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Debate: Behavioral addictions in the ICD-11

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DEBATE PAPER

Should compulsive sexual behavior (CSB) be considered as a behavioral addiction? A debate paper presenting the opposing view

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ABSTRACT

Background and aims: Compulsive sexual behavior disorder (CSBD) has been a long debated issue. While formerly the discussion was about whether to regard CSBD as a distinctive disorder, the current debate is dealing with the classification of this phenomenon. One of the prominent voices in this field considers CSBD as a behavioral addiction and proposes CSBD to be called and diagnosed as sexual addiction (SA). This present debate paper will review the existing evidence supporting this view and it will argue against it. *Results:* We have found that a great deal of the current literature is anecdotal while empirical evidence is insufficient. First, the reports about the prevalence of CSBD are contradictory. Additionally, the field mainly suffers from inconsistent defining criteria of CSBD and a consensus which symptoms should be included. As a result, the empirical evidence that does exist is mostly about some symptoms individually and not on the disorder as a whole construct. *Conclusions:* We conclude that currently, there is not enough data supporting CSBD as a behavioral addiction. Further research has to be done, examining CSBD phenomenology as a whole construct and based on a homogeneous criterion.

KEYWORDS

compulsive sexual behavior, hypersexuality, sex addiction

INTRODUCTION

Excessive sexual behavior, hypersexuality, compulsive sexual behavior disorder (CSBD) or sexual addiction (SA), are all different labels referring the same phenomena, but those different names reflect different theoretical frameworks for the understanding of excessive sexual behavior. The behavior those concepts represent, is a maladaptive sexual behavior, taking a lot of time daily, persisting despite adverse consequences and despite efforts to stop them (Levine, 2010). The literature is still inconclusive regarding the prevalence and the classification of CSBD. The main goal of this paper is to review the current data regarding those topics and specifically addressing the issue if there is enough data to justify seeing CSBD as a behavioral addiction. We will review the prevalence of CSBD and some of the findings regarding co-morbidity with CSBD. We will then address the classification of CSBD by briefly reviewing impulsivity and compulsivity, and then we will discuss in detail the phenomenology of addiction and whether CSBD corresponds with it. We will also review some of the findings from the neurobiology aspect and finally we will discuss some recommendations for further research.

EPIDEMIOLOGY

The Prevalence of CSBD is unknown due to very few population-based studies been made. Data about prevalence of CSBD is limited and sparse. Most of reviews show that the prevalence range of

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CSBD is between 3 and 6% although some studies extend the range to even above 16% (Yoon, Houang, Hirshfield, & Downing, 2016). Reviewing other studies even broadens the range from as high as 18% (American Psychiatric Association, 2000; Walton, Cantor, & Lykins, 2017) to as low as 1% (Dickenson, Gleason, Coleman & Miner, 2018). Further exploration of the existing data raises the hypothesis that part of the discrepancy between studies is explained by gender, age and the sexual orientation of the participants. For example, sexual impulsivity, which might be a facet of CSBD, in the US was found to be higher amongst men than in women, 18.9% versus 10.9% accordingly (Erez, Pilver, & Potenza, 2014). A large survey study conducted by Dickenson et al. (2018) found that above 10% of men and 7% of women are distressed with issues regarding their sexual behavior and feel that their sexual habits are excessive and uncontrollable. Bőthe et al. (2018) have reported a study on CSBD conducted in a large scale diverse non-clinical sample (N = 18,034 participants) across both gender and sexual orientation. The results have indicated that Lesbian Gay Bisexual, Transgender and Queer (LGBTQ) males may be a group most at risk of engaging in hypersexual behavior, and LGBTQ females are at a higher risk of engaging in hypersexual activities due to coping problems. For more detailed review of differences between research populations see Yoon et al. (2016). Additionally, as suggested by Stewart and Fedoroff (2014) and by Yoon et al. (2016) it is obvious that the lack of consensus about the prevalence rates stems also from the disagreement about the core perspective of the disorder and as a result, the use of different tools with different emphasis of the observed behavior.

