HHS Public Access

Author manuscript

Sex Addict Compulsivity. Author manuscript; available in PMC 2015 March 31.

Published in final edited form as:

Sex Addict Compulsivity. 2014 ; 21(3): 240–261. doi:10.1080/10720162.2014.938849.

A Brief Scale to Measure Problematic Sexually Explicit Media Consumption: Psychometric Properties of the Compulsive Pornography Consumption (CPC) Scale among Men who have Sex with Men

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Abstract

Although the phenomenon of hypersexuality has been described in the literature, and scales of compulsive sexual behavior have been published, the existing measures do not assess compulsive sexually explicit media (SEM) consumption. This study tested the psychometric properties of a new scale, the Compulsive Pornography Consumption (CPC). Exploratory and confirmatory factor analyses results showed good psychometric performance of a five item two factor preoccupation-compulsivity solution. As hypothesized, the scale correlates positively with compulsive sexual behavior, internalized homonegativity, and negatively with sexual self-esteem. The scale will enable researchers to investigate the etiologic factors of compulsive SEM use, and enable clinicians to assess problematic consumption.

Keywords

pornography; sexually explicit media; men who have sex with men; compulsive pornography consumption; CPC

Introduction

Compulsive pornography consumption, also known as pornography addiction, is a behavioral problem characterized by obsessive preoccupation and/or compulsive, repeated use of pornographic material until it causes serious negative consequences to one's physical, mental, social, and/or financial well-being (Stein, Hollander, & Rothbaum, 2009). Men who have sex with men (MSM), who are at the highest risk of HIV/STI in the US (Centers for Disease Control and Prevention, 2013), are also disproportionately high consumers of pornography or Sexually Explicit Media (SEM) (Træen & Daneback, 2012). Although MSM are estimated to be 4-15% of the adult male population, in 2007 they were estimated to consume 33-50% of SEM (Rosser et al., 2012). To most MSM, SEM is highly acceptable (Hooper et al., 2008); indeed SEM consumption has been described as “ubiquitous” in the

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gay male community (Morrison, Morrison, & Bradley, 2007). Despite this, until recently, SEM consumption by MSM has been an under-researched area (Rosser et al., 2012); with problematic consumption almost unstudied due, in part, to the lack of validated instruments.

Though limited in numbers, studies report both positive and negative effects of SEM among MSM (Rosser et al., 2012). On the positive side, gay SEM may be instrumental in validating attractions to one's own gender (Lucas, 2006). SEM may play an important role in young MSM's development and sexual education, with young MSM describing SEM as a major source of sexual information (Mustanski, Lyons, & Garcia, 2011; Obendorf, 2006). SEM consumption, or specific SEM genres, has been found to be positively associated with greater sexual arousal, higher frequency of masturbation, and more positive appraisal of anal sex (Kubicek, Beyer, Weiss, Iverson, & Kipke, 2010; Kubicek, Carpineto, McDavitt, Weiss & Kipke, 2011; Morrison, 2004).

On the negative side, SEM consumption appears related to body dissatisfaction and anxiety, negative eating attitudes and a drive for thinness or muscularity in gay men (Morrison, Morrison & Bradley, 2007; Duggan & McCreary, 2004). Consumers can also be given misinformation and unrealistic portrayals of sexual risk behavior which do not acknowledge the risk factors. The recent rise in bareback SEM sites has led HIV researchers to examine what relationship, if any, exists between gay SEM consumption and HIV risk. Greater SEM consumption appears associated with a higher number of male sexual partners, and both protected and unprotected anal intercourse (Eaton, Cain, Pope, Garcia, & Cherry, 2012; Hald, Smolenski, & Rosser, 2013; Rosser et al., 2012; Rosser et al., 2013; Stein, Silvera, Hagerty, & Marmor, 2012; Træen et al., 2013; Weinberg, Williams, Kleiner, & Irizarry, 2010; Wilkerson et al., 2012). While overall SEM consumption was only marginally associated with increased risk behavior, a preference for bareback SEM, and a greater dosage of bareback SEM consumed is reliably associated with increased unprotected anal intercourse with multiple male partners (Rosser et al., 2013). Using the same sample, Hald, Smolenski, and Rosser (2013) reported that 3% of participants self-perceived negative effects of SEM consumption. Further, use of SEM during partnered sex among MSM has been found to be negatively correlated with condom use during first intercourse with the most recent partner, and positively correlated with experience with multi-partner sex (Træen & Daneback, 2012).

There are several scales to measure compulsive or hypersexual behavior (Hook, Hook, Davis, Worthington & Penberthy, 2010; Reid, Garos, & Carpenter, 2011). In HIV prevention research on MSM, two of the most widely used are the Kalichman and Rompa (1995) Sexual Compulsivity Scale (SCS), and the Coleman, Miner, Ohlerking and Raymond (2001) Compulsive Sexual Behavior Inventory (CSBI). However, neither scale has items which assess problematic SEM consumption, nor are there well-validated scales in the literature. Hence, what relationship, if any, exists between compulsive sexual behavior and compulsive SEM consumption has not been studied. To address this gap, this study reports on the development of the Compulsive Pornography Consumption (CPC) scale and examines the psychometric properties of this new scale using two independent samples of MSM in the US.

