




AKADÉMIAI KIADÓ

Impulsivity in Compulsive Sexual Behavior Disorder and Pedophilic Disorder

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BRIEF REPORT



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ABSTRACT

Background and aims: Impulsivity is regarded as a risk factor for sexual crime reoffending, and a suggested core feature in Compulsive Sexual Behavior Disorder. The aim of this study was to explore clinical (e.g. neurodevelopmental disorders), behavioral and neurocognitive dimensions of impulsivity in disorders of problematic sexuality, and the possible correlation between sexual compulsivity and impulsivity. **Methods:** Men with Compulsive Sexual Behavior Disorder ($n = 20$), and Pedophilic Disorder ($n = 55$), enrolled in two separate drug trials in a specialized Swedish sexual medicine outpatient clinic, as well as healthy male controls ($n = 57$) were assessed with the Hypersexual Behavior Inventory (HBI) for sexual compulsivity, and with the Barratt Impulsiveness Scale (BIS) and Connors' Continuous Performance Test-II (CPT-II) for impulsivity. Psychiatric comorbidity information was extracted from interviews and patient case files. **Results:** Approximately a quarter of the clinical groups had Attention-Deficit/Hyperactivity Disorder (ADHD) or Autism Spectrum Disorder. Both clinical groups reported more compulsive sexuality ($r = 0.73$ – 0.75) and attentional impulsivity ($r = 0.36$ – 0.38) than controls ($P < 0.05$). Based on results on univariate correlation analysis, BIS attentional score, ADHD, and Commissions T-score from CPT-II were entered in a multiple linear regression model, which accounted for 15% of the variance in HBI score ($P < 0.0001$). BIS attentional score was the only independent positive predictor of HBI ($P = 0.001$). **Discussion:** Self-rated attentional impulsivity is an important associated factor of compulsive sexuality, even after controlling for ADHD. Psychiatric comorbidity and compulsive sexuality are common in Pedophilic Disorder. **Conclusion:** Neurodevelopmental disorders and attentional impulsivity – including suitable interventions – should be further investigated in both disorders.

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KEYWORDS

Compulsive Sexual Behavior Disorder, Pedophilic Disorder, impulsivity, compulsivity

INTRODUCTION

Compulsive Sexual Behavior Disorder (CSBD) is a diagnosis in the 11th edition of the International Classification of Diseases (ICD-11), section of impulse control disorders (World Health Organization, 2018). It involves a persistent pattern of failure to control intense repetitive sexual impulses or urges, resulting in sexual behaviors with negative consequences

affecting different areas of life. There are indications that CSBD and impulsivity importantly relates (Bothe et al., 2019), and that CSBD present similar impulses and reward processing as addictive disorders (Grubbs et al., 2020). However, it is still unclear whether impulsivity is an integrated part of CSBD, is represented in possible subtypes or contexts (e.g. sexual), or is primary related to conditions highly associated with impulsivity e.g. Attention-Deficit/Hyperactivity Disorder (ADHD) or alcohol use. Symptoms of compulsive sexual behavior are common in men primarily seeking treatment for paraphilic disorders, and vice-versa (Sutton, Stratton, Pytyck, Kolla, & Cantor, 2015; Engel et al., 2019). Findings of impulsivity in Pedophilic Disorder (PeD) are inconsistent (Cohen et al., 2002).

Nevertheless, there is limited data on CSBD, PeD, and the link to impulsivity. Remarkable considering that sexual preoccupation, impulsivity and deviant sexual preferences are risk factors for sexual crime reoffending (Hanson & Morton-Bourgon, 2005).

Aims

In this study, we aimed to investigate behavioral and neurocognitive dimensions of impulsivity, and the occurrence of neurodevelopmental disorders likely to be associated with impulsivity in men seeking treatment for CSBD or PeD in the same subspecialized sexual medicine unit, as well as in healthy male controls.

