



Temporal Stability of Sexual Excitation and Sexual Inhibition in Women

Julia Velten¹ · Lisa Zahler¹ · Saskia Scholten¹ · Jürgen Margraf¹

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Abstract

The dual control model of sexual response proposes two factors, sexual excitation (SE) and sexual inhibition (SI), that aim to predict sexual behavior and response. While SE and SI are described as stable traits that influence sexuality-related outcomes such as sexual function or sexual risk taking, only a few studies have presented data on the stability of these factors. The aim of this study was to evaluate the temporal stability of SE and SI, and to investigate whether changes in sexual function or partnership status influence SE and SI in a longitudinal sample of women. To address these research questions, the Sexual Excitation/Sexual Inhibition Inventory for Women (SESII-W) was administered five times over the course of 4 years. The SESII-W includes two main scales of SE and SI which consist of five (Arousability, Partner characteristics, Sexual power dynamics, Smell, and Setting) and three subscales (Concerns about sexual function, Arousal contingency, Relationship importance), respectively. Data from 553 women ($M_{\text{age}} = 31.38$ years, $SD = 10.25$, range = 18–67) who participated in at least two assessment points were included in this study. Bivariate correlations between baseline and the fifth follow-up assessment indicated a high temporal stability of SE and SI in women ($.47 < r < .71$). A series of generalized linear models were conducted to investigate the impact of time, changes in sexual function, partnership status, and changes in partnership status on SE and SI. Partner characteristics (SE) that showed small increases over time. Across different subscales, improvements in sexual function were associated with higher SE and lower SI. Changes in partnership status and partnership status itself were predictors of one SE- and three SI-related scales. This study suggests a relatively high temporal stability of SE and SI in women and supports the dual control model's assertion that both factors are stable individual traits. Certain life events such as a new partnership or sexual difficulties may, however, impact time stability of both factors.

Keywords Dual control model of sexual response · Sexual excitation · Sexual inhibition · Sexual function

Introduction

The dual control model of sexual response (DCM) offers a theoretical framework to systematically investigate sexual response and behavior (Bancroft & Janssen, 2000; Janssen, Vorst, Finn, & Bancroft, 2002). According to the DCM, two factors, namely sexual excitation (SE) and sexual inhibition (SI), influence a variety of sexuality-related outcomes, such as sexual risk taking (e.g., unprotected intercourse) or problems related to sexual function (e.g., a lack of desire or arousal difficulties; Bancroft, Graham, Janssen, & Sanders, 2009; Velten, 2017). Levels of SE and SI are proposed to vary across individuals, whereby

most levels are related to adaptive and non-problematic sexual responses and behaviors. A combination of a low level of SI and a high level of SE, however, is assumed to increase the likelihood of sexual risk behaviors, while a high level of SI, especially when combined with low SE, may lead to an impairment of sexual response and is expected to increase vulnerability to sexual dysfunctions (Bancroft et al., 2009). These assumptions have been confirmed in samples of women and men with different sexual orientations both inside and outside the U.S. (Bancroft et al., 2005; Jozkowski, Sanders, Milhausen, & Graham, 2016; Velten, Scholten, Graham, & Margraf, 2016b, 2017). Although the context of interactional, social, or cultural factors is relevant, an individual's propensities of SE and SI are expected to be the key factors that determine whether a sexual response occurs in a given situation (Bancroft et al., 2009).

While the DCM is designed as a state-trait model and proposes that processes related to SE and SI occur within individuals in response to sexual stimuli (Janssen, 2011), Janssen and

✉ Julia Velten
julia.velten@rub.de

¹ Clinical Psychology and Psychotherapy, Mental Health Research and Treatment Center, Ruhr-Universität Bochum, Massenbergr. 9-13, 44787 Bochum, Germany

Bancroft (2007) also describe SE and SI as stable individual traits that influence the sexual lives of women and men across a variety of situations. So far, research has focused mostly on the trait component of the model, but only few studies have presented data on the temporal stability of SE and SI. Two longitudinal studies have been published investigating and confirming the predictive value of SE and SI for future sexual function (Velten et al., 2017) and sexual risk taking (Velten et al., 2016b) in women. Using the same dataset, these studies reported a high 1-year stability of both SE ($r = .73$) and SI ($r = .80$). To date, it remains unclear whether SE and SI remain stable over the course of several years.

