by a clinical sexologist with a PhD and more than 20 years of

experience in research concerning sexuality. This version was compared with the original FSFI and no significant loss of information was observed.

Brief Symptom Inventory-18

In order to screen for psychological distress, the Brief Symptom Inventory-18 (BSI-18; Derogatis, 2001) was used. After conducting exploratory and confirmatory factor analyses, a model with 17 of the 18 items loading on four factors was used. The factors were extracted using maximum likelihood with direct oblimin rotation separately for Twin 1 and Twin 2 group, including both males and females. The subscales were the same as in the original BSI-18 for somatization and depression while anxiety was divided into two factors: anxiety (items 3 and 6) and panic (items 9, 12, and 18). Cronbach's α for the subscales and overall questionnaire ranged from .72 to .89. The response options ranged from 0 to 4, with a higher score indicating more psychological distress. In addition to the separate subscales, the BSI-18 also gives an overall composite score for psychological distress, called the global severity index (GSI).

Alcohol Use Disorders Identification Test

Alcohol consumption was assessed using the first part of the Alcohol Use Disorders Identification Test (AUDIT; Babor, Higgins-Biddle, Saunders, & Monteiro, 2001). This first subscale consists of three items (frequency of drinking, typical quantity, frequency of heavy drinking) which measures hazardous alcohol use. Each item's response option ranges from 0 to 4, with a higher score indicating more alcohol use. The test has been developed for generalizability in different cultures, settings, and across sex. In the present sample, internal consistency was acceptable (Cronbach's α for Twin 1 = .62; for Twin 2 = .64). In addition to the AUDIT, a question which investigated the amount and frequency of alcohol usage in connection to sexual intercourse was used. A high score indicates greater alcohol consumption on both AUDIT as well as on the single question.

Childhood Trauma Questionnaire

In order to screen for CSA, five questions comprising the dimension of CSA from the Childhood Trauma Questionnaire-Short Form (CTQ-SF; Bernstein et al., 2003) were used. The questionnaire has been shown to have good internal consistency (Cronabch's α .92–.94 for the sexual abuse scale) and validity (regression coefficients for predicting therapist rating of CSA .75, $p \leq .001$). Response options were on a 5-point, Likert type scale with high scores indicating more perceived CSA.

Adult Sexual Abuse

The question "Have you been a victim of sexual harassment or assault during adulthood (when you were over 15 years of age)" was employed to investigate possible adult sexual abuse. The response options were: (1) No; (2) I have been verbally harassed; (3) I have been touched or kissed against my will; (4) Somebody tried to force me into having oral, vaginal or anal sex; (5) I have been forced to have oral sex; (6) I have been forced to have anal sex; (7) I have been forced to have vaginal sex; (8) In some other way. The variable was dichotomized so that individuals answering one or several of the options 3–8 were assigned to the abused group. This question was added only in the second and last posting of the questionnaire and, therefore, answered by fewer participants ($n = 346$). All other measures used in the present study were included in both waves of questionnaires.

Hormone Based Contraceptives

There were two dichotomous questions that enquired about use of (1) OCP and (2) hormone based intrauterine system (IUS).

Statistical Analyses

Normality of the observed variables was assessed through visual examination of histograms. Because of the skewness of the distribution, a logarithmic transformation was performed for 17 of the 19 items (items 2 and 4 were normally distributed and were, therefore, not transformed). Similarly, all subscales except the desire subscale were logarithmically transformed. In order to avoid dependence, members of a twin pair were included in separate statistical analyses for the factor analyses. The procedure used for exploring correlations, the complex sample general linear model, takes dependence between observations into account, and therefore both Twin 1 and Twin 2 could simultaneously be included in association analyses.

After the transformation, an exploratory factor analysis (EFA) was conducted on the 19 items of the FSFI separately for Twin 1 and Twin 2 dataset using maximum likelihood extraction. Based on previous publications, the factors were expected to correlate and, therefore, direct oblimin rotation was used. A factor loading greater than .50 was considered as good. In addition, no factor loading greater than .30 for any

other factor was desirable, in order to achieve simple factor structure.

Next, confirmatory factor analyses were performed using AMOS Graphics 5.0.1. The hypothesized model was compared with the obtained set of data. Due to the fairly large sample and given the potential limitations of the χ^2 test (Mulaik et al., 1989; Thompson, 2004), we chose to report and consider five additional measures of model fit: the normed-fit index (NFI), the goodness-of-fit index (GFI), the root-mean-square error of approximation (RMSEA), the Akaike information criterion (AIC), and Hoelter's "critical *N*." The fit of the model was considered to be supported if the NFI was greater than .95 (Thompson, 2004), if GFI was greater than .90 (Arbuckle & Wothke, 1999), if RMSEA was roughly or less than .06 (Thompson, 2004), and Hoelter's "critical *N*" greater than 200 (Arbuckle & Wothke, 1999). The AIC was used for comparing models, with a lower value indicating better fit.

Confirmatory factor analyses were performed separately for the two groups. Based on clinical considerations presented in previous reports (Meston, 2003; Rosen et al., 2000; Wiegel et al., 2005), a six factor model of FSFI was hypothesized. The factors were hypothesized to be desire (Q1, Q2), arousal (Q3–Q6), lubrication (Q7–Q10), orgasm (Q11–Q13), satisfaction (Q14–Q16), and pain (Q17–Q19). All of the six factors were expected to covary with one another. As indicated above, the twins were randomly assigned into the two groups. Therefore, no differences were expected between the two groups and the same model was hypothesized to fit both groups equally well. In addition to the exploratory and confirmatory factor analyses, the comorbidity of the different dimensions of sexual function as measured by FSFI was evaluated.

In order to investigate different factors' covariation with the sexual functioning, the Complex Samples General Linear Model (CSGLM) procedure was used. This procedure allows the data to be correlated and adjusts the estimates of standard errors, which was necessary since data from twin pairs are naturally correlated.