COMORBIDITY

Reviewing the literature regarding CSBD reveals a significant occurrence of comorbidity between CSBD and other psychiatric disorders. Mood disorders, especially depression, is the most common disorder that appear to comorbid with CSBD (e.g. Kopeykina et al., 2016; Kor, Fogel, Reid, & Potenza, 2013; Schultz, Hook, Davis, Penberthy, & Reid, 2014; Wéry et al., 2016). Anxiety disorders also found to be highly co-occur with CSBD, particularly generalized anxiety disorder and social anxiety (33–46%; e.g. Kafka, 2015; Karila et al., 2014; Wéry et al., 2016). Additionally, Wéry et al. (2016) found individuals with CSBD to be highly subjected (41.7%) to suicidal risk. Also frequently reported is the comorbidity between CSBD and Substance Use Disorder, mainly alcohol abuse (13–64%; e.g. Ballester-Arnal, Castro-Calvo, Giménez-García, Gil-Juliá, & Gil-Llario, 2020; Hartman, Ho, Arbour, Hambley, & Lawson, 2012; Reid & Meyer, 2016). Research focused on individuals with SUD as opposed to CSBD, have also found positive associations with hypersexuality (25%; Stavro, Rizkallah, Dinh-Williams, Chiasson, & Potvin, 2013). Another disorder frequently found to be associated with CSBD is Attention Deficit Hyperactivity Disorder (ADHD) (23–27%; e.g. Karaca, Saleh, Canan, & Potenza, 2017; Niazof, Weizman, & Weinstein, 2019). A recent large-scale study done by Bőthe, Koós, Tóth-Király, Orosz, and Demetrovics (2019) has found that ADHD symptoms had positive and moderate associations with CSBD in both men ($\beta = 0.5$) and women ($\beta = 0.43$). Studies also report for comorbidity between CSBD and personality disorders. The most common personality types associated with CSBD are histrionic, paranoid, avoidant, obsessive-compulsive, narcissistic, and passive aggressive (14–28%; e.g. Black, Kehrberg, Flumerfelt, & Schlosser, 1997; Kaplan & Krueger, 2010; Raymond, Coleman, & Miner, 2003). Carpenter, Reid, Garos, and Najavits (2013) have found that although personality disorders are more prevalent among individuals with CSBD than in the general population, most of the cases do not meet the full criteria of personality disorder and rather represent a mere personality trait. Similarly, the Minnesota Multiphasic Personality Inventory-2 (MMPI-2; Butcher, Dahlstrom, Graham, Tellegen, & Kaemmer, 1989) scores of individuals with CSBD reveals this group is not characterized by other pathology or even addictive tendency. In fact, evidence support the idea that hypersexual patients are a diverse group with an array of causes that might lead to the hypersexual behavior (Reid & Carpenter, 2009). There are different personal traits that lead to different form of CSBD. For example, individuals with anxiety use masturbation as an avoidant strategy while individuals with novelty-seeking might constantly cruise for occasional partner along with substances use to satisfy the urge for new stimulus (Sutton, Stratton, Pytyck, Kolla, & Cantor, 2015). To conclude, we think further research should be done to isolate the possible subtypes of CSBD, to determine whether they comprise a cohesive disorder and whether it is a behavioral addiction.

TYPOLOGY

Different authors have reviewed CSBD from different perspectives. For example, Gold & Heffner (1998) reviewed CSBD as a sexual addiction, sexual compulsivity or sexual impulsivity. They assumed that each one of the viewpoints they reviewed accounts for a subgroup of cases rather than for the whole phenomena. They have argued that the field will not benefit by further debates rather by well-controlled empirical research. Bancroft (2008) reviewed CSBD as an addiction, failure of self-regulation or Obsessive Compulsive Disorder (OCD), and concluded that any overriding definition will be premature due to the lack of clinically empirical research.

CSBD as impulsive or obsessive–compulsive disorder

The most predominant frameworks of conceptualization are the addiction model, compulsivity model and the impulsivity model (Kingston & Firestone, 2008). Looking at the definitions of the *International Classification of Diseases for Mortality and Morbidity Statistics* (11th ed., ICD-11; World Health Organization, 2018) to those three categories reveals main similarity which is performing an act that is being experienced as irresistible. While those three classes share some features, they defer in profound others. Addiction is characterized by withdrawal and tolerance phenomena which are not featured by impulsivity and compulsivity (American Psychiatric Association, 2013). Impulsivity and

compulsivity are sometimes being used interchangeably (Hollander & Rosen, 2002), but they mainly differ in the motivational mechanisms behind behavior. While impulsive individuals seek to maximize pleasure and gratification, compulsive individuals often desire to avoid harm or reduce anxiety (Claes, Vandereycken, & Vertommen, 2002). Obsessive-compulsive behavior, unlike addiction and impulsivity, is also defined by intrusive distressful thoughts or images (American Psychiatric Association, 2013). Black et al. (1997) found intrusive and repetitive sexual fantasies to be a common experience among individuals with CSBD and that argues in favor of describing CSBD as a particular instance of OCD. Contrariwise, in CSBD, although the urge is experienced as irresistible, the individual purposefully acts out the prior sexual fantasy and the behavior is an emulation of the prior cognition. In OCD, on the other hand, the compulsive rituals are initially resisted and typically are not behavioral representations of the prior though but representing acts of the wish to neutralize those thoughts (Schwartz & Abramowitz, 2005). Recent studies still portray an inconclusive picture. For example, Fuss, Briken, Stein and Lochner (2019) found that CSBD in OCD was more likely comorbid with other impulsive, compulsive, and mood disorders, but not with behavioral- or substance-related addictions. This finding supports the conceptualization of CSBD as a compulsive–impulsive disorder. On the contrary, Bőthe, Tóth-Király et al. (2019) have investigated impulsivity and compulsivity with respect to hypersexuality and problematic pornography in a large community sample (N = 13,778 participants). The results have indicated that impulsivity had a stronger relationship with hypersexuality than did compulsivity among men and women, respectively.