Although some scales of the Sexual Excitation/Sexual Inhibition Inventory for Women (SESII-W; Graham, Sanders, & Milhausen, 2006), a 36-item self-report questionnaire assessing SE and SI in women, predicted sexual function (Velten et al., 2017) at 1-year and 2-year follow-up, it has not been investigated whether changes in sexual function also influence the temporal stability of SE and SI. While the DCM proposes that certain levels of SE and SI are risk factors for sexual dysfunction, the direction of effects has never been tested (Bancroft et al., 2009). Thus, it remains unclear whether improvement or deterioration in women's sexual function is associated with increases or decreases in SE and SI several years later.

The degree to which individuals are sexually excited by certain sexual stimuli or are worried about their sexual response may also vary depending on their life situation (McCabe et al., 2016; Morton & Gorzalka, 2015). In a recent population-based study of 2708 participants, single individuals reported more SE related to partner characteristics and behaviors than participants who were in a committed partnership. In addition, singles reported higher levels of inhibitory cognitions related to sexuality (Velten, Scholten, & Margraf, 2018). Although this has not been thoroughly tested, SE and SI should also be associated to recent changes in partnership status. Studies on sexual desire show that desire for sexual activity with a partner is, for example, highest at the beginning of a new relationship and tends to decline over time (Klusmann, 2002).

The aim of this study was to evaluate the temporal stability of SE and SI in a longitudinal sample of women. To address this research question, the SESII-W was administered five times over the course of 4 years. While the 1-year stability of SE and SI has already been published elsewhere (Velten, Scholten, Graham, & Margraf, 2016a, 2017), data from the second, third, and fourth follow-up assessments are presented in this study. In addition, we investigated whether changes in women's sexual function levels, their current partnership status (i.e., being single vs. being in a committed relationship), and changes in their partnership status (i.e., starting or ending a partnership between two assessments) predicted SE and SI.

Method

Participants

German-speaking women above the age of 18 were eligible, and data were gathered online. At baseline, 2228 women with an average age of 31.65 years ($SD = 9.91$, range = 18–67) completed the baseline questionnaires reported in this study. A detailed description of the original sample can be found elsewhere (Velten et al., 2016a, 2017). To analyze the temporal stability of SE and SI, data from women who completed at least one follow-up assessment ($n = 553$) were included. So far, four follow-up surveys have been conducted in 2014 ($n = 396$), 2015 ($n = 395$), 2016 ($n = 316$), and 2017 ($n = 225$). A total of 135 women participated in all assessment points. A heterosexual orientation was reported by 72.0% ($n = 398$), while 10.3% ($n = 57$) indicated a homosexual, and 13.4% ($n = 74$) a bisexual orientation. Participants were highly educated with 53.9% ($n = 298$) holding a university degree. Most participants were working either full-time (37.3%; $n = 206$) or part-time (14.6%; $n = 81$), or were attending a college or university (36.2%; $n = 200$).

To examine whether these women differed from those only participating at baseline in relevant predictor or outcome variables, a series of *t* tests was conducted. Women who participated more than once showed slightly higher levels of SE (total scale), $t(2226) = -2.45$, $p = .014$, $d = 0.12$, and two SE-related subscales, namely Arousability, $t(2226) = -3.42$, $p < .001$, $d = 0.17$ and Sexual power dynamics, $t(2226) = -3.43$, $p < .001$, $d = 0.17$. No significant differences were found on other SE- or SI-scales, sexual function, or partnership status.