To the best of our review, this is the first study to assess pornography addiction in gay, bisexual and other men who have sex with men (MSM). The earliest instruments of online sex addiction (e.g., Delmonico and Miller, 2003) did not differentiate between using the Internet for sex seeking, sexual information seeking or pornography. In the Sexual Addiction Screening Test (SAST), developed by Carnes and O'Hara in 2002, two of twenty-eight items ask about online pornography but they do not comprise a separate scale (Carnes, Green and Carnes, 2010). The 34-item Cyber-Pornography Use Inventory (Grubbs, Sessoms, Wheeler and Folk, 2010) was the first published instrument to assess pornography addiction. However, it was designed to assess young male students at Christian Colleges for pornography addiction, "even though most of them do not fall anywhere within the diagnostic range required to diagnose one as a sexual compulsive." Normed on 94 male and 51 female undergraduate students (mean age=19years), the items are tailored to the college population (e.g., "I have gotten up earlier or gone to bed later than my roommates to view pornography"), making it unsuitable for use in the broader population. Reid, Li, Gilliland, Stein and Fong (2011) published their Pornography Consumption Inventory (PCI) which assessed motivations for pornography use among hypersexual men seeking treatment, 90 percent of whom reported being heterosexual. This 15-item scale yields four factors – emotional avoidance, sexual curiosity, excitement seeking and sexual pleasure – but does not assess the compulsive/addictive nature of the behavior, or provides any information on pornography consumption behavior. Recently, a 12-item Problematic Pornography Use Scale (Kor, Zilcha-Mano, Fogel, Mikulincer, Reid and Potenza, 2014) scale has been published assessing four factors: distress, excessive use, control difficulties and use for escape and/or avoidance of negative emotions. The scale uses DSM criteria to assess preoccupation and compulsivity, but appears too long and detailed to be useful as a brief screening instrument. Of relevance to our study, it found only a moderate correlation between the PPUS scores and hypersexuality disorder (r=.68; p<.001).

Consistent with the theory of minority stress (Meyer, 1995), the Sexual Health Model (Robinson et al., 2002), sexual orientation development (Coleman, 1982) and research on compulsive sexual behavior and internalized homonegativity in MSM (Smolenski, Stigler, Ross, & Rosser, 2011), a priori we hypothesized the following relationships. Measures of being conflicted about one's homosexuality and/or being in an earlier stage in the coming out process would be positively correlated with problematic gay SEM consumption. Thus, we predicted that internalized homonegativity, non-identification as gay, and closetedness as gay/bi/MSM would all be positively and strongly correlated with compulsive SEM consumption. Since compulsive sexual behavior and compulsive pornography consumption share common etiologic agents, we predicted that they would be strongly positively correlated. Further, we reasoned that if they are essentially the same phenomenon, the association should be very strong (r>.9). Since compulsivity is typically experienced negatively, we predicted that those with high levels of compulsive pornography consumption would also score the effects of their pornography consumption as negative. Consistent with the Sexual Health Model and theories of CSB etiology, we predicted that a history of early sexual onset and/or abuse, and poorer sexual, mental, and emotional health, as measured in sexual risk, alcohol/chemical use, and positive/negative affect would each be correlated with higher compulsive pornography consumption. As one of the first studies of

gay SEM consumption, predictions regarding compulsive SEM consumption and sexual behavior are uncertain. If pornography is used as a substitute for engaging in sex, a negative relationship between SEM use and partner number would be found. Alternatively, if both are driven by compulsivity or some other underlying factor (e.g., sexual drive), a positive correlation between measures of risk and pornography consumption would be found. Finally, social desirability is considered a common bias in self-reports of socially sensitive measures; hence we predicted that social desirability would be negatively correlated with compulsive pornography consumption.

Methods

Study Samples

The SEM (Rosser et al., 2013) Study was conducted in three phases: (1) a formative research phase involving online synchronous focus groups to understand participants' SEM use; (2) a 7-day, test–retest reliability study to develop and assess new measures; and (3) a large quantitative online survey to study effects. For all phases of the study, banner advertisements were placed on 148 gay-oriented websites through the *Gay Ad Network*. Eligibility criteria included self-identification as male, at least 18 years of age, a report of at least one male sexual partner in the last 5 years, and a resident of the United States or one of its territories. In the main survey (Study 2), participants were quota-sampled by race/ethnicity to increase diversity in the main study. Study 1, the test–retest study, occurred between January and February 2011, and Study 2, the main survey study, occurred between May and August 2011.

For Study 1, of the 933 enrollees who began eligibility screening, 410 were deemed eligible and consented to participate in the study. Of these, 326 completed the first survey and were invited to complete the retest survey 7 days later. Of these, 241 completed both surveys. For this analysis, we used data from the 240 men who provided test-retest data on the CPC scale items.

In Study 2, a total of 5,201 MSM met the eligibility criteria (excluding race/ethnicity caps). By design, to ensure a racially/ethnically diverse sample, 3,338 MSM were excluded because their stated racial/ethnic category – “white, non-Hispanic” -- had filled. A total of 1,863 MSM met all eligibility criteria. Of these, 1,479 (79.4%) consented to participate in the study and completed the survey. We followed a standard de-duplication, cross-validation and data cleaning process to exclude participants with impossible or nonsensical data patterns (Konstan, Rosser, Ross, Stanton, & Edwards, 2005). After excluding 88 participants for impossible or nonsensical data patterns on sexual behavior data, and others for missing data on the CPC scale, the final study sample was 1,165 participants. All study protocols and consent procedures were approved by the Institutional Review Board at the investigators' home institution.