We also investigated association between sexual compulsivity and impulsivity measures. Based on the assumption that CSBD is associated with impulsivity, we hypothesized that impulsivity is positively related to the level of compulsive sexual behavior also after adjustment for ADHD and alcohol use. Since trait of compulsive sexual behaviors are common in PeD, we also hypothesized that the PeD group would present more impulsivity than controls, although the literature is inconsistent.

METHODS

Participants

Data from two separate drug trials on CSBD and PeD was included in this study (Table 1). The PeD trial only invited men due to the drug properties and no women applied for the CSBD study. Both studies were conducted during overlapping time periods (2016–2019; 2018–2019) at ANOVA, a multi-disciplinary center for research, assessment, and treatment in andrology, sexual medicine, and transgender medicine at the Karolinska University Hospital, Stockholm, Sweden.

CSBD: Thirty-two men were evaluated on-site, of which 20 were included in a pilot study of the opioid antagonist naltrexone for CSBD (Savard et al., 2020). Two independent interviews with a board-certified psychiatrist and a psychologist confirmed the diagnosis of CSBD according to ICD-11 and the conceptualization of Hypersexual Disorder (Kafka, 2010) (not meeting criteria, $n = 7$). Exclusion criteria included severe physical illness or mental disorder

such as current psychotic episode, a substance use disorder during the past month ($n = 3$), participation in another study ($n = 1$) or ongoing psychotherapy ($n = 1$). No participant met criteria for PeD.

PeD: Sixty-five men were screened by phone for eligibility by a board-certified psychiatrist. Exclusion criteria included severe psychosis, severe ongoing substance-related disorders, and the use of hormonal therapy. Three participants did not meet criteria for PeD, six declined participation and one had hormonal therapy. Hence, fifty-five men were evaluated on-site by a psychiatrist for PeD according to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5) (American Psychiatric Association, 2013) and included for participation in a double-blind, randomized, controlled trial of a testosterone-suppressing agent (Landgren et al., 2020).

Healthy controls: Fifty-seven men age-matched to the PeD cohort were recruited from the Karolinska Trial Alliance database, and by advertisement on the Karolinska Institutet website. They were included after a telephone interview as part of the PeD study. Subjects did not meet criteria for PeD or any of the exclusion criteria in the PeD study. Neither the PeD group, nor the healthy controls were formally interviewed for a diagnosis of CSBD.

Measures

A full list of measures with psychometric properties are presented in [Supplementary Table 1](#).

Psychiatric comorbidity. The Mini International Neuropsychiatric Interview (MINI) version 6.0 (PeD; controls) and 7.0 (CSBD), a validated diagnostic structured interview, was used to assess for mental disorders (Sheehan et al., 1998).

The Alcohol Use Disorders Identification Test (AUDIT) (Saunders, Aasland, Babor, de la Fuente, & Grant, 1993), and the Drug Use Disorders Identification Test (DUDIT) (Berman, Bergman, Palmstierna, & Schlyter, 2005) were used for eligibility assessments.

Compulsive sexual behavior. The Hypersexual Behavior Inventory (HBI) is a scale designed to reflect the proposed DSM-5 criteria of Hypersexual Disorder. HBI consists of three subscales, which measure sex as a coping mechanism, the experience of loss of control, and negative consequences (Reid, Garos, & Carpenter, 2011).

Impulsivity. The Barratt Impulsiveness Scale (BIS) consists of three subscales measuring motor, non-planning, and attentional impulsivity (Patton, Stanford, & Barratt, 1995). Conners' Continuous Performance Test (CPT-II) is a computerized measure with suggested impulsivity variables: Commission errors, Hit RT, and Perseverations (Conners & MHS Staff, 2000).