Procedure

The complete study procedures have been described elsewhere (Velten et al., 2016a, 2017). Data presented in this study were gathered between 2013 and 2017. Each year, data were assessed between July and October. Participants who, at baseline, agreed to be contacted again for future studies ($n = 889$) were invited via email to answer follow-up surveys. For each follow-up assessment, two reminders were sent to participants who did not respond to the invitation within a month. All procedures were carried out in accordance with the provisions of the World Medical Association Declaration of Helsinki (2013). The Ethics Committee of the Faculty of Psychology at the Ruhr-Universität Bochum approved the study procedures.

Measures

Sexual Excitation and Sexual Inhibition

SE and SI were assessed with the German version of the SESII-W (Graham et al., 2006; Velten et al., 2016a), a 36-item self-report questionnaire that measures the propensities for SE and SI in women. Items, a series of statements about factors influencing sexual response, are rated on a scale ranging from 1 (*strongly disagree*) to 4 (*strongly agree*). Via exploratory factor analysis, two higher-order factors (SE and SI) and eight lower-order factors were identified. Five lower-order factors reflect different aspects of SE. Arousal describes how easily a woman becomes aroused by sexual fantasies or external sexual stimuli. Partner characteristics assess how certain aspects of a potential sexual partner such as intelligence can boost a woman's sexual excitement. Sexual power dynamics assesses how aspects of dominant behavior increase or diminish sexual arousal. Smell measures how arousing a woman perceives certain scents, and finally, Setting (unusual/unconcealed) covers different aspects of the sexual situation, such as being overheard by others or the danger of being caught during sexual activity, and their influence on a woman's sexual arousal. Three lower-order factors represent different aspects of SI. Concerns about sexual function assesses how concerns about being a good lover or becoming sufficiently aroused impair sexual response and arousal. Arousal contingency assesses how important it is with regard to a woman's arousal that every aspect of the sexual situation is "just right" and how easily she can be "turned off." Finally, Relationship importance asks how different aspects of a sexual relationship, for example, mutual trust or commitment influence sexual arousal. Reliability and validity of the SESII-W in the original validation study were satisfactory to good (Graham et al., 2006). The German version of the scale also exhibited good construct validity, internal consistency, and 1-month test–retest validity (Velten et al., 2016a).

Change in Sexual Function

Women's sexual function was assessed with the Female Sexual Function Index (FSFI; Rosen et al., 2000), a self-report questionnaire that measures female sexual function over the last 4 weeks. The FSFI consists of six subscales that reflect different aspects of women's sexual function, namely desire, arousal, lubrication, orgasm, satisfaction, and pain. Items are answered on a 5-point scale, with higher scores indicating better sexual function. Some questions include the additional answer category of 0, indicating no sexual activity during the last month. Subscales can be combined into one total score, ranging from 2 to 36 points, with a clinical cutoff of 26.55 (Wiegel, Meston, & Rosen, 2005); women scoring below this cutoff are deemed at risk for sexual

dysfunction. The validation of the German FSFI yielded good psychometric properties (Berner, Kriston, Zahradnik, Härter, & Rohde, 2004). For the second, third, and fourth assessment, a change score was calculated by subtracting the respective FSFI score from the last data assessment point. Thus, positive values indicate an improvement, negative values a deterioration in women's sexual function.

Partnership Status

To investigate whether being in a committed partnership is associated with SE and SI, a dichotomized variable of partnership status was included in our analyses. The variable was coded 0 for women who reported being single, in an open relationship, and those who entered a different relationship status (e.g., "It's complicated"), and 1 for women who were married or in a committed, monogamous relationship.

Change in Partnership Status

We explored the relevance of a change in partnership status as a potential predictor of SE and SI. As we assessed partnership status and duration at each assessment point, we were able to identify the participants who had ended a previous relationship and/or entered a new one. A change in partnership status was present whenever a woman indicated a different partnership status (e.g., single at T1 and committed partnership at T2), and whenever a relationship duration shorter than a year was reported (e.g., committed partnership at T1 and (different) committed partnership with a partnership duration of less than a year at T2).