Results

Psychometrics of FSFI

Exploratory Factor Analyses

In the EFA, four factors had an eigenvalue greater than 1. The fifth factor had an eigenvalue of 0.84 for Twin 1 group and 0.85 for Twin 2 group. The sixth factor had an eigenvalue of 0.57 and 0.62, respectively. After exploring four, five, and six factor solutions, we decided to use the six factor solution based on the criteria of the interpretability of the results and clinical aspects. Table 1 presents the factor loadings from EFA with six factors, as well as the mean and *SD* for each item, separately for Twin 1 and Twin 2. For Twin 1, all items, except two, had a factor loading of .50 or greater for their intended factor and no loading greater than .30 on any other factor. For question 4 the loading on the factor arousal was .42 and for question 5 the factor loading on the factor arousal was .45. The residuals from the reproduced correlation matrix (all lower than .05) also indicated that the solution was a satisfactory one. The results were similar for Twin 2 except that for question 4 there was a cross loading greater than .30 on the desire factor (.32) and the loading on the arousal factor was .38. This result indicated that question 4 is a complex item. The six factor solution explained 76.6% of the variance for Twin 1 whereas a general factor only explained 48.6%. The corresponding figures for Twin 2 were 75.3% and 47.0% respectively. This suggested that a one-factor model was not adequate.

Model Estimation

Maximum likelihood estimation was employed to estimate all models. Based on the results from the exploratory factor analyses, a model in which the 19 items loaded on six factors were estimated separately for the two groups. Table 2 shows the model estimation for Twin 1 for this model. The fit-indexes for the two groups were reasonable considering the large number of participants. The results for Twin 2 were similar.

Based on modification indices for Twin 1, given by AMOS, a modification of the model was imposed (Table 2). For Twin 1 one covariance was added between the error terms of questions 8 and 10. This covariance indicates a unique association between these two variables that was not accounted for by the latent factor, and that may reflect either method or content similarity (Bernstein et al., 2003). This improved the overall fit of the model and the accepted model is shown in Fig. 1 depicted with factor loadings, correlations between the latent variables, and the error terms. The correlations between the latent factors were all quite high, reflecting a substantial overlap between the dimensions and indicating comorbidity between the sexual problems. The highest correlation was between arousal and lubrication ($r = .82$) and the lowest was between desire and pain ($r = .31$).

Using the Cut-off Score to Estimate the Prevalence of Sexual Dysfunctions

As Fig. 2 shows, using the cut-off score at 26.55 would imply that 32.6% of the participants would have a sexual

Table 1 Item means, standard deviations, and factor loadings as well as internal consistency of subdomains of the FSFI from exploratory factor analyses, separately for Twin 1 and Twin 2

	Twin 1 (n = 1,058)			Twin 2 (n = 1,023)		
	M	*SD*	Factor loading[a]	*M*	*SD*	Factor loading[a]
I. Desire (*Twin 1 Cronbach's α = .73, Twin 2 α = .72*)						
1. How often did you feel sexual interest or desire?	1.99	0.66	.62	2.21	0.74	.62
2. How would you rate your level of sexual desire or interest?	2.77	0.81	.93	3.07	0.87	.91
II. Arousal (*Twin 1 α = .92, Twin 2 α = .92*)						
3. How often did you feel sexually aroused during sexual activity?	4.05	1.37	.64	4.20	1.28	.55
4. How would you rate your level of sexual arousal during sexual activity?	3.48	1.12	.42	3.63	1.13	.38
5. How confident were you about becoming sexually aroused during sexual activity?	3.78	1.31	.45	3.87	1.28	.44
6. How often have you been satisfied with your arousal during sexual activity?	3.93	1.37	.54	4.02	1.34	.52
III. Lubrication (*Twin 1 α = .96, Twin 2 α = .96*)						
7. How often did you become lubricated during sexual activity?	4.40	1.25	−.70	4.49	1.21	.62
8. How difficult was it to become lubricated during sexual activity?	4.44	1.18	−.93	4.52	1.12	.88
9. How often did you maintain your lubrication until completion of sexual activity?	4.40	1.25	−.80	4.45	1.22	.83
10. How difficult was it to maintain your lubrication until completion of sexual activity?	4.44	1.19	−.93	4.53	1.12	.98
IV. Orgasm (*Twin 1 α = .91, Twin 2 α = .90*)						
11. When you had sexual stimuli or sexual intercourse, how often did you reach orgasm?	3.70	1.55	−.85	3.68	1.52	.86
12. When you had sexual stimuli or intercourse, how difficult was it for you to reach orgasm?	3.97	1.35	−.86	3.98	1.30	.88
13. How satisfied have you been with your ability to reach orgasm during sexual activity?	3.66	1.49	−.66	3.65	1.49	.81
V. Satisfaction (*Twin 1 α = .88, Twin 2 α = .88*)						
14. How satisfied have you been with the amount of emotional closeness during sexual activity?	3.70	1.60	.75	3.81	1.53	.74
15. How satisfied have you been with your sexual relationship with your partner?	3.88	1.46	.85	3.91	1.44	.85
16. How satisfied have you been with your overall sex life?	3.70	1.26	.82	3.71	1.29	.81
VI. Pain (*Twin 1 α = .96, Twin 2 α = .96*)						
17. How often did you experience discomfort or pain during vaginal penetration?	4.08	1.58	−.93	4.22	1.47	−.92
18. How often did you experience discomfort or pain following vaginal penetration?	4.28	1.56	−.90	4.40	1.43	−.91
19. How would you rate the level of discomfort or pain during or following vaginal penetration?	4.01	1.56	−.90	4.12	1.47	−.90
FSFI total score (Twin 1 α = .95, Twin 2 α = .95)	25.98	6.14		26.69	5.87	

Note: A higher value on FSFI indicates fewer problems with sexual function

The absolute range was 1–5 for items 1, 2, and 16 and 0–5 for all other items; Total score ranges from 2 to 36

[a] Pattern matrix

Table 2 Model estimation for Twin 1 for a six factor solution from confirmatory factor analyses

Model description	χ^2	df	χ^2-Difference from model 1	GFI	NFI	RMSEA	PCLOSE	AIC	HOELTER p = .05
1. The hypothesized model	789.03	137	NA	.924	.956	.067	.000	895.08	222
2. Modified model	682.14	136	106.89	.934	.962	.062	.000	790.14	255
3. The null model	17932.32	171		.180	.000	.313	.000	17970.3	12

dysfunction. However, a visual examination of the distribution graph showed that there seemed to be a natural cut-off at around 13 points, dividing the sample into two different categories. Using this lower cut-off limit would give a prevalence estimate of only 5.1%.

