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Compulsive Use of Internet-based Sexually Explicit Media: Adaptation and Validation of the Compulsive Internet Use Scale (CIUS)

Martin J. Downing Jr., Ph.D.¹, Nadav Antebi, M.A.², and Eric W. Schrimshaw, Ph.D.²

Martin J. Downing: downing@ndri.org

¹National Development and Research Institutes, Inc., 71 W. 23rd St., 4th Floor, New York, NY 10010, USA. Ph: 212-845-4410

²Columbia University, Department of Sociomedical Sciences, Mailman School of Public Health, 722 W. 168th St., 9th Floor, New York, NY 10032, USA

Abstract

Despite evidence that viewing sexually explicit media (SEM) may contribute to greater numbers of sexual partners, sexual risk taking, greater interest in group sex, and lower self-esteem among men who have sex with men (MSM), research has not addressed compulsive use of Internet-based SEM due to the lack of a validated measure for this population. This report investigates the psychometric properties of the 14-item Compulsive Internet Use Scale (CIUS; Meerkerk, van den Eijnden, Vermulst, & Garretsen, 2009) adapted to assess the severity of compulsive Internet SEM use. A total of 265 Internet SEM-viewing MSM participated in an online survey about their SEM preferences, viewing habits, and recent sexual behaviors. A principal components analysis revealed a single-component, 13-item scale to adequately assess the cognitive, emotional, and behavioral aspects of this phenomenon, with a high internal consistency ($\alpha = .92$). Greater compulsive use of Internet SEM was positively correlated with several relevant variables including boredom, sexual frustration, time spent viewing Internet SEM, and number of recent male sexual partners. The results offer preliminary evidence for the reliability and validity of using an adapted version of the CIUS to understand compulsive Internet SEM use, and allow for more research into the potential negative consequences of compulsive SEM use.

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Correspondence to: Martin J. Downing, Jr., downing@ndri.org.

Contributors:

Martin J. Downing, Jr. and Eric W. Schrimshaw designed the study and wrote the protocol. Martin J. Downing, Jr. and Nadav Antebi conducted literature searches and provided summaries of previous research studies. All authors were involved in conducting the statistical analysis. Martin J. Downing, Jr. and Nadav Antebi wrote the first draft of the manuscript and all authors contributed to and have approved the final manuscript.

Conflict of Interest:

All authors declare that they have no conflicts of interest.

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Keywords

compulsivity; Internet; pornography; sexually explicit media

1. Introduction

Over the last decade there has been a dramatic change in the distribution and consumption of sexually explicit media (SEM), from a market based primarily on DVD and “video on demand” to one largely distributed over the Internet (Downing, Schrimshaw, Antebi, & Siegel, 2014; Escoffier, 2009). Individuals searching for and viewing SEM constitute 30% of all Internet traffic (Didymus, 2012). A recent analysis of over 400 million Internet searches from a single, non-SEM specific search engine revealed that 13% of searches were for sexual content (Ogas & Gaddam, 2011). Consistent with the greater availability of SEM on the Internet, data from the General Social Survey have documented a steady increase in SEM use among U.S. men since the 1970s (Wright, 2013).

Expanded access to SEM afforded by the Internet has perhaps had the greatest impact on men who have sex with men (MSM). Indeed, a substantial proportion of SEM on the Internet is targeted to, and viewed by, MSM. Recent research documented that 99% of MSM viewed same-sex male SEM in the past 3 months and 96% viewed it on the Internet (Stein, Silvera, Hagerty, & Marmor, 2012). Researchers have found that significantly more MSM than heterosexual men view SEM on the Internet (Traeen, Nislen, & Stigum, 2006), and do so more frequently (Duggan & McCreary, 2004; Peter & Valkenburg, 2011). Among MSM, viewing SEM may contribute to more partners (Eaton, Cain, Pope, Garcia, & Cherry, 2012), sexual risk taking (e.g., condom-less anal sex; Rosser et al., 2013; Stein et al., 2012), greater interest in group sex (Weinberg, Williams, Kleiner, & Irizarry, 2010), lower self-esteem (Duggan & McCreary, 2004; Morrison, Morrison, & Bradley, 2007), and may trigger sexually compulsive behaviors (Parsons, Kelly, Bimbi, Muench, & Morgenstern, 2007).