Data Analyses

Data were analyzed using SPSS version 25.0 (IBM, 2012). Zero-order bivariate correlations were calculated to assess the associations between the two complete scales of SE, SI, and the eight subscales of the SESII-W at all five data assessment points. Using a generalized linear model (GLM) framework, a series of analyses was conducted to predict the two complete scales of SE and SI as well as the eight subscales. All predictors were standardized before analysis. The predictive value of five variables was assessed: time as measured by the five assessment points, age, changes in sexual function, being in a committed partnership (vs. being single or in an open relationship), and changes in partnership status. In all models, we specified the covariance matrices as first-order autoregressive structures order to fit our models to the correlation between the repeated measures within participants (for an overview, see Singer & Willett, 2003). In addition, semi-partial R^2 , representing the variance in the dependent variable that is uniquely explained by the model parameter of each fixed effect, was calculated (Page-Gould, 2016). The magnitude of semi-partial R^2 may be

classified as small ($.02 \leq R^2 < .13$), medium ($.13 \leq R^2 < .26$), or large ($.26 \leq R^2$; Cohen, 1992; Page-Gould, 2016).

Results

Descriptive Analyses

Average sexual function levels did not significantly change over the 4-year study period, $F(4, 128) = 0.99, p = .417$. On a descriptive level, however, some differences between assessment points emerged with the highest FSFI scores being reported at T2, $M = 24.98, SD = 8.12$, and lowest scores being reported at T4, $M = 23.22, SD = 9.27$ (Cohen's $d = 0.20$). More than half of the women (58.5% at T2, 57.2% at T3, 55.1% at T4, and 50.6% at T5) indicated somewhat stable levels of sexual function determined by a less three-point difference in FSFI scores from one assessment to the next. Between 66.0% (T1; $n = 365$) and 72.7% (T3; $n = 295$) of women were in a committed relationship or married. A change in partnership status from the previous assessment point was indicated by 10.2% (from T4 to T5; $n = 23$) to 19.7% (from T1 to T2; $n = 80$) of women.

Correlational Analyses

A detailed description of our baseline sample including levels of SE and SI, sexual function, sexual risk behaviors, and sociodemographic variables can be found elsewhere (Velten et al., 2016a, b, 2017). Table 1 shows bivariate correlations of the scales of the SESII-W at baseline and all follow-up assessments. Medium-to-large correlations (range = .47–.75.; all $p < .001$) were found for all scales at all assessment points.

Table 1 Bivariate correlations between baseline and follow-up assessments for all scales of the Sexual Excitation/Sexual Inhibition Inventory for Women

Baseline	Follow-up 1 ($n = 398$)	Follow-up 2 ($n = 395$)	Follow-up 3 ($n = 316$)	Follow-up 4 ($n = 224$)
Sexual excitation (total)	.70 ^a	.68	.70	.58
Arousability	.58	.65	.60	.53
Partner characteristics	.52	.58	.58	.53
Sexual power dynamics	.69	.58	.65	.62
Smell	.65	.60	.58	.47
Setting	.66	.67	.63	.55
Sexual inhibition (total)	.74	.75	.67	.70
Concerns about sexual function	.66	.66	.56	.62
Arousal contingency	.74	.69	.64	.63
Relationship importance	.71	.71	.67	.71

^aAll correlations were significant ($p < .001$)

Generalized Linear Models (GLM)

