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PERSONALITY AND IMPULSE CONTROL DISORDERS (J GRANT, SECTION EDITOR)

Sexual Impulsivity in Hypersexual Men

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Abstract Hypersexual behavior is an emerging construct that is receiving increased attention from both clinicians and researchers. Several theoretical perspectives exist about hypersexuality and its associated characteristics. Although the role of impulsivity and how it might be linked to hypersexuality are still being investigated, this article attempts to highlight some of the important concepts related to impulsivity and how they differ from compulsivity. Findings from the field of neuroscience and psychology are integrated to give readers a broader perspective about existing perspectives about the etiology and mechanisms that might link impulsivity with hypersexual behavior. A theoretical model of sexuality impulsivity among hypersexual individuals is discussed, and we conclude by offering some future possibilities for researchers attempting to understand this construct.

Keywords Hypersexual behavior · Hypersexual disorder · Non-paraphilic dysregulated sexual behavior

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Introduction

Hypersexual behavior has been conceptualized from various perspectives including a proposal that sought to advance this phenomenon as a "disorder" in the recently published Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-5) by the American Psychiatric Association [1•]. While "hypersexual disorder" was ultimately excluded from the DSM-5 for a number of reasons [2, 3], research efforts continue to investigate the associated features of hypersexuality. To promote further dialogue and to address previous concerns regarding conceptual ambiguity [4], we highlight what is known about the nature and role of impulsivity in hypersexual behavior.

Sexual Impulsivity

Non-paraphilic dysregulated sexual behavior has been characterized as sexual compulsivity, sexual addiction, hypersexuality, and a host of other labels [5]. In 1987 during the era of the DSM-III, Barth and Kinder suggested this phenomenon should be classified as an atypical impulse control disorder [6]. The "critical element" they argued, is "the individual's perceived lack of control over his or her own sexual impulses." However, such a characterization seems incomplete at best and possibly inaccurate. For instance, in treatment seeking samples of hypersexual patients, only 48 % to 55.3 % exhibit significantly high levels of generalized impulsivity [7, 8]. Moreover, it is unknown whether higher levels of impulsivity would be reported if measured as context specific (e.g., impulsive in the wake of a sexual cue but otherwise non-impulsive). Subsequently, while generalized impulsivity appears common, it is uncertain whether generalized or context specific "impulsivity" is a significant characteristic among populations of hypersexual patients. Indeed, several criteria for the DSM-5 proposal for hypersexual disorder do not contain impulsivity as part of the classification description. Despite these shortcomings, impulsivity has been consistently associated with hypersexual behavior. For example, hypersexual behavior has been positively linked with a self-report measure

of impulsiveness [9] and has been shown to predict levels of hypersexuality beyond the variance associated with facets of emotional dysregulation such as anxiety, depression, and stress proneness [10].

Currently, however, there is a need to yield greater specificity about how impulsivity might manifest among hypersexual individuals. An initial step in this endeavor is to consider how impulsivity might be defined and operationalized. Some researchers define impulsivity as "a predisposition toward rapid, unplanned reactions to internal or external stimuli with diminished regard to the negative consequences of these reactions to the impulsive individual or others" [11]. In the past several years, popular scales attempting to measure impulsivity have typically operationalized it as a multifaceted construct [12] although it is noteworthy that the authors of the most widely used instrument, the Barratt Impulsiveness Scale (BIS), recently suggested operationalizing the construct as a single factor with a short form BIS measuring a unidimensional scale [13]. Thus, in talking about sexual impulsivity, it is first necessary to understand with greater depth and specificity how the construct of impulsivity is operationalized and measured.

Measurement of Impulsivity

There is confusion about exactly how to conceptualize and measure impulsivity, which has been an imprecise construct in the literature. Dozens of scales, subscales, and behavioral measures have been created to measure impulsivity, which are only modestly intercorrelated [14–16], suggesting different underlying conceptions of the construct. The "literature reveals considerable diversity in theory, definition, and approach to the measurement of impulsivity" [17], with little agreement on how to conceptualize the construct [16]. "Different schemes to characterize the multidimensional nature of impulsivity have been proposed" [15, 18] but have had little impact on the research and theory concerning the mechanisms underlying impulsivity. However, recent studies outside the field of hypersexuality have identified a range of important potential mechanisms underlying impulsive behavior.

