8-17-2020 10:30 AM

Assessment Instruments and Basic Personality Underpinnings of Hypersexuality

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A thesis submitted in partial fulfillment of the requirements for the Doctor of Philosophy degree in Psychology

Abstract

Despite rejection of the Hypersexual Disorder (HD) diagnosis from DSM-5, individuals continue to present clinically with feelings of out-of-control sexual behaviour, clinicians continue to treat "sexual addiction," and researchers continue to study HD-type symptomology. To further investigation of the HD construct, Levaque and colleagues (2016) used common HD assessment measures and found that between 16.7% and 37.8% of young adult males met clinically significant scores for HD. Phase one of this dissertation replicated the surprising finding in a North American community sample and furthered the research by testing the assessment tool used in DSM-5 HD field trials, and the first sex addiction screening tool. Study One findings were largely as expected, with as many as 27.6% of the youngest males flagged as problematically hypersexual by commonly used HD scales. Study Two queried whether HD scale cut scores predicted age-relevant negative life outcomes in younger adults (i.e., risky sexual behaviour, sexually transmitted infections [STIs], pregnancy), or in middle and older adults (i.e., long-term relationship distress/instability, contraceptive/STI risk, employment or legal sanctions for sex-related acts). Predicted negative outcomes were based on an expanded novel model synthesizing existing HD research (Montgomery-Graham, 2016). While the scales themselves seem to unexpectedly over-select too many of the youngest males between ages 18 to 24, and the oldest males ages 36 to 45 as HD, the scales are indeed related to the negative life outcomes associated with out-of-control sexual behavior as reflected in the literature, and demonstrate strong criterion validity. Finally, Study Three assessed whether conceptually relevant personality variables are conceptually and statistically superior predictors of clinically significant outcomes associated with hypersexuality in adult males than the current HD scales. Variables investigated included: sex drive, erotophilia, emotion regulation, sexual excitation, sexual inhibition, and religiosity. Together these variables did not account for much of the variance in negative HD behavioural outcomes when competitively tested against existing HD scales. Emotion dysregulation and sociosexuality remained important yet distinct constructs from HD. Study Three findings suggest that the various theoretically and empirically relevant variables do not better account for negative behavioural outcomes associated with hypersexuality than the current HD scales.

Keywords

hypersexual disorder, sex addiction, sexual compulsivity, psychometrics, construct validity, criterion validity

Summary for Lay Audience

"Sex addiction" is a label used commonly in the popular media when people are accused of sex crimes, or sexually inappropriate behaviour. Although "sex addiction" is commonly used, it is not a formal psychological diagnosis supported by scientific research. Yet individuals are treated for "sex addiction" by clinicians who believe that "sex addiction" is a diagnosable condition. Researchers have suggested that a person's religious values, their partner's or family's negative judgments about their sexual practices, or a lack of good sexual education about what is healthy sexuality may be causing some of the confusion. Three studies were designed to examine whether sex addiction or Hypersexual Disorder (HD) is a valid psychological disorder that warrants its own diagnosis. Study One used a community sample of North American males aged 18 to 45 years and replicated research conducted with Canadian undergraduate males in which between 16.7% and 37.8% had been diagnosed a "sex addicted". Study One found up to 27.6% of the youngest males were flagged as HD by commonly used HD scales. Study Two examined whether reaching the HD cut off score on an instrument was related to age-relevant negative life outcomes (i.e., risky sexual behaviour, sexually transmitted infections, pregnancy, long-term relationship distress, employment or legal sanctions for sexual behaviour). While the scales themselves seem to over-select too many of the youngest males (ages 18 to 24), and the oldest males (ages 36 to 45) as HD, the scales are indeed related to the negative life outcomes associated with hypersexual behavior. Finally, Study Three assessed whether certain personality variables are better predictors of clinically significant outcomes associated with hypersexuality in adult males than the current HD scales. Variables investigated included: sex drive, erotophilia (i.e., negative to positive feelings about sex), emotion regulation, sexual excitation/inhibition, and religiosity. Together these variables did not explain negative HD behavioural outcomes when they were compared to how well the existing HD scales could predict negative HD behavioural outcomes. Study Three findings suggest that the various theoretically and empirically relevant variables do not

better explain the negative behavioural outcomes associated with hypersexuality than the current HD scales.

Acknowledgments

First and foremost, I would like to express my profound sense of gratitude to Dr. William Fisher for agreeing to supervise my doctoral scholarship. Bill is an entertaining, generous, intellectually rigorous world class scholar to whom I will always be grateful for his mentorship. Dr. Fisher is both a scholar and a gentleman and I am truly fortunate to have matured scholastically under his tutelage.

I would like to thank Dr. Taylor Kohut and Erin Shumlich who provided a rich and collaborative intellectual climate in our lab, as well as being great human beings to work with.

Thank you to my dissertation preparation committee members, Drs. David Dozois and Paul Tremblay, for giving of their time and effort over the course of my doctoral work, as well as serving as important mentors and teachers throughout my PhD training. Finally, I would like to express my gratitude to Drs. David Dozois, Louis Charland, Erin Kaufman, and Mark Olver for giving of their time to review and lend their combined expertise to examine my doctoral dissertation.

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Chapter 1

1 Background

Assessment Instruments and Basic Personality Underpinnings of Hypersexuality
Hypersexual disorder (HD) (or "sex addiction") is not currently a recognized clinical diagnosis in either the *Diagnostic and statistical manual of mental disorders* (DSM-5; American Psychiatric Association, 2013) or the World Health Organization's (2004) *International Statistical Classification of Diseases and Related Health Problems* (ICD-10). While HD has been proposed as a diagnosis within the Compulsive Behaviour Disorders section of the forthcoming ICD-11, the DSM-5 Task Force rejected the HD diagnosis because it lacked both an empirical research foundation and clinical consensus as to its etiology, construct validity, and symptomology (Reid & Kafka, 2014). At the time of DSM-5, the proposed HD diagnosis had not undergone the rigours of psychometric assessment development, and critics raised additional concerns that the diagnosis could be used unscrupulously by some members of the legal community to assist individuals to avoid the legal consequences of their actions (Reid & Kafka, 2014). Other critics argued that HD should be conceptualized parsimoniously as an extension of existing mental illnesses, and did not require a stand-alone diagnostic category (Halperin, 2011; Moser, 2011). Still others voiced concerns that an HD diagnosis provided a convenient means of labelling as pathological those sexual acts and behaviours of which we morally disapprove (Wakefield, 1992).

The proposed criteria for HD included the occurrence of non-paraphilic, uncontrollable fantasies, urges and actions of a sexual nature leading to adverse consequences and clinically significant impairment in important areas of functioning, for at least 6 months (Kafka, 2010a; 2010b). Patients meeting the proposed criteria are thought to use sexual fantasies, urges and behaviours to cope with dysphoric moods or to manage stress and feelings of anxiety, leading to adverse outcomes (Castellini et al., 2016). Those meeting the proposed criteria will have experienced many unsuccessful attempts to control their sexual fantasies, urges or behaviour. The HD diagnosis under study in this program of research, as is the case with the HD diagnosis rejected by DSM-5, excludes

hypersexuality associated with paraphilic disorders, which are disorders involving intense sexual pleasure derived from atypical objects, situations, and people. While DSM-5 proposes that hypersexuality may be "co-morbid" with some paraphilic disorders (including voyeuristic, exhibitionistic, frotteuristic, fetishistic, and sadistic and masochistic disorders), these studies do not venture into hypersexuality in association with paraphilic disorders (Montgomery-Graham, 2017a). In fact, research on non-paraphilic hypersexuality has received more theoretical and empirical attention (Kafka, 2010a; Kaplan & Krueger, 2010; Walton, Cantor, Bhullar & Lykins, 2017), and is quite separate from paraphilic hypersexuality, which tends to involve forensic, anti-social, and criminal acts like those paraphilic disorders listed above (Kafka & Hennen, 2003). Below we explore the theoretical, epidemiological and psychometric investigations of non-paraphilic hypersexuality.

1.1 Theoretical approaches used to explain hypersexuality

Given that patients continue to present clinically with feelings that their non-paraphilic sexual fantasies, urges, and behaviours are out-of-control, and that clinicians are obliged to attempt to treat them, a number of theoretical frameworks have been applied to conceptualize hypersexual patterns of behaviour and to guide its treatment. While reports of hypersexual urges have been described since the 1800s (von Kraft-Ebing, 1886), the first and most prominent conceptual framework applied to hypersexual behaviour has been the addiction model (Carnes, 1983; 1992; 2001). Sex is pleasurable, and pleasure is believed to be mediated by addictive neuromodulators (i.e., endorphins) that become acclimated and less hedonic over time, thereby requiring more of the same behaviour to achieve the same amount of pleasure (Carnes, 1983; 1992; 2001). The sex addiction model incorporates concepts of tolerance, dependency, and withdrawal symptoms similar to those one would encounter with an exogenous substance use disorder when the sex addict cannot engage in sexual behaviours. The addiction model also frames sex addiction as an intimacy disorder because the paramount interest of a *sex addicted* individual is sex, which is believed to be pursued single-mindedly and in place of relationship intimacy; this separation of sex from intimacy is judged as pathological. The addiction model is commonly reflected in popular media and is a foundation for clinical

practice, but it has less commonly been the subject of rigorous empirical research (Ley, Prause, & Finn, 2014; Montgomery-Graham, Kohut, Fisher, & Campbell, 2015). Critics of the sex addiction model have argued that sex addiction (i.e., problematic hypersexuality of out-of-control sexual behaviour) is a modern sexual invention without rigorous empirical support that attracts a willing group of self-interested therapists and reflects social conservatism, providing a convenient term for cultural discomfort with some sexual activities (Reay, Attwood, & Gooder, 2013). Recently, an international organization devoted to the promotion of sexual health and the advancement of sexuality education and therapy, published a position statement concerning sexual addiction that is designed to protect consumer health and promote sexual rights (American Association of Sex Educators, Counsellors, and Therapists [AASECT], 2016). AASECT recommends that its members avoid using sex addiction models that unduly pathologize consensual sexual behaviours by adults; in fact, the organization rejects sex addiction therapy, which AASECT believes lacks empirical evidence based in accurate human sexual science. At the same time, the American Society of Addiction Medicine (ASAM) has recently removed from its definition of *addiction* the necessity of having a substance external to oneself, thereby opening up the possibility of extending an addiction diagnosis to behavioural addictions (ASAM, 2016). In sum, the addiction model of hypersexuality remains commonly invoked but contentious.

In addition to the addiction framework, hypersexual behaviour has been conceptualized as a form of compulsive behaviour. The term *sexual compulsivity* is typically used to refer to men who are sexual sensation seekers and risk takers (Coleman, 1987; 1992), who have a high number of sexual partners, and are at higher risk for sexually transmitted infections and HIV specifically (Kalichman & Rompa, 1995; Parsons, et al., 2008). Barth and Kinder (1987) proposed *impulse control* as a way to understand HD symptomology, but arguably did not add much to the empirical literature beyond inferring a problem of self-control (Bancroft & Vukadinovic, 2004). Obsessive-compulsive spectrum disorders have also been considered as a means to conceptualize problematic hypersexuality (Black, Kehrberg, Flumerfelt, & Schlosser, 1997) as some studies find individuals with hypersexual behaviour are sometimes also on the obsessive-compulsive disorder (OCD) spectrum. Using OCD as a framework to conceptualize hypersexuality is inconsistent

with DSM-5 diagnostic understandings of OCD, which exclude from the diagnosis those behaviours from which individuals derive pleasure (APA, 2013). While compulsive thoughts of the OCD type often have sexual content, they are typically in conjunction with negative mood states and without accompanying sexual arousal (Bancroft & Vukadinovic, 2004; Schwartz & Abramowitz, 2003).

Researchers at the Kinsey Institute have created a conceptualization of sexual arousal, sexual appetitive behaviour, and sexual risk taking - the Dual-Control model (Bancroft, 1999; Bancroft & Janssen, 2000) - that in some ways is related to impulse control and can be applied to HD. From the perspective of the Dual Control model, people with low sexual inhibition and high sexual excitation and arousal could be sexual risk takers who are prone to sexual "acting out" with associated disadvantageous personal outcomes. Under the Dual Control model, individuals with low sexual excitation and sexual arousal scores may be asexual and/or uninterested in sex; those with moderate to high sexual excitation and moderate to high sexual inhibition may be normatively sexually interested and active, while as noted those with high sexual excitation and low sexual inhibition may be prone to HD. The Dual Control model lends itself to methodologically rigorous research (constructs and relationships among them are well specified, and validated scales for assessing sexual inhibition and excitation are available) and model-based assessments have been widely employed in empirical investigation (for example see Bancroft & Vukadinovic, 2004; and Winters, Christoff, & Gorzalka, 2010) albeit outside the domain of HD.

Several recent studies conceptualize hypersexuality through novel (or at least novel to HD) frameworks examining HD patterns of behaviour. For example, current hypersexuality scholarship has used attachment theory to advance the understanding of hypersexuality (Bogaert & Sadava, 2002; Cooper, Shaver, & Collins, 1998; Gilliland, Star, Hansen, Carpenter, 2015; Zapf, Grenier & Carroll, 2008. For a recent review, see Montgomery-Graham, 2017a). Since an individual's attachment style is associated with lifetime romantic and sexual behaviour (Hazan & Shaver, 1987), researchers have posited an association between a dismissive-avoidant attachment style (i.e., a tendency to eschew intimacy in favour of self-reliance) and problematic sexual behaviour. Investigations into

attachment style and HD patterns of behaviour have yielded mixed findings, and little conclusive evidence of any certain, replicable relationship between attachment and hypersexuality. A second line of research examines executive cognitive dysfunction as a way to understand hypersexuality in men (Mulhauser, et al., 2014; Reid, Carpenter, Spackman & Willes, 2008; Reid, Garos, Carpenter, & Coleman, E, 2011; Reid, Karim, McCrory& Carpenter, 2010). Executive cognitive functioning (ECF) is an umbrella term that describes a set of neurocognitive processes regulating impulse control, inhibition, attention, judgment, planning, and problem solving. In theory, the impulse control deficits we observe in other pathologies relating to executive functioning (such as gambling and binge eating disorders) may also exist in persons presenting with HD. To date both small sample sizes, and inconsistent measures within the ECF and HD research have made firm conclusions in this connection impossible to draw. Further research is needed in this area. Finally, biological and neurobiological correlates of hypersexuality are also being investigated, including brain imaging studies (Kuhn & Gallinat, 2014; Miner, Raymond, Mueller, Lloyd & Lim, 2009; Prause, Steele, Staley & Sabatinelli, 2015), and dysregulation of the hypothalamic pituitary adrenal (HPA) axis, which has been associated with various mental illnesses including severe depression, addiction, and suicidality (Chatzittofis et al., 2016). Given that this (neuro)biological research is nascent, consistent trends have not yet been identified linking HD patterns of behaviour with biological and neural correlates. Future research based on logically and empirically supported conceptualizations of HD patterns of behaviour, using larger samples, consistent measurement instruments, with replication by diverse researchers will be important to determine whether any of the attachment theory, executive cognitive dysfunction, (neuro)biological correlates of hypersexuality, or earlier theoretical conceptualizations of HD (i.e., impulsivity, compulsivity, addiction) provide further insight into HD or out-of-control sexual behaviour.

While not a strict theoretical conceptualization per se, personality traits have been investigated in relation to HD patterns of behaviour in order to better understand relevant correlates of hypersexuality. Within a sample of treatment-seeking hypersexual patients, Reid, Dhuffar, Parhami & Fong (2012) found that stress vulnerability and interpersonal sensitivity were quite elevated traits on the NEO Personality Inventory relative to

norming samples. Other studies have found that patients reporting high levels of hypersexuality plus distress tend to also have low frustration tolerance, boredom proneness, and high perceived stress (Reid, Garos & Carpenter, 2011). Perhaps unsurprisingly, shame and rumination (Reid, Temko, Moghaddam & Fong, 2014) have been shown to be common in individuals with HD patterns of behaviour, with shame both prompting and resulting from hypersexual behaviour.

Another trait (or series of traits) that appears conceptually similar to hypersexuality is masculinity. While clusters of traits that we typically associate with masculinity vary across cultures and historical periods, traditional North American masculine ideology includes traits of self-reliance, aggression, achievement/status, non-relational attitudes toward sexuality, restrictive emotionality (Levine, 2012), and sexual prowess. At least at first glance, it appears reasonable that hypersexuality may share some conceptual variance with masculinity, although having said that, traditionally masculine traits have not been investigated in the hypersexuality literature.

1.2 Epidemiology of hypersexuality

While conceptualization of the underlying etiology and clinical presentation of hypersexuality remain unsettled, similarly, we lack reliable epidemiological data as to its incidence and prevalence. Kinsey, Pomeroy and Martin (1948) published the first epidemiological data relevant to HD in their report of sexual behaviour in a large sample of American males (N=5300). Kinsey and colleagues were interested in measuring the frequency of "total sexual outlet per week" (TSO) which was defined as orgasms achieved by any of masturbation, nocturnal emissions, heterosexual petting, vaginal sexual intercourse, homosexual outlet, and animal contacts. While Kinsey and colleagues were interested in the distribution of TSO in its entirety rather than HD patterns of behaviour per se, self-reported data revealed that some men had higher than average TSO, sustained for several years consecutively. Kinsey and colleagues found that some 7.6% of males between adolescence and 30 years of age had a mean TSO of at least 7 orgasms per week for at least 5 consecutive years. These data are cited often in the HD literature as the most reliable available estimate regarding male orgasmic output, although TSO is acknowledged as an imperfect heuristic for hypersexuality (Kinsey et

al., 1948). Critics note that Kinsey used convenience sampling in his studies so we cannot necessarily draw strong conclusions about how typical or unusual these behaviours truly are. Moreover, this TSO measure tells us nothing about distress or impairment associated with atypically high sexual behaviour, which is crucial to all mental health disorders, including the proposed HD diagnosis.

Even though it was an imperfect measure of excessive sexual desire or hypersexuality, Kafka (1997; 2003) and Kafka & Heenan (2003) expanded upon Kinsey and colleagues' TSO, and operationally defined *hypersexual desire* based on clinically derived data as a persistent TSO of 7 or more orgasms per week for at least 6 consecutive months after age 25. Kafka's proposed definition of hypersexual desire built upon Attwood & Gagnon (1987), Janus & Janus (1993), Lauman and colleagues' (1994), as well as Kinsey et al.'s (1948) normative data. This new empirically derived concept of hypersexual desire first and foremost explained the variety of sexual behaviour in American males, and importantly for present purposes, identified the most sexually active 5.0-10.0% of these samples (Kafka, 2010a).

Following Kinsey and colleagues', and later Kafka's research, more recent epidemiological data from Långström and Hanson's (2006) investigation with a nationally representative Swedish sample sought to answer whether we can identify a level of sexual activity that is excessive and leads to problematic life outcomes. Their data suggested that in individuals 18 through 60 years, 12.1% of men (n=151) and 7.0% of women (n=80) were hypersexual. Långström and Hanson found that those individuals who had high rates of sexual behaviour within stable dyads (which they labelled *personal sex*) were happier than those individuals who had high rates of *impersonal sex* which included sexual behaviour primarily concerned with the sexual act itself (i.e., masturbation, paying for sex, and multiple changes in partners), rather than sex that focused on the sexual partner.

Långström and Hanson based their findings on a composite measure of hypersexuality correlates including: (i) masturbation frequency during the last month, (ii) frequency of pornography use within the last year, (iii) number of sexual partners within the last year,

(iv) number of sexual partners per sexually active year, (v) sex with someone else while married/cohabiting, (vi) currently more than one sexual partner, (vii) preference for a casual sexual lifestyle, and (viii) lifetime participation in group sex. The logic was that if those behavioural items are indeed valid indicators of hypersexuality, then individuals with more of these behaviours should be more hypersexual. What was considered to be a *high rate of sexual behaviour* was based on males (or females) falling within the top 5.0% (or 10.0% for women) on the continuous variables (i.e., masturbation during the last month, pornography use last year, and number of sexual partners per year and per active year); and to reach the category of *high sexual behaviour* on the dichotomous variables the total number of positive responses was summed (i.e., sex with another while married/cohabiting, currently having sex with more than one stable partner, preference for a casual sexual lifestyle, and engaging in group sex). These hypersexuality variables were assigned weights and summed, and participants (divided by sex) were split into *low* (i.e., no hypersexuality indicators), *moderate* (1 or 2 hypersexuality indicators), and *high* (3 or more hypersexuality indicators) hypersexual categories. So for example, if an individual male was above the 95th percentile on the continuous variable masturbation frequency during the past month, that would be weighted as 1 indicator of hypersexuality; all other continuous variables were similarly evaluated using the 95th percentile as a cut score. Categorical (yes/no) variables were more clearly separated as hypersexuality indicators (i.e., *have you ever had group sex?*, where "yes" is a hypersexuality indicator and "no" is not). These eight sexual behaviour variables which were considered to be *Impersonal Sexual Behaviour Variables* were positively correlated with one another, and crude factor analysis demonstrated the 8 items could be subsumed under one factor accounting for 26.3% of the variance with small to moderate correlations among items (Cronbach's α=.58). Importantly, Långström and Hanson found that correlates of high hypersexual behaviour (which was also *impersonal* sexual behaviour) were largely negative. Those individuals falling into the high hypersexual category also tended to be those individuals who had been separated from their parents during childhood, had an early age of first vaginal intercourse, had had a serious discussion within the last year concerning ending a stable romantic relationship, had been diagnosed with an STI, had paid for sexual contact, had sought help for sexual concerns, and tended to have a higher

lifetime prevalence of unprescribed narcotics. Thus, research using a representative Swedish sample with data collected in 1996 suggests that those individuals who engage in more frequent impersonal rather than personal/relational sex also tend to have less stable families of origin, earlier age of sexual debut, more sexual trauma (at least among the women), and a greater number of current sexual concerns. While the outcomes of the study seem to suggest a somewhat judgmental finding that sex with a stable partner is better than solitary or paid sex, with only a few exceptions, results held that increased rates of the 8 Impersonal Sexual Behaviour Variables were associated with a range of negative health indicators, and held true when controlling for age, being in a stable relationship, living in an urban setting, and same-sex orientation. Of course, it is also possible that many third variables are combining to form a type of "poorly adjusted cluster" (i.e., family of origin poverty, violence, drug use) rather than an obvious antecedent-consequence HD behaviour pattern.

The most recent large-scale epidemiological data available come from a nationally representative sample of Americans, aged 18-50 years, using the National Survey of Sexual Health and Behavior data to assess the prevalence of distress and impairment associated with difficulty controlling sexual urges, feelings, and behaviours (Dickenson, Gleason, Coleman & Miner, 2018). Results showed that 10.3% of males and 7.0% of females met a clinical screen cut score for compulsive sexual behaviour using the Compulsive Sexual Behavior Inventory, a measure of hypersexuality with a long history of strong psychometric support. Individuals with less education than high school completion, lower incomes (>$25,000) or higher incomes ($75,000-$100,000), and racial/ethnic and sexual minorities were all more likely to have difficulty controlling their sexual feelings, urges, and behaviours, leading to distress/impairment in their perceived functioning. Study authors suggested that the high prevalence estimate likely results from capturing those individuals who are problematic but non-clinical, all the way to those individuals who likely have a clinically significant set of out-of-control sexual behaviours. In other words, the distress resulting from high rates of sexual behaviour may in many cases, be interpreted through a sociocultural lens, which may cause interpersonal erotic conflicts for an individual that is, in fact, engaging in normative forms of sexual expression (Braun-Harvey & Vigoritto, 2016; Winters, Christoff & Gorzalka, 2010).