Sexual Excitation

In a series of GLM analyses, the predictive value of age, time, changes in sexual function, partnership status, and changes in partnership status for all SE-related scales was assessed (see Table 2). The total scale of SE was predicted by age, $\beta = -.03, SE = .01, t(454.40) = -2.38, p = .018, R^2 = .012$, and changes in sexual function, $\beta = .01, SE = .01, t(649.93) = 2.03, p = .043, R^2 = .006$, in a way that younger women and those who indicated an improvement in sexual function scored higher on this scale. A similar pattern of results was found for Arousability which was also predicted by age, $\beta = -.03, SE = .01, t(462.34) = -2.27, p = .024, R^2 = .011$, and changes in sexual function, $\beta = .02, SE = .01, t(659.08) = 3.55, p < .001, R^2 = .019$. In addition, women in committed relationships scored lower on this scale, $\beta = -.03, SE = .01, t(1093.58) = -2.34, p = .019, R^2 = .005$. Time was the only significant predictor of Partner characteristics, $\beta = .05, SE = .02, t(1070.97) = 3.11, p = .002, R^2 = .009$, indicating that scores on this scale were higher at later assessment points. Mean comparisons between the first and last data assessment indicated that the increase from baseline to 4-year follow-up was small to medium in size ($d = 0.44$). Finally, age was a negative predictor of Sexual power dynamics, $\beta = -.06, SE = .02, t(454.00) = -2.84, p = .005, R^2 = .017$. The remaining two SE-scales, Smell and Setting (unusual/unconcealed), were not predicted by any of the variables under investigation.

Sexual Inhibition

In another series of GLM analyses, the predictive value of age, time, changes in sexual function, partnership status, and changes in partnership status for all SI-related scales was investigated. Changes in sexual function, $\beta = -.03, SE = .01, t(648.85) = -4.32, p < .001, R^2 = .028$, and partnership status,

Table 2 Generalized linear models predicting sexual excitation by age, time, changes in sexual function, partnership status, and changes in partnership status

	Estimate	SE	df	t	p	R ²
Dependent variable: Sexual excitation (total scale)						
Intercept	2.94	.06	667.25	51.39	<.001	
Age	-.03	.01	454.40	-2.38	.018	.012
Time	.00	.01	992.83	-0.14	.885	.000
Changes in sexual function	.01	.01	649.93	2.03	.043	.006
Partnership status (single vs. partnered)	-.02	.01	1078.24	-1.83	.067	.003
Changes in partnership status	.01	.01	806.60	1.89	.059	.004
Dependent variable: Arousability						
Intercept	3.20	.06	704.59	52.80	<.001	
Age	-.03	.01	462.34	-2.27	.024	.011
Time	.01	.01	1057.23	0.49	.626	.000
Changes in sexual function	.02	.01	659.08	3.55	<.001	.019
Partnership status (single vs. partnered)	-.03	.01	1093.58	-2.34	.019	.005
Changes in partnership status	.01	.01	871.18	1.13	.257	.001
Dependent variable: Partner characteristics						
Intercept	2.97	.08	712.83	36.61	<.001	
Age	-.03	.02	463.73	-1.31	.192	.004
Time	.05	.02	1070.97	3.11	.002	.009
Changes in sexual function	.00	.01	661.51	0.24	.808	.000
Partnership status (single vs. partnered)	-.03	.02	1085.34	-1.61	.108	.002
Changes in partnership status	.01	.01	891.69	1.16	.246	.002
Dependent variable: Sexual power dynamics						
Intercept	2.96	.08	683.20	35.82	<.001	
Age	-.06	.02	454.00	-2.84	.005	.017
Time	-.01	.02	1027.60	-0.82	.411	.001
Changes in sexual function	.01	.01	649.81	1.30	.192	.003
Partnership status (single vs. partnered)	.00	.02	1094.30	-0.22	.825	.000
Changes in partnership status	.01	.01	834.84	1.04	.298	.001
Dependent variable: Smell						
Intercept	3.11	.12	714.75	25.95	<.001	
Age	-.04	.03	467.48	-1.35	.178	.003
Time	-.01	.03	1068.37	-0.24	.810	.000
Changes in sexual function	.01	.01	664.89	0.42	.674	.000
Partnership status (single vs. partnered)	-.01	.02	1087.94	-0.53	.595	.000
Changes in partnership status	.02	.02	889.31	1.32	.188	.002
Dependent variable: Setting (unusual/unconcealed)						
Intercept	2.43	.10	701.54	25.17	<.001	
Age	-.02	.02	456.57	-0.70	.485	.001
Time	-.04	.02	1061.31	-1.95	.052	.004
Changes in sexual function	.01	.01	653.70	1.29	.199	.003
Partnership status (single vs. partnered)	-.04	.02	1091.38	-1.88	.060	.003
Changes in partnership status	.02	.01	873.78	1.35	.177	.002