Despite the fact that MSM are frequent consumers of SEM, research has not examined the extent to which the use of Internet SEM by MSM may reach potentially compulsive levels. One reason for the lack of research in this area is the absence of a measure that specifically assesses compulsive Internet SEM use. Although measures of compulsive Internet use in general (e.g., Meerkerk, van den Eijnden, Vermulst, & Garretsen, 2009; Nichols & Nicki, 2004) and compulsive sexual behavior (Coleman, Miner, Ohlerking, & Raymond, 2001; Kalichman & Rompa, 1995) exist, no known measures have assessed compulsive use of Internet SEM among MSM. Furthermore, even in the SEM literature, existing measures assess the perceived effects of viewing SEM among MSM (Hald, Smolenski, & Rosser, 2013) rather than compulsive use. Such a measure is greatly needed to allow for future research to answer questions regarding whether compulsive Internet SEM use is separate from compulsive Internet use or compulsive sexual behavior more generally. Likewise, such a measure is critical to facilitate research on whether compulsive Internet SEM use is associated with potential negative psychological and behavioral health consequences for MSM (e.g., depression, anxiety, sexual risk behavior, HIV/STDs). Therefore, the primary aim of this report is to document the reliability and validity of a measure of compulsive

Internet SEM use among a sample of MSM using an adapted version of the Compulsive Internet Use Scale (CIUS).

1.1. Compulsive Internet Use Scale

The CIUS is a 14-item instrument designed to assess the severity of compulsive Internet use (Meerkerk et al., 2009). Items are based on six criteria for behavioral addictions (Griffiths, 1999) as well as DSM-IV criteria for substance dependence and pathological gambling. Five core dimensions of the CIUS (i.e., loss of control, preoccupation, withdrawal symptoms, coping or mood modification, and conflict) reflect a single factor structure (i.e., unrestrained Internet use) (Meerkerk et al., 2009). Furthermore, the CIUS has demonstrated high internal consistency across diverse samples and time (α range = .89 – .90), as well as both concurrent validity and construct validity. Meerkerk et al. (2009) suggest that the Internet merely serves as a medium by which “several forms of compulsive or addictive-like behaviors” are accomplished (e.g., gambling, sexual compulsivity; p. 5). However, it is unclear whether the original CIUS would adequately assess, much less differentiate between, the various types of compulsive Internet behaviors (e.g., social media, video gaming, SEM use). As such, there is a need to investigate these behaviors beyond general Internet addiction and to develop valid and reliable measures for their assessment. Thus, the current study will examine the psychometric properties of the CIUS adapted to assess compulsive use of Internet SEM.

2. Method

2.1. Participants

Participants were solicited for an Internet-based survey through advertisements posted to Craigslist and Facebook between June and November 2012. Eligible participants had to: (a) identify as male; (b) be 18 years old or older; (c) report having had sex with a man in the past 12 months; (d) report having viewed “man on man” pornographic material on the Internet or on a mobile device in the past 3 months; and (e) reside in the New York City area, Philadelphia, Baltimore, or Washington, DC.

The final data set included 265 men. Although 446 individuals consented to participate, 162 screened out after providing disqualifying information (e.g., did not have sex with a man in the past 12 months), and an additional 19 surveys were identified as potential duplicates and removed from the final dataset. Descriptive characteristics of the sample are presented in Table 1. Participants were primarily White or Caucasian (77%), identified as gay or homosexual (81.5%), and currently single (52.8%). Mean age of participants was approximately 33 years.

2.2. Procedure

The research team utilized elements of time-space sampling (Stueve, O'Donnell, Duran, Sandoval, & Blome, 2001) to post advertisements on Craigslist, a publicly accessible online bulletin board commonly used by MSM to post personal ads for sexual partners. We used a random digit generator to select a 1-hr increment of time, a geographic location from the sampling frame, and a Craigslist category (i.e., men seeking men, casual encounters, or

volunteers). Then, a member of the research team would sign into the Craigslist study account at the selected hour and post an ad in the appropriate city and category. Recruitment on Craigslist occurred twice a day from 8:00 am - midnight for approximately six weeks. Study ads solicited men who were at least 18 years of age to share their experiences and thoughts about viewing sexually explicit videos (or pornography), and instructed anyone interested in participating to reply and request a link to the Internet survey, which was provided through an automated e-mail response. Recruitment ads also mentioned the researchers' affiliation, indicated that the survey would be confidential, and that there was an opportunity to win a \$100 prize for participating.