Associations of Sexual Functioning with Different Factors at the Phenotypic Level

Tables 3–6 show the associations between the different dimensions of sexual function, as measured by FSFI, and

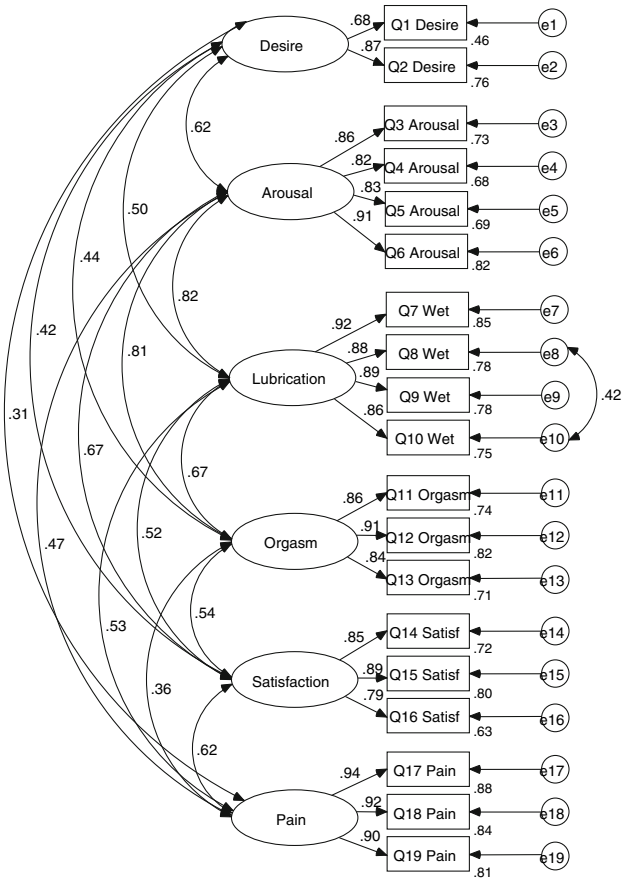

Fig. 1 The modified model with factor loadings, correlations between factors, and error terms. In order to improve the fit of the model a covariance between error term for question 8 and 10 was accepted

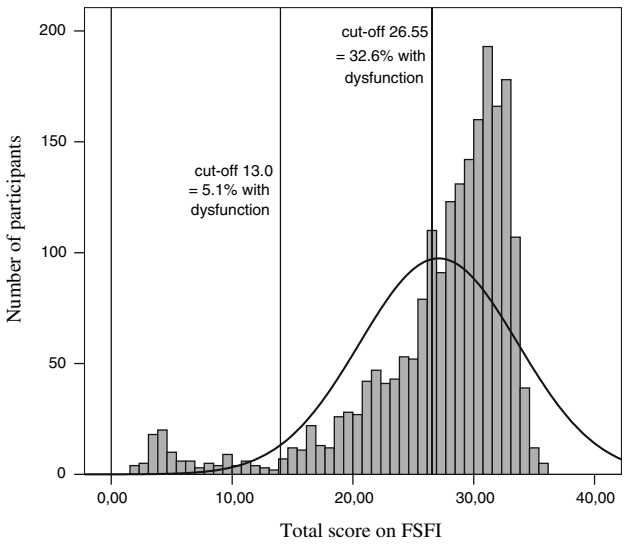

Fig. 2 Graph with normal curve of the distribution of the females total score on Female Sexual Function Index. A higher value indicates fewer problems with sexual functioning. The cut-off score at 26.55 developed by Wiegel et al. is marked as well as a possible cut-off score at 13.00 and the percentage of females that would be classified as having sexual dysfunction using these two different cut-off scores ($N = 2{,}081$, $M = 27.10$, $SD = 6.55$)

different aspects of the participants' sociodemographics, environment, and experiences. Pearson's correlations are reported in addition to R^2 so as to clarify the direction of the relationships.

Psychological Distress

As shown in Table 3, all dimensions of sexual function, except for desire, had an association with somatization, depression, anxiety, and panic as measured by the BSI. All the associations were negative, that is, the more symptoms of psychological distress, the more problems with sexual function. The shared variance was small, ranging from 0.2% to 6.4% for the different subdomains, with a shared variance of 3.0% between the GSI-BSI and the Total-FSFI.

Age and Alcohol Use

Table 4 shows the associations of sexual function with age and alcohol use. There was a small effect of age on pain, indicating that pain symptoms decreased with age. The association with general alcohol use was small but significant for every dimension of FSFI except for satisfaction. More drinking was related to fewer problems with sexual function. However, alcohol use was also measured in connection to intercourse, and these results pointed in the other irection except for desire (Table 5). Alcohol consumption in connection to intercourse was categorized into three different levels: rarely or never (69%), sometimes (less than half of the times) (17%), and half of the time or more often (4%). Differences between levels of the above-mentioned variable were analyzed using simple contrasts method, with the level rarely or never set as the reference category. The association was significant for every dimension of FSFI, except for pain. Those who reported that they sometimes used alcohol also reported more desire than those who rarely or never used alcohol, but for arousal, lubrication, orgasm, and satisfaction those using alcohol half of the time or more often had more problems with sexual functioning compared to the rarely or never group.

Hormone Based Contraceptives and Child and Adult Sexual Abuse

Table 6 reports the associations of sexual function with the dichotomized factors of use of OCP or IUS. The use of OCP did not seem to be associated with sexual function contrary to the use of IUS that was associated with more desire, arousal, and satisfaction as well as less pain. The association between IUS use and pain was substantially greater than the association between IUS and arousal, and IUS and satisfaction. Since age

Table 3 The associations between the subdomains of Female Sexual Function Index (FSFI) and the subdomains of Brief Symptom Inventory (BSI)