Procedure

Study participants were screened for inclusion when calling the national helpline PrevenTell for individuals with self-identified compulsive sexual behavior and/or paraphilia. Assessments were performed in face-to-face interviews



Table 1. Sociodemographic Factors, Clinical Characteristics and Assessments of Compulsive Sexual Behavior, Self-rated Impulsivity, and Neurocognitive Impulsivity

Variable	Group						Statistic	Effect measure: Odds ratio (95% confidence interval)
	CSBD (n = 20)		PeD (n = 55)		HC (n = 57)			
	Median (range)	Mean (SD)	Median (range)	Mean (SD)	Median (range)	Mean (SD)		
Age, y	35.5 (27–60)	39 (10)	36 (18–66)	36 (12)	35 (18–64)	36 (12)	H (2) = 0.99 P = 0.61	N/A
Sociodemographic	n	%	n	%	n	%		
Highest level of education								
Compulsory school (≤ 9 years) or upper secondary school (12 years)	12	60	32	58	25	44	$\chi^2 = 2.9$ (2, n = 132) P = 0.24	PeD vs. CSBD: OR = 1.1 (0.4; 3.1) PeD vs. HC: OR = 0.6 (0.3; 1.2) CSBD vs. HC: OR = 0.5 (0.2; 1.5)
University	8	40	23	42	32	56		
Employed	18	90	32	58	50	88	$\chi^2 = 15.9$ (2, n = 132) P < 0.001 PeD < CSBD = HC	PeD vs. CSBD: OR = 0.2 (0.03; 0.7) PeD vs. HC: OR = 0.2 (0.08; 0.5) CSBD vs. HC: OR 1.3 (0.2; 6.6)
Cohabitation	18	90	21	38	36	63	$\chi^2 = 17.7$ (2, n = 132) P < 0.001 PeD < HC < CSBD	PeD vs. CSBD: OR = 0.07 (0.01; 0.3) CSBD vs. HC: OR = 5.3 (1.1; 24.9) PeD vs. HC: OR = 0.4 (0.2; 0.8)
Parent	11	55	20	36	26	46	$\chi^2 = 2.3$ (2, n = 132) P = 0.31	PeD vs. CSBD: OR = 0.5 (0.2; 1.3) CSBD vs. HC: OR = 1.5 (0.5; 4.1) PeD vs. HC: OR = 0.7 (0.3; 1.5)
Current affective or anxiety disorder ^a	5	25	36	66	2	4	$\chi^2 = 49.5$ (2, n = 132) P < 0.001 HC < CSBD < PeD	PeD vs. CSBD: OR = 5.7 (1.8; 18.0) CSBD vs. HC: OR = 9.2 (1.6; 52.0) PeD vs. HC: OR = 52.1 (11.4; 237.4)
Neurodevelopmental disorder (specified below)	5	25	12	22	0	0	$\chi^2 = 15.0$ (2, n = 132) P = 0.001 HC < CSBD = PeD	CSBD vs PeD: OR = 1.2 (0.4; 4.0)
Autism spectrum disorder	0	0	5	9	0	0		N/A
ADHD	5	25	10	18	0	0	FET, P = 0.53	CSBD vs PeD: OR = 1.5 (0.4; 5.1)

(continued)