Further prevalence data comes from research that has focused on undergraduate samples. Undergraduates are a group of young adults with high levels of stress, less structured time, less surveillance, and easy access to erotica as well as a large pool of easily accessed potential sexual partners, making them an interesting group in which to study HD prevalence. High estimates of *sex addiction* among undergraduates are observed when the Sex Addiction Screening Test (Carnes, 1983) and its related screening tools (i.e., the sex addiction screening questionnaire, PATHOS,[1] Carnes et al., 2012), a commonly employed measure, are used. Employing this assessment instrument, for example, Seegers (2003) found that 17.4% of males needed further investigation and treatment for sex addiction. Similarly, Cashwell, Giordano, Lewis, Wachtel & Bartley (2015) found that 21.2% of undergraduate males screened positive for requiring further sex addiction treatment when the SAST measurement instrument was used. When measures other than sex addiction measures are used, prevalence estimates are consistently lower, and the scales appear to capture a different aspect of sexual compulsivity than that seen in the HD literature. For example, Odlang and Grant (2010) sampled 971 American undergraduates (males=284) exploring impulse control disorders in general, using the Minnesota Impulse Disorders Interview (MIDI). The four screening questions ask about excessive preoccupation with sex/sexuality, distressing fantasies and urges, and repetitive sexual behaviours. Thus, the MIDI employed with an undergraduate sample likely captured something quite distinct from the more typical variant of HD in the literature which is typically rooted in "addiction", and feelings that one's sexual behaviours are "out-of-control". By contrast, OCD conceptualizations are quite different from HD in that HD conceptualizations generally tend to view sexual beahviours as pleasurable and ego-syntonic, whereas OCD conceptualizations of sexual preoccupation lead to sexual behaviour solely to decrease distress. Using the OCD-based MIDI, Odlang

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[1] PATHOS is an acronym which is designed to capture the core elements of the sex addiction model: (P: preoccupied; A: ashamed; T: treatment seeking; H: hurt others; O: out of control; and S: sad).

and Grant (2010) found that 3.66% of the sample reported compulsive sexual behaviour, with male undergraduates being significantly more likely to report than female undergraduates. This finding is similar to the 12-month prevalence rate of OCD in the United States which us 1.2% (APA, 2013). More recent findings by Odlaug et al (2013) seeking prevalence estimates of HD in American undergraduates (*N*=2108) once again using the MIDI rather than a more common compulsive sexual behaviour assessment tool, found that 3.0% of males met criteria for HD/out-of-control sexual behaviour.

All in all, we currently have evidence that HD has been inconsistently measured in young males (18 to 24 years). Studies using sex addiction scales (i.e., the Sex Addiction Screening Test) capture almost one fifth of the young sample as requiring further investigation of problematic hypersexuality. On the other hand, some research finds prevalence estimates of hypersexuality that intuitively seem more reasonable (3.0-3.66%) although, significantly, not using traditional hypersexuality scales, making it difficult to situate findings within the literature. While one more recent study did use the more common Compulsive Sexual Behavior Inventory with 1749 young participants with a mean age of 24.4 years (SD=4.37), and found that 6.0% of the young males were hypersexual (Rettenberger, Klein & Briken, 2016), a German sample was used. Given very little population-based data exist explaining Germans' sexual beahviours (Haversath et al., 2017), we cannot generalize these findings to a North American sample of young people with potentially divergent sexual mores and values from North American age matched male peers.

Thus, amongst young men we have HD patterns of behaviour, prevalence estimates ranging from 17.4%-21.2% using a sex addiction measures, whereas we only capture between 3.0-3.6% of young men when we define HD as being more akin to an obsessive-compulsive disorder. Once again, conceptual frameworks underlying the choice of measurement instruments are confusing rather than clarifying the data. At the same time, prevalence estimates of problematic hypersexuality across men 16-65 years report findings of hypersexuality in the range of 7.6% (Kinsey et al, 1948), to 12.1% (Långström & Hansen, 2006), with the most recent nationally representative data

revealing that 10.3% of American males believe that their sexual urges, feelings and behaviours are out-of-control (Dickenson et al., 2018).

1.3 Psychometric Assessment Measures of Hypersexuality

These epidemiological data and the diverse theoretical frameworks used to understand HD patterns of behaviour (e.g., sex addiction, sexual compulsivity, or impulsivity) have served as the basis for the development of competing scales designed to measure the problematic hypersexuality construct. A recent psychometric review of hypersexuality measures used Hunsley and Mash's (2008) framework to assess the psychometric adequacy of the six most common assessments used in research and clinical practice in this area (Montgomery-Graham, 2016). Hunsley and Mash's (2008) framework defines the criteria that would indicate the minimum evidence needed to warrant the use of a measure for a specific clinical purpose. The psychometric properties assessed were: construct validity, content validity, norms and cut off scores, sensitivity to treatment, validity generalization, internal consistency, test-retest reliability, inter-rater reliability, and clinical utility (i.e., what the test adds to the prediction of a criterion beyond what can be predicted using clinician assessment). Table 1 sets out the details of Hunsley and Mash's (2008) criteria to assess the psychometric properties of an instrument. For example, if we were analyzing the construct validity of an instrument, there are three possible rankings a measurement instrument may receive: adequate, good, or excellent. *Adequate* construct validity is indicated when there exists some independently replicated evidence of construct validity such as predictive, concurrent, and convergent and discriminant validity. *Good* construct validity requires a preponderance of independently replicated evidence across multiple types of validity (e.g., predictive, concurrent, convergent and discriminant validity). In addition to the criteria used for a *good* rating of construct validity, *excellent* construct validity requires all of the criteria used for *good*, as well as evidence of incremental validity with respect to other clinical data. As the psychometric analysis proceeds, *adequate*, *good*, and *excellent* rankings accrue for each of the relevant categories (norms, internal consistency, inter-rater and test-retest reliability, content and construct validity, validity generalization, treatment sensitivity, and clinical utility).

Table 1: Criteria to Assess Psychometric Properties of Instruments (Hunsley and Mash, 2008)

Criteria at a Glance: Norms and Reliability

Norms

Adequate = Measures of central tendency and distribution for the total score (and subscores if relevant) based on a large, relevant, clinical sample are available

Good = Measures of central tendency and distribution for the total score (and subscores if relevant) based on several large, relevant samples (must include data from both clinical and nonclinical samples) are available

Excellent = Measures of central tendency and distribution for the total score (and subscores if relevant) based on one or more large, *representative* samples (must include data from both clinical and nonclinical samples) are available

Internal consistency

Adequate = Preponderance of evidence indicates α values of .70–.79

Good = Preponderance of evidence indicates α values of .80–.89

Excellent = Preponderance of evidence indicates α values $\geq$ .90

Inter-rater reliability

Adequate = Preponderance of evidence indicates κ values of .60–.74; the preponderance of evidence indicates Pearson correlation or intraclass correlation values of .70–.79

Good = Preponderance of evidence indicates κ values of .75–.84; the preponderance of evidence indicates Pearson correlation or intraclass correlation values of .80–.89

Excellent = Preponderance of evidence indicates κ values $\geq$ .85; the preponderance of evidence indicates Pearson correlation or intraclass correlation values $\geq$ .90

Test–retest reliability

Adequate = Preponderance of evidence indicates test–retest correlations of at least .70 over a period of several days to several weeks

Good = Preponderance of evidence indicates test–retest correlations of at least .70 over a period of several months

Excellent = Preponderance of evidence indicates test–retest correlations of at least .70 over a period of a year or longer

Criteria at a Glance: Validity and Utility

Content validity

Adequate = The test developers clearly defined the domain of the construct being assessed and ensured that selected items were representative of the entire set of facets included in the domain

Good = In addition to the criteria used for an *adequate* rating, all elements of the instrument (e.g., instructions, items) were evaluated by judges (e.g., by experts or by pilot research participants)

Excellent = In addition to the criteria used for a *good* rating, multiple groups of judges were employed and quantitative ratings were used by the judges

Construct validity

Adequate = Some independently replicated evidence of construct validity (e.g., predictive validity, concurrent validity, and convergent and discriminant validity)

Good = Preponderance of independently replicated evidence, across multiple types of validity (e.g., predictive validity, concurrent validity, and convergent and discriminant validity), is indicative of construct validity

Excellent = In addition to the criteria used for a *good* rating, evidence of incremental validity with respect to other clinical data

Validity generalization

Adequate = Some evidence supports the use of this instrument with either (a) more than one specific group (based on sociodemographic characteristics such as age, gender, and ethnicity) or (b) in multiple contexts (e.g., home, school, primary care setting, inpatient setting)

Good = Preponderance of evidence supports the use of this instrument with either (a) more than one specific group (based on sociodemographic characteristics such as age, gender, and ethnicity) or (b) in multiple settings (e.g., home, school, primary care setting, inpatient setting)

Excellent = Preponderance of evidence supports the use of this instrument with more than one specific group (based on sociodemographic characteristics such as age, gender, and ethnicity) *and* across multiple contexts (e.g., home, school, primary care setting, inpatient setting)

Treatment sensitivity

Adequate = Some evidence of sensitivity to change over the course of treatment

Good = Preponderance of independently replicated evidence indicates sensitivity to change over the course of treatment

Excellent = In addition to the criteria used for a *good* rating, evidence of sensitivity to change across different types of treatments

Clinical utility

Adequate = Taking into account practical considerations (e.g., costs, ease of administration, availability of administration and scoring instructions, duration of assessment, availability of relevant cutoff scores, acceptability to patients), the resulting assessment data are likely to be clinically useful

Good = In addition to the criteria used for an *adequate* rating, there is some published evidence that the use of the resulting assessment data confers a demonstrable clinical benefit (e.g., better treatment outcome, lower treatment attrition rates, greater patient satisfaction with services)

Excellent = In addition to the criteria used for an *adequate* rating, there is *independently replicated* published evidence that the use of the resulting assessment data confers a demonstrable clinical benefit

Note. Tables excerpted from Hunsley and Mash (2008).

Table 2 sets out the results of this psychometric evaluation of 5 of the most commonly used HD measures, and ranks them based on the Hunsley and Mash (2008) criteria (Montgomery-Graham, 2017a).

Table 2: Rankings (adequate, good, excellent) and summary explanations according to Hunsley and Mash (2008) criteria

1.	HDSI	Adequate norms, Good to excellent internal consistency, Excellent inter-rater reliability, Adequate test-re-test reliability, Adequate content validity, Adequate construct validity, Adequate validity generalization
2.	HBI	Adequate norms, Excellent internal consistency, Adequate test-re-test reliability, Good content validity, Good construct validity, Adequate validity generalization
3. (Tied)	SCS and SAST	Good to excellent internal consistency (both), Good internal consistency (both), Adequate test-re-test reliability (SCS only), Adequate content validity (SAST only); good content validity (SCS), Good construct validity (SAST and SCS), Adequate clinical utility (both), Good content validity (both), Good construct validity (both)
4.	CSBI	Adequate norms, Good internal consistency, Adequate test-re-test reliability, Adequate content validity, Adequate construct validity, Adequate validity generalization
5.	SAST-R	Adequate norms, Internal consistency not yet adequate, All remaining psychometric properties ranked as adequate (i.e., content validity, construct validity, clinical utility)

While none of the 5 HD measures analyzed has consistent rankings of *excellent,* or even *good* across all psychometric properties assessed, the DSM-5 HD Working Groups' tool, the Hypersexual Disorder Screening Inventory (HDSI), was ranked as the best available instrument. This is because it was the only HD scale with at least one ranking of *excellent* among 9 criteria; the *excellent* ranking was attributable to the HDSI's internal consistency (α=.88-.96, Montgomery-Graham, 2017a). Of course, internal consistency should not be over-valued since it may be increased by adding items to a scale. In addition to having excellent internal consistency, however, the DSM-5 field trial also provided evidence that the HD diagnostic criteria that the HDSI measures were valid and reliable and provided clinical utility. Specifically, the HDSI's validity statistics of sensitivity (.88) and specificity (.93) are particularly relevant for diagnostic and prognostic assessment. Additionally, the HDSI has the advantage of being widely available, free, and brief. In contrast to the HDSI, the bottom ranked scale is the Sex Addiction Screening Test (SAST), which placed 5th of five instruments examined. Currently the SAST lacks research evidence of its internal reliability (which is currently ranked as *adequate*), and its norms, content validity, construct validity, and clinical utility remain *adequate* also.

Using many of the HD measures set out in Table 2, Levaque and colleagues employed a convenience sample of Anglo- and Francophone undergraduates from an Ontario university (*N*=717) to examine the appropriateness of existing cutoff scores for common HD measures (Levaque, Sawatsky & Lalumière, 2016). Levaque and colleagues also used Kinsey's TSO, and many of Långström and Hanson's (2006) *Impersonal Sexual Behaviour Variables* in this connection. The goal of Levaque et al.'s Canadian study was primarily to see how well: (1) the HD cut off scores of the HD measures, (2) the first question of Kinsey's TSO Inventory (i.e., self-reported number of weekly orgasms over the last 12 months), and (3) five items from Långström and Hanson's Impersonal Sexual Behaviour Variables, performed in a young adult cohort. Researchers also examined what behaviours are sexually common and what is atypical in a Canadian university population.

Levaque and colleagues (2016) compared their undergraduate sample to Långström and Hanson's (2006) nationally representative, Swedish, non-clinical sample of adults, aged 18 to 60 years (*N*=2450). The main finding of interest in the Canadian study was that the existing cutoff scores for HD measures and that of the TSO Inventory are flawed in that these measures categorize what appears on a rational basis to be far too many students as being *hypersexual*. For example, between 5.0% and 22.6% of undergraduate females, and between 16.7% and 38.7% of undergraduate males met cut scores of hypersexuality on common measures used in research and clinical practice. Similarly, in comparison to Långström and Hanson's data, which used 8 continuous and categorical Impersonal Sexual Behaviour Variables to conceptualize problematic hypersexuality behaviourally, Canadian undergraduates had very high frequencies of impersonal sexual behaviour. For example, whereas 11.4% of Swedish males reported masturbating at least 15 times within the last month, almost half (46.6%) of Canadian undergraduate males masturbated at least 15 times per month. Swedish females reporting higher masturbation frequency reported masturbating 10.6 times monthly compared to those Canadian female undergraduates with higher masturbation frequency who reported 32.6 instances of masturbation within the last month. These findings suggest the inappropriateness of existing HD cut scores in undergraduates, as well as agreement with a large body of research suggesting a large gender difference in sexual behaviour, with men tending to have higher sexual desire than females (Baumeister, Catanese & Vohs, 2001). Given the consistently high estimates of hypersexual behaviour and problematic outcomes in males in the vast majority of the HD literature, as well as in these recent studies, this current program of research explores HD patterns of behaviour in males only.

Chapter 2

2 Study One – Replication and Extension of Recent Research Findings: Most Commonly Used HD Measures Appear to Pathologize Young Males

The first study in this program of research involves a conceptual replication and extension of Levaque and colleagues' (2016) examination of common hypersexuality measures in a Canadian undergraduate sample. Study One employs an MTurk sample of North American males aged 18 to 45, and addresses the question of whether the most commonly used HD pattern of behaviour/problematic hypersexuality/feelings of out-of-control sexual behaviour measures tend to over-select young male adults as being problematically hypersexual, and whether these commonly used HD patterns of behaviour measures perform better with samples of older men (36-45 years). Study One serves as a point of departure for this research program and provides:

a) a needed replication of an initial and surprising result concerning the high prevalence of HD patterns of behaviour among young undergraduate-aged males (18-24 years);

b) an extension of Levaque et al.'s (2016) research in a sample of older as well as younger respondents, as well as adding both the strongest and weakest (but most common) HD measures based on my recent psychometric analysis (Montgomery-Graham, 2016); and

c) novel discriminant and convergent validity analyses of the hypersexuality measures at focus.

Before turning to the hypotheses of Study One's conceptual replication and extension of Levaque et al.'s (2016) Canadian study of undergraduate men, some notable differences exist between this sample and the sample on which this conceptual replication is based. Whereas Levaque et al (2016) used a Canadian undergraduate sample in their research, Study One will use an online community sample of mostly American males (96.0%; *n*=188), aged 18 to 24 years. In addition to males 18 to 24 years of age, Study One will also survey men in two cohorts up to 45 years of age (i.e., 25 to 35 years, and 36 to 45

years) in order to compare results among age cohorts. Focusing for a moment on the 18 to 24 year-old Study One cohort, which we are comparing to Levaque et al.'s (2016) study, we anticipate that two of the relevant differences that may exist between these samples is religiosity, and level of education. Plausibly, age-matched Canadian and American samples may differ in how they view sex and sexuality if these religion and education variables differ appreciably. In general, Americans tend to be more religious than Canadians (Ray, 2003), although at least within the past decade, 4 in 10 American Millennials identify as having no religious faith (Lipka, 2019), suggesting a trend toward less religiosity with young Americans, closer to that of young (and older) Canadians. As well, a more obvious difference between the young male (18 to 24-year old) Canadian and American samples might be education level since the former is drawn from an undergraduate university population while the Study One population is an online community-based sample, not drawn specifically from a university. These potential differences between the samples will be addressed again in the discussion section of Study One.

Moving onto the hypotheses in Study One, an a priori interpretive rule was created for the replication hypotheses in order to keep in mind the broad purpose of the Study One replication. Using the results of the Levaque and colleagues (2016) study as precise point estimates for Study One largely misses the point of Study One, part of which is to see if we may also capture an inordinately large number of young men as problematically hypersexual using typical hypersexuality scales. Toward this end, all replication hypotheses will be broadly interpreted such that when a hypothesis is framed as an approximate percent of participants being expected to meet an empirically derived cut score based on the percentage that achieved that cut score in Levaque et al.'s (2016) work, we will consider the hypothesis to be supported when the percentage meeting the cut score in Study One is within 5.0% more/less of Levaque et al.'s prediction. To analyze the two scales that do not have empirically derived cut scores, Levaque et al use the 10th and 90th percentiles as benchmarks, (the Compulsive Sexual Behavior Inventory – control subscale and the Hypersexual Behavior Consequences Scale, respectively); again 5.0% of the points within each scale will serve as the benchmark in declaring whether a hypothesis is successful or not. The remaining "non-replication" hypotheses

(i.e., the extension hypotheses) function as more typical hypothetical predictions and do not require rules of interpretation.

2.1 Hypotheses

2.1.1 Hypothesis 1. Replication Hypotheses: Hypersexuality Scales

H1. We anticipate our results will replicate Levaque et al.'s Canadian research findings such that a surprisingly large percentage of young men (aged 18 to 24 years) will be flagged as problematically hypersexual based on each scales' empirically derived cut score. Specifically (and in accordance with Levaque et al.'s findings), we hypothesize that:

H1a. Approximately 23.8% of the youngest males (18-24 years) will reach cut score criteria on the Hypersexual Behavior Inventory;

H1b. Approximately 37.8% of the youngest males will reach levels of problematic hypersexuality of ≥7 orgasms per week as identified by the TSO;

H1c. Approximately 16.7% of the youngest males will reach cut score criteria on the Sexual Compulsivity Scale;

H1d. Based on findings in Levaque et al. (2016) for the control subscale of the Compulsive Sexual Behavior Inventory in which the most problematically hypersexual 10% of undergraduate males achieved scores of 39, we expect that likewise, the bottom ten percent of the youngest males will reach a score of approximately 39 (lower scores on the control subscale of the Compulsive Sexual Behavior Inventory indicate problematic hypersexuality); and

H1e. On the Hypersexual Behavior Consequences Scale the 90th percentile score for the youngest group of males will be approximately 53.5.

2.1.2 Hypothesis 2. Replication Hypotheses: Impersonal Sexual Behaviour Variables

When Levaque et al., (2016) replicated 5 of 8 Impersonal Sexual Behaviour variables from Långström and Hanson's nationally representative Swedish study, the Canadian undergraduate sample reported significantly higher sexual behaviour frequencies across

all variables and were more likely to meet the hypersexuality thresholds established by Långström and Hanson. We believe these findings will replicate in our sample. Specifically, we predict:

H2a. Approximately 46.6% of the 18 to 24-year old males will meet the hypersexuality threshold of ≥ 15 instances of masturbation in the last month;

H2b. Approximately 24.1% of the youngest males (18 to 24 years) will report at least 3 sexual partners in the past year; and

H2c. Approximately, 14.8% of the youngest males will report at least 3 sexual partners per active year.

When the two other Impersonal Sexual Behaviour Variables of Långström and Hanson were used within a Canadian undergraduate sample, high levels of hypersexuality were found. Similarly, we expect that:

H2d. 15.7% of the youngest males will indicate a preference for a sexually permissive lifestyle, and

H2e. Approximately 8.6% will report ever having engaged in group sex.

2.1.3 Hypothesis 3. Extension Hypotheses: DSM-5 HD Scale and Sex Addiction Scale

Study One extends Levaque et al.'s (2016) research to include both the psychometrically strongest and weakest HD scales (Montgomery-Graham, 2016) with an emphasis on the appropriateness of scale cut scores for the youngest males. The Hypersexual Disorder Screening Inventory (HDSI) was the DSM-5 Working Groups' HD screening instrument for HD; it is a valid and reliable measure with high clinical utility, and strong sensitivity and specificity (Montgomery-Graham, 2016). We do not know how the HDSI will perform in our sample.

H3a. Similar to findings in Levaque and colleagues' recent study in which all hypersexuality scales over-estimated the number of young men with HD, we

anticipate that the HDSI will capture a high percentage of young males (18-24 years) as being problematically hypersexual. The best available epidemiological evidence regarding hypersexuality across all age groups of males suggests that 10.3% will reach HD pattern of behaviours cut scores (Dickenson et al., 2018), while the best available evidence of hypersexuality among young males suggests that up to 21.2% will demonstrate HD patterns of behaviour (Cashwell et al., 2011; Odlaug et al., 2013). We hypothesize that 15.0% of young males will reach the HD cut score on the HDSI which represents half of the difference between the highest prevalence rate of hypersexuality among young men (21.2%) minus the overall prevalence rate of 10.3% across all age cohorts;

The Sex Addiction Screening Test has been widely used in clinical practice but had not been broadly and rigorously empirically tested. It was recently ranked fifth of 5 common HD instruments based on the adequacy of its current psychometric properties (Montgomery-Graham 2016).

H3b. Based on research that screened undergraduate students for indicia of sex addiction (Cashwell, et al, 2016), we expect that between 17.4% and 21.2% of males in the youngest age category (18 to 24) will meet Carnes' criteria for sex addiction on the Sexual Addiction Screening Test, as well as on a second specialized series of six items for heterosexual males called the SAST-M (Sex Addiction Screening Test, Male Items).

2.1.4 Hypotheses 4 through 6. Discriminant and Convergent Validity Hypotheses

2.1.4.1 Convergent Validity.

A dimension that has not been explored in relation to hypersexuality is masculinity. Traits of restricted/avoidant emotionality, sexual dominance/prowess, overwhelming libido may have commonality with the HD diagnostic criteria that includes avoidance of affect, and feelings of out-of-control sexual fantasies, urges, and behaviours.