Participant Characteristics

Socio-demographic characteristics of the test-retest and main study sample are presented in Table 1. Similar to previous work with Internet based samples, participants in both surveys

were younger, non-Hispanic white, well educated, HIV-negative by self-report, self-identified as gay, were single and not in a long-term relationship. The distribution of race/ethnicity differs between the test–retest and main survey samples because of the aforementioned quota sampling.

Measures

Participants completed an online survey designed to explore the impact of sexually explicit material on HIV-related risk behaviors. The test battery collected self-reported data on basic demographics; SEM consumption and preferences in SEM; sexual behavior; use of condoms; current alcohol and drug use; sexuality and role in sex; long-term relationships (LTRs); openness as gay and bisexual men; mental health; internalized homonegativity; HIV and STI status, and sexual risk taking including number of partners and unprotected anal intercourse. The average completion time for the survey was 42 minutes, for which participants were compensated $25.

Compulsive Pornography Consumption (CPC) Scale—The CPC scale was constructed by the second author with six items designed to measure compulsive pornography consumption. Six items, listed in Table 2, were developed to assess for obsessive thoughts and/or compulsive behaviors based on definitions in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5, American Psychiatric Association, 2013). The DSM-5 characterizes obsessive-compulsive disorders (OCD) by the presence of recurrent and persistent thoughts, urges, or images experienced as intrusive and unwanted (termed “obsessions”); and/or repetitive behaviors or mental acts that the individual feels driven to perform to reduce anxiety or distress (termed “compulsions”). These were translated into survey items to assess the key criteria. Items assessed thoughts about pornography, difficulty controlling consumption, and tendency to use pornography to feel at ease or to need pornography to achieve orgasm. Participants were asked to answer each item using a seven-point Likert-type scale, with a response range of 1 = “Very frequently”, and 7 = “Never”. Each item was reverse-scored so that higher scores indicate more potentially problematic consumption.

Exposure to SEM—To study SEM exposure and consumption, the study consistently used the term “gay SEM” to refer to sexually explicit media depicting men. The exception to this was estimating first exposure where we asked “About how old were you the first time you viewed or read pornographic materials?” collected as a continuous item and categorized here using the median for comparison groups. A second item was used to ask participants about their preference for condom use during anal intercourse in SEM, with three nominal response options: (i) no condoms; (ii) condoms; and (iii) no preference. Four items were used to assess the frequency of accessing SEM through the following four sources: (i) magazines; (ii) video/DVD; (iii) Internet on a computer; and (iv) Internet through a phone or mobile device. Response options to each of these items ranged from 1 = “Not at all” to 6 = “More than once a day.” One item asked participants to report the typical duration of use of SEM when it was used in the last 90 days, with response categories including: (i) 1–15 minutes; (ii) 16–30 minutes; (iii) 31–45 minutes; (iv) 46–60 minutes; (v) between 1 and 1 1/2 hours; (vi) between 1 1/2 and 2 hours; and (vii) more than 2 hours. Finally, frequency

and duration measures of SEM consumption in the last 3 months were combined to create an index of the hours per week dedicated to SEM consumption.

Compulsive Sexual Behavior Inventory (CSBI)—The "control" subscale of the CSBI was used to assess compulsive, or out-of-control sexual behavior (Coleman et al., 2001). The subscale comprised 13 items measured using five-point Likert-type response scales with 1 = "Very frequently" and 5 = "Never". The valence of the arithmetic mean was reversed so that higher scores indicate a stronger manifestation of the construct. Cronbach's α in this sample was 0.90. Two-sided 95% confidence interval (CI) for the Cronbach's alpha was 0.89-0.91.

Positive and Negative Affect Schedule (PANAS)—The 10-item short-form PANAS (Thompson, 2007) was used to assess positive and negative affect in the last 90 days. All items were responded to using a five-point Likert-type index, with 1 = "Very little or not at all," and 5 = "Extremely." Cronbach's alpha was 0.82 (95% CI: 0.80-0.83) for positive affect and 0.87 (95% CI: 0.86-0.88) for negative affect in this sample.

Social Desirability—The Marlowe–Crowne short form (Strahan & Gerbasi, 1972) was used to measure social desirability. This is a standard measure of social desirability that included 10 true/false statements about general characteristics of the participants. The Kuder–Richardson 20 internal-consistency estimate for this measure was 0.60. Considering this estimate was below the generally accepted guideline for reliability, subsequent analyses involving this measure were corrected for attenuation. The disattenuated correlation is the raw correlation between x and y (rxy) divided by the square root of the product of the reliability of x (rxx) and the reliability of y (ryy) (Murphy & Davidshofer, 1991).