The term impulsiveness has been applied to many different aspects of the operant behavior of humans and animals such as the emission of premature responses in schedules in which reinforcement is made contingent upon pausing [19–21], emitting short latency incorrect responses in conditional discrimination tasks [22–25], failure of responding to decline in extinction schedules [26, 27], premature termination of sequences of response [28], impaired temporal differentiation of responding [29, 30], and choice of small earlier reinforcers in preference to delayed larger reinforcers [31–33]. It seems unlikely that such disparate behaviors reflect a unitary underlying behavioral process; however, deficits in behavioral inhibition [34], waiting capacity [35], timing [36, 37], behavioral switching [38], and tolerance of delay of gratification [33, 39] have been proposed to encompass many of these behavioral phenomena [40]. Further, given the diversity of behaviors most often characterized by impulsivity (e.g., violence, gambling, spending sprees, substance abuse, hypersexual behavior, and self-injurious behavior), it seems it cannot be best understood as a product of a single appetitive or a particular consumed substance.

"Instead impulsive behavior must be related to the pattern of rewards available for certain behaviors" and, in the context of sex, might implicate the pleasure sensations linked to sexual excitation and satiation. Impulsivity may arise from brain mechanisms that generally reward behavior [32, 41]. In fact, some argue that measurement of impulsivity is implicitly or explicitly equated with the effect delay has on the value of reward [42]. They believe that impulsivity in animal models, which typically use one of three models (delay of reward, differential reinforcement of low-rate responding, or autoshaping), can be measured in this way.

Deficient inhibition of prepotent behavior assessed using "stop-signal" tasks has been associated with attention-deficit hyperactivity disorder and trait impulsivity [43, 44]. Interestingly, ADHD has also been linked to hypersexuality with approximately 23 % of treatment-seeking patients meeting criteria for an inattentive presentation [45]. Impulsivity in drug users has been linked to increased discounting of delayed large rewards in favor of immediate small rewards [46]. Impulsive aggressive behaviors have also been associated with executive cognitive processes [47]. Further, considerable research suggests that impulsive behavior is associated with increased reward responsiveness or reduced responsiveness to punishment [48, 49]. Although these studies have contributed to our knowledge of the mechanisms of impulsivity and behavioral regulation, their major limitation is that *they present only single mechanism models of impulsivity*. "Evidence from studies of human personality suggests that impulsivity may be made up of several independent factors" [50]. "There seems to be not just one unitary 'impulsivity' or only one type of impulsive behavior," instead there seems to be several related phenomena that are usually classified together as impulsivity and that lead to different forms of impulsive behavior which may be influenced by different biological mechanisms. Different facets of impulsivity may relate to different areas of the brain, particularly within the prefrontal cortex (PFC) [51–53].

In recent years, behavioral and psychological researchers appear to acknowledge that impulsivity is indeed a multifaceted construct. More specifically, five distinct facets have emerged as assessed by the UPPS-P Impulsive Behavior Scale: sensation seeking, lack of premeditation, lack of perseverance, negative urgency, and positive urgency [54–56]. These facets capture impulsive behavior characterized by both positive and negative emotions, action without forethought, in response to low tolerance for boredom or being able to remain focused despite distraction, and sensation-seeking tendencies

(e.g., novel or thrilling experiences). Although research is currently limited, emerging evidence suggests that some, but not all, of these facets may be linked to sexual impulsivity including sexual risk-taking behaviors [57].

Impulsivity vs. Compulsivity

Some researchers have suggested that hypersexual behavior may contain elements of both impulsivity and compulsivity [58, 59]. However, no one in the field of hypersexual research has clearly delineated the differences or how each of these constructs might exert an effect on hypersexual behavior. In this regard, it is important to understand the differences between impulsivity and compulsivity and that, like many constructs, these two fall along a continuum which, at some point, might be considered pathological [60]. Moreover, impulsive and compulsive behaviors are controlled by neural systems that are essential for survival across species. But pathological variants of these behaviors characterize a range of mental disorders.

