

Should compulsive sexual behavior be considered an addiction?

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ABSTRACT

Aims To review the evidence base for classifying compulsive sexual behavior (CSB) as a non-substance or 'behavioral' addiction. **Methods** Data from multiple domains (e.g. epidemiological, phenomenological, clinical, biological) are reviewed and considered with respect to data from substance and gambling addictions. **Results** Overlapping features exist between CSB and substance use disorders. Common neurotransmitter systems may contribute to CSB and substance use disorders, and recent neuroimaging studies highlight similarities relating to craving and attentional biases. Similar pharmacological and psychotherapeutic treatments may be applicable to CSB and substance addictions, although considerable gaps in knowledge currently exist. **Conclusions** Despite the growing body of research linking compulsive sexual behavior (CSB) to substance addictions, significant gaps in understanding continue to complicate classification of CSB as an addiction.

Keywords Addiction, behavioral addictions, compulsive sexual behavior, hypersexuality, neurobiology, psychiatric disorder, sexual behavior, sexual compulsivity.

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STATEMENT OF THE PROBLEM

The release of the Diagnostic and Statistical Manual (DSM-5) [1] altered addiction classifications. For the first time, the DSM-5 grouped a disorder not involving substance use (gambling disorder) together with substance use disorders in a new category entitled: 'Substance-Related and Addictive Disorders'. Although researchers had advocated previously for its classification as an addiction [2–4], the re-classification has sparked debate, and it is not clear whether a similar classification will occur in the 11th edition of the International Classification of Diseases (ICD-11) [5]. In addition to considering gambling disorder as a non-substance-related addiction, DSM-5 committee members considered whether other conditions such as Internet gaming disorder should be characterized as 'behavioral' addictions [6]. Although Internet gaming disorder was not included in DSM-5, it was added to Section 3 for further study. Other disorders were considered, but not included in DSM-5. Specifically, proposed criteria for hypersexual disorder [7] were excluded, generating questions about the diagnostic future of problematic/excessive sexual behaviors. Multiple reasons

probably contributed to these decisions, with insufficient data in important domains likely contributing [8].

In the current paper, compulsive sexual behavior (CSB), defined as difficulties in controlling inappropriate or excessive sexual fantasies, urges/cravings or behaviors that generate subjective distress or impairment in one's daily functioning, will be considered, as will its possible relationships to gambling and substance addictions. In CSB, intense and repetitive sexual fantasies, urges/cravings or behaviors may increase over time and have been linked to health, psychosocial and interpersonal impairments [7,9]. Although prior studies have drawn similarities between sexual addiction, problematic hypersexuality/hypersexual disorder and sexual compulsivity, we will use the term CSB to reflect a broader category of problematic/excessive sexual behaviors that subsumes all the above terms.

The current paper considers classification of CSB by reviewing data from multiple domains (e.g. epidemiological, phenomenological, clinical, biological) and addressing some of the diagnostic and classification issues that remain unanswered. Centrally, should CSB (including excessive casual sex, viewing of pornography and/or masturbation) be considered a diagnosable disorder

and, if so, should it be classified as a behavioral addiction? Given the current research gaps on the study of CSB, we conclude with recommendations for future research and ways in which research can inform better diagnostic assessment and treatments efforts for people seeing professional help for CSB.

DEFINING CSB

During the last several decades, publications referencing the study of CSB have increased (Fig. 1). Despite the growing body of research, little consensus exists among researchers and clinicians about the definition and presentation of CSB [10]. Some view problematic/excessive engagement in sexual behaviors as a feature of hypersexual disorder [7], a non-paraphilic CSB [11], a mood disorder such as bipolar disorder [12] or as a 'behavioral' addiction [13,14]. CSB is also being considered as a diagnostic entity within the category of impulse-control disorders in ICD-11 work [5].

