Personality dimensions of compulsive sexual behavior in the Sex@Brain study

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FULL-LENGTH REPORT

ABSTRACT

Background and aims: Hypersexual disorder is characterized by recurrent and intense sexual fantasies, sexual urges, or sexual behaviors that can lead to clinically relevant levels of distress and adverse consequences for affected individuals. Earlier research has established a connection between sexual phenomena, such as compulsive sexual behavior, and personality features. The aim of the present study was to gain further insights into the associations of personality maladjustment and HD. *Methods:* The present study applied the dimensional approach of personality maladjustment presented in the fifth edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) to connect compulsive sexual behavior to personality maladjustment. We investigated 47 men suffering from HD (age: $M = 36.51$, $SD = 11.47$) and 38 matched men without HD (age: $M = 37.92$, $SD = 12.33$) regarding personality maladjustment using a 100-item version of the Personality Inventory for DSM-5 (PID-5-BF). *Results:* The men with HD showed higher levels of personality maladjustment regarding all PID-5-BF domains (negative affect, detachment, psychoticism, antagonism, and disinhibition) and significantly differentiated from men without HD in the level of subordinate facets. However, no domain of personality differentiated significantly between groups using a binary stepwise logistic regression analysis. *Discussion and conclusions:* In sum, the findings of the study underline the extent of personality maladjustment in men with HD. Interpersonal difficulties which men with HD frequently experience can contribute to clinically relevant levels of distress and adverse consequences reported by affected individuals.

INTRODUCTION

Problems arising from excessive sexual behaviors have been clinically reported for a long time (e.g. Krafft-Ebing, 1886). The term "Hypersexual Disorder" (HD) was proposed to be included as a category in the Diagnostic and Statistical Manual of Mental Disorders (DSM-5, American Psychiatric Association [APA], 2013), to describe "recurrent and intense sexual fantasies, sexual urges, or sexual behaviors" that occur over a period of 6 months (Kafka, 2010). Kafka (2010) defined HD as an atheoretical term that is compatible with different etiological perspectives, such as Sexual Addiction (e.g. Carnes, 2010), or Compulsive Sexual Behavior Disorder (CSBD, e.g. Kraus, 2018). In part due to the scarcity of empirical research on the topic, the proposed category of HD was declined for the DSM-5 (Kafka, 2014; Piquet-Pessôa, Ferreira, Melca, & Fontenelle, 2014). However, CSBD was included in the new version of the International Classification of Diseases, ICD-11 (Kraus et al., 2018). CSBD is classified as an impulse control disorder, characterized by "persistent pattern of failure to control intense, repetitive sexual impulses or urges" (World Health Organization, 2019). Some differences between the concepts

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of HD and CSBD are noteworthy. On one hand, the proposed criteria for HD lists some criteria not included in the concept of CSBD, namely the role of sexual behaviors as a maladaptive emotion regulation strategy, and the incorporation of bipolar and substance use disorders as exclusion criteria (Gola et al., 2020). On the other hand the ICD-11 lists moral incongruence as an exclusion criterion (Gola et al., 2020). However, this can be seen as implicitly included in the HD criteria, as they state that the symptoms must be "recurrent and intense" (Kafka, 2010), meaning that distress which solely results from moral disagreement, should not be included in the diagnosis. Furthermore, it is important to note, that the concepts of HD and CSBD share essential criteria, such as the impaired control over sexual impulses, resulting in negative consequences, accompanied by unsuccessful efforts to control behavior (Bőthe, 2022). Thus, one can argue that CSBD and HD describe the same underlying condition. A possible next development is that CSBD and HD will be categorized as a behavioral addiction (Gola & Potenza, 2018), which is supported by neurobiological findings on shared neuronal patterns between CSBD, substance dependencies, and behavioral addictions, e.g. gambling disorder (Stark, Klucken, Potenza, Brand, & Strahler, 2018). A precursor would be the regrouping of gambling disorder, as occurred in DSM-5 and ICD-11, from the category of impulse control disorder to non-substance or behavioral addictions (Gola et al., 2020). HD can include a broad range of manifestations, such as numerous interactions with consenting adults, but the most common manifestation is excessive masturbation in combination with the online use of sexual content (Kafka, 2010). The etiology of HD remains unknown and is controversial, but there are continually verified empirical approaches that recommend an etiological classification as a behavioral addiction (Brand et al., 2019). Personality characteristics are distributed on a continuum (American Psychiatric Association, 2013). Thus, the 5th edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) presented a new dimensional model of personality maladjustment in its experimental section which may have greater ecological validity than a categorical approach (American Psychiatric Association, 2013). Until now, the five-factor model of personality (FFM), a dimensional approach of normal personality traits that divides personality into the dimensions of neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness (also known as the Big-5), remains the most commonly used model when examining the relationship between human sexuality and personality (Costa & McCrae, 1992; Norman, 1963).

There have been several attempts to understand the specific relationship between personality factors and hypersexuality/CSBD. Reid, Stein, and Carpenter (2011) assessed a sample of men presenting with hypersexual disorder and found that neuroticism and shame jointly affect and increase compulsive sexual behavior. A direct association of neuroticism and CSBD could be observed. In contrast, the effect of shame was indirectly mediated through neuroticism. Reid, Stein, and Carpenter (2011) interpreted this mediating effect as an activation of shame