$\beta = .03$, $SE = .01$, $t(1061.84) = 2.22$, $p = .027$, $R^2 = .005$, were predictors of SI (total scale) in a way that women who reported reduced levels of sexual function compared to a previous assessment and those in a committed relationship reported higher levels of SI. Lower age, $\beta = -.07$, $SE = .02$, $t(453.37) = -2.86$, $p = .004$, $R^2 = .018$, and reduced sexual function levels, $\beta = -.04$,

$SE = .01$, $t(649.73) = -4.33$, $p < .001$, $R^2 = .028$, were predictors of higher Concerns about sexual function. Arousal contingency was higher in women with reduced sexual function, $\beta = -.04$, $SE = .01$, $t(666.77) = -3.14$, $p = .002$, $R^2 = .015$, and those indicating no change in their relationship status, $\beta = -.03$, $SE = .02$, $t(860.65) = -2.18$, $p = .030$, $R^2 = .005$. Relationship

importance was predicted by partnership status, $\beta = .05$, $SE = .02$, $t(1081.41) = 2.78$, $p = .005$, $R^2 = .007$, and changes in partnership status, $\beta = .03$, $SE = .01$, $t(803.06) = 2.08$, $p = .038$, $R^2 = .005$. Women in a committed relationship and those who ended and/or entered a partnership scored higher on this scale. Time was not a significant predictor of any of the SI-related scales (Table 3).

Discussion

The primary objective of this study was to evaluate the temporal stability of the two trait factors proposed by the dual control model of sexual response in a large convenience sample of women. Large bivariate correlations were found for SE and SI across most of the five assessment points. Thus, a relatively high temporal stability of both propensities in women could be confirmed. All scales of the SESII-W showed high temporal stability with bivariate correlations between $r = .47$ and $.71$. The highest time stability was found for Relationship importance, a facet of SI that describes to what extent trust and commitment

are needed for a woman to get sexually aroused. The lowest time stability was found for the Smell scale of SE that describes how arousing the smell of a sexual partner is perceived. In a previous study, eight-week test–retest reliability of this scale was high ($r = .75$; Velten et al., 2016a). Different aspects could contribute to the relatively low temporal stability of this scale. For instance, in women—especially in those who are naturally cycling—Arousability by male scents may depend on hormonal changes related to the phase of their menstrual cycle. In addition, the start or discontinuation of hormonal contraception might lead to changes in Arousability by odors of a potential sexual partner (Gangestad & Thornhill, 1998; Graham, Janssen, & Sanders, 2000). As these factors were not assessed, future studies should examine whether hormone levels associated with contraception, menstrual phase, or menopause status are indeed predictive of SE and SI in women.

Our analyses showed no significant impact of time on nine out of ten scales under investigation. In other words, levels of SE and SI did not systematically increase or decrease over the course of 4 years. Only Partner characteristics showed a small increase over time. Women reported being increasingly aroused

Table 3 Generalized linear models predicting sexual inhibition by age, time, changes in sexual function, partnership status, and changes in partnership status