H4. Given stereotypical sex role expectations, we predict that that all HD scales will be positively correlated with high masculinity on the Bem Sex Role inventory.

2.1.4.2 Discriminant Validity.

While existing personality research regarding individuals with hypersexuality suggests symptomatology regarding stress proneness and emotional problems (i.e., emotion dysregulation, boredom proneness, and stress vulnerability), empathy has not been explored in relation to HD within the existing literature and is not expected to have any relationship to HD. Empathy as assessed by the Empathy Quotient Test (Baron-Cohen & Wheelwright, 2004) will be used as a discriminant validity criterion measure in Study One.

H5. We expect that empathy will not have any significant correlations with any of the hypersexuality scales.

Levaque and colleagues used the Marlow Crowne social desirability scale to measure potential differences in male and female reporting of sexual behaviours given cultural expectations that females should be less interested in sex than males and may tend to under-report their sexual behaviours. We assess social desirability in Study One to test whether participants are engaging in impression management as they answer the problematic hypersexuality scales, as well as to inquire as to whether various age cohorts are similarly inclined to engage in impression management in general.

H6. We expect that social desirability will have modest correlations in the range of r = -.2 to -.3, across all hypersexuality measures (E. Levaque, personal communication, March 8, 2018), and expect that younger men may engage in more impression management than their older peers.

2.1.4.3 Exploratory Hypothesis

We are curious as to how men in the older age cohorts of Study One (25-35, and 36-45 years) will be selected for problematic hypersexuality in an online sample of men. Based on recent nationally representative American prevalence estimates (Dickenson, Gleason,

Coleman & Miner, 2018), which found that 10.3% of men (aged 18 to 65 years) had difficulty controlling sexual feelings, urges and behaviours, we hypothesize that:

H7. Fewer of the somewhat older males (25 to 35 years, and 36 to 45 years) in the Study One online sample will meet cut scores on many of the HD measures.

2.2 Measurement instruments

The scales used in this replication and extension study include the Sexual Compulsivity Scale (Kalichman & Rompa, 1995), the Compulsive Sexual Behaviour Inventory (Coleman et al., 2001), the Hypersexual Behavioural Inventory (Reid, Garos & Carpenter, 2011), the Hypersexual Behaviour Consequences Scale (Reid, Garos & Fong, 2012), Total Sexual Outlet assessment (Kafka, 1997), and five items from Långström and Hanson's indicators of hypersexuality in a Swedish sample (2006). The current study extends this research to the investigation of two important HD measures not considered by Levaque et al. (2016) - the Hypersexual Disorder Screening Inventory (Reid et al., 2012), the psychometrically strongest scale as identified by Montgomery-Graham (2016), and the most common but least psychometrically sound instrument, the Sexual Addiction Screening Test – Revised (Carnes, Green & Carnes, 2010). All scales to be included in Study One are discussed briefly below and the psychometric properties of the scales are described in Table 3.

Table 3: Psychometric Properties of Study One Scales

Replication Scales			
Questionnaire	Scoring	Reliability	Current Sample
Sexual Compulsivity Scale (SCS; Kalichman et al., 1994), 10 questions	4-point Likert scale (*not at all like me* to *absolutely like me*) Range: 10-40 HD cut score: 24+	Internal reliability: α=0.86; Test-retest (3 months): 0.64 (Kalichman & Rompa, 1995) Internal reliability: α=0.88 (Levaque et al., 2016)	Internal reliability: α=0.93 *M*score: 16.68 (*SD*=6.87) Factors: 1 factor accounting for 62.26% of the variance Factor loadings: .586-.841
Compulsive Sexual Behavior Inventory-control subscale	5-point Likert scale (*very frequently* to *never*)	Internal reliability: α=0.88-.96 (Coleman et al, 2001)	Internal reliability: α=0.95

(Coleman, et al., 2001), 13 questions in subscale	Range: 13-65 HD cut score: none; lower is more sexually compulsive	Internal reliability: α=0.91 (Levaque et al., 2016)	*M*score: 27.08 (*SD*=12.23) Factors: 1 factor accounting for 62.31% of the variance Factor loadings: .558-.711.
Hypersexual Behavior Inventory (HBI; Reid et al., 2009), 19 questions	Subscales: control, coping, consequences 5-point Likert scale (*never* to *very often*) Range: 19-95 HD cut score: 53+	Internal reliability: α=.96; test-retest (2 weeks): *r*=.91, and subscale internal reliability: .89-.95; test-retest subscale (2 weeks): r=.88-.90 (Reid, Garos & Carpenter, 2011) Internal reliability: α=0.94, and subscale internal reliability: α=0.81-.91 (Levaque et al., 2016)	Internal reliability: α=90. Subscale internal reliability, control: α=0.95, and coping: α=0.91 *M*score: 37.77 (*SD*=16.09) Factors: 2 factors accounting for 54.77% (control), and 10.88% (coping) of the variance. Factor loadings: control = .658-.820, and coping = .664-.748
Hypersexual Behavior Consequences Scale (HBCS; Reid et al, 2012), 23 questions	5 point Likert scale (*hasn't happened and is unlikely to happen* to *has happened several times*) Range: 19-95; HD cut score: none; higher score means more negative consequences from sexual beahviours	Internal reliability: α=0.84; test-retest reliability (2 weeks): r=.76 (Reid et al, 2012) Internal reliability: α=0.92 (Levaque et al., 2016)	Internal reliability: α=0.95 *M*score: 35.33 (*SD*=17.31) Factors: 1 factor accounting for 48.79% of the variance Factor loadings: .511-.758
Total Sexual Outlet Inventory (TSOI; Kafka, 1997), 4 questions; only 1 used as in Levaque et al. (2016)	Total: Number of orgasms per week Range: limitless HD cut score: 7+ orgasms/week	*M*score: 9.9 (*SD*: 12.3) (Levaque, et al., 2016)	Mscore: 9.72 (SD: 8.17) One item
Extension Scales			
Questionnaire	Scoring	Reliability	Current Sample
Sexual Addiction Screening Test (SAST; Carnes,	Yes/No Range: 0-20 HD cut score: 6+	Internal reliability: α=0.89-.95	Internal reliability: α=0.90 *M*score: 4.48 (*SD*=4.89)

Green & Carnes, 2010), 20 questions		(see review by Montgomery-Graham, 2016)	Factors:[2] 1 factor accounting for 61.67% of the variance Factor loadings: .641-.879
Hypersexual Disorder Screening Inventory (HDSI; Reid et al., 2012), 6 questions[3]	5-point Likert scale (0 - *never* true to 4 - *almost always true*) Range: 0-24[4] HD cut score: 17+[5]	Internal reliability: α=.88-.96; test-retest (2 weeks): φ=.81 (Reid, Garos & Carpenter, 2011)	Internal reliability: α=.91. *M*score: 13.20 (*SD*=6.03) Factors: 1 factor accounting for 68.78% of the variance. Factor loadings: .766-.824

[2] Exploratory Factor analysis was conducted using Maximum Likelihood Estimation, and an oblique rotation.

[3] Usually the scale has 7 items.

[4] Typically, the range of HDSI scores is 0-28. The range in this sample was lower as one item (item A6) was unusable. The item read: *I have continued to engage in risky sexual behaviours that could or has caused illness, injury or emotional damage to myself, my sexual partner(s), or a significant relationship*.

[5] The cut score of 20 is typically used on the HDSI. A new tentative cut point was established for this study given data from item A6 was unusable. The revised tentative cut point was calculated by summing the range of points that could be selected under the scale (24) multiplied by the proportion of scores needed to meet the cutoff (20/28).

2.2.1 Hypersexuality measures.

2.2.1.1 Sexual Compulsivity Scale.

The SCS was developed primarily as a research tool to measure HIV risk sexual behaviour in relation to sexual compulsivity (Kalichman & Rompa, 1995). The scale consists of 10 items adapted from Zuckerman's Sensation Seeking Scale (1964), as well as items based on self-help guides for self-diagnosed "sex addicts", to measure an individual's compulsive preoccupation with sexual encounters, and ranges from 1 – *Not at all like me* to 5 – *Very much like me*. Much of the research concerning the SCS focuses on heterosexual and gay HIV seropositive individuals. The SCS demonstrates strong internal consistency (α=.86; Kalichman & Rompa, 1995), as well as strong concurrent validity (with the SAST, HBI, HDSI, and CBCI-c, which are all discussed herein), discriminant, and criterion-related validity (demonstrating positive correlations with number of sexual partners, unprotected sex practices, drug and alcohol use before sex, frequency of masturbation, and impulsive sensation seeking). Cut scores on the SCS were established initially as the within-gender (male/female) 80th-percentile score, which was replicated and demonstrated to correspond to a score of 24 (Benotsch, Kalichman & Kelly, 1999; Benotsch, Kalichman & Pinkerton, 2001; Grov, Parsons & Bimbi, 2010). More recent Item Response Theory analyses of the SCS confirm 24 as an appropriate cut score (Ventuneac, et al., 2014).

2.2.1.2 Compulsive Sexual Behavior Inventory.

The CSBI (Coleman, Miner, Ohlerking & Raymond, 2001) is a 22 item self-report measure with two subscales measuring: control of one's sexual urges, and violence (viz., items query past consensual and non-consensual sexual violence against respondent and by respondent). Items are rated on a 5-point scale as: 1 – *Never*, 2 – *Rarely*, 3 – *Occasionally*, 4 – *Frequently*, and 5 – *Very frequently*. The CBSI has demonstrated positive concurrent validity with other hypersexuality measures (including SAST, SCS, and HBI), as well as criterion validity with risky sexual behaviours, number of sexual partners, and impulsive sensation seeking. Recent Receiver Operating Characteristic analyses by initial study authors demonstrated that the 13 item Control subscale of the

CSBI had substantially the same predictive power as the Violence subscale which added little incremental validity to the instrument. The researchers concluded that only the 13-item Control subscale is helpful in diagnosing compulsive sexual behaviour (Miner, Raymond, Coleman & Romine, 2017). When the CSBI is clinician-administered as a screening tool, clinical screening cut scores of 30 are suggested to maximize positive predictive value, and when the CSBI is used as a self-report research measure, more conservative cut scores of 35 are deemed appropriate for epidemiological research (Miner et al., 2017). Levaque and colleagues (2016) did not have the benefit of these more recent cut score analyses when their research was published; they reported novel, reverse-coded, 90th-percentile findings in an undergraduate sample rather than using cut scores. To facilitate comparison between Levaque et al.'s (2016) undergraduate findings, Study One also reports reverse coded and 90th-percentile findings by age cohort. Levaque and colleagues (2016) used only the control subscale of the CSBI. Similarly, Study One uses only the control subscale of the CSBI.

2.2.1.3 Hypersexual Behavior Inventory.

The HBI (Reid, Garos, & Carpenter, 2011) is a 19-item scale that was developed by several members of the DSM-5 Workgroup using the proposed HD criteria. The HBI was developed to capture the emotion dysregulation element of individuals with HD; it captures solo as well as partnered hypersexual behaviour (Reid, Garos, & Carpenter, 2011). The HBI ranges from 1 - *Never* to 5 - *Very Often*. Its three-factor structure contains subscales measuring: coping (i.e., *I use sex to forget about the worries of daily life*), control (i.e., *My attempts to change my sexual behavior fail*), and consequences (i.e., *My sexual activities interfere with many aspects of my life, such as work or school*). The HBI has been used with samples of outpatient males, community members, and gay and bisexual males. Initial scale researchers tentatively set cut scores on the HBI at 53, which represents a combination of two approaches to cut scores: (1) averaging the mean HBI scores of controls and the mean HBI scores of individuals with hypersexuality; and (2) setting the cut score as 1.5 standard deviations above the control participants' mean HBI score (Reid, Garos & Carpenter, 2011). Details of the HBI's strong concurrent, discriminant and criterion-related validity may be found in Table 3 above.

2.2.1.4 Hypersexual Behavior Consequences Scale.

Scale development of this 23-item one factor scale was based on DSM-5 HD construct development, and participants were drawn from a sample of patients recruited in a DSM-5 field trial for HD (Reid, Garos & Fong, 2012). The HBCS was developed to assess a broader variety of consequences related to hypersexuality. Using a 5-point Likert scale (1 – *Hasn't happened and is unlikely to happen* to 5 – *Has happened several times*) items sample how an individual's potentially problematic sexual behaviour has interfered with various life domains including job loss, drug use, financial difficulties, mental health, and relationships. While the scale has not been widely used nor received extensive psychometric research, factor analysis reduced the HBCS items to a single factor solution, which showed high internal consistency and stability over time. Higher HBCS scores were positively correlated with higher levels of emotion dysregulation, impulsivity, and stress proneness and lower levels of satisfaction with life and happiness. The HBCS was shown to have high internal consistency (α=.84 -.91), and adequate test-retest reliability (r=.76) over 2 weeks (Reid, et al., 2012; Reid, Garos & Fong, 2012). The scale has not been used widely and no empirically derived cut score exists. Levaque and colleagues (2016) report 90th percentile findings in an undergraduate sample, and Study One presents 90th percentile findings for ease of comparison with Levaque and colleagues' (2016) research.

2.2.1.5 Total Sexual Outlet.

Kinsey and colleagues' (1948), and Kafka's (1997) concept of TSO set out above, measures total sexual outlet through various means. In their study, Levaque and colleagues only reported on one question from the TSO, namely, the number of total orgasms during a typical week over the last 12 months, which was collected in this study as well.

2.2.1.6 Långström and Hanson's Hypersexuality Indicators.

Långström and Hanson identified 8 indicators of hypersexuality – the Impersonal Sexual Behaviour Variables – discussed earlier. Levaque and colleagues included five of 8 of these variables when they replicated Långström and Hanson's study in a Canadian

undergraduate sample, including: (i) masturbation frequency during the last month, (ii) number of sexual partners within the last year, (iii) number of sexual partners per active year, (iv) preference for a casual sexual lifestyle, and (v) lifetime participation in group sex. While on their face none of these variables necessarily seems problematic, Långström and Hanson's research hypothesized that when the 5 above-listed variables, all associated with impersonal sexual behaviour, are engaged in to excess (relative to other members of a representative Swedish community sample), they are associated with negative life outcomes. For example, those Swedish men who were high in impersonal sex/hypersexuality were more likely to have had problems in current adult romantic relationships, engaged in heavy drinking within the last month, and consulted a professional for advice about their sexuality.

2.2.1.7 Hypersexual Disorder Screening Inventory.

The HDSI was the measure used for the clinical screening of HD in the DSM-5 field trial to assess the adequacy of the HD construct for inclusion in DSM-5 (Reid et al., 2012). It is a 7-item scale based on the proposed DSM-5 diagnostic language and includes items such as *frequent, intense sexual fantasies, urges, and behaviours have made me feel very upset or bad about myself (e.g., feelings of shame, guilt, sadness, worry, or disgust) or I tried to keep my sexual behavior a secret.* The HSDI uses a 5-point Likert scale ranging from 0 – *Never true* to 4 – *Almost always true.* The HDSI has received the most rigorous psychometric testing including item response modelling (Parsons et al., 2012) as well as translation, cultural adaptation, and validation in non-North American samples (Scanavino et al., 2016). The HDSI has strong concurrent validity with other hypersexuality scales including the SCS, HBI and HBCS, as well as high sensitivity (.88) and specificity (.93). The HDSI has been used most often with highly sexually active gay and bisexual males although a small percentage of females (<5.0%) who were in treatment for compulsive sexual behaviour were included in the field trial (Montgomery-Graham, 2016). The HDSI is the best psychometric instrument available to measure HD currently as evaluated by Montgomery-Graham (2016) using Hunsley and Mash's criteria (2008). The cut off score of 20 was arrived at via Item Response Theory analysis of the HDSI (Parsons et al., 2013).

2.2.1.8 Sexual Addiction Screening Test (SAST), and SAST-Male Items.

In 1988, Patrick Carnes developed the Sex Addiction Screening Test and touted it as the first assessment tool for clinicians to use with patients who manifested sexually compulsive behaviour (Carnes, Green, & Carnes, 2010). The revised 20-item SAST-R contains a series of easily administered and widely available yes/no questions that have been important to the public, media and clinical narrative of sex addiction rather than being rigorously tested in empirical research by parties who are arms-length to the instrument (Ley, Prause, & Finn, 2014; Montgomery-Graham et al., 2015). For instance, inpatient samples used to norm the SAST often include individuals housed in private "sex addiction" treatment facilities. The SAST-R has 4 dimensions measuring preoccupation, loss of control, relationship disturbance, and affect disturbance. Carnes, Green & Carnes (2010) created the SAST-R to include 20 Core Items thought to capture the essential elements of sex addiction common to various groups, including women, heterosexual men and homosexual men. Using Area Under the Curve analyses, Carnes and colleagues (2010) set the revised SAST-R cut point of 6 to maximize both sensitivity (.817) and specificity (.778). The SAST-R also includes 6 Male items, which are considered research items that add confirmatory information to the 20 core items. A proposed tentative cut score of 3 was offered by scale authors until further validation research is conducted (Carnes, Green & Carnes, 2010). While the 6 Male Items have never been tested psychometrically, the SAST-R has reasonable discriminant and criterion-related validity (See Table 3 above). Concurrent validity research demonstrates positive correlations between the SAST and the Beck Anxiety and Depression Inventories, Boundary Violation Indices, several subscales of the Million Clinical Multiaxial Inventory (MCMI-III), including anti-social, borderline, schizotypal, sadistic, and paranoid, as well as positive correlations with anxious and avoidant attachment styles.

2.2.2 Biographical and sexual history measures.

2.2.2.1 Biographical Questionnaire.

In order to reduce participant response burden, an abbreviated version of the 40-item biographical questionnaire used by Levaque and colleagues was used in this study. The

initial study by Levaque and colleagues was part of a larger series of studies on paraphilic hypersexuality; given that paraphilic disorders in conjunction with HD are beyond the scope of this research, Study One included only basic biographical questions and contained 8 items to provide a description of our research sample. We asked about age (must be over 17 years and under 46 years), fluency in English, gender, ethnicity, religious and political affiliation, education, and relationship status.

2.2.2.2 Questionnaire on sexual history.

Levaque and colleagues (2016) used a 56-item measure created for the purposes of the study to assess participants' sexual history, as potential correlates and relevant indicators of hypersexuality. The content areas include: sexual contact, sexual partners, solitary masturbation, penetrative sex, sexual thoughts, interest and disgust felt towards one sex or the other, use of pornography, use of sex toys, and use of sexual services. Only the 18 items reported in Levaque and colleagues' manuscript were used in Study One to decrease participant response burden. See Appendix A for a list of these items.

2.2.2.3 Sexual Orientation.

One question based on the work of Kinsey and colleagues (1948, 1953) was posed regarding sexual orientation. The question pertains to how participants identify themselves in terms of sexual orientation. The question was answered on a 7 point scale including the choices: (0 – *exclusively heterosexual*, 1 – *predominantly heterosexual, only incidentally homosexual*, 2 – *predominantly heterosexual, but more than incidentally homosexual*, 3 – *equally heterosexual and homosexual*, 4 – *predominantly homosexual but more than incidentally heterosexual*, 5 – *Predominantly homosexual, only incidentally heterosexual*, and 6 – *exclusively homosexual*). Based on Levaque and colleagues' study, men will be considered to be heterosexual if they answer the question with 2 points or fewer, bisexual if they answer with a 3, and homosexual if they answer with at least 4.

2.2.3 Convergent and Discriminant validity assessment.

2.2.3.1 Convergent Validity (Masculinity).

2.2.3.1.1 Bem Sex-Role Inventory.

The Bem Sex-Role Inventory (BSRI; Bem, 1974) is a measure of an individual's gender expression and identification with traditional masculine and feminine gender roles which are presented as unidimensional and orthogonal. The original scale contains 60 items, including personality traits in which participants rate themselves on a 7-point Likert scale (1 - *never or almost never true of me*) to (7 – *almost always true of me*). The scale contains 20 stereotypically masculine, 20 stereotypically feminine and 20 gender-neutral traits, yielding categories of masculine or feminine (scoring above the median in one gender and below the median in the other), undifferentiated (scoring below the median in both masculine and feminine characteristics), and androgynous (scoring above the median in both masculine and feminine traits). The BSRI has attained coefficient alphas of .78 and .87 for the femininity and masculinity scales respectively, as well as high test-retest reliability (Bem, 1981). A recent cross-temporal meta-analysis (1974 through 2012) of university students' scores on the BSRI revealed that whereas women's femininity scores have decreased significantly (d=-.26), no significant changes were observed for men in masculinity, femininity, or androgyny scores over time (Donnelly & Twenge, 2017). Psychometric qualities of the shortened 12-item inventory are adequate (Cronbach's α on Feminine scale = .77, and .73 on the Masculine scale [Fernandez & Colleo, 2010]) and were used in Study One to reduce participant burden and increase attention.

2.2.3.2 Discriminant Validity

2.2.3.2.1 Empathy Quotient.

The Empathy Quotient Test (EQT; Baron-Cohen & Wheelwright, 2004) was initially developed for use with adults of typical intelligence who were suspected to have Asperger Syndrome/High Functioning Autism (now Autism Spectrum Disorder; ASD). As ASD is a social-communication disorder, individuals with ASD struggle with difficulties in empathy. Based on past personality research, empathy is not expected to

correlate significantly with any of the hypersexuality measures. Like the original 60 item EQT, a shorter 8-item version possesses strong reliability and validity properties (Wakabayashi et al., 2006), and is a good measure of empathy as a single dimension (Alison, Baren-Cohen, Wheelwright, Stone & Muncer, 2011). The EQT was used as a discriminant validity measure.

2.2.3.2.2 Social Desirability.

The Marlow-Crowne Social Desirability Scale – Revised (Reynolds, 1982) is a 33-item scale that assesses whether or not respondents are concerned with appearing in a socially desirable fashion in their responding. This short scale has good internal consistency with α ranging from .73 to. 96, and satisfactory reliability (Sarbescu, Costea & Rusu, 2012). According to study authors, the Marlowe-Crowne Social Desirability Scale – Revised is a single factor scale that measures "need for approval" (Crowne & Marlowe, 1964). It is included in Study One for two reasons. First, it was included in the original study that Study One replicates. Levaque and colleagues queried whether sex differences in responding would be exaggerated because of cultural expectations and gender norms that might incite men to over-report sexual desire and activities and women to underreport sexual desire and activities. Plausibly, as well, cohort effects may exist when the age range of participants spans almost three decades, such that older men in our sample may have more conservative perceptions of socially desirable responding and show a stronger correlation of hypersexuality measures with social desirability. As well, the social desirability scale will serve as a discriminant validity measure in Study One given that we would not expect hypersexuality and social desirability to share substantial conceptual variance.

2.2.3.3 Honesty in reporting responses.

2.2.3.3.1 Question of validity.

The following question: *Do you feel you were able to be totally honest when you responded to this survey* was included at the end of the study by Levaque and colleagues (2016), and was answered on a 7 point scale, ranging from *completely* to *not at all*.

Similar to the initial study, only those individuals who indicated they were *completely*, *almost completely*, or *mostly* honest were used in the analyses.