through facets of the FFM dimension of neuroticism which, in turn, contributes to hypersexual behavior. In a recent review Efrati, Kraus, and Kaplan (2022) investigated the relationship between Compulsive Sexual Behavior, Substance Use Disorders, Personality, Temperament and Attachment. The authors cited nine studies investigating the big five personality traits and compulsive sexual behavior (Amamou et al., 2020; Efrati & Gola, 2018; Efrati et al., 2022; Griffiths, 1996; Paz, Griffiths, Demetrovics, & Szabo, 2021; Pinto, Carvalho, & Nobre, 2013; Soraci et al., 2021, Walton, Cantor, & Lykins, 2007). The main conclusions, Efrati et al. (2022) drew from the studies were that there was an overlap in personality characteristics between individuals with CSBD and substance use disorders. For example, individuals with CSBD and substance use disorders seem to be more spontaneous, careless, and less reliable. Individuals with CSBD and substance use disorders seem to have in common that they are more self-centered above getting along with others, have a greater tendency towards emotional instability and experience aversive emotions, e.g. anger, anxiety, and/or depression. In addition, individuals with CSBD and substance use disorders are comparable in their diminished control of attention and/or behavior, and that they are characterized by a sensation of "wanting" (Efrati et al., 2022). What distinguishes individuals with CSBD, is that they report concerns regarding their social ties, fear of losing close others, and difficulties in trusting others. In comparison with individuals with substance use disorders, individuals with CSBD show greater concern about potential relationship losses (Efrati et al., 2022). Pocknell and King (2019) used the short version of the Personality Inventory for DSM-5 (PID-5-BF) and the revised Sexual Addiction Screening Test (SAST-R; Carnes, Green, & Carnes, 2010) in a non-clinical national sample ($n = 428$), showing a connection of all domains of maladjusted personality traits with symptoms of sexual addiction. Collectively, the conducted studies help us in understanding the associations between personality domains and hypersexuality/CSBD. However, what is lately needed, since the introduction of CSBD in the ICD-11, are studies that examine this association in clinical populations. These clinical populations must be selected on the basis of a uniform diagnostic, so that the actual associations are also examined. To do this, criteria are needed that accurately interrogate the disorder, for which the disorder criteria of Kafka (2010) are used in this study. In addition, it is helpful to refer to the modern approaches of the dimensional view of personality. These are included in the research section of the DSM-5 (APA, 2013). A similar approach was introduced in the most recent version of the ICD-11 as a measure of personality disorders (World Health Organization, 2019).

The aim of this study was to compare a group of men with HD and men without HD in terms of the PID-5-BF personality domains (negative affect, detachment, antagonism, disinhibition, and psychoticism) and trait facets. In regard to the small sample size for an investigation of personality characteristics in a clinical population, the study can be seen as an exploratory analysis. We hypothesized that

men with HD show significantly higher levels considering all PID-5-BF domains (negative affect, detachment, disinhibition, antagonism, and psychoticism) than men without HD. A further goal was to identify variables which most clearly differentiated between men with HD and healthy volunteers. To allow comparisons with the related concept of Sexual Addiction, we included an additional analysis investigating the association between Sexual Addiction (as measured by SAST-R-core) and PID-5-BF.

METHODS AND PROCEDURE

Participants

Hypersexual disorder group. Self-identified heterosexual men with HD were recruited through a press release that was later taken up by social media and local newspapers. Men with HD expressed their interest in participating in the study (see Fig. 1). These self-identified men were contacted via email and asked for a telephone number. In sum, 260 individuals replied and 201 potential participants who could be reached via telephone were screened for HD in a semistructured interview including the proposed diagnostic criteria for hypersexual disorder by Kafka (2010). Inclusion

criteria for the HD group were a) score higher than the cut-off ($\sum \leq 53$) of the HBI-19, and b) the fulfillment of the diagnostic requirements by Kafka (2010). To allow comparison to other studies, but not as an inclusion criterion, we included the core items of the SAST-R (Carnes, 2010). A total of 73 men were included and questionnaires were sent to the individuals, of whom 50 decided to participate. Three individuals had to be excluded post-hoc due to a score in the Hypersexual Behavior Inventory 19 (HBI-19; Reid, Garos, & Carpenter, 2011) that did not reach the cut-off ($\sum \leq 53$), leaving a total of 47 men with HD. The study was embedded in the "Sex@Brain"-study which included functional magnetic imaging and neuropsychological testing.

Men without HD. Men without HD were recruited through advertisements on the intranet homepage of the Hannover Medical School. A total of 85 individuals responded and 56 people answered an email asking for a phone number. These individuals were contacted and screened (see Fig. 2). After excluding 15 individuals who preferred not to report their sexuality in a study, the remaining 41 individuals were invited to participate in the study. The men without HD were matched for age ($p = 0.586$) and education ($p = 0.503$) with the CSBD group. Two men without HD had to be excluded from the analysis, one due to earlier head injuries and the other due to a homosexual orientation. The present
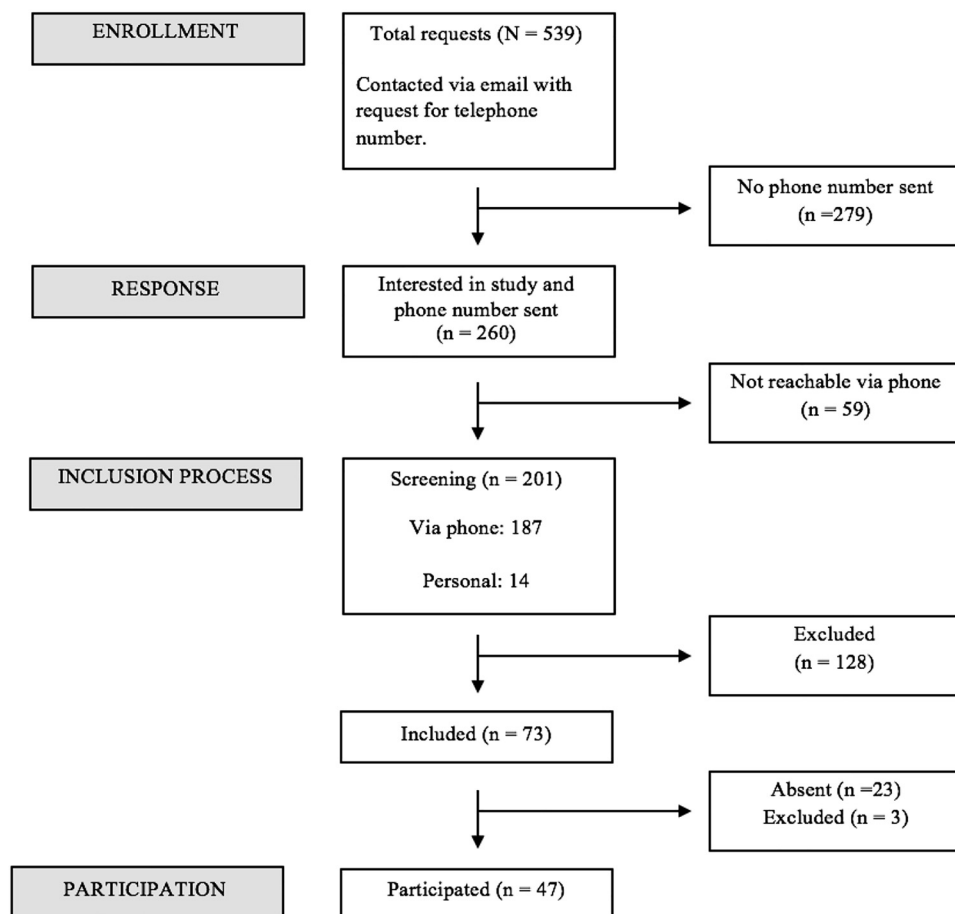