In Table 1 we have summarized some of the main findings that have been discussed in the review papers. We have utilized PubMed Central® search engine using the terms: "hypersexuality," "excessive sex," "sexual addiction," "sex addiction," "addiction to sex," "impulsive sex," "impulsive sexual," "compulsive sexual," "compulsive sex," allowing any or all of them to appear anywhere in the article. We have sorted the result by "best match" and we have looked for articles that include a review on CSBD. We have realized there is no additional data beyond the first 40 results, and as a precaution from missing relevant data, we have explored further the next 60 results without finding any other relevant data. Identical search sorted by "most recent" and "publication date," has revealed no additional relevant papers either. In Table 1 we have detailed the range of prevalence, assessment tools, conceptual perspectives, psychological and pharmacological treatment as well as comorbidities with CSBD that are reviewed and discussed broadly.

CSBD as a behavioral addiction

As mentioned above, one of the three most dominant frameworks of CSBD is the "addiction model" and in this current debate paper, we will examine whether CSBD fits this model. Specifically, we will examine whether CSBD meets the core elements of "behavioral addiction," namely; salience, mood modification, tolerance, withdrawal, conflict and relapse (Griffiths, 2005). Biological studies that might have shed some light on this issue are also very few and will be discussed below as well.

Traditionally, the concept of addiction used to involve taking drugs (e.g. Rachlin, 1990; Walker, 1989). The release of the *Diagnostic and Statistical Manual of Mental Disorders* (5th ed.; *DSM-5*) broadens the definition of addiction and includes Gambling Disorder (GD) as a behavioral addiction along with drugs under the category "Substance-Related and Addictive Disorders" (American Psychiatric Association, 2013; Kraus, Voon, & Potenza, 2016).

In this paper we have used GD as compass to deduce from GD to CSBD, whether it should be defined as an addiction. Griffiths' (2005) components (salience, mood modification, tolerance, withdrawal, conflict and relapse) overlap with the *DSM-5* American Psychiatric Association (2013) criteria for GA. It is important to note that the *ICD-11* (World Health Organization, 2018) classified CSBD under impulse control disorders and the phenomenology described seems to combine those of addiction, impulse control disorders as well as compulsive characteristics. Amongst Griffiths' six components of addiction, the *ICD-11* requires for diagnosis of CSBD, only "salience" ("repetitive sexual activities becoming a central focus of the person's life"), conflict ("Neglecting health and personal care or other interests, activities, responsibilities and continued repetitive sexual behavior despite adverse consequences") and relapse ("Numerous unsuccessful efforts to significantly reduce repetitive sexual behavior"), while "mood-modification," "tolerance" and "withdrawal" are absent. For detailed comparison between *DSM-5* criteria for GD, *ICD-11* for CSBD and Griffiths' (2005) criteria for addiction, see Table 2.

Anecdotal reports based on clinical experience with CSBD patients support the idea of seeing CSBD as an addiction, but the field suffers from a lack of systematic empirical evidence supporting the endorsement of those six components mentioned above, by CSBD patients. Below we will review and discuss some of the relevant literature discussing each of the six addiction components and their relevance to CSBD.

Salience. Salience or preoccupation is when certain activity or content becomes predominant through action and thinking (Griffiths, 2005). Some authors claim for endorsement of the "preoccupation" criteria by CSBD patients, but they rely on general reports of patients rather than on empirical evidence (e.g. Schneider, 2004). Rosenberg, O'Connor, & Carnes (2014) quote Carnes's report (1991) that 77% of CSBD patients endorsed preoccupation criteria. Looking more deeply into Carnes's (1991) findings raise some questions about the meaning of this finding, whether it relies on a self-report tool he administrated or based on interviews he made as well. Looking for more empirical studies requires a more precise definition of "preoccupation." Back in the *DSM-IV-TR* (4th ed., text rev.; American Psychiatric Association, 2000), the GD was defined as "pathological gambling" classified under "impulse control

Table 1. Summary of CSBD reviews

Author	Prevalence	Assessment	Conceptual perspectives	Psychological treatment	Pharmacological treatment	Comorbidities
Derbyshire and Grant (2015)	2–27.9% (among LGBTQ)			Psychodynamic therapy CBT Group therapy Couple therapy	Citalopram Naltrexone with or without SSRI	
Montgomery-Graham (2017)		CSBI HBI SAST SAST-R SCS HDSI	Dual-control model, The addiction model, Obsessive – compulsive model, Deficient impulse control, Attachment Theory, Executive Cognitive Functioning			
Kafka (2010)	3–12.1%	TSO	Dual-control model Sexual Addiction Sexual Compulsivity Sexual Desire Dysregulation Impulsivity Disorders			Depression Anxiety SUD Social avoidance Impulse behavior ADHD Paranoid PD Narcissistic PD Avoidant PD Histrionic PD Obsessive-compulsive PD
	2–6%		Dual-control mode Sexual Addiction Sexual Compulsivity Sexual Impulsivity Cognition biases Attachment style			Narcissistic PD Antisocial PD
Mick and Hollander (2006)	5–6%	TSO	Brain abnormality Behavioral addiction	CBT Group therapy Couple therapy	Citalopram Sertraline Fluoxetine Nefazodone	Mood disorders SUD Social phobia ADHD Impulse control
Kingston and Firestone (2008)	3–10%	TSO	Sexual Addiction Compulsive Sexual Behavior			

(continued)