Impulsivity is a core symptom in several psychiatric disorders that are often comorbid with one another, including bipolar disorder, cluster B personality disorders, and impulse control disorders (ICDs). DSM-IV-TR [61] ICDs included intermittent explosive disorder (IED), pyromania, pathological gambling, trichotillomania (hair-pulling disorder), and kleptomania. The inability to resist an impulse is the common core feature of these disorders. A number of related disorders were classified as ICDs not otherwise specified in the DSM-IV-TR, namely impulsive-compulsive sexual behavior, buying disorder, psychogenic excoriation (skin-picking), and computer usage disorder. These disorders share features of both impulsivity and compulsivity. Only three ICDs were carried over to the DSM-5 [62], namely IED, pyromania, and kleptomania, and they were included in a new chapter called "Disruptive, Impulse-Control and Conduct Disorders."

Impulsive behaviors, across diagnostic boundaries, may share an underlying pathophysiology [63]. Markers of altered serotonergic neurotransmission have been associated with a variety of impulsive behaviors including aggressive violence, suicidality, conduct disorder, and pyromania [64]. Research suggests that decreased serotonergic neurotransmission may result in decreased ability to control one's urges to act.

Compulsivity, compared to impulsivity, refers to repetitive behaviors performed according to certain rules or in a stereotypical or habitual manner. In this regard, some researchers have labeled hypersexuality as a manifestation of a compulsive driven sexual desire [65]. However, compulsivity also involves the repetition of the same often purposeless and unpleasant behaviors, often enacted to prevent perceived unwanted consequences, which can lead to impaired functioning [66–69]. This latter aspect of compulsivity likely differentiates hypersexual behavior given the pleasure derived from sexual behavior is incongruent with behaviors generally associated with a compulsion (e.g., washing hands). The DSM-5 contains a new chapter on "Obsessive-Compulsive and Related Disorders" which includes obsessive-compulsive disorder (OCD) and indicates that OCD type of disturbances should not be "better explained by the symptoms of another mental disorder….[including] sexual urges or fantasies, as in paraphilic disorders; impulses, as in disruptive, impulse-control, and conduct disorders." Thus, it appears the DSM-5 discourages classifying hypersexual behavior or sexual impulsive behavior as a disorder characterized by compulsivity.

As further clarification, impulsivity and compulsivity may be conceptualized as diametrically opposed to each other, or alternatively, as similar in that a dysfunction of impulse control is central to both [70, 71]. Each involves alterations in a range of neural processes including perception, attention, and coordination of a cognitive or motor response. Domain-specific, sensitive neurocognitive tests may help to divide impulsivity and compulsivity into quantifiable, neurobiologically independent domains [72•]. Neurocognitive tests may also help to predict clinical outcomes and illuminate the mechanisms by which psychotropic drugs exert their beneficial clinical effects [73].

Some researchers contend that impulsivity and compulsivity are opposite ends of a spectrum [74, 75] stating that ICDs "share the feature of the irresistible urge to act in a given way, and may be considered as a subset of the obsessive-compulsive spectrum of disorders. The obsessive-compulsive spectrum is a dimensional model of risk avoidance" where "impulsivity and compulsivity represent polar opposite psychiatric spectrum complexes that can be viewed along a continuum" of impulsive and compulsive disorders. Patients on the compulsive end of the spectrum tend to have an exaggerated sense of harm from the outside world and engage in routines/rituals to reduce the harm or neutralize the threat. This endpoint marks risk-aversive or compulsive behaviors characterized by overestimation of the probability of future harm, exemplified by OCD. But some compulsive patients pursue unrewarding rituals for short-term gains (e.g., the relief of tension) despite the negative long-term consequences. However, in general, obsessive rituals are not pleasurable nor are they performed for their own sake, but rather are neutral or unpleasant and irritating activities engaged in to reduce anxiety. In a minority of cases, some hypersexual patients might seek help with this type of presentation. For example, we have seen some hypersexual patients who masturbate to the extent they incur lesions on their genitals requiring medical attention. These patients sometimes describe their sexual activities as a compulsion and certainly no pleasure is derived from autoerotic stimulation resulting in genital hemorrhaging any more than a patient compulsively washing their hands to the point of bleeding. However, such cases are the exception and very few hypersexual patients also meet criteria for an obsessive-compulsive disorder [76].