Table 1. Continued

Variable	Group						Statistic	Effect measure: Odds ratio (95% confidence interval)
	CSBD (n = 20)		PeD (n = 55)		HC (n = 57)			
	Median (range)	Mean (SD)	Median (range)	Mean (SD)	Median (range)	Mean (SD)		
Baseline measures	CSBD		PeD		HC		Statistic	Effect measure: <i>r</i>
	Median (range)	Mean (SD)	Median (range)	Mean (SD)	Median (range)	Mean (SD)		
AUDIT	4 (0–11)	4.5 (3.4)	2 (0–27)	4.1 (5.8)	5 (0–15)	5.0 (3.2)	H (2) = 9.42 <i>P</i> = 0.009 PeD < HC	PeD vs. HC: <i>r</i> = 0.29 CSBD vs. PeD: <i>r</i> = 0.16 CSBD vs. HC: <i>r</i> = 0.08
DUDIT	0 (0–4)	0.3 (0.9)	0 (0–12)	1.3 (2.9)	0 (0–8)	0.6 (1.5)	H (2) = 1.45 <i>P</i> = 0.5	CSBD vs. PeD: <i>r</i> = 0.13 CSBD vs. HC: <i>r</i> = 0.08 PeD vs. HC: <i>r</i> = 0.04
HBI total	74.5 (42–89)	72.8 (13.1)	56 (19–93)	56.3 (17.0)	24 (19–54)	26.9 (7.9)	H (2) = 81.13, <i>P</i> < 0.001 CSBD > PeD > HC	CSBD vs. PeD: <i>r</i> = 0.44 CSBD vs. HC: <i>r</i> = 0.75 PeD vs. HC: <i>r</i> = 0.73
HBI coping	27.5 (10–35)	24.7 (8.0)	20 (7–35)	19.6 (7.6)	10 (7–23)	11.7 (4.3)	H (2) = 45.97, <i>P</i> < 0.001 CSBD > PeD > HC	CSBD vs. PeD: <i>r</i> = 0.28 CSBD vs. HC: <i>r</i> = 0.62 PeD vs. HC: <i>r</i> = 0.52
HBI control	35 (16–40)	33.5 (5.8)	27 (8–40)	27.0 (8.2)	9 (8–27)	10.0 (3.8)	H (2) = 86.03, <i>P</i> < 0.001 CSBD > PeD > HC	CSBD vs. PeD: <i>r</i> = 0.40 CSBD vs. HC: <i>r</i> = 0.76 PeD vs. HC: <i>r</i> = 0.78
HBI consequences	15 (9–27)	14.6 (3.3)	10 (4–20)	9.9 (3.6)	5 (4–11)	5.2 (1.6)	H (2) = 73.40, <i>P</i> < 0.001 CSBD > PeD > HC	CSBD vs. PeD: <i>r</i> = 0.51 CSBD vs. HC: <i>r</i> = 0.77 PeD vs. HC: <i>r</i> = 0.64
BIS total	71 (45–89)	68.4 (13.1)	64.5 (42–88)	66.3 (10.7)	63 (46–84)	62.3 (8.1)	H (2) = 5.76, <i>P</i> = 0.056	CSBD vs. HC: <i>r</i> = 0.23 PeD vs. HC: <i>r</i> = 0.19 CSBD vs. PeD: <i>r</i> = 0.08
BIS attention	20 (9–27)	19.2 (4.5)	18 (9–29)	18.5 (4.4)	15 (10–25)	15.5 (3.3)	H (2) = 18.65, <i>P</i> < 0.001 CSBD = PeD > HC	CSBD vs. HC: <i>r</i> = 0.38 PeD vs. HC: <i>r</i> = 0.36 CSBD vs. PeD: <i>r</i> = 0.10
BIS motor	23 (17–31)	23.6 (4.7)	23 (15–34)	23.1 (4.2)	22 (15–33)	22.9 (3.7)	H (2) = 0.15, <i>P</i> = 0.93	CSBD vs. PeD: <i>r</i> = 0.04 CSBD vs. HC: <i>r</i> = 0.05 PeD vs. HC: <i>r</i> = 0.006
BIS non-planning	27.5 (17–35)	25.7 (5.6)	25 (14–35)	25.0 (4.7)	24 (17–31)	23.8 (3.4)	H (2) = 3.46, <i>P</i> = 0.18	CSBD vs. PeD: <i>r</i> = 0.05 CSBD vs. HC: <i>r</i> = 0.17 PeD vs. HC: <i>r</i> = 0.15
CPT-II ^b Commission errors, T-score	50.4 (38.0–68.9)	50.0 (9.7)	50.9 (32.9–73.0)	52.1 (10.1)	47.5 (34.2–71.3)	48.3 (8.2)	H (2) = 4.24, <i>P</i> = 0.12	CSBD vs. PeD: <i>r</i> = 0.10 CSBD vs. HC: <i>r</i> = 0.07

(continued)