Table 1. Continued

Author	Prevalence	Assessment	Conceptual perspectives	Psychological treatment	Pharmacological treatment	Comorbidities
			Impulsive Sexual Behavior Sexual Desire Disorders Model			
Gold and Heffner (1998)			Sexual Addiction Sexual Compulsivity Sexual impulsivity	12-step program Group therapy	Fluoxetine Other SSRIs	
Karila et al. (2014)	3–16.8%	SAST SAST-R SCS		CBT Couples therapy Motivational interviewing	SSRIs	
		PATHOS SOI		Family therapy		
Garcia and Thibaut (2010)	3–6%		Dual-control model Obsessive-Compulsive Impulse-Control Disorder Sexual Addiction	CBT 12-Step program	Antiandrogen SSRIs	
Kraus, Voon, and Potenza (2016)				CBT	SSRIs	Mood disorders
				ACT	Opioid antagonists	Anxiety SUD Impulse-control disorders Social phobia Paranoid PD Schizotypal PD Antisocial PD Borderline PD Narcissistic PD Avoidant PD Obsessive-compulsive PD

Note. LGBTQ = lesbians, gays, bisexuals, transsexuals and queers; CSBI = compulsive sexual behavior inventory; HBI = hypersexual behavioral inventory; SAST = sexual addiction screening test; SAST-R = sexual addiction screening test – revised; SCS = sexual compulsivity scale; HDSI = hypersexual disorder screening inventory; TSO = total sexual outlet; SOI = sexual outlet inventory; CBT = cognitive behavioral therapy; ACT = acceptance and commitment therapy; SSRI = selective serotonin reuptake inhibitor; SUD = substance abuse disorder; ADHD = attention deficit/hyperactivity disorder; PD = personality disorder.

Table 2. Comparison of criteria for Compulsive Sexual Behavior (CSBD): Griffiths (2005), DSM-5 and ICD-11

Criterion	Griffiths (2005)	*DSM-5* for GD	*ICD-11* for CSBD
Salience	When the particular activity becomes the most important activity in the person's life and dominates their thinking, feelings and behavior	Is often preoccupied with gambling	Repetitive sexual activities becoming a central focus of the person's life
Mood modification	The subjective experience that people report as a consequence of engaging in the particular activity	Often gambles when feeling distressed	
Tolerance	The process whereby increasing amounts of the particular activity are required to achieve the former effects	Needs to gamble with increasing amounts of money in order to achieve the desired excitement	
Withdrawal	The unpleasant feeling states and/or physical effects which occur when the particular activity is discontinued or suddenly reduced	Is restless or irritable when attempting to cut down or stop gambling	
Conflict	Conflicts between the addict and those around them (interpersonal conflict) or from within the individual themselves (intrapsychic conflict) which are concerned with the particular activity	Has jeopardized or lost a significant relationship, job, or educational or career opportunity because of gambling	Neglecting health and personal care or other interests, activities, responsibilities and continued repetitive sexual behavior despite adverse consequences.
Relapse	The tendency for repeated reversions to earlier patterns of the particular activity to recur and for even the most extreme patterns typical of the height of the addiction to be quickly restored after many years of abstinence or control	Has made repeated unsuccessful efforts to control, cut back, or stop gambling	Numerous unsuccessful efforts to significantly reduce repetitive sexual behavior
Chasing losses		After losing money gambling, often returns another day to get even	
Lack of control			Pattern of failure to control intense, sexual impulses or urges and resulting repetitive sexual behavior
Diminished satisfaction			Deriving little or no satisfaction from it

Note. GD, Gambling disorder; CSBD, compulsive sexual behavior disorder; *DSM-5*, Diagnostic and Statistical Manual, 5th ed.; *ICD-11*, International Classification of Diseases, 11th.

disorders - Not Otherwise Specified." With moving GD to "addictive disorder" in the *DSM-5*, the change was accompanied with some "lenience" in diagnosing GD. For example, reducing the required criteria from five to four, or omitting the illegal facet of the behavior. Another reflection is the change from "Is preoccupied with gambling" to, "Is often preoccupied with gambling" to clarify that one needs not be obsessed with gambling all the time to meet this diagnostic symptom (Reilly, 2017). This change suggests that in order to define preoccupation in behavioral addiction, constant preoccupation is not needed and rather often preoccupation is preferred. This new definition opens the diagnosis to subjective interpretation of the assessor and might be biased particularly in self-report measures. The literature that is based on empirical evidence leans mostly on self-report inventories. The four tools most commonly used in English-language literature are the "Sexual Compulsivity Scale," the "Compulsive Sexual Behavior Inventory," the "Sexual Addiction Screening Test," and "The Hypersexual Behavior Inventory" (Stewart & Fedoroff, 2014). Amongst those four only the "Sexual Addiction Screening Test" (SAST) addresses the preoccupation issue directly. The SAST includes dichotomous items such as "Do you often find yourself preoccupied with sexual thoughts." Using the SAST, Carnes, Hopkins, and Green (2014) have found a significant relationship between preoccupation with sex and diagnostic criteria of CSBD. Also using the SAST, Carnes, Green, and Carnes (2010) found preoccupation with sex is a core component of CSBD across women and men. There are two significant interrelated drawbacks using the SAST; the one deals with the patient as the assessor and other deals with the lack of a continuum scale to assess the endorsement of the preoccupation criteria. To conclude, although based on the SAST there is some evidence that CSBD patients subjectively report being preoccupied with sex, more methodological research is required to ensure objective observation whether and how often the "salience" symptom occurs.