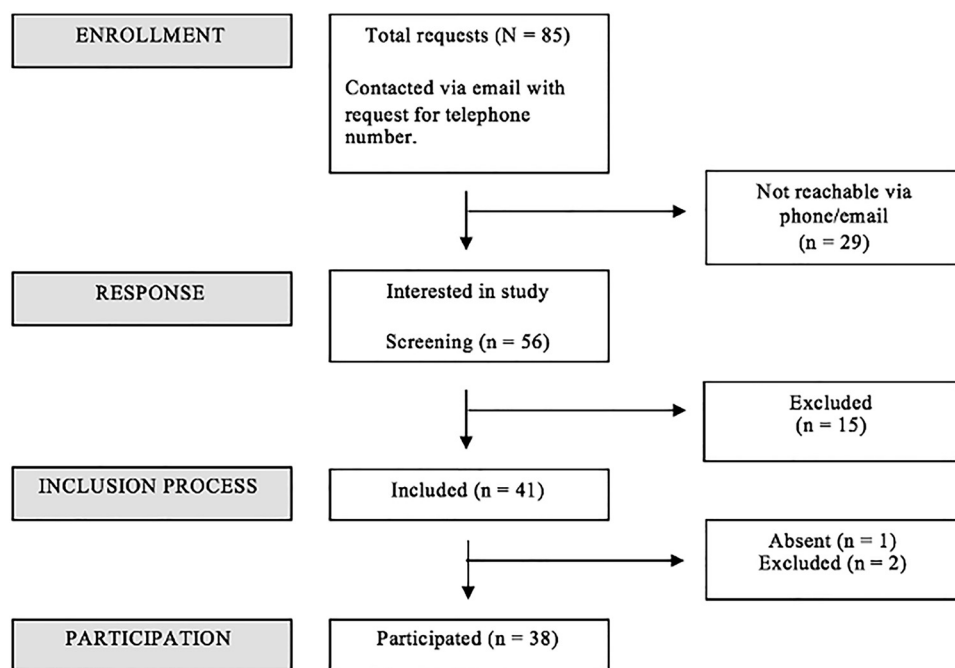Fig. 1. Recruitment of the Men with HD

Fig. 2. Recruitment of the Control Group

investigation is part of a larger body of studies, including neuropsychological testing and functional magnetic resonance imaging. Due to the nature of stimuli in these experiments, we restricted our participants to heterosexual men. One potential participant did not show up to the assessment, leaving 38 men without HD for the analysis. The data of all participants were collected between December 2016 – August 2017.

Exclusion criteria. Exclusion criteria for all participants were: intellectual disability (as measured by subtests the Wechsler Adult Intelligent Scale-IV; Wechsler, 2013), a schizophrenia spectrum or psychotic disorder (assessed through a structured clinical interview for DSM-IV Axis 1 disorders, SCID-I; Wechsler, 2013), severe head injury, and homosexual orientation on the Kinsey scale (Kinsey, Pomeroy, & Martin, 1948) (assessed in a semi-structured interview). Intelligence was approximated using the four subtests of the WAIS-IV which correlated the most with full scale IQ, namely Vocabulary (verbal comprehension; $r = 0.7$), Block Design (perceptual reasoning; $r = 0.65$), Arithmetic (working memory; $r = 0.73$), and Coding (processing speed; $r = 0.5$). An additional exclusion criterion for the control group was fulfillment of the diagnosis criteria of hypersexual disorder.

Sociodemographic comparisons

There were no differences regarding sociodemographic factors in terms of age (men with HD 37.9 ± 12.3, men without HD 36.5 ± 11.4, t (83) = 0.55, $p = 0.587$) and highest educational qualification (Fisher's exact test [$N = 85$], $p = 0.503$). Moreover, employment status (Fisher's exact test [$N = 85$], $p = 0.458$), lifetime criminal history (Fisher's exact test [$N = 85$], $p = 0.368$), and relationship status (Fisher's exact test [$N = 85$], $p = 0.128$) did not differ between groups. For detailed sociodemographic information of the sample, see Table 1.

Measures

Personality Inventory for DSM-5 (PID-5-BF). The Personality Inventory for DSM-5 (PID-5; Krueger, Derringer, Markon, Watson, & Skodol, 2012) measures 25 trait facets that can be condensed into five higher-order domains: negative affect, detachment, antagonism, disinhibition, and psychoticism (Krueger et al., 2012). This study used a German version of the PID-5 with a reduced set of 100 items (PID-5-BF; Zimmermann, Krueger, Markon, & Leising, 2012), which was derived from a validated English version (Maples et al., 2015). Maples et al. (2015) compared PID-5 and the reduced PID-5-BF in two samples of adult Americans (derivation sample: $N = 1,417$, age: $M = 25.6$, SD = 10.7, 59,4 female = 59.5%; validation sample: receiving psychological treatment, $N = 109$, age: $M = 25.6$, SD = 10.7, female = 71%). The brief English version of Maples et al. (2015) showed an excellent fit to the original version of the PID-5 (Krueger et al., 2012) regarding correlational profiles ($r = 0.995$). Criterion validity of the PID-5-BF was satisfactory in the validation sample in relation to FFM trait domains, and internalizing (i.e. rates of anxiety or depression), as well as externalizing outcomes (i.e. alcohol use or antisocial behavior, Maples et al., 2015). Coefficient alphas for the dimensions in the present sample: Disinhibition (0.84), negative affect (0.86), psychoticism (0.89), detachment (0.91), antagonism (0.94). The self-report measure assesses statements on a Likert scale ranging from 0 (very false or often false) to 3 (very true or often true):