Variable	r^a	*B*	*SE B*	*t*	R^2
Desire					
Somatization	.01	0.06	0.16	0.40	.000
Depression	.00	0.01	0.13	0.07	.000
Anxiety	−.02	−0.08	0.10	0.86	.000
Panic	.01	0.03	0.15	0.21	.000
GSI-BSI	.00	0.01	0.08	0.09	.000
Arousal					
Somatization	−.10	−0.13	0.03	4.45***	.011
Depression	−.15	−0.15	0.02	6.78***	.024
Anxiety	−.08	−0.07	0.02	3.70***	.007
Panic	−.07	−0.08	0.03	3.14**	.005
GSI-BSI	−.13	−0.08	0.01	5.77***	.017
Lubrication					
Somatization	−.10	−0.12	0.03	4.12***	.011
Depression	−.10	−0.09	0.02	4.35***	.009
Anxiety	−.07	−0.05	0.02	2.94**	.005
Panic	−.05	−0.05	0.02	1.98*	.002
GSI-BSI	−.10	−0.06	0.01	4.34***	.010
Orgasm					
Somatization	−.10	−0.13	0.03	4.11***	.009
Depression	−.13	−0.15	0.03	5.87***	.017
Anxiety	−.09	−0.08	0.02	3.76***	.007
Panic	−.07	−0.09	0.03	3.10**	.005
GSI-BSI	−.12	−0.08	0.02	5.35***	.014
Satisfaction					
Somatization	−.12	−0.17	0.03	5.47***	.015
Depression	−.25	−0.28	0.02	11.94***	.064
Anxiety	−.15	−0.14	0.02	6.68***	.022
Panic	−.08	−0.10	0.03	3.40***	.006
GSI-BSI	−.21	−0.14	0.02	9.46***	.043
Pain					
Somatization	−.14	−0.20	0.03	5.98***	.020
Depression	−.13	−0.15	0.03	5.73***	.017
Anxiety	−.09	−0.09	0.02	4.06***	.008
Panic	−.07	−0.10	0.03	3.18**	.005
GSI-BSI	−.14	−0.10	0.02	6.06***	.018
Tot-FSFI[c]					
Somatization	−.14	−0.29	0.05	6.12***	.019
Depression	−.19	−0.33	0.04	8.76***	.037
Anxiety	−.13	−0.18	0.03	5.65***	.016
Panic	−.08	−0.16	0.04	3.51***	.006
GSI-BSI[b]	−.17	−0.18	0.02	7.88***	.030

Note: A higher value on FSFI indicates fewer problems with sexual function and a higher value on BSI indicates more symptoms of psychiatric illness. All scales except desire were log transformed. All the separate subscales of BSI were regressed for every subscales of FSFI in separate analysis

All df (1,1540)

[a] *r* is the correlation between the variables without considering the dependence between the measures

[b] GSI = global severity index score

[c] Tot-FSFI = full scale score for FSFI

* $p < .05$; ** $p < .01$; *** $p < .001$

was also associated with a decrease of sexual pain and hence could be a potential confounder, the effect of age was regressed in order to see if the effect was due to age. However, the main effect for IUS remained significant and nearly the same: $M = 1.47, SE = 0.00$ (no IUS); $M = 1.53, SE = 0.01$ (IUS), $F(1, 1540) = 18.37, p < .001$. Being sexually abused during childhood was associated with an increase of lubri-

Table 4 Associations between sexual function as measured by the Female Sexual Function Index (FSFI) with age and alcohol consumption (AUDIT)

Variable	r^a	B^b	*SE B*	*t*	R^2
Desire					
Age	−.01	0.00	0.01	0.36	.000
AUDIT	.10	0.03	0.01	3.94***	.009
Arousal					
Age	−.01	0.00	0.00	0.32	.000
AUDIT	.06	0.00	0.00	2.80**	.004
Lubrication					
Age	−.03	0.00	0.00	1.36	.001
AUDIT	.08	0.01	0.00	3.39**	.006
Orgasm					
Age	.04	0.00	0.00	1.78	.002
AUDIT	.06	0.00	0.00	2.88**	.004
Satisfaction					
Age	.04	0.00	0.00	1.84	.002
AUDIT	.02	0.00	0.00	0.76	.000
Pain					
Age	.06	0.00	0.00	2.83**	.004
AUDIT	.09	0.01	0.00	4.24***	.008
Tot-FSFI					
Age	.04	0.00	0.00	1.69	.001
AUDIT	.08	0.01	0.00	3.62***	.007

Note: A higher value on FSFI indicates fewer problems with sexual function and a higher value on AUDIT indicates more drinking. All scales except desire were log transformed. Age and AUDIT were regressed for every subscales of FSFI in separate analysis

[a] *r* is the correlation between the variables without considering the dependence between the measures

[b] df (1,1540) for age, (1,1536) for AUDIT

** $p < .01$; *** $p < .001$

Table 5 Associations between sexual function as measured by the Female Sexual Function Index (FSFI)) and alcohol use in connection to intercourse

Alcohol use	Rarely or never (n = 1,443)		Less than 50% of the times (n = 356)		50% of the time or more often (n = 150)		
	M	*SE*	*M*	*SE*	*M*	*SE*	*F*(3, 1531)
Desire	3.04	0.02	3.19[b]	0.04	2.88	0.10	6.55**
Arousal	1.43	0.00	1.43	0.01	1.37[c]	0.02	6.48**
Lubrication	1.54	0.00	1.54	0.01	1.49[b]	0.02	4.47*
Orgasm	1.42	0.00	1.42	0.01	1.35[b]	0.02	5.62**
Satisfaction	1.43	0.00	1.43	0.01	1.36[c]	0.02	7.02**
Pain	1.51	0.00	1.52	0.01	1.49	0.02	1.48
Tot-FSFI	1.71	0.01	1.72	0.01	1.60[c]	0.03	8.67***

Note: A higher value on FSFI indicates fewer problems with sexual function. All scales except desire were log transformed, range for desire scale 1.2–6

Differences between the different levels were analyzed using simple contrast comparing the rarely or never group with the other groups, [b] $p < .01$; [c] $p < .001$

* $p < .05$; ** $p < .01$; *** $p < .001$

cation and pain problems and a decrease of sexual satisfaction. There was no association between sexual function and being sexually abused as an adult though a tendency towards feeling more pain could be seen: $M = 1.49$, $SE = 0.01$ (for the not abused group); $M = 1.44$, $SE = 0.02$ (for the abused group), $F(1, 309) = 3.39$, $p = .065$. The questions about feeling sexually abused as an adult was only included in the last posting of the questionnaire, and, therefore, the analyses were conducted with only 324 females (those who reported having sex during the last 4 weeks) of which 62 reported being abused, with low power to detect associations compared to the other factors.