Patients on the impulsive end of the spectrum tend to underestimate the harm associated with behaviors like excessive gambling, self-injury, or aggression. This endpoint represents people who engage in impulsive actions and lack consideration of the negative consequences of these actions, as exemplified by antisocial and borderline personality disorders [77]. Some impulsive patients do recognize and assess the harm associated with their impulsive behavior, but do it anyway because the arousal or thrill they experience from engaging in the behavior outweighs their perception of the impact of negative consequences. This latter pattern is more typical of hypersexual patients suggesting sexual impulsivity might be a more accurate classification. This is true also for sexually impulsive behaviors that have a pleasurable element, at least initially, which may decrease over time. Some patients with ICDs engage in certain behaviors to increase arousal, but there may also be a compulsive component to their behavior in that they continue to engage in the behavior to decrease dysphoria. Thus, while impulsivity may be driven by the desire to obtain gratification, arousal, or pleasure, compulsivity may be driven by an attempt to alleviate discomfort or anxiety. Both types of behaviors however share the inability to delay or inhibit repetitive behaviors. Over time, compulsive behaviors may become impulsive (reinforced habits), and impulsive behaviors may become compulsive (driven behaviors without arousal) [78]. This latter perspective supports the sexual impulsive-compulsive classification for hypersexual behavior [79].

Despite the traditional view described above, that impulsive (reward-seeking) and compulsive (driven by harm avoidance or tension-reduction) disorders are at opposite ends of a single dimension, converging evidence from translational studies points to a shared tendency toward behavioral disinhibition in *both* impulsive and compulsive disorders that stems from a failure in "top–down" cortical control of frontostriatal circuits, or from of overactivation of striatal circuitry. Impulsivity and compulsivity both appear to involve inhibitory (serotonin, gamma-aminobutyric acid) and excitatory (glutamate, norepinephrine, dopamine) neurotransmitters and PFC and/or limbic dysfunction. Overlapping as well as distinct neural circuits modulated by dopamine and serotonin appear to mediate certain aspects of both impulsive and compulsive behaviors. Evidence suggests that a failure in top-down cortical control mechanisms, leading to striatal overdrive, may constitute a unifying pathophysiological model of an "impulsive-compulsive spectrum" of mental disorders [72•, 80]. But compulsive disorders (e.g., OCD) have been shown to be associated with increased activation in the PFC and impulsive disorders (e.g., pathological gambling, borderline personality disorder) with decreased activation in the PFC [52, 77].

In sum, instead of being polar opposites, impulsivity and compulsivity may be orthogonal to each other, each contributing to impulsive and compulsive disorders to varying degrees [72•]. In accordance, many impulsive and compulsive disorders co-occur in the same person or within families, and there is overlap in treatment response across many of these disorders, implying a shared pathophysiology [63, 72•, 81]. Neuropsychological findings in patients with pathological gambling [82–84] and OCD [69, 85] also suggest that impulsivity and compulsivity are not diametrically opposed and that they "share a complex, orthogonal relationship, with specific disorders showing a predominance of one construct over the other that may shift" dynamically over time [72•]. This may have some ramifications for hypersexual behavior as it seems to share many commonalities with gambling disorders in terms of behavioral dysregulation and associated features (e.g., escapism). It is also plausible that compulsive and impulsive symptoms may present at the same or different times during the same disorder [86].

A Theoretical Model of Sexuality Impulsivity

The dual-control model is a theoretical model of sexual response that has been influential in the conceptualization of high-risk sexual activity, impulsive sexual behavior, and hypersexuality [4, 87•, 88]. According to the model, brain functions involve elements of excitatory and inhibitory processes and interaction between these mechanisms determines species-specific patterns of sexual behavior. A central tenet of the dual-control model is that individuals vary in their propensity toward sexual excitation (e.g., sexual arousal in the presence of an attractive person) and sexual inhibition (e.g., sexual response becomes reduced when sexual activity is potentially dangerous). It is hypothesized that individuals who demonstrate a low propensity for sexual excitation and/or a high disposition for sexual inhibition are more likely to exhibit problems with sexual arousal and desire (i.e., sexual dysfunctions), whereas individuals who have a high propensity for excitation and/or a low tendency toward inhibition are more likely to engage in behaviors that are analogous to hypersexuality.