Within the last decade, researchers and clinicians have begun conceptualizing CSB within the framework of problematic hypersexuality. In 2010, Martin Kafka proposed a new psychiatric disorder called 'hypersexual disorder' for DSM-5 consideration [7]. Despite a field trial supporting the reliability and validity of criteria for hypersexual disorder [15], the American Psychiatric Association excluded hypersexual disorder from DSM-5. Concerns were raised about the lack of research including anatomical and functional imaging, molecular genetics, pathophysiology, epidemiology and neuropsychological testing [8]. Others expressed concerns that hypersexual disorder could lead to forensic abuse or produce false positive diagnoses, given the absence of clear distinctions between normal

range and pathological levels of sexual desires and behaviors [16–18].

Multiple criteria for hypersexual disorder share similarities with those for substance use disorders (Table 1) [14]. Both include criteria relating to impaired control (i.e. unsuccessful attempts to moderate or quit) and risky use (i.e. use/behavior leads to hazardous situations). Criteria differ for social impairment between hypersexual and substance use disorders. Substance use disorder criteria also include two items assessing physiological dependence (i.e. tolerance and withdrawal), and criteria for hypersexual disorder do not. Unique to hypersexual disorder (with respect to substance use disorders) are two criteria relating to dysphoric mood states. These criteria suggest hypersexual disorder's origins might reflect maladaptive coping strategies, rather than a means of warding off withdrawal symptoms (e.g. anxiety associated with withdrawal from substances). Whether a person experiences withdrawal or tolerance related to a specific sexual behavior is debated, although it has been suggested that dysphoric mood states may reflect withdrawal symptoms for individuals with CSB who have recently cut back or quit engagement in problematic sexual behaviors [19]. A final difference between hypersexual disorder and substance use disorders involves diagnostic thresholding. Specifically, substance use disorders require a minimum of two criteria, whereas hypersexual disorder requires four of five of the 'A' criteria to be met. Currently, additional research is needed to determine the most appropriate diagnostic threshold for CSB [20].

Clinical characteristics of CSB

Insufficient data exist regarding CSB's prevalence. Large-scale community data regarding prevalence estimates of

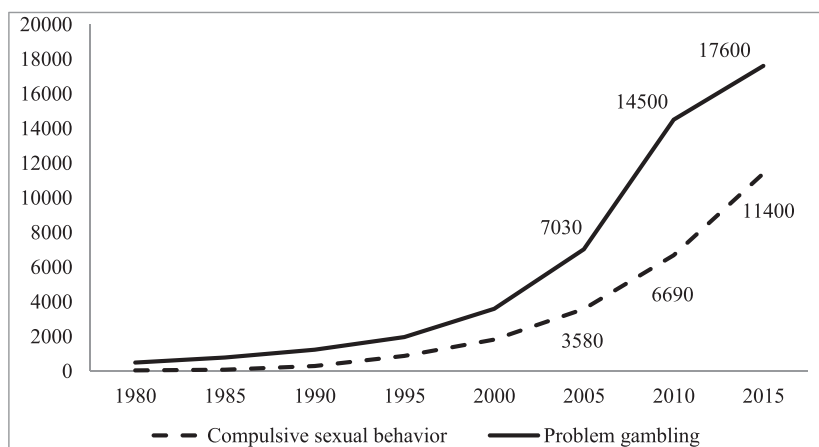


Figure 1 Number of publications in Google Scholar using key terms related to compulsive sexual behavior (CSB) or problem gambling. On 3 December 2015, we entered the following keywords into Google Scholar: 'compulsive sexual behavior' OR 'hypersexual disorder' OR 'sexual addiction' OR 'sexual compulsivity'; for problematic gambling, we entered the following words into Google Scholar: 'gambling disorder' OR 'pathological gambling' OR 'disordered gambling' OR 'problem gambling'

Table 1 Comparison of DSM-5 substance use disorder and hypersexual disorder:

<i>DSM-5 substance use disorder (APA, 2013) criteria</i>	<i>Hypersexual disorder (Kafka, 2010) criteria</i>
A. Problematic substance use over at least 12 months Impaired control and motivation 1. Substance is taken in larger amounts or over a longer period than was intended 2. Persistent desire or unsuccessful efforts to cut down or control substance use 3. Significant time is spent in activities necessary to obtain substance, use the substance, or recover from its effects 4. Craving or a strong desire or urge to use the substance Social impairment 1. Failure to fulfill major role obligations at work, school, or home due to substance use 2. Continued substance use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by use 3. Important social, occupational, or recreational activities are stopped/reduced due to substance use Risky use 1. Recurrent substance use in situations considered physically hazardous 2. Continued use despite persistent or recurrent physical or psychological problem that is likely to have been caused or exacerbated by substance Dependence 1. Tolerance, as defined by either of the following: • Markedly increased amounts of substance to achieve intoxication or desired effect • Markedly diminished effect with continued use of the same amount of substance 2. Withdrawal: substance is taken to relieve or avoid withdrawal symptoms Dysphoric mood state/life stressors No equivalent Diagnostic criteria Severity: mild (2–3 criteria), moderate (4–5 criteria) and severe (6 or more criteria) Substances: alcohol, cannabis, phencyclidine, other hallucinogen, inhalants, opioid, sedative, hypnotic or anxiolytic, stimulant; specify amphetamine or cocaine, tobacco	A. Problematic sexual behavior over at least 6 months. Need 4 of 5 criteria 1. Repetitive but unsuccessful efforts to control or reduce sexual fantasies/urges/behaviors 2. Excessive time is expended by sexual fantasies/urges or planning for sexual behavior Accounted for by clinical impairment in functioning 1. Repetitively engaging in sexual behavior while disregarding the risk for physical/emotional harm to self or others No equivalent 1. Repetitively engaging in these sexual fantasies/urges/behaviors in response to dysphoric mood states 2. Repetitively engaging in sexual fantasies/urges/behaviors in response to stressful life events A. Clinically significant personal distress or impairment in social, occupational or other important areas of functioning associated with the frequency and intensity of these sexual fantasies/urges/behaviors B. Sexual fantasies/urges/behavior are not due to direct physiological effects of substance or to mania C. Person is 18 years of age Specify if: masturbation, pornography, sexual behavior with consenting adults, cybersex, telephone sex, strip clubs, other

CSB are lacking, making the true prevalence of CSB unknown. Researchers estimate rates ranging from 3 to 6% [7] with adult males comprising the majority (80% or higher) of affected individuals [15]. A large study of US university students found estimates of CSB to be 3% for men and 1% for women [21]. Among US male military combat veterans, prevalence was estimated to be closer to 17% [22]. Using data from the US National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), the life-time prevalence rates of sexual impulsivity, a possible dimension of CSB, was found to be higher for men (18.9%) than women (10.9%) [23]. Although important, we emphasize that similar gaps in knowledge did not prevent the introduction of pathological gambling into DSM-III in 1980 or the inclusion of Internet gaming disorder into Section 3 of DSM-5 (see wide prevalence estimates ranging from approximately 1 to 50%, depending on how problematic Internet use is defined and thresholded [6]).

CSB appears more frequent among men compared to women [7]. Samples of university-aged [21,24] and community members [15,25,26] suggest that men, compared to women, are more likely to seek professional treatment for CSB [27]. Among CSB men, the most reported clinically distressing behaviors are compulsive masturbation, pornography use, casual/anonymous sex with strangers, multiple sexual partners and paid sex [15,28,29]. Among women, high masturbation frequency, number of sexual partners and pornography use are associated with CSB [30].

In a field trial for hypersexual disorder, 54% of patients reported experiencing dysregulated sexual fantasies, urges and behaviors prior to adulthood, suggesting an early onset. Eighty-two per cent of patients reported experiencing a gradual progression of hypersexual disorder symptoms over months or years [15]. Progression of sexual urges over time is associated with personal distress and functional impairment across important life domains (e.g. occupational, familial, social and financial) [31]. Hypersexual individuals may have propensities to experience more negative than positive emotions, and self-critical affect (e.g. shame, self-hostility) may contribute to the maintenance of CSB [32]. Given limited studies and mixed results, it is unclear whether CSB is associated with deficits in impaired decision-making/executive functioning [33–36].