Table 1. Socio-demographic characteristics of participants in the Sex@Brain study

Socio-demographic variables	Hypersexual Disorder Group (n = 47)		Control Group (n = 38)		p value
	%	M (SD)	%	M (SD)	
Age		36.51 (11.47) Range: 20–59		37.92 (12.33) Range: 20–61	0.587[a]
Highest Educational Qualification[b]					0.503[c]
No school leaving qualification	2.1		–		
Secondary school leaving certificate of secondary education (4 years)	4.3		2.6		
Secondary school leaving certificate (5 years)	10.6		5.3		
Completed apprenticeship	27.7		26.3		
Secondary school leaving certificate (8 years)	21.3		39.5		
University degree	34.0		26.3		
Employment status[d]					0.458[e]
Unemployed	8.5		13.5		
In training	21.3		29.7		
Retired	4.3		8.1		
Employed	66.0		48.6		
Family status[f]					0.208[g]
Single	42.6		34.2		
In a relationship	17.0		36.8		
Married	25.5		23.7		
Divorced	12.8		5.3		
Widowed	2.1		–		
Duration current/last relationship (in months)		73.1 (95.18)		70.96 (96.12)	0.920[h]
Number of children		0.74 (1.06)		0.77 (1.03)	0.936[i]

Note. [a] Statistical analysis: *t*-test. [b] 0 = No school leaving qualification; 1 = Secondary school leaving certificate of secondary education (4 years); 2 = Secondary school leaving certificate (5 years); 3 = Completed apprentice-ship; 4 = Secondary school leaving certificate (8 years); 5 = University degree. [c] Statistical analysis: Fisher's exact test. [d] 0 = Unemployed; 1 = In training; 2 = Retired; 3 = Employed. [e] Statistical analysis: Fisher's exact test. [f] 0 = Single; 1 = In In a relationship; 2 = Married; 3 = Divorced; 4 = Widowed. [g] Statistical analysis: Fisher's exact test. [h] Statistical analysis: *t*-test. [i] Statistical analysis: Wilcoxon-Mann-Whitney test.

individuals are asked to rate how well a statement describes them generally. Each trait facet consists of four items, and specific triplets of facets (groups of three) can be combined to yield indices of the five broader domains. Higher average scores for facets and domains indicate greater dysfunction (Maples et al., 2015).

Hypersexual Behavior Inventory (HBI-19). The Hypersexual Behavior Inventory-19 was used to measure symptoms of Hypersexual Disorder, as suggested by (Kafka, 2010). Reid et al. proposed a cut-off point of ≥53 (2011). The questionnaire has three subscales, namely *Control* (e.g. "My sexual cravings and desires feel stronger than my self-discipline"), Coping (e.g. "Doing something sexual helps me feel less lonely"), and Consequences (e.g. "My sexual activities interfere with aspects of my life, such as work or school", Reid, Stein, & Carpenter, 2011). Klein, Schmidt, Turner, and Briken (2015) were able to confirm the three-factor model in an online sample of 1749 men and women using a translated German version of the HBI-19. Reid, Stein, and Carpenter (2011) found excellent two-week test-retest reliability (subscale correlations from $r = 0.88$ to

$r = 0.90$). Scale reliability was ensured with a coefficient alpha of 0.96 based on a sample of 203 persons seeking treatment for out of control sexual behavior (Reid, Stein, & Carpenter, 2011). Bőthe et al. (2019) investigated psychometric properties of the HBI-19 in an online sample ($N = 18,034$, age: $M = 33.6$, SD = 11.1, 59,4 female = 59.5%) and replicated findings of Reid, Stein, and Carpenter (2011). Reliability indices and confirmatory factor analysis was in accordance with the proposed structure of the HBI-19 (Bőthe, 2019). However, the authors reported that it was not possible to determine a valid cut-off score, a fact they attributed to the low prevalence of hypersexuality in the general population (Bőthe, 2019). Coefficient alphas in the present sample was 0.98.

The Sexual Addiction Screening Test – revised (SAST-R) – core. The revised version of the Sexual Addiction Screening Test (Carnes et al., 2010) is a widely used questionnaire for identifying Sexual Addiction using a 20-item dichotomous-scaled self-report inventory. In this study, we used the 20 core items of the SAST-R, that Carnes et al. (2010) considered as a useful screening tool to measure Sexual Addiction.

Coefficient alphas of 0.87 and 0.9 were reported for an inpatient ($N = 57$) and an outpatient ($N = 508$) male population (Carnes et al., 2010). Coefficient alphas in the present sample was 0.98. For a comparison of HBI-19 and SAST-R-core scores between groups, see Table 2.

Statistical analysis

All analyses were performed using IBM SPSS Statistics Version 26 (IBM Corporation, Armonk, NY, USA). The raw scores of items of the PID5BF (Zimmermann et al., 2012) belonging to each facet were added and then divided by the total number of items contributing to the facet to calculate the average facet score (the scores of inverted items were reversed before calculations). The domain score was calculated as the mean of the contributing facets, as suggested by Krueger et al. (2012). For hypothesis testing, Bonferroni corrected significance levels of $p = 0.01$ for the five domains and of $p = 0.002$ for the 25 trait facets were applied. Effect sizes are expressed as Cohen's d, $d = 0.2$ indicating a small effect, $d = 0.5$ a medium effect, and $d = 0.8$ a large effect.

Furthermore, it was assessed whether the PID-5-BF domains of personality maladjustment are differentiated between men with HD and healthy volunteers through exploratory analysis. A binary logistic regression analysis according to the forced entry method with group classification as the dependent dichotomous variable was performed to identify which personality domains differed between men with HD and the men without HD. Correlational analyses between the SAST-R-core and the personality dimensions were conducted to ensure comparability between the present study and that by Pocknell and King (2019).

Ethics

All participants provided written, informed consent before participating and received monetary compensation for participation. The study procedures were carried out in accordance with the Declaration of Helsinki. The Institutional Review Board of the Hannover Medical School approved the study. All subjects were informed about the study and all provided informed consent.