Table 1. Continued

Variable	Group						Statistic	Effect measure: Odds ratio (95% confidence interval)
	CSBD (n = 20)		PeD (n = 55)		HC (n = 57)			
	Median (range)	Mean (SD)	Median (range)	Mean (SD)	Median (range)	Mean (SD)		
HIT RT, T-score	54.3 (34.3– 66.6)	52.1 (9.1)	49.5 (29.7–81.1)	50.7 (10.3)	51.2 (38.3– 73.2)	52.0 (8.4)	H (2) = 1.56, P = 0.46	PeD vs. HC: r = 0.20 CSBD vs. PeD: r = 0.12 CSBD vs. HC: r = 0.06 PeD vs. HC: r = 0.09
Perseverations, T-score	45.8 (42.5– 109.2)	49.3 (14.9)	45.8 (42.5–109.2)	53.8 (15.2)	45.8 (42.5– 70.0)	47.1 (5.7)	H (2) = 11.59, P = 0.003 PeD > CSBD = HC	CSBD vs. PeD: r = 0.26 PeD vs. HC: r = 0.30 CSBD vs. HC: r = 0.03
Perseverations, raw score	0 (0–3 (IQR = 0)	0.3 (0.8)	0 (0–10) (IQR = 0–1)	0.9 (1.7)	0 (0–4) (IQR = 0)	0.3 (0.8)	H (2) = 8.63, P = 0.013 PeD > HC	PeD vs. HC: r = 0.25 CSBD vs. PeD: r = 0.21 CSBD vs. HC: r = 0.10

Notes: Test statistics: H = Kruskal-Wallis test with r as effect measure; χ^2 = Chi-square test; FET = Fisher's exact Test; Odds ratios (OR) and confidence intervals are only calculated in 2 x 2 table when at least one cell ≥ 1 .

Abbreviations and symbols: ^a = According to Mini International Neuropsychiatric Interview; ^b = Population norm T-score = 50 (SD = 10). ADHD = Attention-Deficit/Hyperactivity Disorder; CSBD = Compulsive Sexual Behavior Disorder; HC = Healthy Controls; N/A = Not applicable; PeD = Pedophilic Disorder.

Variables: AUDIT = Alcohol Use Disorders Identification Test (Missing data: PeD = 2); DUDIT = The Drug Use Disorders Identification Test (Missing data: PeD = 2); HBI = Hypersexual Behavior Inventory (Missing data HBI total: PeD = 3; control PeD = 3; coping and consequences PeD = 2); BIS = Barratt Impulsiveness Scale (Missing data BIS total: PeD = 5, HC = 1; attentional and non-planning PeD = 4; motor PeD = 5, HC = 1); CPT-II = Conners' Continuous Performance Test (Missing data: CSBD = 1).



including information of previous diagnosis of Autism Spectrum Disorder or ADHD including all subtypes. In Sweden, an extensive clinical assessment of neurodevelopmental disorders includes psychiatric and psychological interviews and neurocognitive testing.

Statistical analysis

All analyses were carried out using IBM SPSS Statistics 25.0. The Kruskal-Wallis test and Mann-Whitney U test were used for group comparisons as the Shapiro-Wilk test as well as skewness ranging from -1.7–4.0 and kurtosis from -1.3–16.9 indicated non-normal distributions. Effect sizes were calculated using r and interpreted according to Cohen (J. Cohen, 1988; Pallant, 2016). For dichotomous data, a χ^2 -test was used, or Fisher's exact test if expected frequencies were less than five. Odds ratios (OR) are reported for significant tests where at least one cell ≥ 1 . Based on results of univariate correlation analyses of all study participants, variables likely to influence sexual compulsivity were integrated simultaneously in a standard multiple linear regression model (assumptions for the analysis were met, all analyses $\alpha < 0.05$). The sample size was regarded a priori large enough for the regression analysis (Tabachnick & Fidell, 2006, p. 123).

Ethics

The study procedures were carried out in accordance with the Declaration of Helsinki. All subjects were informed about the study and all provided written informed consent. The Swedish Ethical Review Authority approved both studies and that data were analyzed together (Ref. no. 2020-01258 and 2019-06092).