To increase study enrollment and target a broader audience of potential Internet SEM users, the research team also implemented a paid advertisement campaign on Facebook. The Facebook ad, which included language consistent with the Craigslist study ads, ran daily for approximately three months and targeted only those users who were at least 18 years of age, identified as male, reported on their profile that they were "interested in men", and were within 50 miles of one of the four urban areas. Individuals who clicked on the ad were taken directly to the survey hosted on Qualtrics. During this period of recruitment, we limited study exposure on Craigslist to one posting per day – targeting peak traffic times (e.g., late morning, late afternoon) and cities from the sampling frame with low enrollment.

Individuals accessing the Internet survey were prompted to review a consent form that outlined the study purpose and informed potential participants that upon completion of the survey there would be an opportunity to enter a random drawing for a \$100 e-gift card. The study protocol received Institutional Review Board approval through Columbia University.

2.3. Measures

The following measures are described in the order in which they were presented to participants.

2.3.1. Participant characteristics and sexual behavior—The Internet survey included a set of demographic questions (e.g., age, relationship status). Participants were also asked to report the number of male partners they had in the past three months as well as the number of times they had anal sex with a man in the past three months. Responses of 1 or more times prompted a follow-up question to assess how many of those anal sex encounters did not include a condom.

2.3.2. Sexual sensation seeking—Participants completed the 11-item revised version of the Sexual Sensation Seeking scale, which has established good reliability and validity among gay men (Kalichman & Rompa, 1995). All items were scored on a 4-point Likert scale from 1 (*Not at all like me*) to 4 (*Very much like me*). Mean scores were computed for each participant, such that higher scores indicated a greater degree of sexual sensation seeking ($\alpha = .80$).

2.3.3. Internet SEM use—To measure time spent online watching SEM, participants were asked to report the number of hours spent viewing "man on man" pornography on the Internet in a typical week on a 52-point response scale ranging from, *Less than 1 to More*

than 50. After recoding values of *Less than 1* to 0 and *More than 50* to 51, the median number of hours spent viewing Internet-based “man on man” pornography and interquartile range were computed. Participants were asked to indicate whether they had “consumed alcohol, smoked, inhaled or used other drugs while viewing or in anticipation of viewing ‘man on man’ pornography on the Internet” in the past three months. Participants who affirmed that they consumed a substance while viewing or in anticipation of viewing were asked to indicate how often (*Some of the time, About half of the time, More than half of the time, All of the time*) they did so during the past three months.

2.3.4. Emotional and sexual states—To assess participants’ emotional and sexual states preceding or concurrent with their Internet SEM use, we developed 7 items for the survey that included a statement, *I am more likely to view Internet pornography*, followed by: *when alone, when with a sexual partner, when bored, when I haven’t had sex in a while, when horny, when drunk or feeling the effects of drugs/illicit substances, and when I can’t find someone to have sex with*. Items were scored on a 4-point Likert scale: 1 (*Strongly disagree*) to 4 (*Strongly agree*).

2.3.5. Behavioral correlates of Internet SEM use—Men were asked to indicate for the past three months (1) how often they fantasized about engaging in similar acts they viewed in “man on man” pornography on the Internet, (2) how often watching Internet pornography has influenced the kind of sexual activity they desired, (3) how often viewing “man on man” pornography on the Internet led them to seek out sex afterward, and (4) how often watching pornography on the Internet has contributed to their engaging in risky sex. Items were scored on a 5-point scale: 1 (*None of the time*) - 5 (*Every time*).

2.3.6. Compulsive Internet SEM use—Participants were presented a modified version of the 14-item Compulsive Internet Use Scale (CIUS; Meerkerk et al., 2009) that included specific instructions to respond to the items based on their use of Internet websites (accessed through a computer or mobile device) to watch “man on man” pornography. Modified items and instructions are presented in Table 2. Consistent with the original measure, items were scored on a 5-point scale: 0—*Never*, 1—*Seldom*, 2—*Sometimes*, 3—*Often*, and 4—*Very often*. Mean scores on the adapted CIUS were computed for each participant, such that higher scores indicated greater compulsive use of Internet-based SEM (Table 2).