RESULTS

Personality characteristics

Personality domains according to the PID-5-BF. The comparison of average domain scores showed significant differences ($p < 0.01$) for all five domains: negative affect (men with HD $M = 7.9 \pm 2.4$, men without HD $M = 6 \pm 2.4$, $t(83) = -3.75$, $p < 0.01$, $d = 0.54$); detachment (men with HD $M = 3.7 \pm 2.4$, men without HD $M = 1.9 \pm 1.4$, $t(73) = -4.38$, $p < 0.01$, $d = 0.53$); psychoticism (men with HD $M = 2.2 \pm 1.3$, men without HD $M = 1.1 \pm 1$, $t(83) = -3.82$, $p < 0.01$, $d = 0.50$); antagonism (men with HD $M = 4.8 \pm 2.6$, men without HD $M = 2.5 \pm 1.5$, $t(77.60) = -4.67$, $p < 0.01$, $d = 0.56$); and disinhibition (men with HD $M = 5.8 \pm 1.8$, men without HD $M = 4.1 \pm 1.5$, $t(83) = -5.80$, $p < 0.01$, $d = 0.54$).

Further analysis of the PID-5-BF trait facets. The trait facets of all five personality domains were compared between groups. Significant results ($p < 0.002$) are reported in all of the respective domains.

In the domain of negative affect, the following facets differed significantly between groups: men with HD presented with significantly higher levels of hostility (men with HD $M = 1.13 \pm 0.76$, men without HD $M = 0.64 \pm 0.54$, $t(82) = -3.41$, $p < 0.002$, $d = 0.67$); perseveration (men with HD $M = 1.13 \pm 0.76$, men without HD $M = 0.80 \pm 0.58$, $t(83) = -3.47$, $p < 0.002$, $d = 0.68$); and separation insecurity (men with HD $M = 1.57 \pm 0.73$, men without HD $M = 1.08 \pm 0.64$, $t(83) = -3.29$, $p < 0.002$, $d = 0.69$). Men without HD showed a significantly higher level of lack of restricted affectivity (men with HD $M = 1.61 \pm 0.63$, men without HD $M = 2.06 \pm 0.49$, $t(83) = 3.53$, $p < 0.002$, $d = 0.57$). Non-significant results could be observed in the facets of anxiousness (men with HD $M = 1.12 \pm 0.84$, men without HD $M = 0.65 \pm 0.61$, $t(83) = -2.9$, $p < 0.05$, $d = 0.75$), emotional lability (men with HD $M = 0.96 \pm 0.63$, men without HD $M = 0.61 \pm 0.62$, $t(83) = 2.58$, $p < 0.002$, $d = 0.62$), and submissiveness (men with HD $M = 1.28 \pm 0.6$, men without HD $M = 1.07 \pm 0.56$, $t(83) = 2.58$, $p < 0.878$, $d = 0.58$).

In the domain of detachment, subjects with HD showed significantly higher levels in the trait facets of anhedonia (men with HD M0 0.89 ± 0.72, men without HD $M = 0.38 \pm 0.51$, $t(82) = -3.84$, $p < 0.002$, $d = 0.63$); suspiciousness (men with HD $M = 1.17 \pm 0.69$, healthy control $M = 0.68 \pm 0.56$, $t(83) = -3.61$, $p < 0.002$, $d = 0.64$); and withdrawal (men with HD $M = 0.87 \pm 0.66$, men without HD $M = 0.42 \pm 0.68$, $t(83) = -3.89$, $p < 0.002$, $d = 0.57$). Non-significant results could be observed in the facets of depressivity (men with HD $M = 0.66 \pm 0.77$, men without HD $M = 0.27 \pm 0.46$, $t(83) = -2.9$, $p < 0.05$, $d = 0.65$), and intimacy

Table 2. Comparison of HBI-19 and the SAST-R-core between groups

Questionnaire	Hypersexual Disorder Group (n = 47) M (SD)	Control Group (n = 38) M (SD)	p value	d
HBI-19				
Overall Score[a]	72.37 (10.31)	30.08 (10.16)	<0.01*	10.25
Coping	26.04 (6.0)	12.5 (5.08)	<0.01*	5.61
Control	30.67 (5.32)	12.05 (4.46)	<0.01*	4.96
Consequences	15.66 (2.91)	5.79 (2.12)	<0.01*	2.59
SAST-R				
Core[b]	13.22 (3.21)	2.62 (2.82)	<0.01*	3.03

Note. All statistical analyses: t-tests. * Significant results ($p \leq 0.05$). [a] HBI overall score >53 indicates a diagnosis of HD. [b] SAST core score >6 indicates sexually addictive symptomatic.
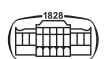
avoidance (men with HD $M = 0.84 \pm 0.64$, men without HD $M = 0.53 \pm 0.46$, t (83) $= -2.43$, $p < 0.05$, $d = 0.59$).

Within the domain of psychoticism, the men in the HD group showed significantly higher levels of eccentricity (men with HD $M = 1.46 \pm 0.86$, men without HD $M = 0.84 \pm 0.65$, t (83) $= -3.70$, $p < 0.002$, $d = 0.77$) and cognitive and perceptual dysregulation (men with HD $M = 0.53 \pm 0.55$, healthy control $M = 0.20 \pm 0.37$, t (80.52) -3.26 $p < 0.002$, $d = 0.48$). A non-significant result could be observed in the facet of unusual beliefs (men with HD $M = 0.58 \pm 0.6$, men without HD $M = 0.28 \pm 0.5$, t (83) -2.45 $p < 0.05$, $d = 0.57$).

In regard to antagonism, the men with HD presented with significantly higher levels of attention seeking (men with HD $M = 1.77 \pm 0.75$, men without HD $M = 1.10 \pm 0.60$, t (83) $= -4.45$, $p < 0.002$, $d = 0.69$); deceitfulness (men with HD $M = 1.15 \pm 0.80$, men without HD $M = 0.44 \pm 0.48$, t (77) $= -509$, $p < 0.002$, $d = 0.68$); and grandiosity (men with HD $M = 0.91 \pm 0.79$, men without HD $M = 0.40 \pm 0.47$, t (76.85) $= -3.68$ $p < 0.002$, $d = 0.67$). Non-significant results could be observed in the facets of callousness (men with HD $M = 0.73 \pm 0.71$, men without HD $M = 0.34 \pm 0.44$, t (83) $= -2.97$ $p < 0.01$, $d = 0.68$), and manipulativeness (men with HD $M = 1.33 \pm 0.67$, men without HD $M = 0.91 \pm 0.62$, t (83) $= -3$ $p < 0.01$, $d = 0.61$).