Mood modification. Different writers address the link between addiction and mood from different angles. Brown (1993) refers to any change of mood that is being experienced following engaging a certain activity. Carnes (1991) requires using the behavior as a coping strategy. Griffiths (2005) defines it as "Mood modification," and like Carnes (1991) denotes the aspect of using the certain behavior as a reliable and consistent coping strategy to deal with unpleasant emotions or feelings. The *DSM-5* requires for Gambling Disorder: that the gambler "often gambles when feeling distressed (e.g., helpless, guilty, anxious, depressed)" which implies the idea of a coping strategy as Griffiths (2005) has elaborated. The SAST questionnaire has one factor "affect disturbance" but involves different items that mainly deal with negative emotions caused by the sexual activity. The Hypersexual Behavior Inventory (HBI) questionnaire has one factor called "coping" and has specific items that describe using sex as a coping strategy. Results from studies using the HBI show significant differences between patients groups and control groups on this scale (Reid, Carpenter, & Lloyd, 2009; Reid, Harper, & Anderson, 2009) and a substantive body of research shows that CSBD patients use sex to deal with unwanted experiences or situations (Gilliland, South, Carpenter, & Hardy, 2011). It is important to note that in a large-scale study using non-clinical sample, Bőthe, Bartók, et al. (2018) have found that LGBTQ participants are more at risk of using sex related behavior as "mood modification" than heterosexual participants. In conclusion, relying on the HBI, we can see how sex is being used as a coping strategy and to avoid inconvenient mood. However, since this symptom was not tested under the framework of an addiction paradigm together with other necessary symptoms such as tolerance and withdrawal, we think it is not enough to deduce the presence of "addiction" by definition and further research is needed.

Tolerance. The *DSM-5* defines Tolerance, by either of the following: (a) a need for markedly increased amounts of a substance to achieve intoxication or a desired effect, (b) markedly diminished effect with continued use of the same amount of a substance. Karila et al. (2014) describe few features of CSBD that could suggest tolerance. Among other behavioral symptoms, they mention pursuit of new sexual partners as well as engagement in sexual activity without physiological arousal. They have based their assertion on few resources which do not include empirical evidence or even specifically exclude tolerance and withdrawal from required elements of CSBD. Similarly to Karila et al. (2014), Coleman-Kennedy and Pendley (2002) specifically refer to the term "tolerance" and to its origin in substance use addiction. They claim that just as in substance addiction, individuals with sex addiction experience the continual need to expand the time spent in sexual activity to ease the emotional pain. In addition, they claim that in the attempt to feel the emotional relief, individuals with sexual addiction tend to choose partners and sexual practices carelessly.

Again, no empirical evidence has been shown to support those tolerance symptoms. Furthermore, choosing partners or practices injudiciously, might be a core element of CSBD patients without escalating or increasing amount of sex, meaning, regardless the tolerance phenomenon. Coleman-Kennedy and Pendley (2002) continue and claim that individuals with CSBD report having sex without truly choosing or wanting it. This element suggests that there is a compulsive quality of CSBD rather than an addiction to a satisfactory activity and the increasing need for more of it. Kalichman and Rompa (1995) have made a distinction between two types of what we would define as CSBD. The first is the "sensation seeking" type. Sensation seeking is described by Zuckerman (1983) as the propensity to change, to diversify and to expand the array of sensations and experiences, as well as the tendency to take risks for the sake of that purpose. Sexual compulsivity on the other hand, is characterized by repetitive and intrusive thoughts and urges to act usually in a ritualized or meticulous way (Barth & Kinder, 1987). Although those acts are experienced as uncontrollable just as impulsive acts, at the core of sexual compulsivity lay the obsessive patterns of cognition and behavior (Kalichman & Rompa, 1995). Those descriptions suggest that first, seeking new partners or practices is not necessarily a feature of CSBD patients. Secondly, seeking new partners or practices does not stem from habituation to old patterns or amount of sensual stimulation, but it is a predominant character of detesting the known, the usual and the banal. Neither the SAST nor the HBI include items assessing the tolerance phenomenon. In conclusion, we could not find methodological evidence for the existence of "tolerance" among CSBD patients.

Withdrawal. Karila et al. (2014) claim that more than 70% of individuals with CSBD report withdrawal symptoms. They base their claim on Carnes (1991) statement that CSBD patients report withdrawal symptoms that utterly alike symptoms reported by individuals with cocaine addiction following cessation or diminishing of using the drug. Those symptoms include a variety of body aches, dizziness, restlessness and sleeping problems. It appears that this report is based on a general impression rather than on methodological research. Similarly, Nakken (1996) claims that some behavioral activities such as gambling, spending or sex, can become an actual addiction with physical symptoms upon withdrawal. He argues that individuals with behavioral addiction report physical symptoms when they stop acting out. As argued before, it appears that a general description is given but it is not necessarily based on methodological research. Furthermore, Nakken (1996) deliberates with the question whether those symptoms are entitled to be called "withdrawal symptoms." He wonders if those symptoms are actual withdrawal symptoms or they might be considered a mere part of a grief process that occurs upon ending an addictive relationship. Moreover, Carnes and Schneider (2000) do not see tolerance and withdrawal as an essential feature to diagnose an addiction. When suggesting the addiction model, they emphasize that tolerance and withdrawal are not part their model, as many drugs of abuse are also not associated with tolerance and do