Internalized Homonegativity (IH)—The revised Reactions to Homosexuality scale (Smolenski, Diamond, Ross, & Rosser, 2010) was used to measure internalized homonegativity. The measure consisted of seven items answered using a seven-point Likert-type scale ranging from 1 = "Strongly disagree" to 7 = "Strongly agree." A sample item is, "Social situations with gay men make me feel uncomfortable." A higher aggregated score indicated greater internalized homonegativity. Alpha reliability for this scale in this sample was 0.82 (95% CI=0.80-0.83).

Sexual Self-Esteem—The sexual confidence and sexual satisfaction subscales of the Multidimensional Sexuality Questionnaire (Snell, 1993) were used to assess the perceived sexual self-esteem of study participants. The measure included 10 items. Items were measured on five-point Likert-type scale ranging from 1 = "Not at all like me" to 5 = "Extremely like me." We used the arithmetic mean of the ten items to create a composite measure of sexual self-esteem. Higher scores on the composite measure indicate greater sexual self-esteem and Cronbach's α in this sample was 0.93 (95% CI=0.92-0.94).

The Pornography Consumption Effect Scale (PCES)—The first person positive and negative effects of SEM consumption were measured using the seven item PCES (Hald et al., 2013). Participants were asked to answer two response sets for each item: (i) a five-point Likert-type item on the magnitude of the effect, if any, with a response range of 1 =

"Decreased", 3 = "No effect", and 5 = "Increased"; and (ii) a five-point Likert-type item on the valence of the effect, if any, with a response range of 1 = "Very bad", 3 = "Neither bad nor good", and 5 = "Very good." Following Hald et al. (2013), composites of the two responses for each item were developed by first recoding the magnitude to range from -2 to 2, with -2 indicating a strong reduction and 2 indicating a strong increase. Second, the information on valence (bad or very bad and good or very good) was used to determine if the reduction or increase on any item was considered positive or negative. As an example, a magnitude of -1 remained -1 if the valence was reported as "bad," and a magnitude of -1 became 1 if the valence was reported as "good". This resulted in a single index ranging from -2 = "Strong, negative effect" to 2 = "Strong, positive effect" with 0 indicating neither a positive nor a negative effect. Participants were assigned a zero if they reported either no effect in terms of magnitude or no effect in terms of valence. Cronbach's α of this measure in this sample was 0.80 (95% CI=0.78-0.82).

Sexual Risk Behavior—A sexual behavior battery investigated sexual risk behavior of the participants. Participants were asked to report age at first sex, age of their first partner, as well as number of male sexual partners in lifetime and in the last 90 days. Child abuse was defined behaviorally as sex before the age of 18 with a partner at least four years older. For the continuous measures -- age at first sex, number of lifetime partners, and number of partners last ninety days – we dichotomized using a 75/25 split. Participants were also asked two items relating to the number of casual male sex partners in the last 90 days with whom they had engaged in unprotected receptive and unprotected insertive anal intercourse. To compare participants who engaged in unprotected anal intercourse with those who did not on the CPC measure, participants who reported one or more unprotected anal intercourse male partner (UAIMP) either as receptive or insertive in the last 90 days were classified as engaging in UAIMP. Participants who reported 0 counts to both items were classified as not engaging in UAIMP.

Other Variables—Demographic variables included age, education, race/ethnicity, long-term relationship status (90+ days), sexual identification, alcohol and drug use, history of any sexually transmitted infections (STI) and HIV serostatus. Participants' sexual identity was measured by asking, "Do you identify as…" with response options being gay/ homosexual, bisexual, heterosexual, or other (with a space to write in their response). How out a man is about his homosexuality was assessed by asking, "How 'out' are you about your sexual attraction to other men?" with response options ranging from 1= "Not 'out' at all" to 5= "'Out' to all or almost all people I know". A higher score indicated greater outness.

Participants were asked to provide information about their alcohol consumption and drug use. We assessed the drinking pattern by using the item, "In the past thirty (30) days, how many times did you have five (5) or more drinks in one sitting?" At analysis, "heavy alcohol use" was defined as drinking 5 or more drinks in one sitting twice or more in a week (Jones-Webb, Smolenski, Brady, Wilkerson, & Rosser, 2013). Participants also provided information on the frequency of (1= "Not at all", 2= "Less than monthly", 3= "Once a month", 4= "Once a week"5= "Daily") using marijuana/hashish, cocaine, uppers

(methamphetamines, crystal, crank), downers (valium, sedatives), club drugs (GHB, ecstasy), opioids (heroin, Vicodin), erectile enhancement drugs (e.g., Viagra, Cialis) and poppers (i.e., amyl nitrite) in the last 90 days. At analysis,we defined “drug use” as using one of the drugs once or more in a week.

Data Analysis

We used the participants' responses from the first survey of test–retest study (N = 241) to validate the new CPC scale. First, we conducted exploratory factor analysis (EFA) with the time 1 and time 2 surveys. After identifying the optimal solution in the exploratory factor analysis, we subjected the items to a confirmatory analysis to assess the fit of the measurement model to the data and made any necessary model revisions. We used multigroup models between time 1 and time 2 from the test–retest study to strengthen the conclusions about the replicability of the measure. For external validation of the scale measure, we estimated a confirmatory factor analysis (CFA) using data from the main study sample (N = 1,165) to verify that the measure replicated in an independent sample. To examine construct validity of the final solution, we examined the Pearson correlations between the unit-scaled scores of the CPC scale, the PCES, the PANAS, the Marlowe–Crowne, the CSBI, the IH measure, and sexual self-esteem. Furthermore, bivariate analyses were conducted to compare mean scores of the CPC scale and selected compulsive measures. Statistical analyses were conducted using StataCorp. Version 11.2 (2010) and M*plus*, Version 6.12 (Muthen & Muthen, 1998-2010).