In DSM-5, 'craving' was added as a diagnostic criterion for substance use disorders [1]. Similarly, craving appears relevant to the assessment and treatment of CSB. Among young adult men, craving for pornography correlated positively with psychological/psychiatric symptoms, sexual compulsivity and severity of cybersex addiction [37–41]. A potential role for craving in predicting relapse or clinical outcomes for CSB patients has not yet been examined.

In treatment-seeking patients, university students, and community members, CSB appears more common among European/white individuals compared to others (e.g. African American, Latino, Asian Americans) [15,21]. Limited data suggest that individuals seeking treatment for CSB may be of higher socio-economic status compared to those with other psychiatric disorders [15,42], although this finding might reflect greater access to treatment (including private-pay treatment given limitations in insurance coverage) for individuals with higher incomes. CSB has also been found among men who have sex with men [28,43,44], and is associated with HIV risk-taking behaviors (e.g. condomless anal intercourse) [44,45]. CSB is associated with elevated rates of sexual risk-taking in both heterosexual and non-heterosexual individuals, reflected in high rates of HIV and other sexually transmitted infections among treatment-seeking patients [7,15].

Psychopathology and CSB

CSB occurs frequently with other psychiatric disorders. About half of hypersexual individuals meet criteria for at least one DSM-IV mood, anxiety, substance use, impulse control or personality disorder [22,28,29,46]. In 103 men seeking treatment for compulsive pornography use and/or casual sexual behaviors, 71% met criteria for a mood disorder, 40% for an anxiety disorder, 41% for a substance use disorder and 24% for an impulse control disorder [47]. Estimated rates of co-occurring CSB and gambling disorder range from 4 to 20% [25,26,47,48]. Sexual impulsivity is associated with multiple psychiatric disorders across sexes, particularly for women. Among women compared to men, sexual impulsivity was associated more strongly with social phobia, alcohol use disorder and paranoid, schizotypal, antisocial, borderline, narcissistic, avoidant and obsessive-compulsive personality disorders [23].

NEUROBIOLOGICAL BASIS OF CSB

Understanding whether CSB shares neurobiological similarities with (or differences from) substance use and gambling disorders would help to inform ICD-11-related efforts and treatment interventions. Dopaminergic and serotonergic pathways may contribute to the development and maintenance of CSB, although this research is arguably in its infancy [49]. Positive findings for citalopram in a double-blind placebo controlled study of CSB among a sample of men suggests possible serotonergic dysfunction [50]. Naltrexone, an opioid antagonist, may be effective at reducing both the urges and behaviors associated with CSB, consistent with roles in substance and gambling addictions and consistent with proposed mechanisms of

opioid-related modulation of dopaminergic activity in mesolimbic pathways [51–53].

The most compelling evidence between dopamine and CSB relates to Parkinson's disease. Dopamine replacement therapies (e.g. levodopa and dopamine agonists such as pramipexole, ropinirole) have been associated with impulse control behaviors/disorders (including CSB) among individuals with Parkinson's disease [54–57]. Among 3090 Parkinson's disease patients, dopamine agonist use was associated with a 2.6-fold increase odds of having CSB [57]. CSB among Parkinson's disease patients has also been reported to remit once the medication has been discontinued [54]. Levodopa has also been associated with CSB and other impulse control disorders in Parkinson's disease, as have multiple other factors (e.g. geographic location, marital status) [57].

The pathophysiology of CSB, currently poorly understood, is being researched actively. Dysregulated hypothalamic–pituitary–adrenal axis function has been linked to addictions and was identified recently in CSB. CSB men were more likely than non-CSB men to be dexamethasone suppression-test non-suppressors and have higher adrenocorticotrophic hormone levels. The hyperactive hypothalamic–pituitary–adrenal axis in CSB men may underlie craving and CSB behaviors related to battling dysphoric emotional states [58].