In the disinhibition domain, the facets significantly higher for men with HD were distractibility (men with HD $M = 1.67 \pm 0.71$, men without HD $M = 0.84 \pm 0.73$, t (83) $= -5.36$, $p < 0.002$, $d = 0.71$); impulsivity (men with HD $M = 1.30 \pm 0.70$, men without HD $M = 0.70 \pm 0.54$, t (83) $= 4.40$, $p < 0.002$, $d = 0.63$); and irresponsibility (men with HD $M = 0.99 \pm 0.75$, men without HD $M = 0.43 \pm 0.39$, t (71.65) $= -4.47$, $p < 0.002$, $d = 0.62$). Non-significant results could be observed in the facets of the (lack of) rigid perfectionism (men with HD $M = 1.55 \pm 0.73$, men without HD $M = 1.96 \pm 0.55$, t (76.85) $= -2.97$ $p < 0.1$, $d = 0.67$), and risk taking (men with HD $M = 1.39 \pm 0.78$, men without HD $M = 1.06 \pm 0.65$, t (83) $= -2.7$ $p < 0.05$, $d = 0.73$).

Binary logistic regression analysis

There was no significant predictor of group classification in the present sample (specified regression model, Nagelkerke $R^2 = 0.39$; Hosmer-Lemeshow test: χ^2 (7) $= 4.69$, $df = 7$, $p = 0.697$). For results, see Table 3.

Additional analyses

Additional analysis investigated the association between Sexual Addiction (as measured by SAST-R-core) and PID-5-BF. To ensure comparability with Pocknell and King (2019) the sample was split between men with HD and men without HD. In men without HD there were significant correlations between the SAST-R-core and the detachment ($r = 0.446$, $p = 0.005$), negative affect ($r = 0.331$, $p < 0.042$), and the psychoticism ($r = 0.326$, $p < 0.046$) dimensions of personality maladjustment, as well as with HBI-19 ($r = 0.675$, $p < 0.001$). Non-significant correlations were

Table 3. Regression analysis

| | B (SE) | 95% CI for Odds Ratio | | |
		Lower	Odds Ratio	Upper
Included				
Constant	−2.95 (1.03)			
Disinhibition	0.88 (0.91)	0.41	2.41	14.24
Antagonism	1.33 (0.72)	0.92	3.77	15.55
Detachment	1.54 (0.88)	0.83	4.65	26.00
Negative Affect	−0.02 (1.12)	0.11	0.98	8.78
Psychoticism	0.03 (0.77)	0.23	1.01	4.63

Note. $R^2 = 0.29$ (Cox & Snell), 0.39 (Nagelkerke); Hosmer & Lemeshow: χ^2 (7) $= 4.693$, $df = 7$, $p = 0.697$.

observed between SAST-R-core and antagonism ($r = 0.205$, $p = 0.216$), and disinhibition ($r = 0.284$, $p = 0.084$) dimensions of personality maladjustment (Table 4).

In men with HD there were significant correlations between the SAST-R-core and the detachment ($r = 0.382$, $p = 0.009$), and negative affect ($r = 0.305$, $p = 0.039$) dimensions of personality maladjustment, as well as with HBI-19 ($r = 0.488$ $p = 0.002$). Non-significant correlations were observed between SAST-R-core and the psychoticism ($r = 0.066$ $p = 0.664$), antagonism ($r = 0.082$, $p = 0.589$), and disinhibition ($r = -0.05$, $p = 0.74$) dimensions of personality maladjustment (Table 5).

DISCUSSION AND CONCLUSIONS

This study is the first to investigate dimensionally measured personality characteristics of a clinical population of men with HD compared to a group of healthy individuals. Personality maladjustment could be identified, which can lead to clinically relevant levels of distress and adverse consequences for affected individuals. The present study is an exploratory study on the association between dimensions of personality maladjustment and HD. For that purpose, a group of men with HD were compared to men without HD using a dimensional approach of personality maladjustment. The group comparison involved personality dimensions according to the PID-5-FBF (Krueger et al., 2012; Zimmermann et al., 2012), namely negative affect, detachment, psychoticism, antagonism, and disinhibition, as well as the respective subordinate trait facets. Furthermore, it was tested whether the higher-order domains can be seen as significant predictive factors of hypersexual disorder. Results were considered significant after a Bonferroni correction of significance levels.

The hypothesis that men with HD are characterized by higher overall personality maladjustment and, therefore, higher levels of all PID-5-BF domains compared to men without HD was supported. High levels of negative affect can be considered an indicator of less emotional stability, and individuals experience a wide range of negative emotions more frequently (Krueger et al., 2012). Additionally, these negative emotions may result in related behavioral

Table 4. Men without HD: SAST-R-core, HBI-19, and domains of personality maladjustment bivariate associations

Measure	SAST-R-core	HBI-19	Negative Affect	Detachment	Psychoticism	Antagonism	Disinhibition
SAST-R-core	1						
HBI-19	0.675***	1					
Negative Affect	0.331**	0.39**	1				
Detachment	0.446**	0.461*	0.739***	1			
Psychoticism	0.326**	0.468**	0.577***	0.522**	1		
Antagonism	0.205*	0.368*	0.319**	0.409**	0.564***	1	
Disinhibition	0.284*	0.468**	0.703***	0.48**	0.682***	0.454**	1

Note. * r-values = 0.1* was considered a small, $r = 0.3$** a medium, and $r = 0.5$*** a large effect size.