not have specific withdrawal symptoms. Garcia and Thibaut (2010) bring a general report of CSBD patients about intense feeling of dysphoria and depressive thoughts when they attempt to cease inappropriate sexual behaviors. The authors compare it to the withdrawal symptoms after abrupt cessation of consuming drugs. As with "tolerance" neither the SAST nor the HBI include items assessing the "withdrawal" phenomenon. Thus, to conclude, we did not find methodological evidence for the existence of "tolerance" among CSBD patients. It is worth emphasizing that the *DSM-5* requires that the withdrawal symptoms (for substance addiction) are not better explained by another mental disorder, if so, those withdrawal symptoms are defined as such only if they are not explained by – for example – a prior state that may lead to the "addiction" at the first place as a coping strategy.

Conflict. Regarding Gambling Disorder, the *DSM-5* defines the criterion that reflects the maladaptive facet of the behavior as, "Has jeopardized or lost a significant relationship, job, or educational or career opportunity because of gambling." Regarding CSBD, Carnes et al. (2010), in their revised version of the SAST, the SAST-R, narrow the definition to "Relationship Disturbance" which described by them as significant problems caused by a sexual behavior. Consequently, in the "Relationship Disturbance" section of their questionnaire, they included only items referring to relationship problems.[1] One item (16) does include other domains of life but they have combined it together with relationship so there is no information specifically regarding those other domains. Naturally, any irregular sexual behavior might adversely affect close relationships even if not caused by clinically significant pathology, so we want to broaden the disturbance effect to different domains of life such as work or education. Additionally, in order to diagnose an addiction, we need to verify that the adverse consequences are caused by the frequency of the behavior and not by any other characteristics such as bizarre or disloyal sexual activity. Indeed, Reid et al. (2012) did find adverse consequences caused by the frequency of sexual thoughts and acts and specifically excluded relationship difficulties caused for example by extra dyadic affairs. In summary, those findings from studies using the HBI questionnaire do suggest "adverse consequences" as described by the *DSM-5* regarding Gambling Disorder, but as we wrote before, those "adverse consequences" are supposed to be tested under the framework of addiction paradigm together with other necessary symptoms such as tolerance and withdrawal.

Repeated unsuccessful attempts to quit – Relapse. One of the core elements of any addiction is the loss-of-control experience. This is reflected in the *DSM-5* criteria for substance use disorder by requiring that "the Substance is taken in larger amounts or over a longer period than was intended" and "There is a persistent desire or unsuccessful efforts to cut down or control substance use." Interestingly, the aspect of lack-of-control appears different in the Gambling Disorder where the relevant criterion is "has made repeated unsuccessful efforts to control, cut back, or stop gambling." Theoretical writing attributes the uncontrollable facet to CSBD (Carnes, 1996). Individuals with CSBD experience their sexuality as excessive and out of control (Winters, Christoff, & Gorzalka, 2010). Kraus, Rosenberg, and Tompsett (2015) found CSBD to be negatively correlated with self-efficacy to initiate taking measures to reduce pornography use. Carvalho, Štulhofer, Vieira, and Jurin (2015), as well as Pachankis, Rendina, Ventuneac, Grov, and Parsons (2014) found that individuals with CSBD perceive an inability to control their sexuality. Regarding the assessment tools discussed above; The SAST has a "loss of control" component that includes items such as: "Have you made efforts to quit a type of sexual activity and failed?" or, "do you feel controlled by your sexual desire." The HBI has also "control" factor that includes also items such as "I engage in sexual activities that I know I will later regret." Different studies using the SAST and the HBI showed constantly and repeatedly that losing control over the sexual behavior and failing the attempts to restrain it are a key feature of CSBD (e.g. Carnes et al., 2014; Kingston et al., 2018; Reid, Garos, & Carpenter, 2011). In summary, as argued before, further research needs to assess this criterion alongside the other addiction criterions. Additionally, since the current questionnaires add more exhibitions of lack-of-control than the *DSM*'s definition, a refinement of this criterion as it appears in assessment tools, should be considered.