RESULTS

Sociodemographic factors and psychiatric comorbidity

Group differences among the 132 men are presented in Table 1. Men with PeD were less likely to be employed (OR = 0.2, 95% CI 0.03; 0.7) or cohabit (OR = 0.07, 95% CI 0.01; 0.3) in comparison to the CSBD group as well as in controls (employment OR = 0.2, 95% CI 0.08; 0.5; cohabitant OR = 0.4, 95% CI 0.2; 0.8). The rate of current affective and anxiety comorbidities was higher in the PeD group (66%) in comparison to the CSBD group (25%; OR = 5.7, 95% CI 1.8; 18.0).

Approximately a quarter of the clinical groups had a previous neurodevelopmental disorder diagnosis (Table 1).

Assessment of compulsive sexual behavior and impulsivity

Table 1 shows mean scores on HBI, BIS, and CPT-II. Thirty-three among PeD and one among healthy controls met the suggested cut-off ≥ 53 on HBI. The clinical groups had higher HBI scores than the controls (all P -values < 0.001). The CSBD group reported higher scores on all HBI scales and subscales compared to PeD group with medium-large effect sizes for the total score ($r = 0.44$), control and

consequences subscales ($r = 0.40$; $r = 0.51$), and low-medium for the coping subscale ($r = 0.28$).

The clinical groups scored higher on the BIS attentional subscale (CSBD vs. controls $r = 0.38$; PeD vs. controls $r = 0.36$). There were no significant differences between the three groups on motor and non-planning subscales.

Results from the CPT-II revealed no group differences in T-scores of Commission errors or Hit RT. The PeD group recorded higher Perseveration T-scores than the CSBD group and controls. However, the data was remarkably skewed and therefore the Perseveration raw scores were also analyzed, hence the difference remained only between PeD and controls ($r = 0.25$).

The correlation between impulsivity and compulsive sexual behavior

Commission errors T-score ($r = 0.20$) and ADHD diagnosis ($r = 0.29$) were positively associated with HBI in all participants, as was BIS total ($r = 0.30$), non-planning ($r = 0.23$) and attentional score ($r = 0.40$. Supplementary Figure 1). Based on these results, a multiple regression analysis was performed using HBI total score as a dependent variable and BIS attentional score, ADHD diagnosis, and Commission errors T-score were simultaneously entered as independent variables. The overall model was significant ($F = 8.39$, $P < 0.0001$) with $R = 0.41$, $R^2 = 0.17$ and adjusted $R^2 = 0.15$, which implies that the model accounted for 15% of the variance in HBI score. Only BIS attentional score was an independent predictor of HBI, with $B = 1.62$, $\beta = 0.31$ ($P = 0.001$) indicating a positive relationship with the two measures (Table 2).

Finally, to control for the known association between alcohol use disorders and impulsivity, a sensitivity analysis was conducted with AUDIT scores entered as an independent variable in the regression model; this was found not to be a significant independent predictor, nor lead to enhancement of the adjusted R^2 .

DISCUSSION

This study explored associations between dimensions of impulsivity and compulsive sexuality, remarkably understudied despite of indication of importance in CSBD and PeD.

Despite similar education levels across the three groups, the PeD group presented lower psychosocial functioning as well as higher rates of autism spectrum disorder and current affective and anxiety disorders, compared to the CSBD group and controls. Additionally, ADHD was more common in both clinical groups than in the general population (Polyzoi, Ahnemark, Medin, & Ginsberg, 2018). Attentional impulsivity was higher in both clinical groups, but did not differ between men with PeD and CSBD. Symptoms of compulsive sexuality were common in PeD; the routine assessment should evaluate whether such symptoms are a result of distress and negative consequences linked to their sexuality or comorbid CSBD.