Table 5. Men with HD: SAST-R-core, HBI-19, and domains of personality maladjustment bivariate associations

Measure	SAST-R-core	HBI-19	Negative Affect	Detachment	Psychoticism	Antagonism	Disinhibition
SAST-R-core	1						
HBI-19	0.488**	1					
Negative Affect	0.305**	0.497**	1				
Detachment	0.381**	0.432**	0.592***	1			
Psychoticism	0.066**	0.417**	0.575***	0.477**	1		
Antagonism	0.081*	0.357**	0.283*	0.289*	0.474**	1	
Disinhibition	−0.05	0.188*	0.22*	0.098	0.433**	0.646***	1

Note. * r-values = 0.1* was considered a small, $r = 0.3$** a medium, and $r = 0.5$*** a large effect size.

manifestations, such as hostility (Krueger et al., 2012). Moreover, higher proportions of detachment suggest that men with HD tend to have a restricted hedonic capacity and withdraw themselves more frequently from other individuals. High levels of psychoticism indicate a tendency to show behaviors and attitudes that can be considered outside the social norm or eccentric (American Psychiatric Association, 2013). In addition, men with HD show a higher level of antagonism, indicating a high sense of self-importance, a tendency toward antipathy toward others, and an unawareness of other people's needs and feelings. Lastly, disinhibition points to impulsive behavior and a general neglect of behavioral consequences (Krueger et al., 2012).

Our additional analyses revealed that the domain of detachment showed the highest correlations of personality maladjustment with symptoms of sexual addiction (as measured with SAST-R) and could be a potential candidate for therapeutic focus (see conclusions below). Generally, our subsample of men without HD showed similar magnitudes of correlations between symptoms of sexual addiction and personality maladjustment, in comparison to findings from Pocknell and King (2019). Half of the participants in the study of Pocknell and King (2019) exceeded the proposed cut-off score of SAST-R (Carnes et al., 2010). However, Pocknell and King (2019) did not distinguish between different groups of men in their correlation analysis. In our sample, correlations between SAST-R and HBI-19 were higher in group of men without HD than in men with HD. We would argue that the HBI-19 is in greater accordance with contemporary definitions of the clinical disorder (e.g. CSBD in ICD-11) than SAST-R which is almost a decade older. Generally, correlations between HBI-19 and personality maladjustment were higher than between SAST-R and

personality maladjustment. It would be of interest to investigate these results in a larger sample. Since the introduction of Compulsive Sexual Behavior Scale – 19, based on the ICD-11 criteria (CSBD-19, Bőthe et al., 2020), we expect frequent use of this questionnaire. We would expect similar associations of personality maladjustment and CSBD-19 when measured. Especially, since a short version of the HBI and CSBD-19 show high criterion and convergent validity (Bőthe et al., 2020).

Comparisons between groups on the five dimensions of personality suggest that there could be several significant predictors in the binary logistic regression. However, the binary regression analysis showed that there was no significant predictor of group classification in the sample. This means that the second hypothesis that negative affect, disinhibition, and antagonism can be considered as predictive factors of HD was not supported. We could, however, observe significant differences in the levels of disinhibition between groups. A possible explanation for the prominent role of disinhibition in HD is that it may be deeply rooted in neuropsychology. While the other personality domains may be experience by affected individuals, disinhibition may be less controllable. Thus, it may play an important role in the development and sustainment of HD. The importance of disinhibition is discussed in models categorizing hypersexual disorder as a behavioral addiction (Brand et al., 2019). Brand et al. (2019) discuss inhibitory control as an important vulnerability factor for addictive behaviors and a moderating variable of the association between implicit responses to triggering stimuli (i.e. stress) and decisions to engage in addictive behaviors (e.g. pornography consumption, Brand et al., 2019). Furthermore, the finding is in line with neuroscientific theories that focus on the disrupted function

of the prefrontal cortex resulting in impaired response inhibition and salience attribution in addictions (Goldstein & Volkow, 2011). In the disinhibition domain, the facets significantly higher for men with HD were distractibility (i.e., easily diverted attention by external stimuli), impulsivity (i.e., behaviors with little or no forethought), and irresponsibility (i.e., disregard for obligations). Thus, men with HD may be described as easily distractible, especially by sexual stimuli (Sinke et al., 2020), without properly considering the outcome of their actions. A lack of care for obligations adds to this impulsive way of acting and may be reflected in various negative consequences, such as neglect of social commitments and problems in the workplace. These findings are in line with research linking hypersexual behavior to increased attentional bias (Pekal, Laier, Snagowski, Stark, & Brand, 2018), executive control (Schiebener, Laier, & Brand, 2015), and impairments in working memory (Laier, Schulte, & Brand, 2013). Lastly, Bancroft, Janssen, Strong, and Vukadinovic (2003) postulated lowered inhibition due to a threat of performance consequences for hypersexual individuals, implying a neurological basis for lowered inhibition even when the outcome of sexual behavior might be harmful. Pocknell and King (2019) found negative affect and antagonism as predictors in addition to disinhibition using the PID-5-BF. Moreover, Pinto et al. (2013) found the complementary FFM dimensions neuroticism and agreeableness to be predictive of hypersexual behavior. The incongruence regarding these findings shows that further research is needed. Research using the PID-5 has also associated the domain of disinhibition with substance abuse and behavioral addictions: Maples et al. (2015) linked the domain of disinhibition to externalizing outcomes, such as alcohol and drug consumption. Furthermore, a study by Cavicchioli et al. (2020) was able to establish a connection between the personality domains of disinhibition and negative affect and alcohol use disorder. Gervasi et al. (2017) found the phenomenon of internet addiction to be intertwined with disinhibition, linking it to poor self-control, sensation-seeking, and impulsivity.

A refined and more tangible characterization of the two groups is possible when including information on the lower hierarchy facet level. Within the domain of negative affect, the HD group showed higher levels of hostility (characterized by frequent angry feelings, irritability in response to minor events, and vengeful behavior) and separation insecurity (i.e., fear of being rejected by others). Furthermore, men with HD showed higher proportions of perseveration (i.e., a rigidity in applying behavioral strategies even after they have proven to be ineffective), leading to failure. Lastly, the men without HD showed a higher lack of restricted affectivity, meaning that men with HD seem to be characterized by indifference and aloofness in emotionally arousing situations. These findings can be linked to previous research on HD that characterizes individuals suffering from the condition as more prone to stress, being emotionally dysregulated, and presenting with low self-esteem (Reid, Carpenter, Spackman, & Willes, 2008; Reid et al., 2012). On top of this, research has shown that hypersexual individuals

often report familial disengagement as well as sexual, physical, or emotional abuse (Carnes, 2000). Moreover, other studies have found that hypersexual individuals show insecure and avoidant attachment styles (Engel et al., 2019; Leedes, 2001). Engel et al. (2019) showed that men with HD from this sample demonstrated a higher level of overall adverse childhood experiences, emotional neglect, and sexual abuse. In summary, it seems likely that a lack of trust in others and an inability to cope effectively with negative emotions is partially tied to negative childhood experiences and insecure attachment. Sexual preoccupation becomes an easily accessible way of dealing with these negative emotions, and the symptoms are reinforced by a tendency toward rigidity and preserving behavior even when it has proven to be ineffective or harmful.