NEUROBIOLOGY

Another domain that determines the classification of CSBD is the neurobiological mechanism of CSBD and its similarities to other disorders. A sexual pleasure is involved with neural reward system such as the mesolimbic dopamine pathway (Balfour, Yu, & Coolen, 2004). According to "salience incentive theory of addiction" (Robinson & Berridge, 2008), this neural activity is linked to "wanting" hedonic stimuli rather than "liking," and pathological activity of the dopamine-"wanting" system is behind addictive behavior. Neuroimaging Studies comparing non-CSBD and CSBD patients showed – like substances addiction – augmented reactivity in the mesolimbic (wanting) area. For example, Voon et al. (2014) showed how sexual cues lead to greater cortico-striatal activity by CSBD patients compared with healthy control participants. Specifically, the greater activity was found in the dorsal anterior cingulate, ventral striatum and amygdala. This pathway suggests for more wanting (as opposed to liking) arousal by CSBD patients as a reaction to sexual cues. Gola et al. (2017) showed that

[1] 6. Has your sexual behavior ever created problems for you and your family? 7. Has anyone been hurt emotionally because of your sexual behavior? 16. Have important parts of your life (such as job, family, friends, leisure activities) been neglected because you were spending too much time on sex? 26. People in my life have been upset about my sexual activities online

compared to control participants, individuals with problematic pornography use showed greater neural activation in response to cues predicting sexual stimuli. This difference was not shown in reaction to the actual sexual stimuli which suggests for differences in "wanting" rather than in "liking." Furthermore, Brand, Snagowski, Laier, & Maderwald (2016) found that CSBD patients showed stronger ventral striatum activity for preferred compared to non-preferred pornographic stimuli and not only when comparing pornographic with non-pornographic material. Similarly, Seok and Sohn (2015) showed that compared to the control group, CSBD patients had more intense and more frequent – due to sensitization – activity in reaction to pornographic stimuli. Those findings suggest advocating for the addiction model of CSBD. Based upon the mentioned studies in addition to other studies, Stark, Klucken, Potenza, Brand, & Strahler (2018), as well as Kowalewska et al. (2018) concluded in their review that CSBD should be classified as an addiction. Slightly different results found by Klucken, Wehrum-Osinsky, Schweckendiek, Kruse, & Stark (2016) showed greater activity – by CSBD patients compared to control participants in the amygdala in reaction to conditioned stimuli but found no differences between CSBD and control participants in the ventral striatum.

In addition to differences in cue activation between CSBD and control participants, there is also evidence of differences in brain structure. Time spent watching pornography was negatively corelated with gray matter volume in the striatum. Volumetric differences in the striatum have previously been associated with substance use disorder but with mixed results. While some studies reporting a decrease, others reported an increase of grey matter volume. Consuming pornography was found also to be related to poorer connectivity between the striatum and the left dorsolateral prefrontal cortex (Kühn & Gallinat, 2014) and the superior temporal gyrus (Seok & Sohn, 2018). Seok and Sohn (2018) also found gray matter enlargement in the right cerebellar tonsil amongst CSBD patients and they pointed out the role of this area in OCD and that similar findings were observed in OCD patients. Schmidt et al. (2017) have found increased volume in the amygdala that is relevant to motivational salience and emotional processing. They argued the fact that opposite findings were shown regarding alcohol addiction and raise the assumption that it is a result of alcohol neurotoxicity.

More possible relevant information comes from Diffusion Tensor Imaging (DTI). DTI is an MRI technique that examines white matter integrity by measuring self-diffusion of water in the brain tissue. Kor et al. (2013) have found differences in the inferior frontal region between patients with pathological gambling and healthy participants. Regarding CSBD, Miner, Raymond, Mueller, Lloyd, and Lim (2009) have found no differences between CSBD patients and control participants. In fact, some differences were shown in the superior frontal region, suggesting similarities to patterns found by OCD patients, which might also imply that CSBD fits better to an OCD model. Thus, while according to Stark et al. (2018), Kowalewska et al., (2018), Kraus et al. (2016) and Kor et al. (2013) neuroimaging data supports the addiction model it seems that other neuroimaging studies require in order to examine also the OCD model.

CSBD and neurochemical interplay can also shed some light on the relatedness of CSBD and addiction. Naltrexone, an opioid antagonist that is primarily used to manage alcohol or opioid dependence, was found as effective at reducing urges and behaviors associated with CSBD (Raymond, Grant, & Coleman, 2010). This is consistent with its role in gambling disorder and it supports the addiction model of CSBD. A literature review conducted by Nakum and Cavanna (2016) shows higher prevalence of CSBD among patients with Parkinson's disease who were treated with dopamine replacement therapy (TRP), especially with dopamine agonists. Kraus et al. (2016) argued that the association between TRP and CSBD can resolve the classification issue, but to our opinion the findings about TRP is not a decisive evidence regarding this puzzle since TRP has been found to cause a variety of impulse–control problems and not necessarily addictive behaviors (see Potenza, Voon, & Weintraub, 2007; Seeman, 2015).

DISCUSSION

The scientific interest in hypersexuality or CSBD has considerably elevated since the publication of Carnes's book *The Sexual Addiction* (1983). Since then, a debate was conducted whether considering CSBD as a distinct clinical disorder and under which groups of disorders it should be classified. Three possible categories of mental disorders are being suggested as a framework of CSBD, namely: impulse control, OCD and a behavioral addiction. The evidence that is needed to answer these questions should come from the fields of: epidemiology, phenomenology, mental health and neurobiology.

In the early review by Kor et al. (2013) the authors have discussed the similarities and differences between hypersexual disorder, drug addiction, and pathological gambling. They have concluded that despite many similarities between the features of hypersexual behavior and substance-related disorders, the research on CSBD disorder at this time is in its infancy and much remains to be learned before definitively characterizing CSBD disorder as an addiction at this time.