Results

Compulsive Pornography Consumption (CPC) Scale Items

Table 2 presents the scale items and descriptive statistics for the Compulsive Pornography Consumption (CPC) scale for both the test–retest and main studies. For each study, we provide the composite mean and standard deviation (SD) for each item. In both the studies, a majority of participants reported lower than mid-point (4 = (1+7)/2) scores on each item. Significant ($p< 0.001$) inter-correlations indicate moderate to strong positive relationship between the items. A very similar pattern was observed across both studies (see Table 3).

Factor Analyses

Various factor analyses and solutions were used to test the underlying dimensionality of the CPC scale. The fit indices are presented in Table 4. First, we conducted an EFA with oblique rotation using the time 1 survey data. Fit indices suggested a two factor solution, with item 6 removed, fit the data best. Both factors were readily interpretable, with factor 1 reflecting intrusive thoughts (the key characteristic of obsession) and factor 2, lack of control over behavior (or compulsivity). A similar solution was replicated in the time 2 survey data. Next, we fit a CFA for this model in the merged test-retest sample. The overall model fit indices and modification indices suggested a constrained model (residual correlation between item 3 with item 1 and item 2) fit the data best rather than the model with item 3 cross-loaded on both factors. Finally, we replicated the model using data from the main study sample (N = 1,165) for external validation of the final solution in an

independent sample. The model fit indices indicated good model fit for a five-item two-factor model.

Reliability Analyses

The factor loadings and internal-consistency reliability estimates for the final model in the test-retest sample and in the main study are presented in Table 5. The factor loadings were strong to very strong in both the studies. We labeled factor 1 as CPC-preoccupation subscale and factor 2 as CPC-compulsion subscale. The reliability of preoccupation and compulsion subscales and the combined scale was investigated using Cronbach's alpha. The internal-consistency reliability of the subscales as well as the combined scale was high in both the studies. The Cronbach's alpha of the combined CPC scale in both the samples was identical (0.85) suggesting good internal consistency.

Validity Testing

In Table 6, Pearson product-moment correlation coefficients between the unit-scaled CPC score with the psychometric measures used for external validation and the descriptive statistics of each measure are presented. Higher scores on the CPC scale were found to be positively associated with negative affect ($r = 0.21$; $p < 0.001$), compulsive sexual behavior inventory ($r = 0.53$; $p < 0.001$), and internalized homonegativity ($r = 0.30$; $p < 0.001$); and negatively associated with positive affect ($r = -0.08$; $p < 0.05$); social desirability ($r = -0.27$; $p < 0.001$) and sexual self-esteem ($r = -0.25$; $p < 0.001$). Preoccupation and compulsion sub scales of the CPC scale showed similar direction and magnitude of relationship with validity measures.

Bivariate comparisons of the combined and subscale CPC scores by selected compulsive measures are presented in Table 7. Participants who reported viewing more than seven hours of sexually explicit material on average in a week reported higher scores on the combined as well as the preoccupation and compulsion subscales as compared to participants who reported less than one hour of SEM viewing. Similar results were found for participants who reported preferring bareback SEM. In addition, participants with heavy alcohol use (more than five drinks in one sitting two or more times a week) and with multiple sexual partners (more than four partners in last ninety days) scored higher on the combined CPC scale.

Discussion

This study examined the psychometric properties of the Compulsive Pornography Consumption (CPC) scale using a seven day test-retest sample and a large sample of MSM in the US. The key finding of this study is that a 5-item brief screening instrument appears psychometrically acceptable to assess compulsive pornography consumption in MSM. The results support good psychometric performance of the CPC scale as a measure of compulsive pornography consumption among MSM. The final CPC scale consists of five items making the scale easily implemented in both research and applied settings. Exploratory and confirmatory factor analyses indicate that the measure contains two factors, one that assesses obsessive thoughts or preoccupation with pornography, and the other compulsive or problematic pornography use.

As hypothesized, the scale correlates positively with compulsive sexual behavior and internalized homonegativity and negatively with sexual self-esteem and social desirability. This is consistent with the theory of minority stress and sexual health model and lends support to the conclusion that the identified scale is measuring compulsive pornography use. A higher score on the combined scale by heavy alcohol users is consistent with problematic use. Sexually, a higher total score was associated with more recent partners (driven mainly by a higher preoccupation score). Against prediction, those who reported an older age (>13 years) of first sex had higher CPC total scores.