2.3 Method

2.3.1 Sampling Procedure and Sample Size

We sought to replicate and extend the Levaque et al (2016) study that was performed using a Canadian undergraduate sample aged 18-24 years of age. As discussed earlier, existing epidemiological data are derived from American, Canadian, and Swedish samples, and thus our study recruited Canadian and American participants exclusively. Using Amazon's Mechanical Turk Prime, 973 Canadian and American adult male participants, aged 18 to 45, were recruited between September and November 2018 (See Appendix B for a flow chart of the studies). Participants were registered as workers on Mechanical Turk (formerly www.MTurk.com; now www.cloudresearch.com), and have achieved a 97% approval rating on the site, which means that they were in good standing and highly valued respondents by past researchers. All participants were over 18 years of age and represented they could read and write in English fluently. Participants were paid $1.00 US to participate in Study One, which took approximately 20 minutes to complete. All measures were presented using Qualtrics Survey Software (www.Qualtrics.com) on the MTurk prime server. Quota sampling was used to ensure adequate age representation within each age cohort of interest in the study (i.e., 18-24, 25-35, and 36-45)(See Appendix B for a listing of instruments employed in Study One).

The vast majority of psychometric research regarding HD measurement instruments uses either national survey data (for example see Långström & Hanson (2006) who use a Swedish sample; or more recently Dickenson, Gleason, Coleman & Miner (2018) who use an American sample), which tend to have very large sample sizes (N=2450), and (N=2325) respectively; by contrast clinical research samples have sample sizes closer to 200 (Reid et al., 2012). The only community sample of a hypersexuality scale with diverse ethnic and sexual orientation composition had a sample of N=482 (Storholm, Fisher, Napper, Reynolds, & Halkitis, 2011). A sample size of one thousand participants was selected as the appropriate size for this study in order to take account of spoiled data

and to establish more robust and precise prevalence estimates. Once the study had been online for 2 months, 973 participants had participated in the study, and further recruitment attempts were not successful. At that point, the participant pool was deemed to have been exhausted, and the study was closed.

During data cleaning, data from participants who were: female (*n*=86), non-English speaking (*n*=43), under 18 years of age (*n*=32), or over 46 years of age (*n*=21), were deleted from the dataset. The remaining dataset contained 791 participants. Following the procedures in Levaque et al. (2016) on which this study is based, participants who indicated that they had answered study questions honestly *half of the time, less than half of the time, not really or not at all*, were excluded from all analyses (*n*=26). The final sample was 756 male participants in three age cohorts: 18 to 24 (*n*=195), 25 to 35 (*n*=340), and 36 to 45 (*n*=221).

MTurk workers who volunteered to participate in the study reviewed a Letter of Information and Consent before agreeing to participate in the study. The LOI explained that participants would be asked questions about their sexual thoughts, feelings, behaviour, and beliefs. The study was reviewed and approved by the Non-Medical Research Ethics Board of Western University (see Appendix C for Study One Advertisement, Letter of Information, Consent and Debriefing documents).

2.3.2 Study One Assessment Scale Scoring

Missing value analyses were conducted using the Statistical Package for the Social Sciences (SPSS) 25 to examine patterns of missing responses. T-tests were conducted within scales, to determine whether missingness was related to any other variable, with α=.05, and tests were requested only for variables with at least 5 percent of data missing. Two of the scales, CSBI-control, and SAST-R had equal to or greater than 5% of the data missing, with the CSBI-control scale missing 38 cases or 5.0% of the data, and the SAST-R missing 47 cases or 6.2% of the data with the remaining scales having as little as 1.6% of data missing for any item on an individual test. A Missing Values Analysis of the CSBI-control indicated that Little's Test of Missing Completely at Random (MCAR; 1988) was not significant, χ^2=140.48, df=131, *p*=.270. When significant, this test

suggests that the hypothesis that the data are MCAR can be rejected. Therefore, there was no evidence to suggest that the data were not MCAR in the CSBI-control measure. No further analyses were completed, and 5% missing data was considered to be acceptable in a large sample. The SAST-R is a test that asks a series of yes/no questions. Missing Values Analysis revealed that if 4 cases were deleted from the dataset, there would be fewer than 1.0% of the data missing within the scale. Accordingly, these 4 cases were deleted. As such, pairwise deletion was used in all statistical procedures.

Once the data were cleaned, we summed the items within all scales as directed in scale development sources and used empirically derived cut scores to determine which participants were hypersexual or not hypersexual for the following scales: the HBI (cut score: 53), the TSO ($\geq$ 7), SCS (cutscore: 24), SAST-R (cutscore: 6), and SAST Male Items (cutscore: 3). Since neither the (reversed) CSBI[6] nor the HBCS has empirically derived cut scores, a cut score of 39 for the CSBI (representing the bottom decile on a reverse-coded scale), and of 53.5 for the HBCS (90th percentile) were selected, following the procedures for determining cut scores in Levaque et al.'s (2016) study.

One item on the HDSI (item A5) which reads: I have continued to engage in risky sexual behavior that could or has caused injury or illness, or emotional damage to myself, my sexual partner(s), or a significant relationship was unusable as the item was mistakenly omitted from data collection, so a new cut score for the scale was calculated. The empirically derived cut score for HDSI is 20 with a range of totals from 0-28 (Parsons, et al., 2013). As a result of the loss of item A5, the revised tentative cut point for Study One was calculated by summing the range of points that could be selected under the now 6 point scale (total=24 points), multiplied by the proportion of scores needed to meet the cut score (20/28), resulting in a new cut score for purposes of Study One of 17.

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[6] The CSBI has an empirically derived cut score for the 13-item scale used in Study One (which is called the "Control subscale of the CSBI" in this dissertation). Since Study One is a replication study, data presentation follows that of Levaque et al (2016) such that the CSBI is presented as reverse coded and the bottom 10 percent is the benchmark by which the scale is judged.

Respondents who scored 17 or greater were classified as a positive screen for hypersexuality.

Five variables equivalent to five of Långström and Hanson's (2006) Impersonal Sex Variables were created based on Levaque et al.'s (2016) study: (1) frequency of solitary masturbation in the last month, (2) the number of sexual partners in the 12 last months, (3) the number of sexual partners per active year, (4) the preference for a sexually permissive lifestyle, and (5) lifetime participation in group sex. Impersonal Sex Variable items posed to participants may be found in Appendix A.

2.3.3 Statistical Analysis

Convergent and discriminant validity were evaluated by calculating Pearson correlations between scores on the eight hypersexuality scales and the (1) Bem Sex Role Inventory (convergent validity), and the (2) Empathy Quotient and Marlow-Crowne (discriminant validity measures).

Given the inconsistent psychometric quality among the hypersexuality scales employed in Study One, factor analysis was conducted to ascertain factor structure, factor loadings, and percentage of the variance accounted for within each hypersexuality scale. These factor analyses were conducted with a view to comparing Study One outcomes with the original scale development sources. Separate factor analyses were performed on 7 of the eight hypersexuality scales using a maximum likelihood (ML) estimation (See Table 3 above). An ML estimation was used since this method permits significance testing of factor loadings and correlations among factors and is the preferred method when the data are generally normally distributed (Fabrigar, Wegener, MacCallum & Strahan, 1999). While three of 8 hypersexuality scales may be considered highly skewed (i.e., less than -1 or greater than 1: SCS=1.19; HBCS=1.34; SAST=1.39), and four remaining scales as moderately skewed (i.e., between -1 and -.5 or between .5 and 1: HBI=.916; HDSI=.628; SAST-M=.853; CSBI=.832), Tabachnik and Fidell (2014) note that in sample sizes over 200 (here *N*=756), the shape of the distribution is more important than the skewness of the distribution. While there is a tendency toward a positive skew in the distributions of the hypersexuality scales, the kurtosis of all replication scales, is good (i.e., +/- 1). Two

scales – the Sex Addiction Screening Test [kurtosis=1.59], and the Hypersexual Behavior Consequences Scale [kurtosis=1.15] have higher but still acceptable kurtosis (+/-2). Thus, the shapes of the distributions were considered to be within the limits of acceptability in conducting ML estimation factor analysis. The one-item TSO was not factor analyzed. Catell's (1966) scree test was used to evaluate evidence of a meaningful factor in addition to Eigenvalues of at least 1. Items with a factor loading of at least 0.5 were considered to meaningfully load onto a factor. As well, the internal consistency of scales was evaluated using the Cronbach's alpha coefficient. Tetrachoric correlations were calculated in MPlus software for those scales that used a dichotomous format (i.e., yes/no items) prior to factor analysis. Tetrachoric correlations are appropriate when the two dichotomies whose association is to be assessed are obtained by dichotomizing a truly continuous variable (e.g., here the continuum would be the level of hypersexuality)(Lorenzo-Seva & Ferrando, 2012).

2.4 Study One Results

2.4.1 Participant Characteristics

The sociodemographic characteristics of the participants are shown in Table 4. The majority of participants were White (73.2%), and heterosexual or predominantly heterosexual (83.6%). Most participants identified as Christian (49.1%), Agnostic (20.9%), or Atheist (19.7%). Participants were relatively well educated as well over half (60.3%) of the participants had completed at least a bachelor's degree. The participants fell into the following age categories: 18-24 years (25.9%, *n*=196), 25-35 years (44.9%, *n*=341), and 36-45 years (29.2%, *n*=221). Inferences may be drawn from the responses to an item regarding political affiliation that the vast majority of participants was American (75.23%, *n*=565).

Table 4: Demographic Characteristics of Study One Participants

	Full Sample		**Youngest**		**Middle**		**Oldest**	
	n	%	n	%	n	%	n	%
Race								
White	557	73.2	131	66.8	249	73.0	176	79.6
Black	66	8.8	15	7.7	31	9.1	19	8.6
Asian	65	8.5	24	12.2	26	7.6	15	6.8
Hispanic	49	6.4	20	10.2	20	5.9	9	4.1
Aboriginal	15	2.0	5	2.6	8	2.3	2	0.9
(unanswered)	9	1.2	1	.5	7	2.1	-	-
Religious Affiliation								
Christian	374	49.1	73	37.2	188	55.1	112	50.7
Agnostic	159	20.9	54	27.6	63	18.6	42	19.0
Atheist	150	19.7	44	22.4	63	18.6	42	19.0
Buddhist/Hindu/Jewish/Muslim	50	5.5	20	10.3	15	4.5	15	6.9
Other	25	3.3	5	2.6	10	2.9	10	4.5
(unanswered)	3	1.5	-	-	2	0.6	-	-
Education Completed								
Some high school	7	0.9	2	1.0	-	-	5	2.3
Trade school	31	4.1	6	3.1	13	3.8	12	5.4
High School/GED	140	18.4	60	30.6	44	12.9	36	16.3
Associate's/Bachelor's	459	60.3	124	63.2	221	64.8	112	50.7
Professional/graduate school	118	15.6	2	1.0	62	18.3	54	24.5
(unanswered)	6	0.8	2	1.0	1	0.3	2	0.9
Sexual Orientation								
Hetero/mostly hetero	633	83.6	153	78.1	283	82.9	195	88.2
Equally hetero and homo/predominantly one but more than incidentally the other	91	11.9	26	13.2	45	13.2	20	9.0
Homo/mostly homosexual	32	4.2	15	7.7	12	3.0	5	2.3
(unanswered)	5	.3	2	1.0				
Relationship Status								
Single	235	30.9	87	44.4	100	29.3	47	21.3
Casually dating	82	10.8	36	18.4	34	10.0	12	5.4
Dating seriously/engaged	152	20	63	32.2	55	16.2	34	15.4
Married	271	35.6	9	4.6	144	42.2	117	52.9
Widower (divorced)	1(15)	0.1 (2.0)	-	-	- (7)	2.1	1(8)	0.5(3.6)
(unanswered)	5	.6	1	.5	1	0.3	2	1

2.4.2 Psychometric Properties of the Scales

All of the hypersexuality scales demonstrated strong psychometric properties, with all hypersexuality scales replicating expected factor structures, achieving high item factor loadings (scales range from .558 to .879), and strong reliability indices (Cronbach's α ranging from $\geq$ .90, except the 6-item SAST Male, which had a Cronbach's α=.70; see Table 3 above for further details). As well, all scales correlated with one another significantly in the r=.56 to .89 range (p< .01), suggesting all scales tap a similar construct (see Table 5 for further details). Only the one-item TSO, which measures orgasmic output per week by any means, had a weaker but significant positive correlation with all other scales in the range of 0.32 to 0.37.

Table 5: Pearson Correlations among all Study One Scales

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.
1.HBCS	-										
2. TSO	.316**	-									
3. SCS	.733**	.370**	-								
4. CSBIc	-.758**	-.355**	-.845**	-							
5. HBI	.812**	.369**	.820**	-.844**	-						
6. HDSI	.715**	.392**	.813**	-.889**	.846**	-					
7. SAST-R	.796**	.341**	.679**	-.711**	.769**	.700**	-				
8. SAST-M	.589**	.327**	.558**	-.549**	.604**	.563**	.679**	-			
9. Fem	.007	.180**	.015	-.028	.029	.036	.049	.079*	-		
10. Masc	.087*	.131**	.073	-.023	.059	.029	.091*	.146**	.136**	-	
11. Empath	.202**	.149**	.300**	-.277**	.249**	.277**	.186**	.180**	-.382**	-.242**	-
12. Soc Des	-.211**	.012	-.169**	.191**	-.232**	-.208**	-.170**	-.191**	.206**	.076	-.158

Note. HBCS-Hypersexual Behavior Consequences Scale; TSO-Total Sexual Outlet; SCS-Sexual Compulsivity Scale; CSBIc- Compulsive Sexual Behavior Inventory control subscale; HBI-Hypersexual Behavior Inventory; HDSI-Hypersexual Disorder Screening Inventory; SAST-R-Sex Addiction Screening Test Revised; SAST-M- Sex Addiction Screening Test, Male Items; Fem-Feminine items from the Bem Sex Role Inventory; Masc-Masculine items from the Bem Sex Role Inventory; Empath – Empathy Quotient; and Soc Des – social desirability.

** Correlation is significant at the 0.01 level (2 tailed).

2.4.3 Hypothesis 1. Replication Hypotheses: Hypersexuality Scales

A number of our replication hypotheses were supported, and the outcomes of several others remained close to predicted outcomes. Table 6 sets out a comparison of the number of males reaching HD cut scores across scales in Levaque and colleagues' (2016) research as compared to each age cohort in Study One.

Table 6: Comparison of Study One with Levaque et al.'s (2016) results across age cohorts

Questionnaire	**Levaque et al.**	**Youngest (18-24)**	**Middle (25-35)**	**Oldest (36-45)**
HBI (range 19-95)				
n	185	190	331	219
M	41.8 (15.3)	34.1 (13.9)	40.18 (17.0)	37.29 (15.90)
Median	39.0	30.0	37.0	33.0
90th percentile	66.0	54.9	63.8	61.0
% ≥ cutscore of 53	**23.8**	**11.6**	**24.2**	**17.8**
TSOI (0-35)				
n	180	195	340	221
M	9.9 (12.3)	9.13 (7.9)	11.06 (8.77)	8.21 (7.1)
Median	5.0	7.0	7.0	6.0
90th percentile	21.0	21.0	25.0	18.8
%≥ 7	**37.8**	**35.8**	**47.4**	**33.9**
SCS (range 10-40)				
n	186	186	326	218
M	17.1 (6.4)	15.1 (5.65)	17.89 (7.38)	16.14 (6.6)
Median	15.0	13.0	15.0	14.0
90th percentile	28.3	24.0	28.3	26.0
%≥ cutscore of 24	**16.7**	**10.2**	**24.2**	**15.1**
CSBI-C[7] (18-65)				
n	185	188	323	210
Mean	51.9 (9.7)	44.77 (10.27)	40.24 (12.54)	43.44 (11.0)
Median	54.0	48.0	41.5	47.0
10th percentile	**39.0**	**30.0**	**21.0**	**24.0**
HBCS (19-95)				
n	186	192	332	215
Mean	33.1 (14.9)	31.68 (13.5)	37.94 (19.34)	34.37 (16.08)
Median	28.0	25.0	30.0	28.0
90th percentile	**53.3**	**55.0**	**69.0**	**58.4**

[7] Note that the CBSI-c items are reversed scored as in the original Levaque et al study (2016); thus, lower scores mean higher problematic hypersexuality.

Hypothesis 1a. Approximately 23.8% of the youngest cohort will reach the empirically established cut score of the Hypersexual Behavior Inventory: Not supported

We hypothesized that 23.8% of the youngest cohort would reach cut scores on the Hypersexual Behavior Inventory, whereas only 11.6% of the youngest men met this cut score. This hypothesis was unsupported even when applying the interpretive rule +/- 5.0%, which expands the possible range from 18.8% to 28.8%.

Hypothesis 1b. Approximately 37.8% of the youngest men will reach a problematic threshold of 7+ orgasms per week on the Total Sexual Outlet: Supported.

We were within +/-5.0% of our prediction that 37.8% of the youngest men would reach a problematic threshold of 7+ orgasms per week on the Total Sexual Outlet; 35.8% met this criterion.

Hypothesis 1c. Approximately 16.7% of the youngest men will reach the cut score on the Sexual Compulsivity Scale: Not supported.

We hypothesized that 16.7% of the youngest men will reach the cut score on the Sexual Compulsivity Scale and outcomes, and while lower than predicted at 10.2%, a substantial proportion of young men met this hypersexuality cut score.

Hypothesis 1d. The bottom 10% of the youngest males will score approximately 39 on the Compulsive Sexual Behaviour Inventory – control subscale: Not supported, although Study One males endorsed even more hypersexuality than the Canadian male undergraduates.

While we had predicted that the bottom 10% of the youngest males would score 39 on the Compulsive Sexual Behaviour Inventory – control subscale, where lower scores indicate more hypersexuality, in fact, the bottom 10% of the youngest males in this sample scored even lower than expected, reaching a score of 30. In other words, the bottom 10 percent of males in our sample endorsed more hypersexual behaviours than the Canadian undergraduates in the Levaque et al. sample. Viewing this outcome by taking account of the interpretive rule allowing +/- 5.0% (here equaling +/- 3 points for a score range of 34-

44), the replication hypothesis is not supported. Study One young males have even more difficulty controlling their sexual behaviours than their Canadian undergraduate age matched peers.

Hypothesis 1e. The 90th percentile will reach approximately 53.5 on the Hypersexual Behavior Consequences Scale: Supported.

Another hypothesis that performed according to expectations was the Hypersexual Behavior Consequences Scale, in which we predicted that the 90th percentile score would be approximately 53.5 (5.0% of total scale points around this point estimate is a range from 47.3 to 59.3) in the youngest cohort of males, and it was slightly higher at 55.0.

2.4.4 Hypothesis 2. Replication Hypotheses: Impersonal Sex Variables

Table 7 sets out comparisons of Långström and Hanson's (2006) findings on the Impersonal Sexual Behaviour Variables in a Swedish sample with Levaque et al.'s (2016) Canadian undergraduate sample and compares both groups to the males in the current study.

Hypothesis 2a. 46.6% of the youngest males (18 to 24) would masturbate ≥ 15 times a month: Not supported.

Based on age-matched Canadian undergraduate estimates using Långström and Hanson's Impersonal Sexual Behaviour Variables, we predicted that approximately 46.6% of the youngest cohort of males would fall into a group of men masturbating more than 15 times last month, while only 37.0% of the youngest men fit this category. This holds true even if we grant the +/- 5.0% of 37.0%

Hypothesis 2b. Approximately 24.1% of the youngest males will have had ≥ 3 sexual partners in the past year: Not supported, although many more Study One males endorsed *having more than 3 sexual partners in the past year* than expected.

While the findings was not technically replicated since just over thirty two percent (32.1%), rather than the predicted 24.1% +/- 5.0% (i.e., 19.1%-29.1%) of the youngest

males reported having more than 3 sexual partners last year, an exceptionally large number of the youngest males – almost one third – in Study One reported encountering ≥ 3 sexual partners within the last year.

Hypothesis 2c. Approximately 14.8% of the youngest males will have had 3 or more sexual partners per active year: Supported.

In fact, 16.0% of the youngest males (18 to 24 years) reported having at least 3 sexual partners per active year.

Hypothesis 2d. Approximately 15.7% of the youngest cohort of males will have a preference for a sexually permissive lifestyle: Not supported, although many more Study One males than predicted preferred a sexually permissive lifestyle.

Even with the +/- 5.0% rule applied to the replication hypothesis it was not supported. More young males than predicted – 21.9% - reported preferring a sexually permissive lifestyle relative to the 15.7% predicted.

Hypothesis 2e. Approximately 8.6% of the youngest males will have participated in group sex in their lifetimes: Supported.

As well, 13.3% of the youngest men reported having participated in group sex, compared to the 8.6% in the Levaque et al (2016) study.

Table 7: Comparison of Study One results, Levaque et al results, and Långström and Hanson results on the Impersonal Sexual Behaviour Variables

Variable	**Långström & Hanson (2006)**	**Levaque et al (2016); male only**	**Current Replication (full sample)**	**Current Replication (18-24)**
Masturbation in past month				
n	1244	174	714	192
M	4.9 (6.9)	15.6 (13.2)	7.72 (3.4)	8.32 (3.4)
% ≥ 15	**11.4**	**46.6**	**32.1**	**37.0**
Number of sexual partners in the last year				
n	1244	187	743	190
M	1.4 (1.6)	2.2 (3.0)	4.09 (5.9)	3.03 (4.3)
% ≥ 3	**10.0**	**24.1**	**37.1**	**32.1**

Number of sexual partners per active year				
n	1244	162	734	187
M	0.9 (1.4)	1.5 (1.7)	1.02 (1.6)	1.97 (2.8)
% ≥3	**6.4**	**14.8**	**5.4**	**16.0**
Preference for a sexually permissive lifestyle				
n	1244	185	750	196
% "yes"	**20.1**	**15.7**	**31.3**	**21.9**
Ever engaged in group sex				
n	1244	187	749	196
% "yes"	**10.4**	**8.6**	**22.0**	**13.3**

2.4.5 Hypothesis 3. Extension Scale Hypotheses: DSM-5 Scale and Sex Addiction Scale

Table 8 sets out a comparison of findings on the psychometrically strongest and weakest HD scales, as ranked by Montgomery-Graham (2016), by age. Since Study One is both a replication and an extension of Levaque and colleagues' (2016) research, two additional HD assessments are included in Study One that were not used by the prior investigators; as a result, there are no comparisons to the findings of Levaque et al (2016) in Table 7. The extension hypotheses based on the strongest and weakest HD scales are set out below.

Table 8: Descriptive Statistics results of extension scales by age cohort

Questionnaire	**Youngest (18-24)**	**Middle (25-35)**	**Oldest (36-45)**
SAST (range 0-25)			
n	185	316	212
M	3.75 (3.93)	5.13 (5.59)	4.17 (4.42)
Median	3.0	3.0	3.0
90th percentile	10.0	14.0	11.0
%≥ 6	**27.6**	**32.22**	**29.7**
SAST-M (range 0-6)			
n	190	335	217
M	1.29 (1.08)	2.07 (1.83)	1.82 (1.49)
Median	1.0	2.0	2.0

90th percentile	3.0	5.0	4.0
%≥ 3	**12.1%**	**34.9**	**29.0**
HDSI (range 0-28)			
n	191	332	217
M	11.59 (5.5)	14.34 (6.24)	12.15 (5.81)
Median	12.0	14.0	11.0
90th percentile	20.0	23.0	21.2
%≥ 17	**19.4**	**44.0**	**20.3**

Hypothesis 3a. The Hypersexual Disorder Screening Inventory will capture approximately 15.0% of the youngest cohort of men: Not supported, although even more Study One males were captured than hypothesized.