Table 2. Correlation Matrix and Results of the Multiple Linear Regression Analysis for Impulsivity Factors and the Dependent Variable Hypersexual Behavior Inventory (HBI)

Variable	n	M	SD	1	2	3	4
1. HBI total	129	45.84	22.02	–			
2. BIS attentional	128	17.27	4.27	$r = 0.40 P < 0.001$	–		
3. ADHD	132	–	–	$r = 0.29 P = 0.001$	$r = 0.45 P < 0.001$	–	
4. CPT commissions T-score	131	50.15	9.34	$r = 0.20 P = 0.026$	$r = 0.24 P = 0.007$	$r = 0.18 P = 0.041$	–

Effect	B	SE	95% CI		β	t	P
			LL	UP			
Intercept	6.07	11.66	–17.01	29.16			0.60
BIS attentional	1.62	0.48	0.66	2.57	0.31	3.36	0.001
ADHD	9.90	6.74	–3.45	23.26	0.13	1.47	0.15
CPT commissions, T-score	0.21	0.20	–0.18	0.61	0.09	1.06	0.29

$R = 0.41, R^2 = 0.17$ (adjusted $R^2 = 0.15$)

Notes: HBI = The Hypersexual Behavior Inventory; BIS = Barratt Impulsiveness Scale; ADHD = Attention-Deficit/Hyperactivity Disorder; CPT = Conners' Continuous Performance Test; CI = confidence interval; LL = lower limit; UL = upper limit; β = Standardized Coefficients Beta.

Our results suggest self-rated attentional impulsivity, rather than motor or non-planning impulsivity, to be an associated factor with compulsive sexual behavior. As hypothesized (attentional) impulsivity was positively associated to the level of compulsive sexual behavior also after adjustment for ADHD, though a large proportion of variance in compulsive sexuality is explained by other factors than the measures used in this study. For example, affective disorders has been suggested to predict compulsive sexuality (Scanavino et al., 2013).

One strength of this study compared to previous studies is the relatively large number of formally diagnosed participants in both the PeD and CSBD groups enrolled during overlapping time periods, thus making the study unique in its use of DSM-5 and ICD-11 diagnostic criteria, respectively.

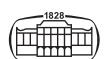
Further, we were able to investigate behavioral and neurocognitive dimensions of impulsivity in relation to compulsive sexual behavior. Nonetheless, the ecological validity of continuous performance tests has been questioned (Hall et al., 2016). Some additional limitations should be pointed out. Firstly, this study used data from two separate studies with different research questions, yielding only a few comparable assessments. Secondly, the diagnostic procedures for PeD and CSBD differ, and the PeD cohort was not formally evaluated for CSBD, although compulsive sexual behavior in the PeD cohort was assessed using a well-established measurement. Thirdly, the cross-sectional format prevents interpretation of causation. Furthermore, the controls were recruited to age-match the PeD group and not the CSBD group. On the other hand, the groups did not differ in terms of background factors such as age and educational level. Finally, the error rate for multiple comparisons was not corrected for and some analyses were underpowered – as can be seen by the large confidence intervals. Overall, the results should therefore only be considered preliminary until replicated.

CONCLUSION

Participants with CSBD and PeD reported more impulsivity and had more often comorbid ADHD than healthy controls. ADHD did not predict the level of compulsive sexuality, whereas self-rated attentional impulsivity did. Screening for neurodevelopmental disorder should nevertheless be part of routine assessment in disorders of problematic sexuality, since treatment of ADHD can improve attentional impulsivity. Clinicians should be aware of low psychosocial functioning, high psychiatric comorbidity and compulsive sexuality in PeD.

CSBD is categorized as an impulse control disorder in ICD-11, however, a large proportion of variance in compulsive sexuality may be explained by other factors than the impulsivity measures used in this study. Future studies should not only investigate other aspects of impulsivity such as sensation seeking or impulsivity in specific contexts (e.g. presence of sexual cues) but also further explore the suggested shared neurobiological mechanisms with substance use disorders (Gola et al., 2017).

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Conflicts of interests: Jussi Jokinen has participated in Advisory Board of Janssen concerning esketamine for MDD with current suicidal ideation.

SUPPLEMENTARY MATERIAL

Supplementary data to this article can be found online at <https://doi.org/10.1556/2006.2021.00044>.

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