Although this investigation had the advantage of two studies, three time points and relatively large sample sizes, there are several limitations to consider. First, recruitment for both study samples relied solely on volunteers responding to advertisements on gay-targeted websites. Thus, participants were individuals with access to the Internet, who accessed websites catering to MSM and who chose to complete a survey about sexually explicit media. As a result, generalizability to other online samples of MSM or the population of MSM at large is unknown. Second, the studies were cross-sectional; hence caution against causal inferences is advised. Third, the "gold standard" of clinical measures is individualized in-person clinical assessments, whereas this study used validated scales to assess CSB, IH and other constructs. Although almost all the results were consistent with our a priori hypotheses, we cannot draw any conclusions about the construct validity of the measure. Fourth, the first sub-scale contains only two items. Factors with fewer than three indicators are considered less than ideal psychometrically. The development of one or more additional items that are related to obsessive thoughts about pornography might improve the psychometric properties but at the cost of model parsimony.

In spite of the limitations of this analysis, the five-item CPC scale holds promise for both clinicians and researchers interested in screening for or studying problematic pornography consumption. The five-item scale will be easy to implement in clinical settings, without significant survey burden, and may serve as a particularly valuable addition in assessments of compulsive sexual behavior. The scale can assist clinicians to identify the small subgroup of sexually compulsive MSM who may not be involved in risky personal sexual encounters, per se, but experience their SEM consumption as causing difficulties in their lives.

This study is very much a first step in advancing research into problematic pornography consumption. Future research should identify clinical cut-off points to assess problematic and compulsive pornography consumption; and to examine, in more depth, the differences between MSM who score in the problematic or compulsive range compared to those who do not. While the items were constructed for use across populations, separate studies will be needed to identify norms by gender, and for non-MSM groups. Finally, despite the myriad websites and clinical services touting treatments for pornography addiction, as scientists, we caution against premature acceptance of this phenomenon as "real." Hopefully, the development of a well-validated scale to measure a phenomenon will stimulate more research in this area, and examine relationships which to date, have been hypothesized but untested.

Acknowledgments

The *SEM study* was funded by the National Institute of Mental Health Center for Mental Health Research on AIDS, grant number R01MH087231.

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Table 1
Socio-demographic characteristics of the test-retest and main study participants

Variable	Test-Retest (N=241)[1] %	Main Study (N=1165)[2] %
Age		
18 – 24	31.5	36.2
25 – 34	30.3	31.9
35 – 44	19.5	15.8
≥45	18.7	16.1
Race/ethnicity		
NH white	78.8	43.0
NH black	3.3	10.7
Latino	6.2	28.6
Asian/PI	2.9	8.1
Other[3]	4.6	9.6
Education		
Less than college degree	36.1	50.6
College degree or greater	63.9	49.4
HIV-status		
Positive	6.6	8.6
Negative	82.2	77.1
I don't know/Not sure	10.8	14.2
Refuse to answer	0.1	0.1
Non-HIV sexually transmitted infection[4]		
Yes	11.2	9.1
No	88.8	90.9
Sexual identification		
Gay/Homosexual	88.9	82.2
Other[5]	10.9	17.3
In a long term relationship		
No	50.2	51.2
Yes	37.3	32.7
Missing	12.5	16.1

Note: NH= Non-Hispanic; PI=Pacific Islander

[1]Due to missing values N=211∼241

[2]Due to missing values N=977∼1165

[3]Other: Native American (2.5% and 1.9%)/Multi Race (2.1% and 7.7%)

[4]In the past 12 months

[5]Other: Bisexual (6.3% and 11.7%)/Straight (0.8% and 0.5%)/Same-gender loving (1.7% and 1.2%)/Queer (2.1% and 2.1%)/Other (1.6% and 1.8%)

Table 2

Descriptive statistics of the 6 items used in the Compulsive Pornography Consumption (CPC) scale

	Test-Retest (N=240)		Main Study (N=1165)	
Item	**M**	**SD**	**M**	**SD**
Please indicate how often the following statements described you during the past three (3) months				
1. I thought of pornography when I was trying to focus on other things	3.04	1.41	3.43	1.77
2. I was upset because I could not stop thinking about pornography	1.77	1.22	2.08	1.63
3. I watched pornography even though I did not want to	2.13	1.47	2.23	1.70
4. It was necessary for me to watch pornography to feel at ease	1.98	1.36	2.27	1.75
5. I could only have an orgasm when watching pornography	2.10	1.44	2.28	1.76
6. I tried to cut down or stop my pornography watching	2.64	1.74	2.77	1.93

Note: All items ranged from 1 to 7, with 1 = never and 7 = very frequently.

SD=Standard Deviation

Table 3

Inter-correlations of the Compulsive Pornography Consumption (CPC) scale items

	Measure number					
Item	**1**	**2**	**3**	**4**	**5**	**6**
Test-Retest Sample (N=240)						
1. I thought of pornography when I was trying to focus on other things	1.00					
2. I was upset because I could not stop thinking about pornography	0.59*	1.00				
3. I watched pornography even though I did not want to	0.48*	0.72*	1.00			
4. It was necessary for me to watch pornography to feel at ease	0.52*	0.68*	0.72*	1.00		
5. I could only have an orgasm when watching pornography	0.35*	0.38*	0.42*	0.55*	1.00	
6. I tried to cut down or stop my pornography watching	0.46*	0.63*	0.63*	0.56*	0.32*	1.00
Main Study Sample (N=1165)						
1. I thought of pornography when I was trying to focus on other things	1.00					
2. I was upset because I could not stop thinking about pornography	0.58*	1.00				
3. I watched pornography even though I did not want to	0.49*	0.70*	1.00			
4. It was necessary for me to watch pornography to feel at ease	0.50*	0.62*	0.65*	1.00		
5. I could only have an orgasm when watching pornography	0.38*	0.45*	0.46*	0.52*	1.00	
6. I tried to cut down or stop my pornography watching	0.38*	0.52*	0.55*	0.49*	0.37*	1.00