Discussion

The results from the present evaluation of the FSFI support earlier findings of a six-factor solution, with an acceptable if not excellent fit. The FSFI was translated into Finnish following normal back-translation procedures. Due to the fact that the FSFI measures sexual function problems, most of the items were not normally distributed and therefore logarithmically transformed. The internal consistency was acceptable for desire and excellent for the other subscales. In line with earlier findings (Rosen et al., 2000; Wiegel et al., 2005), the distinction between desire and arousal was not statistically optimal in the present population. In 2003 an international multi-disciplinary group reviewed existing evidence-based research in order to examine the definitions of female sexual dysfunctions (Basson et al., 2004). Their recommendations included separate diagnosis for (1) sexual interest/desire, (2) subjective sexual arousal disorder, (3) genital arousal disorder, and (4) combined genital arousal and subjective disorder. Both Rosen et al. (2000) and Wiegel et al. (2005) found a five factor solution to be statistically more supported than a six factor solution but chose a six factor solution based on clinical considerations. In order to improve the fit of a six factor model of the FSFI and clearly separate between desire and arousal, the desire questions could be reconsidered. The complexity of the desire and arousal dimensions has been noticed in reports of women not always distinguishing desire from arousal (Graham, Sanders, Milhausen, & McBride, 2004). In addition, according to Tabachnick and Fidell (2001, p. 622), "Interpretation of factors defined by only one or two variables is hazardous..."; consequently, the desire scale might improve by additional items.

In line with previous literature reporting high comorbidity between the different sexual problems, as well as substantial overlap between the dimensions, high domain intercorrelations were found. The highest correlations were between arousal and lubrication, and between arousal and orgasm, and the lowest between desire and pain, consistent with the results reported by Rosen et al. (2000) for the total group and control group. The high correlation between arousal and lubrication may reflect the overlap between these two dimensions, with subjective arousal having focus on perceived arousal and lubrication on the physiological side of the arousal dimension (Rosen et al., 2000). Meston (2003) found that among females diagnosed with orgasmic dysfunction, the arousal disorder was the most common sexual co-disorder, while Fugl-Meyer and Fugl-Meyer (2002) found it to be the second most common.

By using the cut-off point developed by Wiegel et al. (2005), the prevalence rate for female sexual dysfunction in the present study was 32.6%. Since there were no clinical observations or diagnosis by a clinician this figure is speculative.

Table 6 Associations between sexual function as measured by the Female Sexual Function Index (FSFI) and the use of oral contraceptive pills (OCP), intrauterine systems (IUS), child sexual abuse (CSA) and sexual abuse as an adult

Variable	No		Yes		F^a
	M	*SE*	*M*	*SE*	
Desire					
OCP	3.01	0.02	3.03	0.05	0.20
IUS	3.00	0.02	3.18	0.08	5.02*
CSA[b]	3.00	0.02	3.09	0.05	2.56
Sexabuse-A[c]	3.00	0.05	3.06	0.12	0.32
Arousal					
OCP	1.40	0.00	1.41	0.01	1.80
IUS	1.40	0.00	1.44	0.01	5.09*
CSA[b]	1.41	0.00	1.39	0.01	1.96
Sexabuse-A[c]	1.40	0.01	1.39	0.02	0.53
Lubrication					
OCP	1.51	0.00	1.52	0.01	2.24
IUS	1.51	0.00	1.52	0.01	0.99
CSA[b]	1.51	0.00	1.49	0.01	3.92*
Sexabuse-A[c]	1.51	0.01	1.48	0.02	2.05
Orgasm					
OCP	1.40	0.00	1.39	0.01	1.13
IUS	1.40	0.00	1.43	0.02	3.55
CSA[b]	1.40	0.00	1.39	0.01	1.53
Sexabuse-A[c]	1.40	0.01	1.40	0.02	0.07
Satisfaction					
OCP	1.40	0.00	1.40	0.01	0.32
IUS	1.40	0.00	1.44	0.02	6.04*
CSA[b]	1.41	0.00	1.36	0.01	13.50***
Sexabuse-A[c]	1.42	0.01	1.40	0.02	0.45
Pain					
OCP	1.47	0.00	1.49	0.01	3.28
IUS	1.47	0.00	1.53	0.01	19.90***
CSA[b]	1.48	0.00	1.41	0.01	28.64***
Sexabuse-A[c]	1.49	0.01	1.44	0.02	3.45
Tot-FSFI					
OCP	1.66	0.01	1.67	0.01	0.23
IUS	1.66	0.01	1.74	0.03	9.56**
CSA[b]	1.67	0.01	1.61	0.02	9.84**
Sexabuse-A[c]	1.67	0.02	1.65	0.03	0.16

Note: All scales except desire were log transformed, range for desire scale 1.2–6

[a] The degrees of freedom, df, were as followed; OCP (1,1541), IUS (1,1541), CSA (1,1539), and for Sexabuse-A (1,309) because the questionnaire containing these items were sent to fewer participants

[b] Sexual abuse in childhood as measured by *Childhood Trauma Questionnaire* (Bernstein et al., 2003)

[c] Sexual abuse as an adult

* $p < .05$; ** $p < .01$; *** $p < .001$

The percentage is also somewhat smaller than corresponding figures reported by Laumann et al. (1999), Lewis et al. (2004), and Fugl-Meyer and Fugl-Meyer (2002), and could be due to methodological or population discrepancies or both. However, a visual examination of the distribution of the observed symptoms suggested a natural cut-off limit at 13.00 which would give a prevalence estimate of only 5.1%, which is substantially smaller than the estimates commonly reported. Whether this might reflect a more severe form of sexual dysfunction or a measurement artefact is unclear. Van den Oord, Pickles, and Waldman (2003) found that even though behavioral scale scores often show a skewed distribution, the underlying liability distributions are mostly normal, suggesting a continuous model affected by many genes and environmental factors. Nonetheless, they concluded that the more severely incapacitating the investigated disorder potentially is the more likely discrete groups are. The question of whether female sexual dysfunctions constitute such entities is at the moment unclear.

We also examined the relationship between sexual function and a wide range of other aspects of the participants' lives. Several of the investigated variables were associated with sexual function and thus support the concept of female sexual functioning as multidetermined. However, the associations were mostly quite weak.

Our hypothesis regarding the associations between sexual function problems and psychological distress, and CSA was, in part, confirmed. As expected and in line with previous literature, psychological distress was associated with arousal, lubrication, orgasm, satisfaction, and pain problems, but not with desire. Why no significant association was found between desire and psychiatric distress is an intriguing finding and there are no straightforward explanations for this. Perhaps it reflects the psychological complexity and ambiguity of the nature of sexual desire. Compared to the other factors of the FSFI, sexual desire is less dependent on sexual activity and less time-limited. The observation that women mean different things when they are talking about sexual desire (Heiman, 2001) was also corroborated in the present study. As discussed above, it seems that women do not always differentiate between arousal and desire. Of the separate dimensions of BSI, depression was the single strongest correlate of arousal, orgasm, and satisfaction while somatization was the strongest correlate of lubrication and pain. However, the overall shared variance was small, and considering the large size of the sample this may imply that psychological distress is not as strongly associated with sexual function as earlier studies have suggested.