Later on, Kraus et al. (2016) have reviewed the evidence for regarding CSBD as a behavioral addiction from epidemiological, phenomenological, clinical and biological domains with respect to data from substance addiction and gambling disorder. They have found overlapping features between CSBD and substance-use disorders such as common neurotransmitter systems and similar craving and attention biases that were shown by recent neuroimaging studies. Also, similar pharmacological and psychotherapeutic treatments may be applicable to CSBD and substance addictions, although there is little evidence at the moment to support that. The authors have concluded that despite the growing body of research linking

compulsive sexual behavior to substance addictions, significant gaps in understanding continue to complicate classification of compulsive sexual behavior as an addiction. Finally, Bőthe, Koós, et al. (2019) have used self-report data from a very large community sample and they have rejected the OCD model and they have concluded that compulsivity is a negligible component of CSBD while impulsivity has a major role in it.

In this paper we have reviewed the evidence in view of the theories that see compulsive sexual behavior as a behavioral addiction. We have used Griffiths (2005) six components model of addiction to evaluate the existing literature about CSBD. The components are: Salience, Mood modification, Tolerance, Withdrawal, adverse consequences and relapse. In addition, we have reviewed the recent data about the neurological and neurochemical nature of CSBD as well as a short review of the prevalence of this phenomenon. Our review reveals that in the phenomenology aspect most of the studies did not include all the six components of behavioral addiction in their definition of CSBD. As a result, for the most part, those components have not been investigated as a whole construct so that the little empirical evidence we do have, gives us only a fragmented picture of the phenomenology of CSBD. Additionally, looking at the neuroscience field, as opposed to the conclusive view of Stark et al. (2018) and Kowalewska et al. (2018) that see CSBD as addiction, we think the data suggesting that there is a compulsive component in CSBD should be given more attention and further research.

Recommendations for future research

We think the main field that suffers from stagnation is the phenomenology research of CSBD. In order to assess properly the nature of this phenomenon and decide whether it fits the addiction model, we recommend using a comprehensive assessment that includes all the addiction components. Recently, three assessment tools were developed, one corresponds with the *ICD-11* criteria for CSBD and two that correspond with the six components of addiction. The Compulsive Sexual Behavior Disorder Scale (CSBD-19; Bőthe et al., 2020) is a 19-item self-report measuring tool that aims to assess CSBD based on *ICD-11* diagnostic guidelines. The authors recognized in the *ICD-11* criteria, five domains (i.e., control, salience, relapse, dissatisfaction, and negative consequences) and the CSBD-19 is loaded with five factors reflecting these domains. The CSBD-19 show good psychometric properties in terms of factor structure, reliability, measurement invariance, and associations with theoretically relevant constructs (Bőthe et al., 2020). The Bergen–Yale Sex Addiction Scale (BYSAS; Andreassen, Pallesen, Griffiths, Torsheim, & Sinha, 2018) and the Problematic Pornography Consumption Scale (PPCS; Bőthe, Tóth-Király et al., 2018) both reflect the six components of addiction. The BYSAS comprises of six items simply depict the six components of addiction as discussed above. The psychometric properties support one factor model consists of the six items and show good internal consistency (*Cronbach's* $\alpha = 0.83$) of the six components. We believe clinical population-based research is needed to determine through the BYSAS whether CSBD consists of the six-component addiction and whether a single item is enough to encompass each of the addiction components. The PPCS is more elaborate and includes 18 items with three items dedicated to each of the six components. As we wrote before, some components such as "salience" might suffer from subjective bias when they are self-reported. Thus, we suggest using clinician administrated inventories that also specify the frequency of the sexual acts and thoughts such as the Sexual Outlet Inventory (SOI) as recommended by Hook, Hook, Davis, Worthington, and Penberthy (2010) or interviews by trained clinician (Reid et al., 2012). Regarding the PPCS, it is important to note that Bőthe, Tóth-Király et al. (2018) differentiate between CSBD and "problematic pornography consumption." According to Bőthe, Koós, et al. (2019), problematic pornography use is not necessary considered a manifestation of CSBD. For example, they differ in the extent of impulsivity involved (Bőthe, Tóth-Király et al., 2019) and their association with attention deficit hyperactivity disorder (Bőthe, Koós, et al., 2019). These findings support Derbyshire and Grant (2015) claim that CSBD does not reflect just one type of problematic sexual behavior and that there is a substantial heterogeneity within the disorder.

Additionally, since researchers define and interpret differently some of the mentioned components of addiction, we recommend using and interpreting those components homogeneously according to the *DSM-5* criteria for "Gambling Disorder." Regarding epidemiology data, after defining a consistent construct of the disorder, more population-based studies should be done to asses better the prevalence of CSBD among different populations. Mapping the prevalence of CSBD amongst different groups might shed more light on the essence and nature of CSBD.

To summarize, it seems that the conclusion of previous reviews by Kor et al. (2013), Derbyshire and Grant (2015) and Kraus et al. (2016) supports our conclusion that although the evidence may support the view of CSBD as a behavioral addiction there is insufficient data to determine this conclusion. We agree with Derbyshire and Grant (2015) who argued that the categorization of CSBD is still a challenge that requires further research and understanding.

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