Existing neuroimaging studies have focused primarily on cue-induced reactivity. Cue-reactivity is clinically relevant to drug addictions, contributing to cravings, urges and relapses [59]. A recent meta-analysis reported overlap between tobacco, cocaine and alcohol cue-reactivity in the ventral striatum, anterior cingulate cortex (AC) and amygdala related to drug cue-reactivity and self-reported craving, suggesting that these brain regions may constitute a core circuit of drug craving across addictions [60]. The incentive motivation theory of addictions posits that addiction is related to the enhanced incentive salience to drug-associated stimuli resulting in greater attentional capture, approach behaviors, expectancy and pathological motivation (or 'wanting') for drugs [61,62]. This theory has also been applied to CSB [63].

In college female students [64], individual differences in human reward-related brain activity in the nucleus accumbens in response to food and sexual images related prospectively to weight gain and sexual activity 6 months later. Heightened reward responsivity in the brain to food or sexual cues was associated with overeating and increased sexual activity, suggesting a common neural mechanism associated with appetitive behaviors. During functional magnetic resonance imaging (fMRI), exposure to pornographic video cues compared to non-sexual exciting videos in CSB men relative to non-CSB men was associated with greater activation in the dorsal anterior cingulate, ventral striatum and amygdala, regions

implicated in drug-cue reactivity studies in drug addictions [63]. Functional connectivity of these regions was associated with subjective sexual desire to the cues, but not liking, among men with CSB. Here, desire was taken as an index of 'wanting' compared to 'liking'. The men with CSB versus those without also reported heightened sexual desire and demonstrated greater anterior cingulate and striatal activation in response to pornographic images [65].

CSB men compared to those without also showed greater attentional biases to sexually explicit cues, suggesting a role for early attentional orienting responses towards pornographic cues [66]. CSB men also demonstrated greater choice preference for cues conditioned to both sexual and monetary stimuli compared to men without CSB [67]. The greater early attentional bias to sexual cues was associated with greater approach behaviors towards conditioned sexual cues, thus supporting incentive motivation theories of addiction. CSB subjects also showed a preference for novel sexual images and greater dorsal cingulate habituation to repeated exposure to sexual pictures, with the degree of habituation correlating with enhanced preference for sexual novelty [67]. The access to novel sexual stimuli may be specific to online availability of novel materials.

Among Parkinson's disease subjects, exposure to sexual cues increased sexual desire in those with CSB compared to those without [68]; enhanced activity in limbic, paralimbic, temporal, occipital, somatosensory and prefrontal regions implicated in emotional, cognitive, autonomic, visual and motivational processes was also observed. CSB patients' increased sexual desire correlated with increased activations in the ventral striatum and cingulate and orbitofrontal cortices [68]. These findings resonate with those in drug addictions in which increased activation of these reward-related regions is seen in response to cues related to the specific addiction, in contrast to blunted responses to general or monetary rewards [69,70]. Other studies have also implicated prefrontal regions; in a small diffusion tensor imaging study, CSB versus non-CSB men showed higher superior frontal mean diffusivity [71].

In contrast, other studies focusing on individuals without CSB have emphasized a role for habituation. In non-CSB men, a longer history of pornography viewing was correlated with lower left putaminal responses to pornographic photos, suggesting potential desensitization [72]. Similarly, in an event-related potential study with men and women without CSB, those reporting problematic use of pornography had a lower late positive potential to pornographic photos relative to those not reporting problematic use. The late positive potential is elevated commonly in response to drug cues in addiction studies [73]. These findings contrast to, but are not incompatible with,

the report of enhanced activity in the fMRI studies in CSB subjects; the studies differ in stimuli type, modality of measure and the population under study. The CSB study used infrequently shown videos compared to repeated photos; the degree of activation has been shown to differ to videos versus photos and habituation may differ depending on the stimuli. Furthermore, in those reporting problematic use in the event-related-potential study, the number of hours of use was relatively low [problem: 3.8, standard deviation (SD) = 1.3 versus control: 0.6, SD = 1.5 hours/week] compared to the CSB fMRI study (CSB: 13.21, SD = 9.85 versus control: 1.75, SD = 3.36 hours/week). Thus, habituation may relate to general use, with severe use potentially associated with enhanced cue-reactivity. Further larger studies are required to examine these differences.