* $p < 0.001$

Table 4

Model fit statistics of exploratory factor analysis of the 6-item Compulsive Pornography Consumption (CPC) scale in the test-retest sample and confirmatory factor analysis in the main study sample

Model fit statistics	Time1 (N=241)			Time2 (N=240)			Test-retest (N=240)			Main Study (N=1165)
	1-factor	2-factor	Item 6 removed	1-factor	2-factor	Item 6 removed	2-factor	Cross-loading[1]	Residual Constrained[2]	
χ^2, df	19.58, 9	3.42, 4	0.45, 1	27.44, 9	7.64, 4	1.85, 1	19.50, 4	4.86, 3	1.82, 2	1.08, 2
p-value	0.03	0.49	0.5	0.001	0.11	0.17	< 0.001	0.18	0.40	0.58
AIC	5037.55	5031.38	4128.72	4730.51	4720.7	3881.76	3636.87	3642.68	3623.64	20375.54
BIC	5100.27	5111.53	4194.93	4793.16	4800.76	3947.89	3692.56	3683.85	3686.29	20466.63
aBIC	5043.22	5038.63	4134.71	4736.1	4727.85	3887.67	3641.85	3629.97	3629.24	20409.46
RMSEA (90% CI)	0.07 (0.03-0.11)	0.0 (0.0-0.09)	0.0 (0.0-0.15)	0.09 (0.05-0.13)	0.06 (0.0-0.13)	0.06 (0.0-0.19)	0.13 (0.07-0.18)	0.05 (0.0-0.13)	0.00 (0.0-0.12)	0.00 (0.00-0.05)
CFI	0.98	1.00	1.00	0.97	0.99	0.99	097	0.99	1.00	1.00
TLI	0.97	1.00	1.00	0.96	0.98	0.98	093	0.99	1.00	1.00
SRMR	0.03	0.01	0.006	0.03	0.016	0.013	0.03	0.02	0.01	0.004

Note: SRMR = Standardized Root Mean Square Residual; CFI = Comparative Fit Index; TLI = Tucker-Lewis Index; RMSEA = Root Mean Square Error of Approximation; CI = Confidence Interval; AIC = Akaike Information Criterion; BIC = Bayes Information Criterion; CFA= Confirmatory Factor Analysis.

[1]Item 3 cross loaded on both the factors

[2]Residual correlated item3 with item 1 and item 2

Table 5

Factor loadings of confirmatory factor analysis and reliability estimates in the full test-retest and main study sample

Item		Test-retest (N=240)		Main Study (N=1165)	
		Factor Loading		Factor Loading	
		Factor 1	Factor 2	Factor 1	Factor 2
1.	I thought of pornography when I was trying to focus on other things	0.67		0.69	
2.	I was upset because I could not stop thinking about pornography	0.88		0.85	
3.	I watched pornography even though I did not want to		0.75		0.76
4.	It was necessary for me to watch pornography to feel at ease		0.97		0.85
5.	I could only have an orgasm when watching pornography		0.57		0.62
	Reliability				
	subscales	0.74	0.79	0.74	0.78
	combined scale (95% Confidence Interval)	0.85 (0.82-0.89)		0.85 (0.84-0.86)	

Table 6

Descriptive statistics and correlations (r) between the unit-scaled CPC score and the scores of external validation measures

	Measure number									
Measure	**1**	**2**	**3**	**4**	**5**	**6**	**7[1]**	**8**	**9**	**10**
	r	***r***	***r***	***r***	***r***	***r***	***r***	***r***	***r***	***r***
1. CPC- Combined	1.00									
2. CPC- Preoccupation	0.89***	1.00								
3. CPC- Compulsion	0.95***	0.70***	1.00							
4. PCES	-0.01	0.03	-0.03	1.00						
5. PANAS, Positive	-0.08*	-0.03**	-0.11**	0.30***	1.00					
6. PANAS, Negative	0.21***	0.19***	0.20***	-0.03	-0.04	1.00				
7. Marlowe-Crowne[1]	-0.27***	-0.29***	-0.25***	0.07	0.20***	-0.40***	1.00			
8. CSBI	0.53***	0.49***	0.49***	-0.02	-0.06*	0.35***	-0.34***	1.00		
9. IH	0.30***	0.24***	0.30***	-0.18***	-0.14***	0.14**	-0.10*	0.33***	1.00	
10. Sexual self-esteem	-0.25***	-0.23***	-0.24***	0.18***	0.30***	-0.32***	0.35***	-0.23***	-0.31***	1.00
N	1165	1165	1165	1165	1163	1163	1133	1164	1164	1163
M (SD)	2.46 (1.36)	2.76 (1.51)	2.26 (1. 45)	0.97 (0.63)	3.39 (0.82)	2.20 (0.88)	5.38 (2.02)	2.05 (0.76)	2.75 (1.23)	3.14 (0.97)
Range	1, 7	1, 7	1, 7	-1.71, 2	1, 5	1, 5	1, 10	1, 5	1, 7	1, 5

Note: *r* = Pearson product-moment correlation coefficient; CPC= Compulsive Pornography Consumption scale; PCES= Effects of Pornography Consumption Scale; PANAS = Positive and Negative Affect Schedule; CSBI = Compulsive Sexual Behavior Inventory; IH = Internalized Homonegativity; SD= Standard Deviation.