When including the facets of the detachment domain, men with HD are additionally characterized by higher levels of anhedonia (i.e., a lower capacity to feel pleasure). Perhaps, the increased sexual desire by which men with HD are characterized may be a coping mechanism to overcome anhedonia. Further elevations on a facet level involve withdrawal (i.e., a preference for rather being alone than with others), and suspiciousness (a habit of feeling mistreated or persecuted by others). The significantly differing facets of this domain add to the notion that individuals with lower hedonic capacity have trouble engaging in social contact and trusting people's intentions or loyalty. In Wéry et al. (2016) sample, a majority of men with HD are in a relationship. Nevertheless, there are several studies on maladaptive interpersonal styles in non-clinical populations, showing that tendencies towards hypersexuality and pornography consumption were associated with difficulties with relationship commitment (Lambert, Negash, Stillman, Olmstead, & Fincham, 2012) and general detachment (Giordano, Prosek, Cecil, & Brown, 2015). In the present sample, men with HD reported far more affairs in their past or current relationships (Engel et al., 2019). Literature also thematizes the tendency for hypersexual individuals to neglect social commitments and to behave in a way that causes harm to intimate relationships (Kafka, 2010; Muench et al., 2007). These findings point toward individuals who are not always able to sustain intimate relationships despite wanting them. Sexual interaction or even pornography consumption might be a more accessible way to feel intimacy while not being confronted with problems that may occur in emotionally intimate relationships.

In the domain of psychoticism, levels of eccentricity (strange or unpredictable thoughts and behaviors) and cognitive and perceptual dysregulation (i.e., unusual thought processes, derealization, and depersonalization) were higher in men with HD. These attributes might make men with HD more prone to behavior outside the social norm and lead to the rationalization of maladaptive or dangerous behavior, adding to potential tendencies toward continuing dysfunctional behavior and maladaptive coping. Furthermore, showing attitudes and behaviors that can be considered deviant might enhance the feeling of detachment and lacking intimacy.

In the domain of antagonism, the levels of attention seeking, deceitfulness (i.e., dishonesty), and grandiosity (i.e., belief of being superior) were significantly higher for men with HD and may enhance interpersonal difficulties. Previous research linked low levels of agreeableness—the FFM counterpart of antagonism—to phenomena that also play a role in terms of HD, such as risky sexual behavior (Mashegoane, Moalusi, Ngoepe, & Peltzer, 2002; Ripa, Hansen, Mortensen, Sanders, & Reinisch, 2001), attitudes supporting violence towards women (Hald & Malamuth, 2015), and sexual infidelity (Schmitt, 2004). Research on hypersexuality has found that hypersexual individuals are generally more prone to shame (Gilliland, South, Carpenter, & Hardy, 2011), which can lead to a distorted self-concept (Baldwin, Baldwin, & Ewald, 2006) and a tendency to externalize responsibility by blaming others for one's own actions (Fontaine, Luyten, De Boeck, & Corveleyn, 2001; Tangney & Dearing, 2002). These findings might help synthesize the paradox of exhibiting insecurities in human interaction while believing in one's superiority.

Limitations

There are some limitations that should be considered. Firstly, the study can only be seen as an exploratory investigation, because of the small sample size. Importantly, the heterosexual men in this Western sample were not representative of the general population in terms of, for example, age and educational level. Conclusions made in this study cannot be drawn to other cultures, especially after considering that the evaluation of HD/CSBD is heavily dependent on cultural context (Chen et al., 2022). Future studies should aim to include diverse samples, which include populations extending beyond white, heterosexual men, and from outside of WEIRD (Western, Educated, Industrialized, Rich and Democratic) countries. Causal explanations of the etiology of HD are difficult to draw because we relied on self-reported data in a cross-sectional study and responses may have been affected by social desirability bias.

Conclusions

Men with HD show higher overall personality maladjustment, as indicated by increased levels of all PID-5-BF domains, namely negative affect, detachment, psychoticism, antagonism, and disinhibition, compared to men without HD. Furthermore, the domain of disinhibition differed significantly between men with HD and the men without HD in a binary logistic regression analysis using the enter method. The results of personality maladjustment research such as the present study can help generate a better understanding of HD and especially the individual predispositions involved in developing the condition. Moreover, personality research in this area can contribute to generating treatment methods that specifically tend to the unique needs of patients suffering from HD. First, it should be noted that there is little established evidence as to which psychotherapeutic and pharmacological interventions are effective for

the treatment of HD (Antons et al., 2022). Previous treatments for HD often follow the treatment of behavioral addictions, focusing on reducing impulsive behavior (Antons et al., 2022). The results of our analyses show the serious interpersonal problems of those affected, but this has not been the focus of treatment to date. In addition, it would be advisable to include partners and peers in the therapy sessions, e.g. in order to improve the relationships in dyadic therapy. For example, the reported problems in detachment reflect this important area of intervention. Even though the sociodemographic comparisons showed that the relationship status of men with HD does not differ, it can be assumed that the quality of the relationship is worse than that of men without HD. This may in turn be reflected in other significant differences in facets, such as increased separation insecurity in the domain of negative affectivity. In some patients, the therapeutic focus on the couple dynamics may lead to an improvement of the HD symptoms. However, because the etiological conditions for the development of HD are likely to vary widely across individuals, therapists should focus on those aspects of personality deficits that are most negatively construed in patients. In sum, continuing to fail to include personality issues in the treatment of HD reduces the likelihood of effective treatment.

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