	Estimate	SE	df	t	p	R ²
Dependent variable: Sexual inhibition (total scale)						
Intercept	2.61	.07	655.58	34.81	<.001	
Age	−.03	.02	453.23	−1.73	.085	.007
Time	.03	.01	970.38	1.92	.056	.004
Changes in sexual function	−.03	.01	648.85	−4.32	<.001	.028
Partnership status (single vs. partnered)	.03	.01	1061.84	2.22	.027	.005
Changes in partnership status	−.01	.01	790.57	−0.55	.585	.000
Dependent variable: Concerns about sexual function						
Intercept	2.81	.10	691.37	29.42	<.001	
Age	−.07	.02	453.37	−2.86	.004	.018
Time	.03	.02	1046.13	1.65	.100	.003
Changes in sexual function	−.04	.01	649.73	−4.33	<.001	.028
Partnership status (single vs. partnered)	.01	.02	1095.74	0.73	.467	.000
Changes in partnership status	−.01	.01	853.39	−1.03	.303	.001
Dependent variable: Arousal contingency						
Intercept	2.24	.11	705.78	20.87	<.001	
Age	−.04	.03	470.87	−1.40	.161	.004
Time	.02	.02	1044.79	1.09	.275	.001
Changes in sexual function	−.04	.01	666.77	−3.14	.002	.015
Partnership status (single vs. partnered)	.04	.02	1096.00	1.87	.062	.003
Changes in partnership status	−.03	.02	860.65	−2.18	.030	.005
Dependent variable: Relationship importance						
Intercept	2.78	.09	660.27	29.82	<.001	
Age	.00	.02	444.47	0.15	.881	.000
Time	.02	.02	995.44	1.17	.243	.001
Changes in sexual function	−.01	.01	640.00	−0.97	.334	.001
Partnership status (single vs. partnered)	.05	.02	1081.41	2.78	.005	.007
Changes in partnership status	.03	.01	803.06	2.08	.038	.005

when seeing someone who is interacting well with others, who is showing his/her talent, or is doing something that shows he/she is intelligent. This finding suggests that certain partner behaviors may become more relevant for women over time. Age did not predict this scale and neither did a change in sexual function, partnership status, nor a change in partnership status. As baseline levels of this scale were comparable than levels reported in the Dutch (Bloemendaal & Laan, 2015) or U.S. American (Graham et al., 2006) validation studies, a regression-to-mean effect seems unlikely. Future studies should replicate this finding and investigate whether factors not assessed in this study (i.e., relationship satisfaction, mental health, or psychological well-being) explain this change in SE related to Partner characteristics in women.

As the predictive value of SE and SI for sexual function in women has already been established (Velten et al., 2016a, 2017, 2018), absolute levels of sexual function were not considered as predictors of SE and SI in this study. To investigate the directionality of effects between sexual function, SE, and SI, we explored whether improvement or deterioration in sexual function compared to an earlier assessment point was related to higher or lower SE and SI. Two SE-scales, the total scale and Arousalability, were significantly predicted by changes in sexual function. Women who reported increased levels of sexual function compared to a previous assessment scored higher on these scales. The complete SI scale as well as two subscales, Concerns about sexual function and Arousal contingency, were predicted by changes in sexual function. Women indicating reduced levels of sexual function scored higher on these scales. A recent occurrence of sexual difficulties (i.e., reduced desire for sex or arousal problems) might reinforce women's concerns about their sexual functioning ("If I am worried about taking too long to become aroused, this can interfere with my arousal") and might lead to a feeling that everything has to be "just right" for arousal to occur. A previous study that included the first three assessment points of this dataset (Velten et al., 2017) found that Arousalability, Concerns about sexual function, and Arousal contingency can predict future sexual function. Taken together, the findings support the notion of a bidirectional relationship between these variables. Being easily excited by a variety of sexual stimuli (SE) may improve women's ability to get aroused during sexual activity, their orgasmic capacity, and sexual satisfaction, while high levels of sexual function (e.g., sufficient lubrication, high arousal, and frequent orgasms) might also lead to the perception of being easily aroused. While most research has focused on the relevance of SE and SI as "vulnerability traits" (Bancroft et al., 2009, p. 132) for sexual dysfunction, Bancroft et al. also emphasize that the DCM is designed as a state-trait model and acknowledge that both SE and SI should be influenced by, for example, mood or sexual arousal (Janssen & Bancroft, 2007). Future studies should focus on the state-trait aspect of this model and clarify the ways in which state factors might influence SE and SI. In addition, cross-lagged panel designs (Kenny, 2005)

should replicate these findings in other female and male samples to shed further light on the directionality of effects. The preliminary findings presented in this study have implications for clinical research as they suggest that interventions aiming at targeting sexual dysfunction in women might also increase levels of SE and lower their levels of SI. Including a measure of SE and SI in treatment studies might improve understanding of the relationship between sexual function and the factors of the DCM and can help to examine mechanisms of change by identifying mediators of treatment success.