[1] Corrected for attenuation

* $p < 0.05$;

** $p < 0.01$;

*** $p < 0.001$

Table 7

Comparison of means on the unit-scaled CPC scale score by compulsive measures

Variable	*n*	CPC-combined score			Preoccupation Score			Compulsion Score		
		M (SD)	$F_{(df)}$	*Post-hoc*	*M (SD)*	$F_{(df)}$	*Post-hoc*	*M (SD)*	$F_{(df)}$	*Post-hoc*
Amount of SEM viewed, hr/wk										
≤ 1	236	1.94 (1.11)	$21.84_{(3, 1153)}^{***}$	A≠B	2.17 (1.28)	$23.97_{(3, 1153)}^{***}$	A≠B	1.78 (1.17)	$15.35_{(3, 1153)}^{***}$	A≠B
> 1 – 3.5	410	2.39 (1.31)		A≠C	2.68 (1.43)		A≠C	2.20 (1.41)		A≠C
> 3.5 – 7	238	2.65 (1.42)		A≠D	2.93 (1.52)		A≠D	2.47 (1.56)		A≠D
> 7	273	2.84 (1.41)		B≠D	3.24 (1.60)		B≠D	2.57 (1.50)		B≠D
Condom use preference in SEM										
No preference	409	2.30 (1.34)	$5.64_{(2, 1162)}^{**}$	A≠C	2.62 (1.50)	$3.20_{(2, 1162)}^{*}$	A≠C	2.08 (1.41)	$6.13_{(2, 1162)}^{**}$	A≠C
Condoms	277	2.45 (1.38)			2.75 (1.55)			2.25 (1.45)		
Bareback	479	2.60 (1.35)			2.88 (1.49)			2.42 (1.47)		
			Z^1			Z^1			Z^1	
Heavy alcohol use in the last 30 days										
No	840	2.43 (1.35)	-2.085^{*}		2.72 (1.50)	-1.86		2.31 (1.44)	-1.64	
Yes	73	2.61 (1.13)			2.96 (1.38)			2.38 (1.26)		
Number of total life time sex partners										
60 or less	835	2.50 (1.39)	1.90		2.81 (1.52)	1.90		2.30 (1.49)	1.45	
More than 60	286	2.31 (1.26)			2.62 (1.47)			2.11 (1.30)		
			$t_{(df)}$			$t_{(df)}$			$t_{(df)}$	
Drug use in the last 90 days										
No	1069	2.45 (1.37)	$-0.72_{(1161)}$		2.78 (1.52)	$-0.87_{(1161)}$		2.25 (1.46)	$-0.52_{(1161)}$	
Yes, once a week	94	2.56 (1.24)			2.89 (1.43)			2.34 (1.37)		
Age at first SEM use										
13 years or younger	482	2.51 (1.40)	$1.31_{(1153)}$		2.84 (1.55)	$1.77_{(1153)}$		2.29 (1.48)	$0.82_{(1153)}$	
Older than 13 years	673	2.41 (1.32)			2.68 (1.47)			2.22 (1.42)		
Age at first sex with a male										

Variable	*n*	CPC-combined score			Preoccupation Score			Compulsion Score		
		M (SD)	***F*** $_{(df)}$	***Post-hoc***	***M (SD)***	***F*** $_{(df)}$	***Post-hoc***	***M (SD)***	***F*** $_{(df)}$	***Post-hoc***
13 years or younger	235	2.29 (1.29)	$-2.05_{(1152)}$ *		2.62 (1.49)	$-1.55_{(1152)}$		2.10 (1.31)	$-2.14_{(1152)}$ *	
Older than 13 years	919	2.49 (1.38)			2.79 (1.52)			2.30 (1.48)		
Number of partners in the last 90 days										
4 or less	898	2.40 (1.34)	$-2.24_{(1148)}$ *		2.69 (1.49)	$-2.64_{(1148)}$ **		2.21 (1.43)	$-1.66_{(1148)}$	
More than 4	252	2.62 (1.40)			2.97 (1.55)			2.38 (1.47)		
Engage in UAI with casual partners in the last 90 days										
No	828	2.43 (1.36)	$-0.52_{(1145)}$		2.73 (1.52)	$-0.60_{(1145)}$		2.23 (1.45)	$-0.39_{(1145)}$	
Yes	319	2.48 (1.33)			2.79 (1.48)			2.27 (1.41)		

Note: One-way analysis of variance with Scheffe correction used to compare the means for variables with three or more categories; Student's t-test with equal variances used for dichotomous variables; SEM=Sexually Explicit Material; CPC= Compulsive Pornography Consumption scale

[1] Two-sample Wilcoxon rank-sum (Mann-Whitney) test

* $p<.05$;

** $p<.01$;

*** $p<.001$