Based on past findings, we hypothesized that the instrument with the strongest psychometric evidence, the Hypersexual Disorder Screening Inventory, would capture approximately 15.0% of the youngest cohort of men, and in fact it captured even more young males - 19.4% - as meeting the HD cut score.

Hypothesis 3b. The Sex Addiction Screening Test-Revised, and its 6 Male items will capture between 17.4% and 21.1% of the youngest males (aged 18 to 24 years): Not supported although far more young Study One males were captured on SAST-R while far fewer were captured on the 6 additional Male Items.

The second extension scale, the Sex Addiction Screening Test and the additional Male items of the Sex Addiction scale were predicted to capture between 17.4% and 21.2% of the youngest males as “sex addicted”. Both scales fell outside the prediction range of young men expected to be sex addicted, although the hypotheses were contrary to predictions in differing ways. Based on past research using the Sex Addiction Screening Test with young men, between 17.4% and 21.2% were sex addicts; within Study One far more young men – 26.7% - well over one third of the youngest sample were “sex addicted”. The 6 Male items of the SAST also failed to meet prediction although far fewer young males – 12.1% - were selected as sex addicted on this abbreviated SAST research scale.

2.4.6 Hypotheses 4 through 6. Convergent and Discriminant Validity Hypotheses

Table 5 sets out Pearson correlations among all scales employed in Study One.

Hypothesis 4. We expect that all hypersexuality scales will be positively associated with masculinity: Weak support.

Masculinity had quite weak although statistically significant positive correlations with 2 of 8 of the scales (including the Total Sexual Outlet, r=0.13, p< .01, and the Sex Addiction Screening Test's Male items [r=.15, p< .01], as well as marginal significance on the Hypersexual Behavior Consequences Scale (r=.09, p< .05), and the Sex Addiction Screening Test-Revised (r=.09, p< .05). Masculinity has no meaningful correlation with the remaining 4 hypersexuality scales.

Hypothesis 5. Empathy will act as a discriminant validity scale and will not have any significant correlations with any of the hypersexuality scales: Not supported.

Unexpectedly, empathy had weak but significant statistical positive associations with 7 hypersexuality scales (r= 0.15 - 0.30, p< .01), so as men were more hypersexual, they also tended to be slightly more empathetic. Empathy was also significantly negatively correlated with the control scale of the Compulsive Sexual Behavior Inventory, which is reverse coded (r=-0.28, p< .01), and indicates that with men scoring more hypersexual, they became more empathetic.

Hypothesis 6. Social desirability will have no or low significant correlations in the range of -0.20 to -0.30: Supported.

The Marlow-Crowne social desirability scale performed as anticipated with all HD scales (except the single item TSO, r=.01, p > .05), having low but statistically significant negative correlations with social desirability at the 0.01 level (r= - 0.17 to - 0.23, p< .01).

Hypothesis 7. Exploratory Hypothesis. The older cohorts (ages 25-35, and 36-45) will select approximately 10.3% of men as hypersexual across the five hypersexuality scales with empirically established cut scores (including the HBI, SCS, SAST, and SAST-M,

and HDSI): Not Supported, although much higher prevalence rates were captured across scales.

Among the middle cohort of males (25 to 35 years), between 24.2% and 44.0% percent of men were captured as hypersexual across scales; among the older cohort of males (36 to 45 years), between 15.1% and 29.7% were labelled as hypersexual.

2.5 Discussion

A main purpose of Study One was to examine whether commonly used hypersexuality scales that appear to over-select Canadian male undergraduates as problematically hypersexual could be replicated in an online age-matched sample of males 18-24 years of age. Additional aims included: (1) extension of the "over selection" effect identified by Levaque et al (2016) to two additional scales, including the most and least psychometrically sound scales identified by Montgomery-Graham (2016), (2) demonstration of convergent and discriminant validity, and (3) exploration of age cohort effects on the "over selection" phenomenon. All of these aims were achieved using a slightly different sample from that of Levaque et al (2016) who used a Canadian undergraduate sample (N=717); 186 of whom were young males aged 18 to 24 years. By contrast, participants in Study One were an online MTurk sample of 756 males, 195 of whom were aged 18 to 24 years, and approximately 96.0% (n=188 of whom were American). At first glance it may appear that there are significant differences for example, we may assume a university sample is more educated than a community sample. On closer inspection it appears that the differences between samples are not as large as may initially appear. For example, the Study One sample is a relatively well-educated community sample. Almost two thirds completed an associate's or bachelor's degree (63.9%), which would be an appropriate level of education given their relative youth. Only 3.0% were trained in a trade, and only 1.5% did not complete high school. A second, typically distinguishing factor between Americans and Canadians is religiosity, which is particularly salient to research which makes enquiries regarding sexual values and sexual behaviour. While Americans are typically more religious than Canadians as shown in a recent Gallop poll revealing that whereas 60.0% of American nationals over 18 years rated religion as being very important to their own lives, fewer than one third of

Canadian respondents – 28.0% - reported that religion was very important to them (Ray, 2003). While we do not know how Levaque et al.'s Canadian undergraduates would have responded to similar questions about religiosity, within Study One, 50.0% of the youngest male respondents reported being agnostic or atheist, suggesting that at least for now, the youngest Study One males were less religiously identified than may be expected within some American samples. Thus, the two main areas in which we may expect to find dissimilarities between a Canadian undergraduate sample and an online MTurk sample – namely level of education achieved and religiosity – do not appear to be borne out in these data. What is important to bear in mind in comparing the samples is that the sample sizes of both studies remain small (i.e., Levaque et al.'s male sample size was *n*=186; Study One's youngest males, *n*=195). Further empirical inquiry regarding the performance of these measures within larger North American samples of young men is needed.

Two of the scales in the replication study that have empirically derived cut scores - the Sexual Compulsivity Scale and the Hypersexual Behavior Inventory – performed quite differently in this age-matched online sample relative to Levaque et al (2016). Whereas 16.7% and 23.8% of the young Canadian undergraduate males in their research reached critical hypersexuality cut scores on the SCS and HBI respectively, within the Study One sample only 10.2% and 11.6% of young males met the HD cut scores. While the absolute comparisons between Levaque et al. (2016) and Study One do not represent a strict replication, both studies arguably identify a rather high proportion of undergraduate men as experiencing problematic hypersexuality. We note that while the number of young males captured as being HD in Study One may sound somewhat high on these two scales (10.2% on the Sexual Compulsivity Scale and 11.6% on the Hypersexual Behavior Inventory), results are similar to findings of a recent nationally representative American study which indicated that approximately 10.3% of men (aged 18 to 50) were quite distressed that their sexual behaviour was out-of-control (Dickenson et al., 2018), suggesting Study One estimates may not be unreasonable.

Two further scales were used in the Study One effort to conceptually replicate Levaque et al (2016) – the Hypersexual Behavior Consequences Scale (HBCS) and the Control scale

of the Compulsive Sexual Behaviour Inventory (CSBI). Regarding the former, the HBCS, since Study One was a replication and no cut score is yet established for the HBCS, we used the Levaque et al. (2016) Canadian sample's 90th percentile as a benchmark against which to assess the Study One young males, finding little difference between the groups (i.e., 90th percentile score for Levaque et al [2016] was 53.3, and Study One 90th percentile was 55). While no empirically agreed upon cut score exists, those studies that have used the HBCS have used clinical samples and have achieved much higher mean averages on the HBCS (Reid, Carpenter & Hook, 2016; Reid, Garos & Fong, 2012), making them inappropriate comparators with Levaque et al.'s (2016) and Study One's community samples. Thus, currently Study One and Levaque and colleagues' (2016) study are the best indicators of potential cut scores for the HBCS in a community sample and the findings of the two studies replicate one another. The CSBI was also scored using the bottom decile from the Levaque et al (2016) study as the benchmark to judge problematic hypersexuality. The scores differed by 9 points (i.e., 10th percentile for Levaque et al study was 39, and for Study One was 30), suggesting that the outlying 10.0% of the Study One participants were experiencing more distress as a result of feelings of out-of-control sexual fantasy, urges, and behaviours, than the same proportion of Canadian undergraduates. It is not entirely clear why this may have been the case although past criterion validity research using American undergraduate samples (N=334, Mage=19.54, SD=2.16) has found strong correlations between the control subscale of the CSBI and past sexual coercion, sexual monitoring, sexual anxiety, depression, and external control (Lee, Ritchey, Forbey & Gaither, 2009). We do note that within Study One, 9.0% of the youngest males have reported having experienced childhood sexual abuse (data not presented). We suggest that high CSBI scores may be related to a somewhat high proportion of the youngest sample having been sexually victimized as children.

The two scales that extended the Levaque et al research - two sex addiction scales, and the DSM-5 HD field trial measure, the HDSI - did not perform as expected. The Sex Addiction Screening Test, and the 6 male-only SAST-M, are scales based on the clinical sex addiction model. The sex addiction measurement instrument itself has been criticized for being a blunt and potentially under-developed clinical instrument rather than a

scientifically rigorously researched measure (Ley, Prause & Finn, 2014). As well, the Sex Addiction measurement instrument has been criticized as fueling an industry of sex addiction therapists trained in the sex addiction model, whose therapy practices are underscored by socially conservative values and a discomfort with certain sexual activities (Reay, Attwood & Gooder, 2013). We hypothesized that the sex addiction measurement instruments would capture between 17.4% and 21.0% of the youngest males as sex addicted based on past sex addiction research in similarly aged populations; in fact, the sex addiction scales captured *even more* young men than expected as problematically hypersexual, capturing 27.6% and 12.1% of the youngest men by the SAST and the SAST-Male items, respectively. It is curious why a screening instrument would flag almost one third of males as *sex addicted*. When the sex addiction scale data are examined at an item level, up to 45.0% of the youngest participants reported feeling preoccupied with sex on several scale items, and 46.0% reported they experience shame associated with their sexual behaviours. Plausibly internalized erotophobic cultural, social, and religious norms may create a shame-based narrative around sexual beahviours that are, in fact, normophilic. At the same time, "sex addiction" is used in everyday parlance and may provide a convenient and familiar moniker to label one's own erotic conflicts (i.e., not approving of one's own same-sex sexual attraction, or growing up in a religion or culture in which masturbation is seen as immoral). For example, looking across the male life span, testosterone, believed to be highly associated with masturbation (Bancroft, 2005; Kinsey et al., 1948), typically peaks in young men at age 19 and slowly declines until about age 40 (Kelsey, Li, Mutchell, Whelan, Anderson, & Wallace, 2014). As a result of the male sex hormone that drives sexual desire being at a lifetime high for most Millennials in Study One, we may expect that almost half of them would report being "preoccupied with sexual thoughts", which is one of the sex addiction scale items. Moreover, when we combine these findings with the self-report that 46.0% of the youngest males hide their sexual behaviours from others, yet only 3.6% of them are engaging in sexual activities that are against the law (data not presented), it raises the possibility that the shame associated with sexual behaviour may be misplaced and surveyed by the sex addiction scale. Young males may be engaging in normal, healthy

sexual behaviour about which they feel shame (i.e., masturbation), and report shame, which is then caught within the rubric of "sex addiction" on the sex addiction scale.

The six additional Male items that are designed to be used in conjunction with the Sex Addiction Screening Test, load almost entirely on pornography consumption, with 4 questions about pornography use, one question about sex with minors, and one question about hiring a sex worker. One needs to respond affirmatively to 3 items to score in the "problematic" range. While pornography use is presumed to have negative consequences for males, we have little well designed, methodologically rigorous, and replicated science suggesting that pornography is consistently associated with aggression against women (Bergen & Bogie, 2000; Fisher & Grenier, 1994; Malamuth & Donnerstein, 1984), that it leads to sexual dysfunction (Landripet & Stulhofer, 2015; Prause & Pfaus, 2015), or that it is associated with negative couple outcomes (Kohut, Fisher & Campbell, 2016). Plausibly, the sex addiction scale (and possibly some of the other HD scales) pathologize typical, healthy, normative male sexual expression. Past empirical research findings suggest that hypersexuality may not be a meaningful discrete construct, beyond high sexual desire, and the associated distress in managing high sexual thoughts, feelings, and needs (Winters, Christoff & Gorzalka, 2010).

Also surprisingly, the HDSI, the well-respected and psychometrically rigorous tool used in the DSM-5 field trials for HD, which we predicted would select approximately 15.0% of the youngest male cohort as having HD, selected approximately one fifth of the youngest males as problematically hypersexual. As discussed in the Methods section above, we failed to capture one of the seven HDSI scale items, and while we recalculated an approximate new cut score based on fewer items, this error may account for some of the HDSI's surprising outcome. When we look at the one HDSI single item that queries the *distress* associated with sexual behaviour, rather than measuring sexual behaviour alone, we see that only 8.7% of the youngest men report that their sexual fantasies, urges and behaviours are causing significant distress in their personal, social or work lives. Arguably this one HDSI item is the essence of HD – meaning, it is not the sexual behaviour alone that is problematic, it is the personal distress flowing from the behaviour that ultimately causes difficulties in one or more domains of an individual's life. This one

HDSI item had a specificity of at least 90% in recent item response theory analyses; it was very uncommon to screen positive for HD and endorse that item (Parsons et al., 2013). Thus while the scale as a whole likely over-selected the youngest males as HD, the single HDSI item with high specificity selected only 8.7% of the youngest males who reported feeling distress in various life domains as a result of their sexual behaviour; this estimate accords with the most recent hypersexuality prevalence estimates from a nationally representative American sample (Dickenson et al., 2018).

Study One also sought to shed light on much needed prevalence estimates of problematic hypersexuality on the variables deemed good indicators of *impersonal sexual behaviours* by Långström and Hanson, which were again recently replicated within Levaque and colleagues' Canadian undergraduate sample. While the Långström and Hanson (2006) impersonal sexual behaviour variables that were demonstrably associated with hypersexuality are now almost a decade and a half old, emanate from a European sample, and draw from a much broader age range of males (18-60 years), these benchmarks do serve as a point of departure to examine the frequency of sexual behaviours seen as potentially problematic. Perhaps unsurprisingly, and as Table 8 highlights, the youngest cohort of males in Study One masturbate most often, with 37.0% reporting masturbating at least every second day within the last month (M=8.32, SD=3.44), and on average, each young man masturbates approximately twice weekly. These estimates are quite a bit lower than Levaque's similarly aged Canadian undergraduate sample that reported much more frequent masturbation within the last month (M=15.6, SD=13.2) – almost twice as high as Sample One, but this study was still higher than the Swedish sample in which only a small fraction of all males - 11.4% - reported masturbating more than once every second day within the last month (M=4.9, SD=6.9). Of course, Långström and Hanson's findings were averaged across 18 to 60-year olds, rather than presented by age, so we do not know if the younger males were clustered among the higher masturbation frequencies, which seems likely. As well, the finding of lower than expected masturbation in the youngest males in Study One may be interpreted in light of the number of sexual partners they reported for the preceding year. Whereas 32.1% of the youngest Study One males reported three or more sexual partners last year, only 24.1% of Levaque's sample reached that threshold. Taken together the lower reported masturbation

of the youngest Study One males combined with slightly more sexual partners makes sense given some research suggesting that males may tend to masturbate less while they are in partnered relationships (Regnerus, Price & Gordon, 2017).

Noteworthy too is that reports of group sex participation (set out in Table 8) are higher in the youngest men in this sample (13.3%) relative to age-matched Canadian undergraduate males (8.6%), and instead are more similar to a representative sample of Swedish males, aged 18-60 (10.4%). Recent research using a nationally representative American sample found that 17.8% and 11.5% of American males had engaged in a threesome or group sex, respectively, (Herbenick et al., 2017) perhaps contextualizing this seemingly high group sex participant number in the youngest males in Study One.

Turning to the discriminant and convergent validity analyses of the hypersexuality scales, it was expected that traditional notions of masculinity would share conceptual variance as convergent validity measures with all of the hypersexuality scales. Two of 8 hypersexuality scales (including the 6 Male Items of the Sex Addiction scale (r=0.15, p< .01), and the TSO, which measures weekly orgasmic output [r=.13-.16, p< .01]) showed weak but significant positive associations with masculinity. These findings suggest that hypersexuality scales are not simply capturing traditional notions of masculinity, but capture a distinct concept emphasizing distress at how one experiences their sexual fantasies, urges, and behaviours.

Two discriminant validity measures, empathy and social desirability, were used to test their conceptual distinctness from hypersexuality. Quite unexpectedly, all hypersexuality scales had a small but significant positive correlation with empathy (r=0.18 to .30, p< .01). While we should not overinterpret these weak but stable findings, these findings suggest that the conceptualization of individuals with problematic hypersexuality as unempathic or unaware of the impact of their behaviours on their partners likely requires further research (Reid & Wooley, 2006). Findings of increased empathy correlated with higher hypersexuality lend support to the conceptualization of problematic hypersexuality as distinct from those paraphilic disorders with hypersexual features, (i.e., specifically voyeuristic, exhibitionistic, and frotteuristic disorders). These aforementioned paraphilic

disorders are crimes and may be correlated with a different type of problematic hypersexuality, which in turn, likely has little or no correlation with empathy, but likely has anti-social elements. The second discriminant validity measure, social desirability, performed as expected, with low significant negative associations across all hypersexuality scales, suggesting that when participants were answering questions about their sexual feelings, and behaviours, they were not markedly inclined to answer in a socially desirable light.

Finally, and surprisingly, across all of the HD scales, a similar and surprising trend was observed and explored. Whereas it was expected that the youngest males (18-24 years) would have the highest levels of problematic hypersexuality among all age groups in the study, in fact, the middle cohort of males (25-35 years) consistently demonstrated the highest levels of problematic hypersexuality. Table 6 highlights how the replication scales captured between 24.2% to 47.4% of the mid-age group (25-35-year old men) as meeting cut scores for experiencing their sexual feelings as out-of-control. As well, Table 7 shows how the newly tested scales (the two sex addiction scales and the DSM-5 field trial scale) captured between 33.2% to 44.0% of the middle group of men as problematically hypersexual. Similar findings existed on two of the Långström and Hanson replication items of problematic hypersexuality as well (i.e., this group of 25 to 35 year old men reported the highest number of sexual partners in the last year, and it was this mid-age group of males in Study One that was most inclined to favour a sexually permissive lifestyle). At first it was unclear why the 25 to 35-year old men were consistently hypersexual across all scales and on most of the impersonal sexual behaviour variables. Using one item (item 6) from the Hypersexual Behavior Consequences Scale that queried how many times an individual had been arrested for their sexual behaviour (which ranged from *1*-this has never happened and is unlikely to happen to *5* – this has happened several times), a post hoc exploration of the relationship between age and having been arrested for one's sexual activities once, twice or several times revealed that whereas only 1 of the youngest men (0.5%), and 7 of the oldest men (*n*=3.2%) fell into this category, 24 men, representing 7.1% of the Study One mid-age group males (aged 25-35) had been in trouble with the law at least once because of sex-related activities. Tables 9 and 10 compare the number of middle cohort males (age 25 to 35) captured as

HD across all replication scales (Table 9), and extension scales (Table 10), with sex offenders included, and with sex offenders removed. Examining the replication scales in Table 9, we see that when the sex offenders are removed from the middle cohort, 1/5 rather than ¼ of these males are captured as hypersexual on the scales with established cut scores (namely the Hypersexual Behavior Inventory and the Sexual Compulsivity Scale). As well, in the extension scales in Table 10 we can observe that 28.4% of the middle cohort are captured as "sex addicts" rather than 32.2% when sex offenders are included. Similarly, on the DSM-5's HDSI, once sex offenders are removed from the 25-35-year old cohort, 35.5% rather than 44.0% are flagged as problematically hypersexual. While removing the sex offenders from the mid cohort still leaves a puzzling "bulge" in the data, such that the 25 to 35 year old males are the most problematically hypersexual on all hypersexuality indices, the removal of the sex offenders does cause an average drop of approximately 4 points across scales. These unexpected findings for the middle age cohort in Study One may be interpreted in one of several ways. First, on average the 25 to 35-year-old men may be qualitatively different from the other groups of the youngest and oldest men in this sample. For example, and somewhat speculatively, the 25 to 35-year-old cohort has likely had more time than the youngest group (18 to 24 years) to engage in problematic behaviour and probably has a higher sex drive than the oldest group of males (36 to 45 years).

Table 7: Replication Scale Results by Age Cohort with Sex Offenders Included and Excluded

Questionnaire	**Levaque et al.**	**Youngest (18-24)**	**Middle (25-35)**	**Middle (sex offenders removed)**	**Oldest (36-45)**
HBI (range 19-95)					
n	185	190	331	307	219
M	41.8 (15.3)	34.1 (13.9)	40.2 (17.0)	38.5 (15.8)	37.2 (15.9)
Median	39.0	30.0	37.0	36.0	33.0
90th percentile	66.0	54.9	63.8	62	61.0
% ≥ cutscore of 53	**23.8**	**11.6**	**24.2**	**20.5**	**17.8**
TSOI (no limit)					
n	180	195	340	314	221
M	9.9 (12.3)	9.13 (7.9)	11.06 (8.7)	10.46 (8.4)	8.21 (7.1)
Median	5.0	7.0	7.0	7.0	6.0
90th percentile	21.0	21.0	25.0	22.5	18.8

%≥ 7	**37.8**	**35.8**	**47.4**	**43.9**	**33.9**
SCS (range 10-40)					
n	186	186	326	302	218
M	17.1 (6.4)	15.1 (5.6)	17.89 (7.3)	17.20 (7.0)	16.14 (6.6)
Median	15.0	13.0	15.0	15	14.0
90th percentile	28.3	24.0	28.3	28	26.0
%≥ cutscore of 24	**16.7**	**10.2**	**24.2**	**20.9**	**15.1**
CSBI-C (range 18-65)					
n	185	188	323	296	210
Mean	51.9 (9.7)	44.77 (10.2)	40.24 (12.5)	41.15 (12.1)	43.44 (11.0)
Median	54.0	48.0	41.5	43.0	47.0
10th percentile	**39.0**	**30.0**	**21.0**	**23.7**	**24.0**
HBCS (range 19-95)					
n	186	192	332	308	215
Mean	33.1 (14.9)	31.68 (13.5)	37.94 (19.3)	35.30 (16.8)	34.37 (16.1)
Median	28.0	25.0	30.0	27	28.0
90th percentile	**53.3**	**55.0**	**69.0**	**62.10**	**58.4**

Table 8: Extension Scale Results by Age Cohort with Sex Offenders Included and Excluded

Questionnaire	**Youngest (18-24)**	**Middle (25-35)**	**Middle (sex offenders removed)**	**Oldest (36-45)**
SAST (range 0-25)				
n	185	316	292	212
M	3.75 (3.93)	5.13 (5.59)	4.39 (4.91)	4.17 (4.42)
Median	3.0	3.0	3.0	3.0
90th percentile	10.0	14.0	11.7	11.0
%≥ 6	**27.6**	**32.2**	**28.4**	**29.7**
SAST-M (range 0-6)				
n	190	335	310	217
M	1.29 (1.08)	2.07 (1.83)	1.90 (1.71)	1.82 (1.49)
Median	1.0	2.0	2.0	2.0
90th percentile	3.0	5.0	4.0	4.0
%≥ 3	**12.1**	**34.9**	**31.6**	**29.0**
HDSI (range 0-28)				
n	191	332	307	217
M	11.59 (5.5)	14.34 (6.24)	13.85 (6.06)	12.15 (5.81)
Median	12.0	14.0	13.0	11.0

90th percentile	20.0	23.0	23.0	21.2
%≥ 17	**19.4**	**44.0**	**35.5**	**20.3**

2.6 Conclusion

Study One conceptually replicated and expanded Levaque and colleagues' (2016) findings that between 16.7% and 37.8% of Canadian undergraduate students had problematic hypersexuality as defined by commonly used HD instruments. Replication, and post hoc findings were largely as anticipated, and confirmed findings that as many as 27.6% of the youngest men were flagged as problematically hypersexual by commonly used HD scales. An unexpected trend within all hypersexual scales was that an even larger percentage of the middle cohort of men, aged 25 to 35, was deemed hypersexual. Although existing epidemiological data regarding HD prevalence are unclear, we would not expect almost half of an adult sample to be hypersexual and experience associated clinical distress (e.g., the Hypersexual Disorder Screening Inventory captured 44.0% of this group as problematically HD). Given findings in both an undergraduate sample - and now a community sample as well - that too many men are captured by the current problematic hypersexuality scales, suspicions arise as to what indeed is being assessed using these measures. Might these HD scales be capturing normative sexual desire, and problematizing or even pathologizing adventuresome sexual sensation seeking? Are there negative life outcomes associated with having hypersexuality as defined and captured by these HD scales? And, might other variables predict distress associated with high sex drive as well as these scales do? These questions will be explored in Studies Two and Three.