2.4. Data analysis

We conducted a principal components analysis (PCA) with the adapted CIUS items using both exploratory and confirmatory factor analysis procedures in SPSS (Version 20). The number of factors to extract was determined by Catell’s (1966) scree test followed by a parallel analysis using Monte Carlo PCA for Parallel Analysis (Watkins, 2006). The distribution of mean scores for the adapted CIUS was positively skewed and therefore subsequently normalized using a square root transformation (Cohen & Cohen, 1983). To examine potential associations with compulsive Internet SEM use, two-tailed Pearson and Spearman rho correlations were used for continuous variables, and an Independent samples *t*-test for dichotomous variables. Convergent validity was evaluated by examining the correlations of scores on the adapted CIUS with sexual sensation seeking, Internet SEM use

measures, participants' emotional and sexual states preceding or concurrent with Internet SEM use, and behavioral correlates of Internet SEM use.

3. Results

3.1. Principal components analysis

A PCA of the 14 adapted items revealed the presence of three components with eigenvalues exceeding 1, explaining 49.96%, 8.20%, and 8.10% of the variance respectively. Inspection of the screeplot, however, suggested the presence of a single component. This was further supported by the parallel analysis, which showed only one component with an eigenvalue exceeding the corresponding criterion values for a randomly generated data matrix of the same size (14 variables x 265 participants; 500 replications).

The items were then subjected to a second PCA specifying a single component. One item [*How often do others (e.g., partner, friends, parents) say you should access these websites less?*] had a low communality value (.20) and also showed the lowest factor loading (.45). This item was subsequently dropped and a final PCA was conducted with the remaining 13 items. The Kaiser-Meyer-Olkin value was .89 and Bartlett's Test of Sphericity reached statistical significance ($p < .001$), supporting the factorability of the correlation matrix (Dziuban & Shirkey, 1974). The one-component model explained 52.45% of the variance.

3.2. Reliability and validity

Reliability analysis of the 13-item adapted CIUS for SEM use demonstrated high internal consistency ($\alpha = .92$), slightly higher than the original scale ($\alpha = .89$; Meerkirk et al., 2009). Item-total correlations are shown in Table 2 along with the factor structure loadings and item descriptive statistics.

Evidence of convergent validity was available. As shown in Table 3, compulsive Internet SEM use (as assessed by scores on the adapted CIUS) was positively correlated with sexual sensation seeking and the number of hours spent viewing "man on man" pornography on the Internet in a typical week. Compulsive Internet SEM use was also positively correlated with how often in the past three months participants fantasized about engaging in similar acts to those they viewed, as well as how often they perceived their viewing as having 1) influenced the types of sexual activity they desired, 2) led them to seek out sexual encounters afterward, and 3) contributed to their engaging in risky sex. However, compulsive Internet SEM use did not differ between men who used substances while viewing or in anticipation of viewing Internet SEM in the past three months ($M = .94$, $SD = .37$; $n = 98$) and those who did not ($M = .93$, $SD = .43$; $n = 149$), $t(245) = -.23$, *ns*. Furthermore, compulsive Internet SEM use did not differ between those who used substances only some of the time while viewing or in anticipation of viewing Internet SEM in the past three months ($M = .90$, $SD = .37$; $n = 68$) compared to those who used them at least half of the time ($M = 1.04$, $SD = .39$; $n = 26$), $t(92) = -1.61$, *ns*.

Several emotional and sexual states preceding or concurrent with Internet SEM use were also positively correlated with compulsive Internet SEM use. Indeed, higher scores on the adapted CIUS were significantly associated with greater agreement by participants with

statements that they are “more likely to view Internet pornography” when bored ($r_s = .26, p < .01$), when they haven’t had sex in a while ($r_s = .17, p < .01$), when drunk or feeling the effects of drugs/illicit substances ($r_s = .16, p < .05$), and when they can’t find someone to have sex with ($r_s = .20, p < .01$).

3.3. Relationship with participant characteristics and sexual behavior

Compulsive Internet SEM use was not significantly associated with participant age ($r_s = .06, ns$), and did not differ between single men ($M = .94, SD = .40; n = 128$) and men in a relationship ($M = .93, SD = .42; n = 119$), $t(245) = .199, ns$. Compulsive Internet SEM use was significantly correlated with more male partners in the past three months ($r_s = .13, p < .05$), but not with frequency of anal sex or frequency of unprotected anal sex.