Genetics of CSB

Genetic data relating to CSB are sparse. No genome-wide association study of CSB has been performed. A study of 88 married couples with CSB found high frequencies of first-degree relatives with substance use disorders (40%), eating disorders (30%) or pathological gambling (7%) [74]. A twin study suggested genetic contributions accounted for 77% of the variance relating to problematic masturbatory behaviors, whereas 13% was attributable to non-shared environmental factors [75]. Substantial genetic contributions also exist for substance and gambling addictions [76,77]. Using twin data [78], the estimated proportion of variation in liability for gambling disorder due to genetic influences is approximately 50%, with higher proportions seen for more severe problems. Inherited factors associated with impulsivity may represent a vulnerability marker for the development of substance use disorders [79]; however, whether these factors increase odds of developing CSB has not yet been explored.

ASSESSMENT AND TREATMENT OF CSB

During the last decade, research on the diagnosis and treatment of CSB has increased [80]. Various researchers have proposed diagnostic criteria [13] and developed assessment tools [81] to aid clinicians in the treatment of CSB; however, the reliability, validity and utility of many of these scales remain largely unexplored. Few measures have been validated, limiting their generalizability for clinical practice.

Treatment interventions for CSB require additional research. Few studies have evaluated the efficacies and tolerabilities of specific pharmacological [53,82–86] and psychotherapeutic [87–91] treatments for CSB. Evidence-based psychotherapies such as cognitive-behavioral

therapy and acceptance-and-commitment therapy appear helpful for CSB [89,91,92]. Similarly, serotonergic reuptake inhibitors (e.g. fluoxetine, sertraline and citalopram) and opioid antagonists (e.g. naltrexone) have demonstrated preliminary efficacy in reducing CSB symptoms and behaviors, although large-scale randomized controlled trials are lacking. Existing medication studies have typically been case studies. Only one study [50] used a double-blind, placebo-controlled design when evaluating the efficacy and tolerability of a drug (citalopram) in the treatment of CSB.

No large randomized controlled trials exist examining the efficacy of psychotherapies in treating CSB. Methodological issues limit the generalizability of existing clinical outcomes studies, as most studies employ weak methodological designs, differ on inclusion/exclusion criteria, fail to use random assignment for treatment conditions and do not include control groups necessary to conclude that the treatment worked [80]. Large, randomized controlled trials are needed to evaluate the efficacies and tolerabilities of medications and psychotherapies in treating CSB.

Alternative perspectives

The proposal of hypersexual disorder as a psychiatric disorder has not been embraced uniformly. Concerns have been raised that the label of 'disorder' pathologizes normal variants of healthy sexual behavior [93], or that excessive/problematic sexual behavior may be better explained as an extension of a pre-existing mental health disorder or poor coping strategies used to regulate negative affect states rather than a distinct psychiatric disorder [16,18]. Other researchers expressed concern that some individuals labeled with CSB may merely have high levels of sexual desire [18], with suggestions that difficulty controlling sexual urges and high frequencies of sexual behaviors and consequences associated with those behaviors may be explained more clearly as a non-pathological variation of high sexual desire [94]. In a large sample of Croatian adults, cluster analysis identified two meaningful clusters, one representing problematic sexuality and another reflecting high sexual desire and frequent sexual activity. Individuals in the problematic cluster reported more psychopathology compared to individuals in the high-desire/frequent-activity cluster [95]. This suggests that CSB may be organized more along a continuum of increasing sexual frequency and preoccupation, in which clinical cases are more likely to occur at the upper end of the continuum or dimension [96]. Given the likelihood that there is considerable overlap between CSB and high sexual desire, additional research is needed to identify features associated most specifically with clinically distressing sexual behaviors.