Chapter 3

3 Study Two – Criterion Validity Study

Study Two extends our findings concerning hypersexuality assessments by providing hypersexuality scale criterion validity tests. To accomplish this, we used data collected from Study One participants who were subsequently recruited for participation in Study Two and completion of problematic hypersexuality behavioural criterion measures. Using the problematic hypersexuality and non-problematic hypersexuality cut scores obtained from Study One, Study Two examines whether those individuals reaching problematic hypersexuality cut scores across the scales used to measure problematic hypersexuality in Study One have negative outcomes that are personally or socially disadvantageous. While Study Two involves cross-sectional rather than longitudinal data, and we are methodologically measuring correlates, many criterion items are conceptualized as outcomes (i.e., job loss from watching pornography at work, loss of primary romantic relationships because of extra-dyadic sexual relationships and spending more time than intended looking for sexual activity).

Given that consensus on the problematic hypersexuality construct does not yet exist, it is unsurprising that there is a lack of systematic research exploring negative behavioural outcomes associated with non-paraphilic problematic hypersexuality (for a review of negative outcomes associated with paraphilic [and criminal] hypersexuality see, for example, Engel et al., 2019). Instead, within the hypersexuality literature, negative behavioural outcomes associated with problematic non-paraphilic hypersexuality are largely based on reasonable conjecture (i.e., unplanned pregnancy, sexually transmitted infection, and relationship distress are thought to be likely negative outcomes of frequent extra-dyadic sex), or are minimally and incidentally reviewed as criterion items in the context of the psychometric development of hypersexuality scales (For example see Coleman, et al., 2010; Lee, Ritchey, Forbey & Gaither, 2009; McBride, Reece & Sanders, 2007). Below we review the empirical literature regarding various negative life outcomes that may be associated with problematic non-paraphilic hypersexuality, including STI/HIV risk behaviour, clandestine, extra-dyadic relationships, the belief that sex-related activities are wasting my time, my money and interfering with my primary

romantic relationship, unplanned pregnancy/pregnancy termination, sexual violence-either victimization or perpetration, non-criminal legal issues related to sex (i.e., sexual harassment), online sex chat, and pornography use.

3.1 Literature

3.1.1 STI/HIV Risk Behaviour

Early hypersexuality research sought empirical information about sexual sensation seeking and conceptualized problematic hypersexuality as sexual compulsivity, focusing on the sexual behaviours of highly sexually active gay and bisexual men who have sex with men (GBMSMs), who were also HIV seropositive (Bentosch et al., 2002; Kalichman & Rompa, 1995). Broadly speaking, research using the framework of compulsive sexual behaviour found that in samples of HIV+ GBMSMs, Latino MSMs, general samples of GBMSMs, as well as low income African-American women, compulsive sexual behaviour was associated with risky sexual behaviour, including sero-discordant unprotected anal intercourse (Miner, Peterson, Welles, Jacoby, & Rosser, 2009), unprotected vaginal intercourse (Robinson, et al., 2002), and unprotected anal intercourse (Miner et al., 2007; Coleman et al, 2010). To be clear, this research does not suggest that individuals with HIV+ status are more inclined to engage in behaviours that place their sexual partners at greater risk of HIV exposure. Instead, the minority of individuals who do continue to engage in unprotected sex with HIV negative partners or partners of unknown HIV status tend to be those individuals scoring as sexually compulsive on validated hypersexuality scales. Thus, the early sexual compulsivity research grew out of HIV risk behaviour research and revealed that at least some of the time sexual compulsivity seemed to be prompting at least some high risk HIV transmission.

To date there is little empirical research on problematic hypersexuality and sexually transmitted infection prevalence more broadly, (i.e. not just HIV+ risk behaviours). Outside of the HIV risk literature, some data exist surveying sexually compulsive undergraduate-aged males about their sexual behaviours regarding unprotected vaginal and anal intercourse. McBride, Reece and Sanders (2008) examined the relationship

between sexual compulsivity (using the Sexual Compulsivity Scale), and sexual risk behaviours within an American undergraduate sample (*N*=390; *n*=116 males, 29.7%). The researchers sought to determine whether sexual compulsivity had predictive capacity for explaining sexual risk-taking behaviour beyond gender, age, ethnicity, and relationship status. Among young men, the only significant predictor of condomless vaginal intercourse was being in a sexually exclusive relationship, suggesting that problematic hypersexuality did not contribute much to the outcomes of not using a condom. By contrast, further study findings suggested that sexual compulsivity as well as homosexual orientation were significant predictors of condomless receptive or insertive anal intercourse among young men.

Further research regarding problematic hypersexuality and broad STI risk was produced during the DSM-5 HD field trial which sampled 207 participants including an HD group (*n*=152; *M*age=41.1 years, *SD*=13.0), a general psychiatric group (*n*=35; *M*age=38.1, *SD*=14.7), and a substance abuse group (*n*=20; *M*age=32.2, *SD*=10.1). Among participants with HD, 22.0% reported contracting an STI once or twice, while a much smaller percentage - 5.5% - had received a diagnosis of a sexually transmitted infection several times (Reid et al., 2012). Since the main goal of the research in the DSM-5 field trial was to assess the reliability and validity of the HD construct, and conduct initial sensitivity analyses of the diagnostic measure, STI scores among the psychiatric and substance use groups are not reported in the study. We may contextualize the STI findings among the DSM-5 field trial HD males by noting that in the United States, the two most common STIs – chlamydia and gonorrhea – appear in the population at large at rates of 539.9 per 100,000 and 179.1 per 100,000 (CDC, 2019). Nonetheless, the DSM-5 field trial research provides the best current estimates available of the incidence of STIs among individuals with problematic hypersexuality within a clinical sample. Given that within the DSM-5 HD field trial more than three quarters of the problematically hypersexual individuals (84.4%) reported that their age of hypersexual onset was below age 25, and the mean age of participants was quite a bit higher (41.1 years), a gap exists in our understanding of being problematically hypersexual and whether or not we are seeing STIs in problematically hypersexual younger men.

In sum, we have some research suggesting a relationship between problematic hypersexuality and contraction of STIs, including HIV, via unprotected vaginal and anal intercourse. Existing research demonstrates that compulsive sexual behaviour likely contributes to increased frequency of HIV+ risk within high-risk community samples of GBMSMs, STI transmission via condomless anal intercourse within undergraduate males, and increased STI risk behaviour more generally within a clinical sample of mostly males diagnosed with HD. What we do not yet know is: (1) the extent to which negative behavioural outcomes associated with unprotected anal and vaginal intercourse occur in males "diagnosed" with problematic hypersexuality across various age ranges (i.e., is an STI more likely in a male over 35 with HD, rather than a male with HD who is under 25 since the best available prevalence data indicates HD is prodromal before age 25?), and (2) the extent to which associated negative outcomes will vary (if at all) depending upon which hypersexuality measure is used to "diagnose" problematic hypersexuality.

3.1.2 Clandestine extra-dyadic relationship

While the sex addiction literature commonly cites extra-dyadic relationships as a consequence of sex addiction, we have not been able to locate empirical data to substantiate this claim. In one study 56.0% of self-identified "sex addicts" reported that their sexual behaviours with the highest functional impairment included having multiple sexual partners. Researchers neither specified whether the participants were distressed by serially monogamous, or several concurrent romantic relationships, nor whether it may have been the clandestine nature of such relationships causing distress (Wery, et al., 2016). Early sex addiction research reported that 40.0% of sex addicts lost their spouse/partner as a result of sex addiction but the participants, sample sizes, and composition of the samples are not revealed (Carnes, 1991). In general, clinical anecdotes and treatment literature within the sex addiction arena tends to presume a correlation between problematic hypersexuality and affairs without presenting data (for example see Carnes, 1983; 1991; 1992; 2001). Interestingly, the DSM-5 field trial examining the feasibility of the HD construct suggested *sexual behavior with consenting adults* as a possible specifier of HD, rather than whether or not the sexual behaviour occurred within

or outside of an ongoing relationship (Reid, et al., 2012). As a result, we do not know the extent to which extra-dyadic relationships are associated with problematic hypersexuality among men of any age.

3.1.3 Wasting time, money, and interfering with primary romantic relationships

The original Sex Addiction Screening Test (i.e., the SAST) was the initial screening tool for problematic hypersexuality that included one scale item asking participants whether they believed that their sexual desires were interfering with any of several broad areas of their life, including job, family and friends **(**Carnes, 1992). Some of the foundational research in the hypersexuality literature began asking individuals with problematic hypersexuality about various outcomes associated with spending what they themselves perceived as a large amount of time on sex-related behaviours, including financial loss associated with their sexual behaviors (Reid, Garos & Fong, 2012). In terms of time wasted on sex-related activities, Kalichman and Cain (2004) found that 43.0% of sexually compulsive adults believed their sexual appetite had interfered with their relationships, and another 43.0% indicated that they thought about sex more often than they would have liked. The extent to which sex-related behaviours are leaving problematically hypersexual individuals believing they are wasting time, and money and that sex is interfering with relationships needs further empirical investigation.

3.1.4 Unplanned Pregnancy and Pregnancy Termination

The only research available regarding unplanned pregnancy and hypersexuality has surveyed sex addicted women rather than men. Available data suggests that 40.0% of sex addicted women had unplanned pregnancies and 36.0% of sex addicted women terminated those pregnancies (Carnes, 2001). While these numbers seem high, no data are offered comparing these numbers to non-sex addicted women. We have no available data on the extent to which men with problematic hypersexuality have female partners who are experiencing unplanned pregnancies. Similarly, no empirical data exists regarding terminated pregnancies by the female partners of problematically hypersexual males.

3.1.5 Sexual Violence - Victimization and Perpetration

An issue that is not discussed in the non-paraphilic, problematic hypersexuality literature is whether an individual's strong sexual fantasies, urges and behaviours lead hypersexual males into sexually violent circumstances, either as victims or as perpetrators. While some empirical research suggests that childhood sexual abuse may be related to symptoms of compulsive sexual behaviour beyond other forms of child maltreatment in GBMSMs (Blain, Muench, Morgenstern & Parsons, 2012; see also Tedesco & Bola, 1997 for heterosexual males and females; see also Perera et al., 2009), very little empirical literature exists regarding hypersexual males and their post-pubertal rates of sexual victimization. Data regarding rates of post-pubertal sexual victimization in males would likely be difficult to access given sex role stereotypes that men are not typically perceived as victims of sexual violence (Peterson & Muehlenhard, 2011). By contrast, more data exists within the forensic literature examining compulsive sexual behaviour/hypersexuality and its relationship to the victimization of others, and typically examines paraphilic and paraphilia-related hypersexuality (for example, see Kafka & Heenan, 2003; Lussier, Leclerc, Cale & Proulx, 2007). Since paraphilic hypersexuality includes sexual behaviour with objects, or with people or animals that are unable to consent (i.e., typically criminal behaviours) these studies do not help us to better understand whether non-paraphilic hypersexual males (whose sexual behaviour is solo and/or consensual adult relationship-associated) are more likely to violate sexual boundaries. While it is possible that individuals who experience their sexual urges, fantasies and behaviours as out-of-control may carry out illegal sexual behaviour, there is no scientific literature to suggest that all or even most individuals experiencing problematic hypersexuality act out sexually against others in illegal ways (i.e. sex offenders) (Montgomery-Graham, 2017). Canadian (Montgomery-Graham, 2016), and American (Ley, Brovko & Reid, 2015) authors have commented on the litigation resulting from criminal hypersexual behaviour (e.g., sexual assault, hiring a sex worker), as a practical, legal matter, however, we lack data explaining the extent to which non-paraphilic hypersexual males are either victims or perpetrators of sexual violence, and any legal sanctions that may flow from these behaviours.

3.1.6 Non-criminal legal issues

An example of a possible non-criminal legal issue arising from an individual's belief that their sexual behaviour is compulsive or out-of-control may be a sexual harassment claim or a human-rights claim within the context of employment. For example, we have recent Canadian arbitral case law (legal matters that take place within a unionized environment), in which a unionized employee argued that his sex addiction was the cause of his masturbation in his workstation cubicle; here termination ensued (*Unifor, Local 2215* v. *IMP Group Ltd[Aerospace Division)*(AB Grievance]). Another example of a non-criminal hypersexuality-related negative employment outcome may be related to professional discipline for inappropriate sexual boundary violations as a physician with a patient, or a Police officer with an accused (For example see *Re Kernemen and the College of Physician and Surgeons of Ontario*, 2010; and see *Nelles*. v. *Law Society of Upper Canada*, 2014). Currently, hypersexuality studies have not specifically asked participants about negative employment related outcomes associated with their hypersexual behaviour. Instead, more general questions about several broad areas in which negative life outcomes are grouped, are asked in HD measures (for example the Hypersexual Behaviour Consequences scale contains an item: *my sexual behavior has interfered with my work or my schooling*; and the Sex Addiction Screening Test has an even broader item: *Have important parts of your life (such as job, family, friends, leisure activities) been neglected because you were spending too much time on sex?*). Study Two will be the first study to survey whether there is an association between out of control sexual behaviour and employment disciple or termination.

3.1.7 Online sex chat

Online sex chat in which at least two individuals are communicating electronically via audio/video technology from differing locations may be seen as a positive, negative or neutral behavioural outcome that may be associated with problematic hypersexuality. If individuals participate in online sex chat as single people, or when their partner is aware of it, online/remote sex chat has the benefit of not spreading an STI. By contrast, if an individual is in a sexually exclusive relationship and one partner's sex chat is clandestine, and/or against the non-consenting partner's values, it can become potentially problematic

for a relationship (Resch & Alderson, 2014). Online sex chat was selected as a specific potential criterion outcome of interest because the initial DSM-5 diagnostic criteria included *cybersex*, and *telephone sex* as potential specifiers of Hypersexual Disorder. Technology has developed since the timing of the draft DSM-5 diagnostic criteria for HD, and *sex chat* was seen as a more contemporary means to capture this phenomenon. Having said that however, assessing the prevalence of online sex chat is difficult to quantify since many studies investigate *cybersex* more generally which may include any of: downloading of pornography, group sex chat, using sex web cameras, online partner searching apps, or engaging in role playing (Cooper et al., 2004; Döring, 2009; Wéry, Karila, Sutter, & Billieux, 2014). Thus, we do not have any empirical information about sex chat and its relationship, if any, with problematic hypersexuality among any age group of men.

3.1.8 Pornography

With the advent of Internet pornography, the "Triple A Engine" of accessibility, affordability, and anonymity (Cooper, Delmonico & Burg, 2000) is often cited in the sex addiction (as well as the emerging Internet addiction and porn addiction literature), suggesting that these factors may combine to make otherwise healthy pornography use problematic. An early large-scale study using an online convenience sample (*N*=9265) found that 1.0% of the sample had problematic pornography use that had major deleterious consequences in the users' lives, which was rooted in sexual compulsivity (Cooper, Delmonico & Burg, 2000). A typology of problematic online pornography uses has been proposed (i.e., recreational users, sexually compulsive users, at-risk users, depressive type, and fantasy type), although as admitted by study authors, no empirical data supports this taxonomy as of yet (Carnes, Delmonico, & Griffin, 2001; Cooper, Putnam, Planchon, & Boies, 1999). Importantly, pornography use was suggested as a potential specifier within the DSM-5 proposed Hypersexual Disorder diagnosis. The field trial suggested that the clinical course of HD for most individuals includes pornography and masturbation (Reid et al., 2012). As such we have included specific researcher designed criterion items querying pornography use among different age groups of males, as well as items regarding pornography use, and whether an individual is sufficiently

motivated to watch pornography that they will pay for access. One Study Two researcher-generated criterion item is designed to provide information confirming existing research that pornography use is characteristic of problematically hypersexual males (i.e., paying for access to specific content), a second criterion item is designed to assess whether the pornography use is problematic in that the pornography use causes negative life outcomes (i.e., loss of a job for watching pornography while at work).

While Study One examined the prevalence of hypersexuality as assessed by a variety of HD measures and sought to conceptually replicate and extend previous work on this issue, Study Two examines important behavioural criterion evidence for the validity of HD scales as predictors of consequential outcomes. Exploratory hypotheses will be examined in the context of analyses comparing those scoring as HD or not HD, to observe whether any of the 8 HD scales successfully predict age-appropriate negative outcomes associated being within early (18-24), middle (25-35), or older (36-45) adult male samples. Based on a systematic review of the HD literature, ten outcomes were associated with HD including: STI/HIV risk behaviour, clandestine, extra-dyadic relationships, sex wasting the individual's time, money and interfering with primary romantic relationship, unplanned pregnancy/pregnancy termination, sexual violence-either victimization or perpetration, non-criminal legal issues related to sex (i.e., sexual harassment), online sex chat, and pornography use. These above-reviewed anticipated possible negative behavioural outcomes associated with hypersexuality are set out in a model published in *Sexual Medicine Reviews*, which surveyed existing hypersexual disorder research (Montgomery-Graham, 2016; see Figure 1), and will be tested in Study Two.

Hypotheses are presented by age cohort once again in Study Two (i.e., 18 to 24 years, 25 to 35 years, and 36 to 45 years) for several reasons. First, Study Two of course follows Study One, which was a conceptual replication and extension of Levaque et al.'s (2016) research examining how well problematic hypersexuality measurement instruments perform within a male undergraduate sample, aged 18 to 24 years. In order to further examine the extent to which problematic hypersexuality may express itself differently within age cohorts, Study Two continues with the three-cohort design. The "older" age

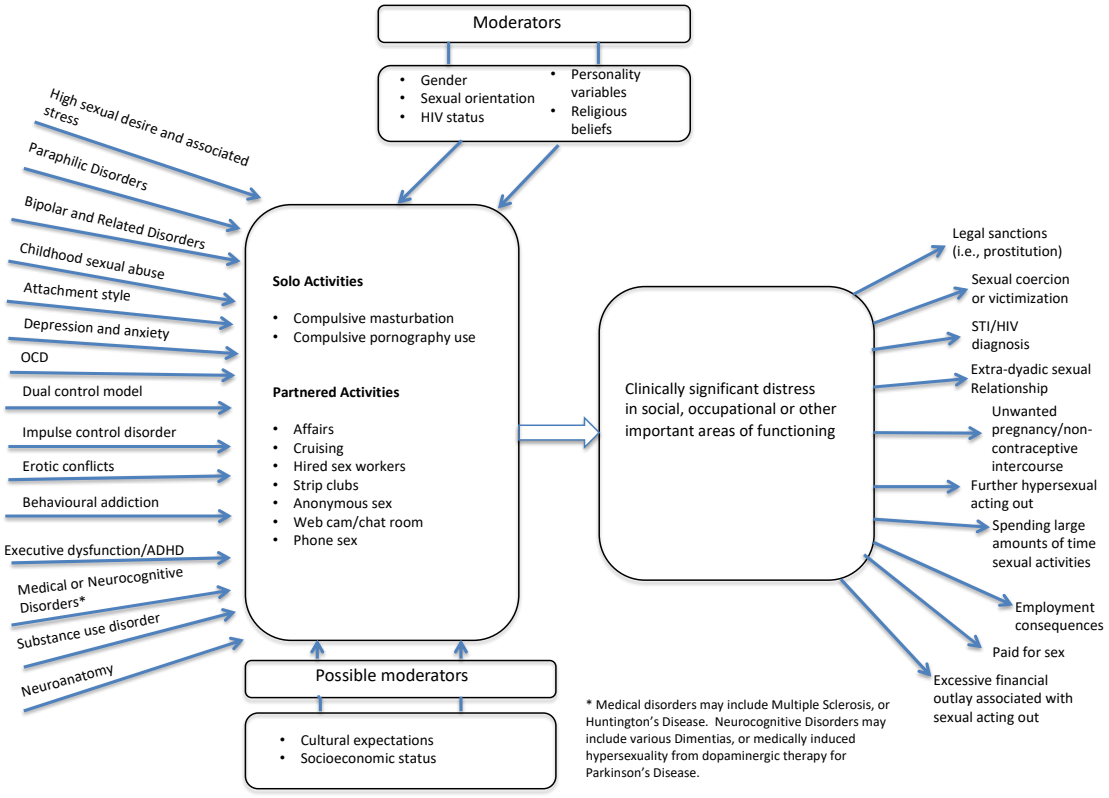

Figure 1: Novel model summarizing negative behavioural outcomes associated with hypersexuality in the empirical literature (Montgomery-Graham, 2016)

cohorts in Study Two (i.e., 25 to 35 years, and 36 to 45 years) are included and so grouped in Study Two because it was of particular interest to add research that examined the extent to which problematic hypersexuality may be associated with different outcomes across the lifespan. As well, we believe that the chosen age cohorts in Studies One, Two and Three (upcoming) map onto predictable and important developmental trajectories that are particularly appropriate in this context. For example, by age 18, young American males have usually experienced, or will soon experience, their sexual debut (Golden, Furman & Colibee, 2016; Harden, 2012). From a developmental lifespan perspective, individuals at this age will have typically completed high school and be in the process of embarking upon further formal education, acquiring a trade (United States Census Bureau, 2018), or joining the working world, and becoming financially independent from their parents (Pew Research Center, 2019). Importantly too, this emerging adult age group also typically shares the commonality of a high sex drive and a

lower likelihood of having a stable sexual partner, which may make problematic hypersexuality look quite different than it does at ages 35 or 45. As well, the 18 to 24 year old age cohort is an important age group needing further investigation following the DSM-5 HD field trial which revealed that 84.4% of males with HD reported an age of onset prior to 25 years (Reid et al, 2012), yet we have little robust data to corroborate these findings.