Partnership status was relevant only for the Arousalability scale of SE. Single women reported being more easily aroused by a variety of sexual stimuli. This finding is in line with previous studies suggesting that desire for sexual activity might be lower in long-term relationships (Klusmann, 2002). In addition, single women reported lower SI (total scale) as well as lower Relationship importance. A possible explanation may be that single women do not emphasize trust and commitment as much in a sexual partner as they may be more content with casual sexual encounters. As our data analysis does not allow for an assessment of directionality, it may also be that women who need a close and intimate relationship in order to let go sexually are more prone to seek out such committed relationships. Taken together, this pattern of results corresponds to a population-based study that found higher levels of SE and lower SI in single individuals (Velten et al., 2018).

Our data suggest that a recent change in partnership status might not influence SE. When controlling for the current partnership status, women who have been single or in a committed partnership for at least a year did not differ from other women in their self-reported sexual arousalability by visual stimuli, partner behaviors, smells, or unusual settings. Some differences, however, emerged concerning SI with women who indicated relationship changes over the past year reporting lower Arousal contingency and higher Relationship importance. As women become single or enter a new relationship, they might not worry that much about whether they can get aroused sexually but might be more concerned about the trustworthiness and commitment of new sexual partners. To investigate how SI might change in response to different stages of partnerships (e.g., marriage, pregnancy), future longitudinal studies should include a comprehensive assessment of the recent and current personal situations of participants. As SI is a known predictor of sexual function in women, identifying circumstances that lead to increases in SI might help to identify populations at risk for sexual dysfunction.

Higher age was associated with lower SE (total scale, Arousalability, and Sexual power dynamics) and higher SI (Concerns about sexual function). These findings are in line with other population-based studies (Pinxten & Lievens, 2015, 2016; Velten et al., 2018) that suggested higher SE and lower SI in older women and men. The results also correspond to studies reporting a decline in sexual desire with age (DeLamater, 2012). As the risk for sexual dysfunctions increases with age (Nicolosi

et al., 2004), worries about sexual performance might become more salient.

Limitations

The time frame of 4 years might be too short to adequately assess long-term changes in SE and SI. Longer follow-up intervals might help to investigate more subtle changes in SE and SI. In addition, we interpreted correlation coefficients in a way that indicates stability of both traits. This interpretation could, however, be challenged as coefficients were higher for shorter test–retest intervals suggesting that SE and SI show some degree of dynamic change over time (Fraley & Roberts, 2005). In this study, we explored only a few potential covariates. Future studies should investigate if and how other important life events (e.g., pregnancy, child birth, retirement), health issues (e.g., mental disorders or physical diseases), as well as interactional factors (e.g., relationship quality, long-distance partnerships, marriage) may influence women's propensity for SE and/or SI.

Conclusion

Data presented in this study suggest a high temporal stability of SE and SI in women. Nine out of ten scales of the SESII-W did not significantly change over the study period of 4 years. Our study supports the assumption of the dual control model of sexual response that both propensities are individual traits that remain relatively stable across several years. Additional analyses, however, revealed that some aspects of SE and SI are susceptible to change. Improvements in sexual function might lower SE and increase SI levels in women. Some aspects of SI might change in women who end or enter a committed partnership. In addition, single women might experience lower SI related to Relationship importance. Longitudinal (treatment) studies including women with sexual concerns are needed to clarify whether treatments that aim to improve sexual function do indeed lead to a decrease in SI.

Compliance with Ethical Standards

Conflict of interest All authors declare that they have no conflict of interest.

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