4. Discussion

This study investigated the psychometric properties of the CIUS (Meerkerk et al., 2009) adapted to assess compulsive use of Internet-based SEM. Findings in a sample of MSM indicated a single-component, 13-item scale to assess the cognitive, emotional, and behavioral aspects of this phenomenon. Although the original scale included 14 items, there was low communality value and poor factor loading for an item asking: *How often do others (e.g., partner, friends, parents) say you should access these websites less?* This finding is understandable as one’s SEM use may be a sensitive topic that is not likely to be discussed with parents, friends, or partners.

We found the adapted scale to be highly reliable and internally consistent, while also demonstrating adequate construct validity based on multiple significant correlations with relevant variables (DeVellis, 2003). First, there was a positive association between compulsive Internet SEM use and the number of hours spent viewing SEM, suggesting that the adapted scale captures the core behavioral aspect of the compulsion. Second, as with past research on Internet addiction (Nichols & Nicki, 2004; Rotunda, Kass, Sutton, & Leon, 2003), compulsive Internet SEM use and boredom were positively correlated. Third, similar to studies of sexual compulsivity (e.g., Grov, Parsons, & Bimbi, 2010; Kalichman & Rompa, 1995), participants with greater compulsive Internet SEM use had more recent male partners, spent more time seeking out offline sexual encounters post-viewing, and reported a greater perceived influence of Internet SEM on engaging in risky sex. Fourth, we observed positive associations between compulsive Internet SEM use and sexual sensation seeking, the frequency of having fantasies similar to sexual activities viewed online, the perceived influence of SEM viewing on an individual’s sexual desires, and viewing while drunk or under the influence of drugs. Although the latter finding may indicate a comorbidity of substance use and compulsive Internet SEM use, this conclusion should be interpreted with caution as scores on the adapted CIUS did not differ between participants who reported using alcohol or other substances while viewing or in anticipation of viewing and those who did not. Lastly, participants with greater compulsive Internet SEM use did so when experiencing sexual frustration (i.e., not having sex in a while, not being able to find a partner to have sex with). This may suggest a role for Internet SEM in managing one’s emotions associated with sexual frustration when offline sexual encounters are not necessarily available or accessible.

The findings reported here should be interpreted within the study's limitations. First, this study included an online non-probability sample and therefore, issues of participant selection and external validity may potentially bias the results. However, it has been suggested that Facebook is a useful social networking website for recruiting participants for health-related research (Ahmed et al., 2013; Gass, Hoff, Stephenson, & Sullivan, 2012) as more than 60% of men in the general population are Facebook users (Duggan & Brenner, 2013). Moreover, stigmatized individuals, including sexual minorities, are especially likely to use the Internet for various purposes, such as romantic and sexual partnering (Downing, 2012; Rosenfeld & Thomas, 2012), thereby making Facebook and Craigslist useful for recruitment. Second, the measures were presented in the same order for each participant, thus creating the possibility of ordering effects. To eliminate any concern for how compulsive Internet SEM use items might influence responses to other study measures, we presented the adapted CIUS following all other measures of significance to this report. Third, measures that were used to validate the adapted CIUS had statistically significant, but low, correlations with compulsive Internet SEM use (r range = .13 to .38). This may be explained by the inclusion of a more general sample of Internet SEM users that may have contained a relatively small number of individuals who scored high on compulsive Internet SEM use. Future research should examine the usefulness of the adapted CIUS to differentiate low Internet SEM users from those approaching potentially problematic levels.

Despite these limitations, the results offer preliminary evidence for the psychometric properties of the adapted CIUS to assess compulsive Internet SEM use among MSM. Future studies could evaluate the reliability and validity of this measure among heterosexual men and women. Furthermore, the findings reported here identifying associations between compulsive Internet SEM use and sexual behaviors (i.e., number of recent partners, perceived influence on engaging in risky sex) have implications for research investigating the potential negative consequences of SEM content on the sexual scripts (Simon & Gagnon, 1987) of users. A growing line of research suggests that there may be psychological and behavioral consequences to viewing SEM. As MSM are frequent consumers of Internet-based SEM (Stein et al., 2012) and a high-risk population for HIV/STD infection (CDC, 2013), special attention should be given to whether compulsive consumption of SEM influences their sexual practices.