SUMMARY AND CONCLUSIONS

With the release of DSM-5, gambling disorder was reclassified with substance use disorders. This change challenged beliefs that addiction occurred only by ingesting of mind-altering substances and has significant implications for policy, prevention and treatment strategies [97]. Data suggest that excessive engagement in other behaviors (e.g. gaming, sex, compulsive shopping) may share clinical, genetic, neurobiological and phenomenological parallels with substance addictions [2,14]. Despite the increasing number of publications on CSB, multiple gaps in knowledge exist that would help to determine more conclusively whether excessive engagement in sexual behaviors might best be classified as an addiction. In Table 2, we list areas where additional research is needed to increase understanding of CSB. Insufficient data are available regarding what clusters of symptoms may best constitute CSB or what threshold may be most appropriate for defining CSB [20]. Such insufficient data complicate classification, prevention and treatment efforts. While neuroimaging data suggest similarities between substance addictions and CSB, data are limited by small sample sizes, solely male heterosexual samples and cross-sectional designs. Additional research is needed to understand CSB in women, underprivileged and racial/ethnic minority groups, gay, lesbian, bisexual and transgendered people, individuals with physical and intellectual disabilities and other groups.

Another area needing more research involves considering how technological changes may be influencing human sexual behaviors. Given that data suggest that sexual behaviors are facilitated through Internet and smartphone applications [98–100], additional research should consider how digital technologies relate to CSB (e.g. compulsive masturbation to Internet pornography or sex chatrooms) and engagement in risky sexual behaviors (e.g. condomless sex, multiple sexual partners on one occasion). For example, whether increased access to Internet pornography and the use of websites and smartphone applications (e.g. Grindr, FindFred, Scruff, Tinder, Pure, etc.) designed to facilitate casual sex between consenting adults is associated with an increased reports of hypersexual behaviors awaits future research. As such data are collected, acquired knowledge should be translated into improved policy, prevention and treatment strategies for people most at risk for and impacted by CSB.

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Table 2 Knowledge gaps relating to compulsive sexual behavior (CSB) and approaches for addressing the gaps.

<i>Current gaps</i>	<i>Future directions</i>
Defining CSB	Use cluster analysis to examine latent dimensions of CSB and investigate how best to threshold cases
Prevalence data	Large-scale, population-based epidemiological studies examining prevalence of CSB in multiple geographic areas. Emphasis needed on assessing prevalence among racial/ethnic minority groups, women, gay, bisexual, transsexual and low-income/uninsured individuals/groups, as well as those with physical and intellectual disabilities, in order to mitigate against possible health disparities
Longitudinal data	Naturalistic longitudinal studies assessing the trajectory of sexual behaviors and CSB across the life-span. Using a cohort design, researchers should: (a) identify risk and protective factors for the development of CSB; and (b) measure the progression of CSB symptoms over time
Clinical data	Assess prevalence of medical and mental health comorbidities as related to CSB in the general population
Neuropsychological data	Examine whether there are any intelligence, memory, language, executive functioning and visuospatial differences found among CSB patients compared to non-diagnosed individuals
Neurobiological data	Use neuroimaging techniques to examine neurochemical and functional changes in the brains of CSB patients. Assess the relationship between brain structure and function and treatment outcomes. Assesses relationships between craving for sex/pornography and treatment outcomes (e.g., relapse)
Genetic data	Conduct genome-wide association studies (GWAS) on CSB. Examine genetic factors that may serve as vulnerability factors for the development of CSB
Treatment	Well-powered randomized controlled trials examining efficacies and tolerabilities of psychotherapies and medications in treating CSB
Screening	Develop standardized screening assessments for accurately diagnosing CSB
Prevention	Create intervention programs aimed at promoting healthy and safe sexual behaviors among the public. Design advertisement campaigns aimed at raising awareness about 'warning signs' and symptoms associated CSB, particularly risky sexual behaviors facilitated by the Internet

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