The dual-control model has undergone extensive theoretical development and has received a fair amount of empirical support [89, 90], particularly with regard to sexual risk taking. Much of this research has utilized the SIS/SES scales [91], which were developed to measure an individual's propensity for sexual arousal and excitation (SES), sexual inhibition due to threat of performance failure (SIS1), and sexual inhibition due to threat of performance consequences (SIS2). A number of studies have shown SES to be associated with the number of causal sexual partners and high-risk sexual activity, such as unprotected anal intercourse [92]. With regard to sexual inhibition, high scores on SIS1 have been typically associated with more risky sexual behaviors, which have been attributed to a reluctance to use condoms given concerns about loss of arousal. In contrast, high scores on SIS2 have generally been significant negative predictors of high-risk sexual activity [93]. Recent studies have also

shown that dual-control processes have been associated with sexual sensation seeking [94], a trait that has been defined as the need for varied, novel, and complex experiences and sensations. Sexual sensation seeking has also been linked closely with impulsive decision making and risky sexual behavior [95, 96].

Generalized or Context-Specific Sexual Impulsivity?

Over the past several years, researchers have started to assess whether some individuals may demonstrate self-control generally but exhibit impulsivity in domain-specific contexts. For example, only modest correlations have been shown for impulsivity across multiple behavior domains (e.g., work, food, relationships, substance use) compared with six times more variance on impulsivity *within* individuals across domains as there was *between* individuals. This difference was largely attributed to the hedonic value or salience of the temptation or stimuli [97]. Such research suggests it is plausible for some individuals to have an Achilles' heel depending on the situation. We would expect that individuals seeking help for hypersexual behavior to exhibit impulsivity in the wake of sexual stimuli and our research, as noted previously, provides some evidence for this assertion. However, as the phenomenon of sexual impulsivity is explored, the field might benefit from greater specificity about the circumstances and situations under which self-control is compromised in order to purse sexual opportunities. This approach has relevance for the proposed criteria for hypersexual disorder whereby hypersexual behavior manifests in the context of difficult, unpleasant mood states or as a mechanism to cope with stress. This is also consistent with the notion that impulse control is often sacrificed in times of emotional distress, when individuals prioritize affect regulation [98]. "In essence, when individuals feel unpleasant emotion, they generally seek some type of symptom relief, and this desire is perceived as urgent. Thus, the inability to regulate unpleasant affective experiences undermines impulse control because emotional" distress "creates a short-term focus on the present moment, whereas impulse control requires future-directed thinking (e.g., recognizing the benefits of delayed gratification to obtain a more distant goal)." This pattern is not unique to hypersexual behavior and has been noted in other populations with impulse-control deficits such as individuals with gambling disorders [99].

Conclusion

The phenomenon of hypersexual behavior is of interest to both researchers and clinicians, and the field is currently in its infancy [100]. Sexual impulsivity among hypersexual patients appears common to many but not all of those seeking treatment. As outlined in this article, the construct of impulsivity is complex and continues to evolve including various positions on how impulsivity should be operationalized and measured. Neuroscience has helped to highlight some of the underlying mechanisms linked to impulsivity. However, clearly more studies are needed to investigate similarities and differences between constructs such as impulsivity and compulsivity. Some models of hypersexual behavior, such as the dual-control model, seek to offer explanations for the role of impulsivity and behavior dysregulation common in hypersexual patients. However, greater specificity in research is needed to elucidate the role of sexual impulsivity in hypersexual individuals. One direction for future inquiry might include investigations seeking to understand the extent to which sexual impulsivity is expressed in domain-specific contexts and under what conditions impulse control is compromised in order for individuals to engage in hypersexual behavior.

Compliance with Ethics Guidelines

Conflict of Interest The authors of this manuscript have no conflicts of interest to declare.

Human and Animal Rights and Informed Consent This article does not contain any studies with human or animal subjects performed by the authors.

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