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Highlights

- We adapted the Compulsive Internet Use Scale to assess compulsive use of SEM.
- The sample included 265 Internet SEM-viewing men who have sex with men.
- The adapted scale demonstrated high internal consistency and construct validity.

Table 1

Sample Characteristics

	<i>M (SD) or n (%)</i>
Age (Mean years)	32.9 (12.5)
Race or ethnicity	
White/Caucasian	204 (77.0)
Black/African American	14 (5.3)
Hispanic/Latino	21 (7.9)
Asian/Pacific Islander	14 (5.3)
More than one race/Other	12 (4.5)
Sexual identity	
Gay/Homosexual	216 (81.5)
Bisexual	39 (14.7)
Straight/Heterosexual	9 (3.4)
Other	1 (0.4)
Relationship status	
Single	140 (52.8)
Relationship with a man	103 (38.9)
Relationship with a woman	22 (8.3)
Recruitment source (n = 263)	
Craigslist	88 (33.5)
Facebook	175 (66.5)

Table 2

Factor Loadings and Item-total Correlations for the Adapted CIUS to Assess Compulsive Internet SEM Use

Item	<i>M</i> (<i>SD</i>)	Factor Loading	Item-total Correlation
How often do you find it difficult to stop <u>accessing these websites</u> when you are online?	1.45 (1.19)	.77	.72
How often do you continue to <u>access these websites</u> despite your intention to stop?	1.22 (1.31)	.77	.71
How often do you prefer to <u>access these websites</u> instead of spending time with others (e.g., partner, <u>friends</u> , parents)?	.76 (.95)	.73	.67
How often are you short of sleep because <u>you were up using these websites?</u>	.90 (1.06)	.64	.59
How often do you think about <u>these websites</u> , even when not online?	1.09 (1.01)	.68	.64
How often do you look forward <u>for your next Internet session accessing these websites?</u>	1.39 (1.15)	.60	.54
How often do you think you should <u>spend less time on these websites?</u>	1.20 (1.22)	.73	.67
How often have you unsuccessfully tried to spend less time on <u>these websites?</u>	.80 (1.05)	.73	.67
How often do you rush through your work in order to <u>access these websites?</u>	.47 (.91)	.80	.75
How often do you neglect your daily obligations (work, school, or family life) because you prefer to <u>access these websites?</u>	.61 (.97)	.78	.72
How often do you <u>access these websites</u> when you are feeling down?	1.44 (1.21)	.71	.66
How often do you <u>access these websites</u> to escape from your sorrows or get relief from negative feelings?	1.24 (1.26)	.72	.66
How often do you feel restless, frustrated, or irritated when you cannot <u>access these websites?</u>	.85 (1.10)	.73	.67

Notes: $N = 241$. $\alpha = .92$. Item modifications are underlined. Instructions for the adapted CIUS: "Please answer the following questions about your use of Internet websites (accessed through a computer, tablet, or mobile phone) to watch 'man on man' pornography." For original CIUS items, see Meerkerk, van den Eijnden, Vermulst, and Garretsen (2009).

Table 3

Intercorrelations for the Adapted CIUS to Assess Compulsive Internet SEM Use

Measure	1	2	3	4	5	6	7	8	9	10
1. Adapted CIUS for SEM use	--									
2. Sexual Sensation Seeking	.25**	--								
3. Hours viewed per week	.38**	.21**	--							
4. Number of male partners	.13*	.40**	.12*	--						
5. Frequency of anal sex	-.05	.20**	.02	.24**	--					
6. Frequency of UAI	.03	.12	-.04	-.10	.56**	--				
7. Led you to seek out sex afterward	.29**	.37**	.32**	.18**	.11	.07	--			
8. Contributed to you engaging in risky sex	.30**	.43**	.16**	.23**	.14*	.14	.35**	--		
9. Fantasized about engaging in similar acts	.21**	.35**	.18**	.12	.08	.05	.25**	.22**	--	
10. Influenced sexual activity you desired	.31**	.28**	.22**	.04	.05	.02	.33**	.37**	.47**	--

Notes:

* $p < .05$;** $p < .01$. Two-tailed tests.