The two older age cohorts of 25 to 35 years, and 36 to 45 years, are also grouped according to typical shared life tasks of American males within each cohort, and their potential relevance to problematic hypersexuality. Individuals between ages 25 and 35 can be expected to marry (at approximately 29.2 years), and have their first child (30.9 years)(U.S. Census Bureau, 2019), both of which are major life events that may be expected to change how an individual perceives himself and his responsibilities, and expresses himself sexually within a permanent partnership. Moreover, the 36 to 45 year old age cohort is an important age group since Studies One, Two and Three will build on the existing HD research literature which typically samples males within the 36 to early 40s age range (for example see Carnes, Green & Carnes, 2010; Coleman, Miner, Ohlerking & Raymond, 2001; Kalishman & Rompa, 2001; Reid et al., 2012). Finally, the most common event uniting this “late young adulthood” cohort (age 36 to 45 years) is the increased potential for dissatisfaction with life and an increased likelihood of extra-dyadic sexual and romantic involvement (Alter & Hershfield, 2014), which may or may not be linked to problematic hypersexuality. As a result, two broad, age-based exploratory hypotheses in three male age cohorts are presented below.

3.2 Hypotheses

H1. It is expected that despite the presumed high number of young males reaching cut scores for problematic hypersexuality on 8 existing HD measures, far fewer men reaching HD cut scores will report experiencing hypothesized behavioural negative outcomes.

H2. It is expected that the HD scales will be consistent with past research in that HD scales will be more strongly predictive of negative life outcomes for the middle age

cohort (25-35), relative to the youngest cohort (18 to 24 years) and even more negative outcomes for the oldest cohort (36-45).

Outcomes of Study Two will demonstrate whether HD cut scores are meaningful in predicting negative hypersexuality-related outcomes (correlates), and whether scales are more strongly associated with negative outcomes (correlates) in older cohorts within a North American (although mostly American) male community sample.

3.3 Methods

3.3.1 Participants

Participants were Canadian and American males between the ages of 18 and 45 years who were recruited from among those individuals who completed Study One on Amazon's Mechanical Turk Prime. Participants were contacted anonymously via Mechanical Turk upon completion of Study One and paid US $1.50 to participate in Study Two. The sociodemographic characteristics of the participants are shown in Table 11. Out of 758 participants in Study One, 581 remained for Study Two, representing a retention rate of 76.6% between Study One and Study Two, which is an average retention rate for longitudinal research, as reported by recent meta-analytic findings (Teague et al., 2018). Retention rates did improve across age cohorts as follows: 68.95% of 18 to 24-year-olds remained across Studies One to Two, 74.7% of the 25- to 35-year-olds

Table 9:Demographic Characteristics of Participants Retained for Studies Two and Three

	Full Sample		**Youngest**		**Middle**		**Oldest**	
	n	%	n	%	n	%	n	%
Race								
White	427	72.6	91	67.4	182	71.9	153	80.1
Black	48	8.2	10	7.4	22	8.6	15	7.9
Asian	53	9.1	19	14.1	21	8.2	13	6.8
Hispanic	39	6.7	13	9.6	18	7.1	8	4.2
Aboriginal	11	1.9	2	1.5	7	2.7	2	1.0
(unanswered)	10	1.7	-	-	5	2.0	-	-
Religious Affiliation								
Christian	280	48.1	49	36.3	137	53.7	93	48.7
Agnostic	125	21.3	33	24.4	52	20.5	40	20.9

Atheist	121	20.6	35	25.9	47	18.5	38	19.9
Buddhist/Hindu/Jewish/Muslim	34	5.8	13	9.6	9	3.5	12	6.3
Other	22	3.7	5	3.7	9	3.5	8	4.2
(unanswered)	6	1.0	-	-	1	0.4	-	-
Education Completed								
Some high school	6	1.0	2	1.5	-	-	4	2.1
Trade school	28	4.8	4	3.0	12	4.7	12	6.3
High School/GED	101	17.2	42	31.6	30	11.8	29	15.2
Associate's/Bachelor's	384	65.3	33	24.8	170	66.9	97	50.8
Professional/graduate school	90	15.3	-	-	42	16.6	48	25.1
(unanswered)			2	1.5	1	0.4	-	-
Sexual Orientation								
Hetero/mostly hetero	491	76.4	108	79.9	214	83.9	168	88.4
Equally hetero and homo/predominantly hetero/homo but more than incidentally the other	67	11.4	19	14.0	31	12.2	17	8.9
Homo/mostly homosexual	22	3.8	8	5.9	9	3.6	5	2.6
(unanswered)	1	0.2	1	0.7	1	0.4	1	.5
Relationship Status								
Single	185	31.5	65	48.1	76	29.8	43	22.5
Casually dating	60	10.2	27	20.0	22	8.6	11	5.8
Dating seriously/engaged	106	18.2	38	28.2	39	20.9	29	15.2
Married	216	37.1	4	3.0	112	43.9	99	51.8
Widower (divorced)	13	2.3	-	-	-	-	8	4.2
(unanswered)	2	0.3	1	0.7	1	0.4	1	0.5

remained, and 86.4% of the 36 to 45-year old cohorts were retained for Study Two. Almost identically to Study One, the majority of participants were White (72.6%), and heterosexual or predominantly heterosexual (76.4%). Most participants identified as Christian (48.1%), Agnostic (21.3%), or Atheist (20.6%). Participants were reasonably well educated, as almost two thirds (65.3%) of the participants had completed at least a bachelor's degree. Study Two participants fell into the following age categories: 18-24 years (23.2%, *n*=135), 25-35 years (43.9%, *n*=255), and 36-45 years (32.9%, *n*=191). Inferences may be drawn from the responses to an item regarding political affiliation that the vast majority of participants was American (73.7%, *n*=428) in Study Two, as was the case with Study One. The results of the number of men captured as problematically hypersexual across various scales and age cohorts are set out in Tables 12A ("Replication Scales", as labelled in Study One), and 12B ("Extension Scales" as labelled in Study

Table 10 A: Study Two Hypersexuality Scale Results across Age Cohorts

Questionnaire	**Youngest (18-24)**	**Middle (25-35)**	**Oldest (36-45)**
HBI (range 19-95)			
n	135	255	191
M (SD)	33.05 (13.29)	39.4 (16.44)	36.3 (15.44)
Median	30.0	37.0	31.5
90th percentile	52.6	62.0	59.0
% ≥ cut score of 53	**9.6%**	**23.5%**	**16.3%**
TSOI (0-35)			
n	134	255	191
M (SD)	8.97 (7.90)	10.66 (8.73)	7.69 (6.71)
Median	7.0	7.0	5.0
90th percentile	21.0	25.0	15.80
%≥ 7	**55.6%**	**56.1%**	**43.5%**
SCS (range 10-40)			
n	135	255	191
M (SD)	15.08 (5.70)	17.59 (7.05)	15.77 (6.33)
Median	13.0	15.0	13.0
90th percentile	23.0	29.0	25.0
%≥ cutscore of 24	**8.1%**	**22.0%**	**14.7%**
CSBI-C[8](18-65)			
n	135	255	191
Mean (SD)	45.45 (9.58)	40.70 (12.12)	44.2 (10.52)
Median	48.0	42.5	48.0
10th percentile	31.0	23.7	28.0
Cut score (10th percentile per Study One)	**8.1%**	**11.0%**	**6.8%**
HBCS (19-95)			
n	135	255	191
Mean (SD)	30.83 (12.68)	37.24 (18.63)	33.86 (15.82)
Median	24.0	28.0	28.0
90th percentile	53.0	66.0	56.8
Cut score (90th percentile per Study One)	**8.9%**	**8.2%**	**9.4%**

[8] Note that the CBSI-c items are reversed scored as in the original Levaque et al study (2016); thus, lower scores mean higher problematic hypersexuality.

Table 12 B: Study Two descriptive statistics results of replication scales by age cohort

Questionnaire	**Youngest (18-24)**	**Middle (25-35)**	**Oldest (36-45)**
SAST (range 0-25)			
n	135	255	191
M (SD)	3.41 (3.52)	4.78 (5.03)	3.87 (4.16)
Median	3.00	3.00	2.50
90th percentile	8.00	13.00	10.00
%≥ 6	**23.0%**	**28.6%**	**25.7%**
SAST-M (range 0-6)			
n	135	255	191
M (SD)	1.25 (1.05)	2.0 (1.72)	1.78 (1.43)
Median	1.0	2.0	2.0
90th percentile	3.0	5.0	4.0
%≥ 3	**12.6%**	**31.8%**	**27.2%**
HDSI (range 0-28)			
n	135	255	191
M (SD)	11.84 (5.48)	14.36 (6.25)	12.35 (5.77)
Median	10.0	14.0	11.0
90th percentile	19.5	23.8	21.0
%≥ 17	**20.7%**	**37.3%**	**22.5%**

One). The proportion of participants scoring as problematically hypersexual who remained in Study Two are similar to the proportion of problematically hypersexual males reported in Study One. Approximately 8.0% to 9.0% of the youngest males captured as problematically hypersexual across replication scales, and approximately 12.6% to 23.0% on extension scales; within the middle cohort approximately 22.0% to 23.5% were captured as problematically hypersexual on replication scales and 31.1% to 37.8% on extension scales. Among the oldest cohort of males approximately 14.7% to 16.3% were problematically hypersexual on replication scales and 22.9% to 27.8% on replication scales. Note that the scores for the Compulsive Behavior Inventory-control subscale, and the Hypersexual Behavior Consequences Scale are not empirically derived but are based on extreme top and bottom deciles from Study One. The Total Sexual Outlet Inventory (TSOI), which measures orgasmic output in a week, is not a robust

measure of anything other than orgasmic output, and tends to capture almost half of all males across cohorts. This variable is discussed in more detail below.

3.3.2 Procedure

Study Two participants were asked to complete 2-3 questions per criterion outcome (i.e., potentially negative correlates or behavioural outcomes associated with problematic hypersexuality) which took participants approximately 8 minutes to complete (See Appendix D for a list of questions participants answered). Note however that data collection for Studies Two and Three was combined such that in total 168 questions were asked of participants, which took approximately 25 to 30 minutes to complete. (See Appendix B for a complete list of how Study One, and Studies Two and Three were organized on Mechanical Turk). Two to 4 researcher-generated binary choice (yes/no) criterion outcomes questions were asked of participants in the following broad areas based on the empirical literature review above: STI/HIV risk behaviour, clandestine extra-dyadic relationships, wasting time and money on sex, sex and sex-seeking behaviours interfering with primary romantic relationships, sexual violence – victimization and perpetration, civil law issues related to sex (i.e., sexual harassment claims, employment termination), participation in online sex chat, or pay-per-view pornography services online. Two questions about sexual violence were taken from the Sexual Experiences Survey – Short Form Victimization (Koss, et al., 2006), and two questions were taken from the Sexual Experiences Survey – Short Form Perpetration (Koss, et al., 2006). Participants were given 6 response choices including: (a) Telling lies to end the relationship, threatening to spread rumors about them, making promises about the future I knew were untrue, or continually verbally pressuring them/me when they/I said they/I did not want to; (b) Showing displeasure, criticizing their/my sexuality or attractiveness, getting angry but not using any physical force after they said they did not want to; (c) taking advantage when they/I were/was too drunk to stop what was happening; (d) Threatening to physically harm them/me or someone close to them/me; (e) Using force, for example, holding them/me down with my/their body weight, pinning their/my arms or having a weapon; these 5 answers were collapsed as “1” = yes for either potential sexual victimization or sexual perpetration, and the answer “none of the above

applies to me" was coded as "2" = no potential victimization/ potential perpetration. Across all analyses, problematic hypersexuality was the dichotomous criterion variable (i.e., dependent variable) as measured by the Hypersexual Behavior Consequences Scale, and the researcher-generated questions, and four above described violence questions were the dichotomous predictor variables.

3.3.3 Statistical Analyses

All data analyses were completed using the statistical package, IBM SPSS Statistics 25 and 26 for Windows. The original phase two data set (which included data for Studies Two and Three) contained 679 participants. All data from participants who reported they were: female (*n*=15), non-English speaking (*n*=16), under 18 years (*n*=9), or over 46 years (*n*=18), or failed an attention check (*n*=40) were deleted. The final data set contained 581 participants.

Prior to analysis, outcome and predictor variables were examined for accuracy of data entry, missing values, and fit between their distributions and the assumptions of multivariate analysis. Multivariate assumptions were tested because Study Two and Study Three were collected as one dataset, and Study Three uses multiple regression data analytic techniques. The full results of these multivariate analyses will be discussed in Study Three.

Data were cleaned in accordance with guidelines set out in Tabachnick and Fidell (2013). Missing value analyses were run in SPSS to examine patterns of missing variables. T-tests were requested within scales, to analyze whether missingness was related to any other variable, with α = .05, and tests were requested only for variables with at least 5 percent of data missing. None of the items had more than 5 percent of the data missing, and the maximum number of missing items on any variable was *n*=20 (3.44%) of data missing. A Missing Values Analysis indicated that Little's (1988) test of Missing Completely at Random (MCAR) was not significant, χ^2 = 67.56, p = .526, suggesting that the small number of missing data were missing completely at random. To be cautious, Multiple Imputation (MI) was used to fill in the small number of missing items (between 5 to 7 of the youngest cohort participants had incomplete data). MI is

considered the most appropriate method of addressing missing data (Tabachnick and Fidell, 2013). Using the rule of thumb that the number of imputations should equal the number of cases that are incomplete (Graham, Olchowski & Gilreath, 2007; White, Royston & Wood, 2011), 20 iterations of imputation were conducted since so little data were missing. In particular, very few participants were missing data in the young male sample (*n*=6), so analyses were conducted with both the incomplete and multiple imputation datasets, with little difference, if any, between analyses on the incomplete and multiple imputation datasets. Imputed data were not used.

3.3.4 Crosstabs and Logistic Regression

The assumptions used in analyzing categorical data were met, namely that each person contributed to only one cell of the frequency table (i.e., there is no repeated-measures design), and expected cell frequencies were greater than 5, meaning the approximate chi square distribution was reliable.

Within each HD scale, crosstabs were run to examine clustered bar charts (a type of graph allowing for the display of two categorical variables) and to search for evidence of violations of the assumptions of logistic regression, including a binary dependent variable, independence of observations, sufficiently large sample size, and in particular the expectation that expected cell frequencies should not <5. When cell frequencies violated this assumption, instead of a chi squared test statistic, the two-sided Fisher's test was used. When expected cell frequencies are below 5, and the approximate chi square distribution becomes unreliable, Fisher's exact test is used (Fisher, 1922). This test statistic provides a way of computing the exact probability of the chi square statistic alongside 2 x 2 contingency tables with small samples. Fisher's exact test (1922) provides a more exact *p* value to test the null hypothesis that the relative proportions of the outcome and predictor variables are independent of one another (Kim, 2017). When there was no evidence of expected low cell frequencies, a logistic regression was run, and when available, it is reported in below in Tables 14A through H (youngest cohort, 18 through 24 years), Tables 16A through H (middle cohort, 25 through 35 years), and Tables 18, A through H (oldest cohort, 36 through 45 years). Note that the one-item Total Sexual Outlet scale (TSO), measuring frequency of orgasmic output in a week, was

included throughout Studies Two and Three to provide for continuity of results following Study One, which was a replication study that used this variable. The TSO is a one-item continuous measure, it is thus uncapped, and is positively skewed within this sample; across cohorts, the TSO also has some individual cases of high orgasmic output in a week (>20 orgasms/week). Since the TSO contained no Z scores in excess of 3.29, which are considered to be extreme outliers (Tabachnick and Fidell, 2013), the scale was used, and no variables were omitted or transformed, but results should be interpreted with caution.

The scale total scores from 6 of 8 problematic hypersexuality scales used in Study One were dichotomized and recoded into Not-HD (0), and HD (1) based on established cut scores. For those two scales without empirically derived cut scores (i.e., the Hypersexual Behavior Consequences Scale, and the control subscale of the Compulsive Sexual Behavior Inventory), the 90th and 10th percentiles (the Compulsive Sexual Behavior Inventory is reverse-coded so lower scores indicate more problematic hypersexuality) within each age group as determined in Study One were selected as cut scores, to make comparisons with Study One more easily understood.

In order to account for possible predictor-criterion overlap between scale items and criterion items, a review of the scale items was conducted. When a scale item was substantially similar to the criterion based on a face validity item-level review, the scale

item and its contribution to the total score were removed, and the cut score of the scale was recalculated as follows: new total item range x proportion needed to meet cut score. On the two scales in which no empirically derived score exists, the 90th percentile (Hypersexual Behavior Consequences Scale) and the 10th percentile (the reverse-coded Compulsive Sexual Behavior Inventory, Control subscale) were calculated taking into account the removed items. Total scores were re-calculated and dichotomized into HD (1), and non-HD (0), based on the new cut scores. For example, the Compulsive Sexual Behavior Inventory has an item that reads *how often have your sexual activities caused financial problems for you?* (item 8): two researcher designed criterion items had predictor-criterion overlap, each reading as follows: (a) *Have you ever spent more money than you intended on sex-related activities (not including dating),* and (b) *Have you ever*

regretted the amount of money you have spent on sex-related activities (not including dating)? To remove possible predictor-criterion overlap, item 8 from the scale was removed, a new cut score was calculated (as set out above), and a new Cronbach's alpha was calculated with the item removed. Four scales – the Compulsive Sexual Behavior Inventory, the Hypersexual Behavior Consequences Scale, the Hypersexual Disorder Screening Inventory, and the Sex Addiction Screening Test-Male Items had 1, 6, 1, and 2 scale items removed, respectively. See Table 13 for further details. Broadly, the research question we will consider is the extent to which the association between being problematically hypersexual and having associated negative life outcomes differs among age cohorts.

Table 11: Results of the criterion-predictor overlap review for Study Two

Scale	**Criterion**	**Scale items removed**	**Original Cut score**	**New Cut score**	**α with items removed**
Compulsive Sexual Behavior Inventory	Spent more money than I intended on sex-related activities (non-dating)	How often have your sexual activities caused financial problems for you? (Item 8)	30	27	.924
	There have been times within the last 12 months that I have regretted the amount of money I spent on sex.				
Hypersexual Behavior Consequences Scale	Have you ever worried you had an STI?	I have gotten a sexually transmitted disease or infection from my sexual activities (Item 4)	55	44	.916
	Have you ever been diagnosed with an STI?				
	Have you ever been diagnosed with HIV?				
	I have had sexual relationships with people other than my primary partner that my primary partner did not know about.	A romantic relationship has ended because of my sexual behavior (Item 3)			
	I have had fights with my primary partner or ended our relationships because of my sexual activities with other people				
	I have spent more money than I intended on sex-related behaviour (non-dating)	I have experienced financial losses as a result of my sexual behavior (Item 8)			
	I have regretted the amount of money I have spent on sex-related behaviour (non-dating)				
	I have been fired from work because of sex-related activity at work (sex/porn at work, sexual harassment)	I have lost a job because of my sexual behavior (Item 1)			
	The Police have questioned me for inappropriate sexual conduct	I have had legal problems because of my sexual activity (Item 5), And- I have been arrested because of my sexual activities (Item 6)			
	I have gotten in trouble in my state/province for hiring a sex worker because it is illegal where I live				

Scale	Criterion	Scale items removed	Original Cut score	New Cut score	α with items removed
Hypersexual Disorder Screening Inventory	I have spent too much time within the last 12 months looking for a sex partner Over the last 12 months I have wasted too much time on sex-related activities	I have spent a great amount of time consumed by sexual fantasies and urges as well as planning for and engaging in sexual behavior (Item A1)	20	17	.855
Sexual Addiction Screening Test – Male Items *N.B. Once the Cronbach α of this scale was determined, the recalculation and reanalysis of the items was abandoned given the scale cohesion was so poor.*	*I have paid to access erotic/pornographic images online* *I have paid to access online sex chat*	*I have subscribed to or regularly purchased or rented sexually explicit materials (magazines, videos, books, or online pornography) (Item 28)* *And* *I have spent considerable time surfing pornography online (Item 32)*	4	3	.087

Notes. Four scales had such similarity of language overlap with criterion items that prediction may have been too strong and not meaningful. Table 13 shows: (1) the items of 4 scales with significant criterion-predictor overlap; (2) the criterion items thought to have too much criterion-predictor overlap; (3) the scale items that were removed to address this issue; (4) the former cut scores with all scale items; (5) the revised cut scores with overlapping criterion-predictor items removed; and (6) recalculated alphas with removed criterion-predictor overlapping items.

3.4 Results

3.4.1 Youngest group of males (18 to 24 years)

3.4.1.1 Criterion items not distinguishing hypersexual from non-hypersexual young men

Results of scale criterion analyses for young males may be found in Tables 14, A through H, with each table corresponding to one of the HD scales discussed in Study One. As well, Table 15 sets out the proportions of young males who are hypersexual and have a negative life outcome as a percentage of all young males reporting negative life outcome, by scale. Within the youngest cohort of men who participated in Study Two (n=135), the base rate (BR) of several criterion items, namely having an HIV diagnosis (n=2, BR=.015), having conceived an unintentional pregnancy (n=13, BR=.096), and having a

female partner who had an abortion (*n*=9, BR=.067), were quite low; as a result, the findings within these criterion items should not be overinterpreted given the low base rate of the occurrence of each of HIV+ diagnoses, unintentional pregnancy, and female partner having terminated an unintentional pregnancy. By contrast, the base rates of other potentially problematic sexual behaviour outcomes were relatively high among all young men such that these criterion items failed to distinguish behaviours between those young males flagged as hypersexual on any of the scales, and young males who were not hypersexual. Such items distinguishing neither group of young males included an item inquiring if participants had ever worried they had acquired a sexually transmitted infection (*n*=52, BR=.385), and an item inquiring if young men had ever engaged in condomless vaginal sex with a new partner (*n*=63, BR=.467). All non-significant findings from these analyses may be found in Appendix E (i.e., when there were no statistically significant findings between a scale and a negative behavioural outcome, results may be found in Tables 14Ai through 14Hi).