Surprisingly, CSA was not significantly associated with desire or arousal problems. According to Leonard and Follette (2002), those who have experienced CSA report problems with arousal and/or desire more frequently than orgasm and pain problems. Considering the construct of FSFI with arousal

separated to subjective arousal and physiological arousal-lubrication, it is reasonable to assume that the correlation between lubrication and CSA in the present study reflects the corresponding association between CSA and arousal in other studies. In addition, we found significant correlations between CSA and more pain and less sexual satisfaction.

Interestingly, OCP was not associated with any of the sexual function domains while IUS was associated with fewer arousal, satisfaction, and pain problems. Earlier findings have been ambiguous. In a prospective observational study with 365 women, combined oral contraceptives and intrauterine contraceptive device did not have an impact on sexual function while sterilization improved both sexual satisfaction and sexual drive (Li et al., 2004). In contrast McCoy and Matyas (1996) found pill users to have more desire but also less lubrication than nonusers; however, the associations differed depending on the type of pill. In addition to different effects depending on the type of OCP, cultural differences have been reported (Graham, Ramos, Bancroft, Maglaya, & Farley, 1995). In a study conducted by Rosen et al. (2000), significantly more healthy controls used some form of contraceptives compared to the participants with female sexual arousal disorder. Further, McCoy and Matyas (1996) found, for example, that pill users experienced first intercourse at an earlier age, were more likely to have a partner, and had intercourse more frequently than sexually active nonusers. However, if there would be a directional pathway from IUS use to fewer problems with sexual function, especially pain problems, which had the strongest association with IUS, it would be a clue in the treatment puzzle. Apparently, there is some difference either between the effects of using OCP or IUS or a difference between the women using them.

Alcohol use was measured in two different ways, namely drinking in general and in connection to intercourse. Interestingly, alcohol use in general was associated with fewer sexual problems while frequent alcohol use in connection to intercourse was associated with more sexual problems, except pain problems. It could be that women who use alcohol in connection to intercourse do so for a reason. Alcohol consumption may, in fact, lead to more disinhibited sexual behavior (Abbey, Zawacki, & McAuslan, 2000) and it has been suggested that some women may use alcohol in order to reduce anxiety related to sexual expression (Covington & Kohen, 1984). Most likely, alcohol use in connection to sexual activities may increase sexual problems, as well as sexual function problems may increase anxiety about sexual performance and thus lead to greater alcohol consumption in order to reduce the anxiety. It could also be that we are dealing with two independent categories of women, those with a general high consumption of alcohol representing individuals less depending on outside social control and consequently generally less inhibited with a greater ability to enjoy both drinking and sexual activities. Women having to encourage themselves with alcohol before sexual activities probably have at least the same amount of problems even without the alcohol.

A limitation of the present study was the relatively narrow age range of the participants. Age has frequently been reported to affect sexual function in various ways but the only effect that was found in the present study was a reduction of pain problems. It is reasonable to assume that the effect would have been larger with a broader age spectrum and that also other effects would have appeared. Several studies have also shown different dimensions of sexual function to be changing in different ways with age, and thus the development may not be linear. Since sexual function is dynamic and differs throughout the lifespan, the generalization of the present results to other age groups is limited. Having such a narrow age range does, however, reduce the variation. Another limitation was the lack of direct information about the distress the participants felt about their reported sexual function problems. In the literature, it has been stressed that sexual function might be on a continuum and, for example, having low desire might just reflect an individual variation that is at one end of the continuum but still normal and possibly not causing distress. According to Bancroft, Loftus, and Long (2003), the best predictors of sexual distress about one's own sexuality were mental and physical health and not sexual function problems.

Even though the response rate was not excellent, it was comparable with prior sexuality related survey studies (Bailey, Dunne, & Martin, 2000; Långström & Zucker, 2005). In addition, the present sample was comparable with other representative samples of the Finnish population with respect to important sexuality related characteristics, such as mean age at first sexual intercourse (Mustanski, Viken, Kaprio, Winter, & Rose, 2007) and rates of sexual abuse (Sariola & Uutela, 1994). Previous research (Dunne et al., 1997) suggests that nonresponders to sexuality surveys are somewhat better educated and have less conservative sexual attitudes compared to nonresponders. Also, responders were more novelty-seeking and had somewhat elevated levels of major depression, alcohol dependence as well as an earlier age at first sexual intercourse and higher rates of sexual abuse. As already noted, no significant differences in sexual abuse rates were found in the present study, suggesting that these biases were not necessarily operating in the present study.

Though the present study was conducted with twins, comparisons with other studies (Helweg-Larsen & Bøving Larsen, 2002; Mustanski et al., 2007; Sariola & Uutela, 1994) indicate that the generalizability of the results should not be limited to twins only. Several studies have shown that twins do not differ from singletons either on sociodemographic and lifestyle characteristics or on behavioral characteristics or in psychiatric morbidity, such as depression, somatization, and insomnia (Andrew et al., 2001; Kendler, Martin, Heath, & Eaves, 1995; Pulkkinen, Vaalamo, Hietala, Kaprio, & Rose, 2003).

The present study showed that FSFI generally is an instrument with good psychometric standards and suitable for assessment of sexual function in population based samples. The comorbidity between the different dimensions of sexual function was high and thus needs to be taken into account in clinical practice. Several variables were found to be associated with sexual function and may thus shed light on the etiology of sexual disorders. This is an important aspect in the treatment of these problems and should be considered in the possible development of drugs for female sexual disorders. Further studies are needed to evaluate the causality of these variables. The present sample allows for looking at possible genetic influences on sexual functioning by using the twin design, which will be our next step.

Acknowledgments This research was financed by Grant No. 210298 from the Academy of Finland and a Centre of Excellence Grant from the Stiftelsen för Åbo Akademi Foundation. We want to thank the anonymous reviewers and the Editor for their valuable comments. We also want to thank the participating twins.

References

Abbey, A., Zawacki, T., & McAuslan, P. (2000). Alcohol's effects on sexual perception. *Journal of Studies of Alcohol, 61*, 688–697.

Abdo, C. H. N., Oliviera, W. M., Moreira, E. D., & Fittipaldi, J. A. S. (2004). Prevalence of sexual dysfunctions and correlated conditions in a sample of Brazilian women: Results of the Brazilian study on sexual behavior (BSSB). *International Journal of Impotence Research, 16*, 160–166.

Andrew, T., Hart, D. J., Snieder, H., de Lange M., Spector, T. D., & MacGregor, A. J. (2001). Are twins and singletons comparable? A study of disease-related and lifestyle characteristics in adult women. *Twin Research, 4*, 464–477.

American Psychiatric Association. (2000). *Diagnostic and statistical manual of mental disorders* (4th ed., text revision). Washington, DC: Author.

Arbuckle, J. L., & Wothke, W. (1995–1999). *Amos 4.0 user's guide*. Chicago: SmallWaters Corporation.

Aydin, G., Başar, M. M., Keleş, I., Ergün, G., Orkun, S., & Batişlam, E. (2006). Relationship between sexual dysfunction and psychiatric status in premenopausal women with fibromyalgia. *Urology, 67*, 156–161.

Babor, T. F., Higgins-Biddle, J. C., Saunders, J. B., & Monteiro, M. G. (2001). *The alcohol use disorders identification test: Guidelines for use in primary care (WHO document WHO/MSD/MSB/01.6a)*. Geneva: WHO.

Bailey, J. M., Dunne, M. P., & Martin, N. G. (2000). Genetic and environmental influences on sexual orientation and its correlates in an Australian twin sample. *Journal of Personality and Social Psychology, 78*, 524–536.

Bancroft, J., Loftus, J., & Long, J. S. (2003). Distress about sex: A national survey of women in heterosexual relationships. *Archives of Sexual Behavior, 32*, 193–208.

Basson, R. (2005). Women's sexual dysfunction: Revised and expanded definitions. *Canadian Medical Association Journal, 172*, 1327–1333.

Basson, R., Althof, S., Davis, S., Fugl-Meyer, K, Goldstein, I., Leiblum, S., et al. (2004). Summary of the recommendations on sexual dysfunctions in women. *Journal of Sexual Medicine, 1*, 24–34.

Basson, R., Berman, J., Burnett, A., Derogatis, L., Ferguson, D., Fourcroy, J., et al. (2000). Report of the International Consensus Development Conference on Female Sexual Dysfunction: Definitions and classifications. *Journal of Urology, 163*, 888–893.

Beckman, L. J., & Ackerman, K. T. (1995). Women, alcohol, and sexuality. *Recent Developments in Alcoholism, 12*, 267–285.

Bernstein, D. P., Stein, J. A., Newcomb, M. D., Walker, E., Pogge, D., Ahluvalia, T., et al. (2003). Development of a brief screening version of the Childhood Trauma Questionnaire. *Child Abuse and Neglect, 27*, 169–190.

Bonierbale, M., Lancon, C., & Tignol, J. (2003). The ELIXIR study: Evaluation of sexual dysfunction in 4557 depressed patients in France. *Current Medical Research and Opinion, 19*, 114–124.

Çayan, S., Bozlu, M., Canpolat, B., & Akbay, E. (2004). The assessment of sexual functions in women with male partners complaining of erectile dysfunction: Does treatment of male sexual dysfunction improve female partner's sexual functions. *Journal of Sex and Marital Therapy, 30*, 333–341.

Covington, S. S., & Kohen, J. (1984). Women, alcohol, and sexuality. *Advances in Alcohol and Substance Abuse, 4*, 41–56.

Daker-White, G. (2002). Reliable and valid self-report outcome measures in sexual (dys)function: A systematic review. *Archives of Sexual Behavior, 31*, 197–209.

Derogatis, L. R. (2001). *Brief Symptom Inventory-18 (BSI-18): Administration, scoring, and procedures manual*. Minneapolis: NCS Pearson.

Dunn, K. M., Croft, P. R., & Hackett, G. (1999). Association of sexual problems with social, psychological, and physical problems in men and women: A cross sectional survey. *Journal of Epidemiology and Community Health, 53*, 144–148.

Dunne, M. P., Martin, N. G., Bailey, J. M., Heath, A. C., Bucholz, K. K., Madden, P. A. F., et al. (1997). Participation bias in a sexuality survey: Psychological and behavioral characteristics of responders and non-responders. *International Journal of Epidemiology, 26*, 844–854.

Figueira, I., Possidente, E., Marques, C., & Hayes, K. (2001). Sexual dysfunction: A neglected complication of panic disorder and social phobia. *Archives of Sexual Behavior, 30*, 369–377.

Frohlich, P., & Meston, C. (2002). Sexual functioning and self-reported depressive symptoms among college women. *Journal of Sex Research*, *39*, 321–325.

Fugl-Meyer, K. S., & Fugl-Meyer, A. R. (2002). Sexual disabilities are not singularis. *International Journal of Impotence Research, 14*, 487–493.

George, W. H., & Stoner, S. A. (2000). Understanding alcohol and sexual behavior. *Annual Review of Sex Research, 11*, 125–157.

Graham, C. A., Ramos, R., Bancroft, J., Maglaya, C., & Farley, T. M. M. (1995). The effects of steroidal contraceptives of the well-being and sexuality of women: A double-blind, placebo-controlled, two-centre study of combined and progesterone-only methods. *Contraception, 52*, 363–369.

Graham, C. A., Sanders, S. A., Milhausen, R. R., & McBride, K. R. (2004). Turning on and turning off: A focus group study of the factors that affect women's sexual arousal. *Archives of Sexual Behavior, 33*, 527–538.

Gruszecki, L., Forchuk, C., & Fisher, W. A. (2005). Factors associated with common sexual concerns in women: New findings from the Canadian contraceptive study. *Canadian Journal of Human Sexuality, 14*, 1–13.

Heiman, J. R. (2001). Sexual desire in human relationships. In W. Everaerd, E. Laan, & S. Both (Eds.), *Sexual appetite, desire and motivation: Energetics of the sexual system* (pp. 117–134). Amsterdam: Royal Netherlands Academy.

Helweg-Larsen, K., & Bøving Larsen, H. (2002). *Unges trivsel år 2002. En undersøkelse med fokus på seksuelle overgreb i barndommen*. København: Statens Institut for Folkesundhed.

Johnson, S. D., Phelps, D. L., & Cottler, L. B. (2004). The association of sexual dysfunction and substance use among a community epidemiological sample. *Archives of Sexual Behavior, 33*, 55–63.

Kadri, N., Alami, K. H. M., & Tahiri, S. M. (2002). Sexual dysfunction in women: Population based epidemiological study. *Archives of Women's Mental Health, 5*, 59–63.

Kendler, K. S., Martin, N. G., Heath, A. C., & Eaves, L. J. (1995). Self-report psychiatric symptoms in twins and their non-twin relatives: Are twins different? *American Journal of Medical Genetics, 60*, 588–591.

Laumann, E. O., Paik, A., & Rosen, R. C. (1999). Sexual dysfunction in the United States: Prevalence and predictors. *Journal of the American Medical Association, 281*, 537–544.

Leonard, L. M., & Follette, V. M. (2002). Sexual functioning in women reporting a history of child sexual abuse: Review of the empirical literature and clinical implications. *Annual Review of Sex Research, 13*, 346–387.

Lewis, R. W., Fugl-Meyer, K. S., Bosch, R., Fugl-Meyer, A. R., Laumann, E. O., Lizza, E., et al. (2004). Epidemiology/risk factors of sexual dysfunction. *Journal of Sexual Medicine, 1*, 35–39.

Li, R. H. W., Lo, S. S. T., Teh, D. K. G., Tong, N.-C., Tsui, M. H. Y., Cheung, K-B., et al. (2004). Impact of common contraceptive methods on quality of life and sexual function in Hong Kong Chinese women. *Contraception, 70*, 474–482.

Loeb, T. B., Williams, J. K., Carmona, J. V., Rivkin, I., Wyatt, G. E., Chin, D., et al. (2002). Child sexual abuse: Associations with the sexual functioning of adolescents and adults. *Annual Review of Sex Research, 13*, 307–345.

Långström, N., & Zucker, K. J. (2005). Transvestic fetishism in the general population: Prevalence and correlates. *Journal of Sex and Marital Therapy, 31*, 87–95.

Masheb, R. M., Lozano-Blanco, C., Kohorn, E. I., Minkin, M. J., & Kerns, R. D. (2004). Assessing sexual function and dyspareunia with the Female Sexual Function Index (FSFI) in women with vulvodynia. *Journal of Sex and Marital Therapy*, *30*, 315–324.

McCoy, N. L., & Matyas, J. R. (1996). Oral contraceptives and sexuality in university women. *Archives of Sexual Behavior, 25*, 73–90.

Meston, C. M. (2003). Validation of the Female Sexual Function Index (FSFI) in women with female orgasmic disorder and in women with hypoactive sexual desire disorder. *Journal of Sex and Marital Therapy, 29*, 39–46.

Mulaik, S. A., James, L. R., Van Alstine J., Bennett, N., Lind, S., & Stilwell, C. D. (1989). Evaluation of goodness-of-fit indices for structural equation models. *Psychological Bulletin, 105*, 430–445.

Mustanski, B. S., Viken, R., Kaprio, J., Winter, T., & Rose, R. J. (2007). Sexual behavior in young adulthood: A population-based twin study. *Health Psychology, 26*, 610–617.

Najman, J. M., Dunne, M. P., Purdie, D. M., Boyle, F. M., & Coxeter, P. D. (2005). Sexual abuse in childhood and sexual dysfunction in adulthood: An Australian population-based study. *Archives of Sexual Behavior, 34*, 517–526.

Nobre, P. J., Pinto-Gouveia, J., & Gomes, F. A. (2006). Prevalence and comorbidity of sexual dysfunctions in a Portuguese clinical sample. *Journal of Sex and Marital Therapy, 32*, 73–182.

Ponholzer, A., Roehlich, M., Racz, U., Temml, C., & Madersbacher, S. (2005). Female sexual dysfunction in a healthy Austrian cohort: Prevalence and risk factors. *European Urology*, *47*, 366–375.

Pulkkinen, L., Vaalamo, I., Hietala, R., Kaprio, J., & Rose, R. J. (2003). Peer reports of adaptive behavior in twins and singletons: Is twinship a risk or an advantage? *Twin Research, 6*, 106–118.

Rellini, A. H., & Meston, C. M. (2006). Psychophysiological sexual arousal in women with a history of child sexual abuse. *Journal of Sex and Marital Therapy, 32*, 5–22.

Rosen, R., Brown, C., Heiman, J., Leiblum, S., Meston, C., Shabsig, R., et al. (2000). The Female Sexual Function Index (FSFI): A multidimensional self-report instrument for the assessment of female sexual function. *Journal of Sex and Marital Therapy, 26*, 191–208.

Salonia, A., Munarriz, R. M., Naspro, R., Nappi, R. E., Briganti, A., Chionna, R., et al. (2004). Women's sexual dysfunction: A pathophysiological review. *British Journal of Urology International, 93*, 1156–1164.

Salonia, A., Nappi, R. E., Pontillo, M., Daverio, R., Smeraldi, A., Briganti, A., et al. (2005). Menstrual cycle-related changes in plasma oxytocin are relevant to normal sexual function in healthy women. *Hormones and Behavior, 47*, 164–169.

Sariola, H., & Uutela, A. (1994). The prevalence of child sexual abuse in Finland. *Child Abuse & Neglect, 18*, 825–833.

Seal, B. N., Brotto, L. A., & Gorzalka, B. B. (2005). Oral contraceptive use and female genital arousal: Methodological considerations. *Journal of Sex Research, 42*, 249–258.

Shokrollahi, P., Mirmohamadi, M., Mehrabi, F., & Babaei, G. (1999). Prevalence of sexual dysfunction in women seeking services at family planning centers in Tehran. *Journal of Sex and Marital Therapy, 25*, 211–215.

Simons, J. S., & Carey, J. P. (2001). Prevalence of sexual dysfunctions: Results from a decade of research. *Archives of Sexual Behavior, 30*, 177–219.

Tabachnick, B. G., & Fidell, L. S. (2001). *Using multivariate statistics*. Boston: Allyn and Bacon.

Thompson, B. (2004). *Exploratory and confirmatory factor analysis: Understanding concepts and applications*. Washington, DC: American Psychological Association.

Van den Oord, E. J. C. G., Pickles, A., & Waldman, I. D. (2003). Normal variation and abnormality: An empirical study of the liability distributions underlying depression and delinquency. *Journal of Child Psychology and Psychiatry, 44*, 180–192.

Wiegel, M., Meston, C., & Rosen, R. (2005). The Female Sexual Function Index (FSFI): Cross-validation and development of clinical cutoff scores. *Journal of Sex and Marital Therapy, 31*, 1–20.