Table 12 A: Researcher-generated Criterion Items associated with being HD on the Hypersexual Behavior Inventory Among Young Men (18-24 years)

	Base Rate	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio
HIV+ Diagnosis	.015 (*n*=2)	19.015**	.009	1	-[a]
Someone attempted anal sexual assault	.104 (*n*=14)	19.817***	.001	1	12.21
Attempted perpetration of vaginal sexual assault	.119 (*n*=16)	9.750**	.009	1	4.95
Paid for online pornography	.259 (*n*=35)	9.500**	.005	1	5.630
Paid for online sex chat	.119 (*n*=16)	16.202***	.001	1	9.598
Secret concurrent extra dyadic relationship	.141 (*n*=19)	18.616***	.001	1	10.599
Relationship termination/distress, re: my infidelity	.125 (*n*=17)	14.721**	.002	1	8.651
Too much time spent looking for sex partner	.215 (*n*=17)	13.685***	.001	1	7.695
Waste too much time on sex-related activities	.281 (*n*=38)	7.930**	.009	1	4.907
Spent more money than intended on sex	.133 (*n*=18)	28.651***	.001	1	17.76

Regretted amount of money spent on sex	.133 (*n*=18)	13.410**	.002	1	7.857
Trouble at work re internet porn	.044 (*n*=6)	23.473**	.001	1	21.45
Legal problems for hiring a sex worker	.044 (*n*=6)	21.411***	.001	1	26.667
Police questioning re sexual conduct	.045 (*n*=6)	12.979**	.010	1	13.222

Note. Table displays odds ratios of young male cohort (*n*=135) who are problematically hypersexual on one of the 8 hypersexuality scales under consideration in Study Two compared to those who are not. Base rate in the table is the base rate of a criterion item within this young group; [a]The odds ratio of having an HIV+ diagnosis and being/not being HD could not be calculated because one cell frequency was 0 (having HIV+ diagnosis and not having HD); this means that of the 2 HIV+ young men both were problematically hypersexual on the HBI

** $p < .01$ $p < .001$***

Only significant findings are displayed. Non-significant criterion item findings are in Appendix E.

Table 14 B: Researcher-generated Criterion Items associated with being HD on the Sexual Compulsivity Scale Among Young Men (18-24 years)

	Base Rate	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio (when significant)
Paid for online sex chat	.119 (*n*=16)	12.091**	.005	1	6.21
Secret concurrent extra dyadic relationship	.141 (*n*=19)	9.645**	.007	1	4.60
Relationship termination/distress, re: my infidelity	.125 (*n*=17)	17.986**	.001	1	6.12
Too much time spent looking for sex partner over last 12 months	.215 (*n*=29)	8.554**	.009	1	3.74
Waste too much time on sex-related activities	.281 (*n*=38)	14.441***	.001	1	4.98
Spent more money than intended on sex-related activities (not dating)	.133 (*n*=18)	20.297***	.001	1	9.47
Regretted amount of money spent on sex	.133 (*n*=18)	8.812**	.003	1	4.55

Note. Table displays odds ratios of young male cohort (*n*=135) who are problematically hypersexual on one of the 8 hypersexuality scales under consideration in Study Two compared to those who are not. Base rate in the table is the base rate of a criterion item within this young group

** $p < .01$ $p < .001$***

Only significant findings are displayed. Non-significant criterion item findings are in Appendix E.

Table 14 C: Researcher-generated Criterion Items associated with being HD on the Sexual Addiction Screening Test Among Young Men (18-24 years)

			95% CI for Odds Ratio			P	Pseudo-R^2
	BR	B	Lower	Odds	Upper	value	(Nagelkerke)
Paid for Online Sex Chat	.119 (*n*=16)	1.825	1.998	6.205**	19.267	.002	.114
Too much time spent looking for sex over 12 months	.215 (*n*=29)	1.320	1.495	3.744**	9.378	.005	.088
Waste too much time on sex	.281 (*n*=38)	1.606	2.095	4.985***	11.864	.001	.149
Have spent more money than intended on sex	.133 (*n*=18)	2.249	3.106	9.474***	28.399	.001	.191
Regretted amount of money spent on sex	.133 (*n*=18)	1.515	1.576	4.551**	13.144	.005	.087

	Base Rate among young men in sample	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio (when significant)
Secret concurrent extra-dyadic relationship	.141 (*n*=19)	9.645**	.007	1	4.6
Relationship termination/distress, re: my infidelity	.125 (*n*=17)	12.791***	.001	1	6.12

Note. Table displays odds ratios of young male cohort (*n*=135) who are problematically hypersexual on one of the 8 hypersexuality scales under consideration in Study Two compared to those who are not. Base rate in the table is the base rate of a criterion item within this young group

** $p < .01$ $p < .001$***

Only significant findings are displayed. Non-significant criterion item findings are in Appendix E.

Table 14 D: Researcher-generated criterion items associated with being HD on the Sexual Addiction Screening Test – Male Items Among Young Men (18-24 years)

	Base Rate among young men in sample	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio (when significant)
Diagnosed with an STI	.067 (*n*=9)	8.681* *15.540***	(.016) *.006*	1	6.83 *15.25*
Paid for pornography	.259 (*n*=35)	19.702*** *13.742***	.001 *.001*	1	10.63 *20.48*
Paid for online sex chat	.119 (*n*=16)	9.968** *14.389***	.007 *.004*	1	5.77 *12.89*
Relationship termination/distress, re: my infidelity	.126 (*n*=17)	8.861** *13.312***	.009 *.005*	1	5.22 *11.79*
Waste too much time on sex	.281 (*n*=38)	16.861*** *6.838**	.001 *.019*	1	8.31 *7.02*
Have spent more money than I intended on sex-related activities	.133 (*n*=18)	12.727** *33.184****	.002 *.001*	1	6.69 *5.75*
Fired from work because sex-related activity at work (sex/porn at work, sexual harassment)	.030 (*n*=4)	14.187** *16.696**	.007 *(.013)*	1	24.45 *25.00*

Note. italicized numbers are those odds ratios that were run once the items with criterion overlap were removed (see Table 13). Table displays odds ratios of young male cohort (*n*=135) who are problematically hypersexual on one of the 8 hypersexuality scales under consideration in Study Two compared to those who are not. Base rate in the table is the base rate of a criterion item within this young group; **p*< .05 (not considered significant but noted)

** *p*< .01 *p*< .001***

Only significant and marginally significant (**p*< .05) findings are displayed. Non-significant criterion item findings are in Appendix E.

Table 14 E: Researcher-generated criterion items associated with being HD on the Hypersexual Disorder Screening Inventory Among Young Men (18-24 years)

	Base Rate among young men in sample	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio (when significant)
Paid for online pornography	.259 (*n*=35)	9.607** *12.122***	.004 *.001*	1	3.78 *4.78*
Paid for online sex chat	.119 (*n*=16)	13.009** *12.893***	.001 *.002*	1	6.36 *6.44*
Secret concurrent extra dyadic relationship	.141 (*n*=19)	12.538** *13.067***	.001 *.001*	1	5.61 *6.00*
Relationship termination/distress, re: my infidelity	.125 (*n*=17)	16.079*** *11.804***	.001 *.003*	1	7.44 *5.67*

Too much time spent looking for sex partner over last 12 months	.215 (*n*=29)	24.855*** *14.075*****	.001 *.001*	1	8.80 *6.47*
Waste too much time on sex-related activities	.281 (*n*=38)	7.398** *6.891**	.010 *(.013)*	1	8.56 *3.27*
Spent more money than intended on sex-related activities (not dating)	.133 (*n*=18)	19.101*** *20.024****	.001 *.001*	1	8.56 *9.10*
Regretted amount of money spent on sex	.133 (*n*=18)	10.015** *10.104***	.004 *.004*	1	4.850 *5.05*
Trouble at work re internet porn	.044 (*n*=6)	14.242** *10.267***	.002 *.009*	1	21.87 *10.90*

Note. italicized numbers are those odds ratios that were run once the items with criterion overlap were removed (see Table 13). Table displays odds ratios of young male cohort (*n*=135) who are problematically hypersexual on one of the 8 hypersexuality scales under consideration in Study Two compared to those who are not. Base rate in the table is the base rate of a criterion item within this young group;

*p< .05 (not considered significant but noted) ** p< .01 p< .001***; Only significant findings are displayed. Non-significant criterion item findings are in Appendix E.

Table 14 F: Researcher-generated criterion items associated with being HD on the Compulsive Sexual Behavior Inventory, Control subscale, Among Young Men (18-24 years)

	Base Rate among young men in sample	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio (when significant)
Spent more money than intended on sex-related activities (not dating)	.133 (*n*=18)	17.615** *10.323**	.001 *.004*	1 *1*	14.487 *4.94*
Regretted amount of money spent on sex	.133 (*n*=18)	17.790** *4.506**	.001 *(.049)*	1 *1*	14.615 *(2.9)*

Note. italicized numbers are those odds ratios that were run once the items with criterion overlap were removed (see Table 13). Table displays odds ratios of young male cohort (*n*=135) who are problematically hypersexual on one of the 8 hypersexuality scales under consideration in Study Two compared to those who are not. Base rate in the table is the base rate of a criterion item within this young group

*p< .05 (not considered significant but noted) ** p< .01 p< .001***

Only significant findings are displayed. Non-significant criterion item findings are in Appendix E.

Table 14 G: Researcher-generated criterion items associated with being HD on the Hypersexual Behavior Consequences Scale Among Youngest Men (18 to 25years)

			95% CI for Odds Ratio			P	Pseudo-R^2
	BR	B	Lower	Odds	Upper	value	(Nagelkerke)
Attempted victimization	.104 (*n*=14)	1.919	2.02	6.81**	22.96	.002	.128
Secret concurrent extra dyadic sexual relationship	.141 (*n*=19)	2.03	2.50	7.64***	23.36	.001	.153
Relationship termination/distress, re: my infidelity	.125 (*n*=17)	1.57	1.51	4.82**	15.37	.008	.087
Too much time spent looking for sex partner over last 12 months	.215 (*n*=29)	1.86	2.25	6.45***	18.45	.001	.131
Waste too much time on sex-related activities (non-dating)	.281 (*n*=38)	2.67	4.09	13.56***	44.96	.001	.22
Have spent more money than intended on sex	.133 (*n*=18)	2.14	2.73	8.48***	26.34	.001	.168
Regretted amount of money spent on sex	.133 (*n*=18)	1.814	1.975	6.13**	19.038	.002	.119
Police questioned me for inappropriate sexual conduct	.045 (*n*=6)	2.79	2.73	16.29**	37.14	.002	.229

Note. Table displays odds ratios of young male cohort (*n*=135) who are problematically hypersexual on one of the 8 hypersexuality scales under consideration in Study Two compared to those who are not. Base rate in the table is the base rate of a criterion item within this young group

** *p*< .01 *p*<. 001***

Only significant findings are displayed. Non-significant criterion item findings are in Appendix E.

Table 14 H: Researcher-generated significant criterion items associated with being HD on the Total Sexual Outlet Inventory Among Young Men (18-24 years)

	Base Rate among young men in sample	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio (when approaching significance)
Attempted victimization	.104 (*n*=14)	5.612*	(.022)	1	5.43
Attempted perpetration of sexual assault (against a woman)	.119 (*n*=16)	4.712*	(.043)	1	3.85
Secret concurrent extra dyadic relationship	.141 (*n*=19)	4.879*	(.044)	1	(1.0)
Relationship termination/distress, re: my infidelity	.125 (*n*=17)	5.499*	(.020)	1	(4.29)

Trouble at work re internet porn	.044 (*n*=4)	4.941*	(.034)	1	( )[a]

Note. Table displays odds ratios of young male cohort (*n*=135) who are problematically hypersexual on one of the 8 hypersexuality scales under consideration in Study Two compared to those who are not. Base rate in the table is the base rate of a criterion item within this young group;

[a]The odds of *I have gotten into trouble at work because of the time I spend on the Internet looking at erotic/sexual pictures* created a category with one cell frequency of 0 since 6 in 135 young men agreed with this statement, and all of those participants met the criteria for HD. Thus no odds ratio could be calculated

*p< .05 ** p< .01 p< .001***

Only significant and marginally significant (p< .05) findings are displayed. Non-significant criterion item findings are in Appendix E.

3.4.1.2 Total Sexual Outlet Scale

The TSO, the one-item scale which measures orgasmic output in a week and uses a cut score of 7 orgasms per week to indicate problematic hypersexuality, was included in these analyses (findings are reported in Tables 14 and 15) in order to provide continuity with Study One. The TSO is not discussed in detail, however, since it is not statistically significantly related to any criterion outcome in the regression analyses among the youngest cohort (p< .001), and across criterion items, the TSO scale captures between 2 and 6 times as many hypersexual young men as any other scale, skewing the proportions of men who are captured as hypersexual and have also experienced a negative life outcome. In short, the fact that a man has 7+ orgasms in a week (which is all the TSO tells us) likely does not provide much useful research data when it is significantly related to a negative criterion outcome but is presented in order to be thorough.

3.4.1.3 Criterion items distinguishing hypersexual young males

A critical piece of contextual information to bear in mind in reviewing the data that follow is that, according to the 5 HD scales with evidence-based cut scores (i.e., Hypersexual Behavior Inventory, Sexual Compulsivity Scale, Sex Addiction Screening Test (SAST), SAST-Male Items, and Hypersexual Disorder Screening Inventory), problematically hypersexual young males comprised between 8.1% and 20.7% of all young males surveyed (see Table 15). Across 5 of 8 scales, and trending toward

significance on the one-item TSOI (orgasm frequency scale), significant associations were found with being hypersexual on any scale and having relationship distress or termination as a result of the primary partner discovering an infidelity (OR=5.22, $\chi 2$=8.86, *p*=.009 to OR=8.65, $\chi 2$=14.72, *p*=.002)(See Tables 14A though 14 H, above).

Table 13: Young males who are hypersexual and have a negative life outcome as a percentage of all young males reporting negative life outcome, by scale, n=135

	Scales with empirically validated cut scores							
#HD/scale Base rate in cohort	**HBI** (HD*n*=13) 9.6%	**SCS** (HD*n*=11) 8.1%	**SAST** (HD*n*=31) 23.0%	**SAST-M** (HD*n*=17) 12.6%	**HDSI** (HD*n*=28) 20.7%	**CSBI** (HD*n*=11) 8.1%	**HBCS** (HD*n*=12) 8.9%	**TSO** (HD*n*=75) 55.6%
Worried STI (BR=.385, *n*=52)	4/52 7.7%	6/52 11.5%	16/52 30.8%	7/52 13.5%	13/52 25.0%	3/52 5.8%	5/52 9.6%	30/52 57.7%
STI diagnosis (BR=.067, *n*=9)	1/9 11.1%	1/9 11.1%	4/9 44.4%	4/9 44.4%	2/9 22.2%	0/9 0.0%	1/9 11.1%	6/9 66.7%
HIV+ diagnosis (BR=.015, *n*=2)	2/2 100.0%	0/2 0.0%	½ 50.0%	0/2 0.0%	½ 50.0%	½ 50.0%	2/2 100.0%	2/2 100.0%
Unwanted pregnancy (BR=.096, *n*=13)	2/13 15.4%	1/13 7.7%	5/13 38.5%	3/13 23.0%	1/13 7.7%	0/13 0.0%	3/13 23.0%	9/13 69.2%
Pregnancy termination (BR=.067, *n*=9)	0/9 0.0%	0/9 0.0%	2/9 22.2%	3/9 33.3%	1/9 11.1%	0/9 0.0%	2/9 22.2%	4/9 44.4%
Condomless anal intercourse with new partner (BR=.244, *n*=33)	7/33 21.2%	6/33 18.2%	11/33 33.3%	6/33 18.2%	12/33 36.4%	4/33 12.1%	3/33 9.0%	18/33 54.5%
Condomless vaginal sex with new partner (BR=.467, *n*=63)	7/63 11.1%	6/63 9.5%	17/63 27.0%	8/63 12.7%	16/63 25.4%	7/63 11.1%	8/63 12.7%	35/63 55.6%
Attempted sexual violence perpetration (BR=.119, *n*=16)	8/16 50.0%	4/16 25.0%	5/16 31.3%	3/16 18.8%	5/16 31.3%	2/16 25.0%	4/16 25.0%	13/16 81.3%

Attempted victimized (.104; *n*=14)	6/14 42.9%	3/14 21.4%	6/14 42.9%	4/14 28.6%	7/14 50.0%	2/14 14.3%	5/14 35.7%	12/14 85.7%
Paid for sex worker (BR=.052, *n*=7)	1/7 14.3%	1/7 14.3%	1/7 14.3%	1/7 14.3%	1/7 14.3%	0/7 0.0%	2/7 28.6%	6/7 85.7%
Paid for porn (.259; *n*=35)	8/35 22.9%	6/25 24.%	3/25 12.0%	12/25 48.0%	14/25 56.0%	4/25 16.0%	6/25 24.0%	24/25 96.0%
Paid for online sex chat (.119; *n*=16)	7/16 43.8%	5/16 31.3%	9/16 56.3%	6/16 56.3%	9/16 56.3%	4/16 25.0%	4/16 25.0%	11/16 68.8%
Secret, extra-dyadic relationship (.141; *n*=19)	7/19 36.8%	6/19 31.6%	10/19 52.6%	5/19 26.3%	10/19 52.6%	4/19 21.1%	5/19 26.3%	15/19 78.9%
Relationship termination re my sexual behaviour (.126; *n*=17)	7/17 41.2%	6/17 35.3%	10/17 58.8%	6/17 35.3%	10/17 25.8%	4/17 23.5%	5/17 29.4%	14/17 82.4%
Waste too much time on sex (.281; *n*=38)	9/38 23.7%	8/38 21.%	17/38 44.7%	12/38 31.6%	14/38 36.8%	3/38 7.9%	11/38 29.0%	21/38 55.3%
Spent more money than intended on sex (.133; *n*=18)	9/18 50.0%	5/18 27.8%	12/18 66.7%	7/18 38.9%	11/18 61.1%	5/18 27.8%	5/18 27.8%	13/18 66.7%
Regretted amount of money spent on sex (BR=.133, *n*=18)	6/18 33.3%	5/18 27.8%	9/18 50.0%	6/18 33.3%	9/18 50.0%	5/18 27.8%	5/18 27.8%	12/18 66.7%
Trouble at work re: porn (BR=.044; *n*=6)	4/6 66.7%	4/6 66.7%	4/6 66.7%	3/6 50.0%	5/6 83.3%	2/6 33.3%	2/6 33.3%	6/6 100.0%
Trouble at work for being sexually inappropriate (BR=.030, *n*=4)	2/4 50.0%	¼ 25.0%	2/4 50.0%	0/4 0.0%	2/4 50.0%	¼ 25.0%	¼ 25.0%	¾ 75.0%

Fired for sexual behaviours (BR=.030, *n*=4)	2/4 50.0%	2/4 50.0%	¾ 75.0%	¾ 75.0%	¾ 75.0%	¼ 25.0%	2/4 50.0%	¾ 75.0%
Legal problems Re: hire sex worker (.044; *n*=6)	4/6 66.7%	2/6 33.3%	4/6 66.7%	1/6 16.7%	2/6 33.3%	1/6 16.7%	3/6 33.3%	5/6 83.3%
Police Qs re my sexual behaviour (.044; *n*=6)	3/6 50.0%	1/6 16.7%	4/6 66.7%	0/6 0.0%	2/6 33.3%	1/6 16.7%	3/6 50.0%	4/6 66.7%

Whereas only 12.6% of young men as a whole report such relationship distress resulting from their sexual behaviour, problematically hypersexual young men account for between one quarter (25.8%) to well over half (58.8%) of the young men experiencing sex-related relationship distress. Within this sample of young men, when scoring as problematically hypersexual on a given scale, they were also between 4.60 (χ2=9.65, *p*=.007) and 10.59 times (χ2=18.62, *p*< .000) more likely to be involved with an extra-dyadic partner unknown to their primary partner. And while only 14.1% of young men reported having clandestine, extra-dyadic relationships, problematically hypersexual young men were proportionately overrepresented across scales, comprising between one fifth (21.1%) to over half (52.6%) of the men having affairs. Interestingly, as well, paying for sex chat was between 5.77 (χ2=9.97, *p*=.007) to 9.60 times more likely (χ2=16.20, *p*< .001) among the problematically hypersexual youngest males on 5 of 8 HD scales, and problematically hypersexual young men were overrepresented as paying for pornography too. Whereas only 11.9% of young men in this sample paid for sex chat, problematically hypersexual young men comprised one quarter (25.0%) to well over half (56.3%) of these young men.

Across 6 problematic hypersexuality scales, the hypersexual young males tended to report they were wasting too much time on sex related activities: in fact, they were between 4.90 (χ2=7.93, *p*=.009) to 8.31 times (χ2=16.86, *p*< .01) more likely to so report than their non-problematically hypersexual peers. While those HD scales with

empirically-derived cut scores suggest that between 8.1% and 20.7% of young males are problematically hypersexual, problematically hypersexual young men accounted for almost one-third (31.6%), to almost one half (44.7%) of young men reporting wasting time on sex-related activities, while only 28.0% of all young men reported that they waste too much time on sex. Across 3 scales, there is a significant relationship between being a young problematically hypersexual male and paying for pornography such that problematically hypersexual young men are between 3.78 ($\chi 2$=9.607, p=.004) and 10.63 ($\chi 2$=19.702, p=.001) times more likely to do so; of the 25.9% of young cohort males who are willing to pay to access pornography, problematically hypersexual young men comprise between 12.0% and 56.0% of these men. As well, those young males flagged as problematically hypersexual across all scales were 4.55 times (CI =1.58, 13.14, p=.005) to 14.62 times ($\chi 2$=17.79, p=.001) more likely to report regretting the amount of money they had spent on sex-related activities. And while a mere 13.1% of all young men reported regretting the amount of money they spent on sex-related activities, problematically hypersexual young males comprised just shy of one-third (27.8%) to one half of men who reported having spent too much money.

In terms of having been an attempted victim of anal sexual assault within the last 12 months, we see that on 2 scales, problematically hypersexual young men are between 6.81 (CI:2.02, 22.96, p=.002) and 12.21 ($\chi 2$=19.82, p< .001) times more likely to have been (at least potentially) victimized. And while the base rate of this attempted victimization is only .104 among this group of young men, individuals with problematic hypersexuality account for one-fifth (21.4%) to 50.0% of these young men. There was a significant association between attempted perpetration of vaginal sexual assault within the last year, and problematic hypersexuality on one scale only, the Hypersexual Behavior Inventory, such that problematically hypersexual young males were 4.95 times more likely ($\chi 2$=9.750, p=.009) to have attempted unwanted vaginal penetration. Looking across all of the 8 HD scales under investigation, we see that proportionately, problematically hypersexual young cohort men account for 18.8% to 50.0% of attempted perpetrators of sexual violence, and 21.4% to 50.0% of attempted victims of sexual violence. Recalling that hypersexual young men account for only 8.1% to 20.7% of

young males surveyed, they are over-represented among attempted perpetrators and attempted victims (see Table 15).

Finally, results from some of the potentially illegal sexual behavioural outcomes included discipline at work for looking at Internet pornography in which 2 scales found that problematically hypersexual young men were approximately 21 times ($\chi 2$=23.47, p< .001) more likely to be involved with this activity. And on another two scales (the Hypersexual Behavior Inventory, and the Hypersexual Behavior Consequences Scale) young males captured as problematically hypersexual were between 13.33 ($\chi 2$=12.98, p=.010), and 16.29 (CI: 2.73, 37.14, p< .001) times more likely to have been questioned by police for their sexual behaviours. Another scale (the Hypersexual Behavior Inventory) found that problematically hypersexual young males were 22.67 ($\chi 2$=21.411, p< .001) times more likely to have legal problems for hiring a sex worker. Having said that however, the base rates of each of these criterion items (namely, discipline at work for watching Internet pornography, police questioning of sexual behaviour, and legal trouble for hiring a sex worker) were all so low within the youngest male cohort (BR=.045, n=6 for 3 criterion items above) that caution in interpreting these data is warranted.

3.4.2 Middle Cohort of Males (25 to 35 years)

Results of the hypersexuality scale criterion validity analyses for the middle group of males may be found in Tables 16, A through H (again, non-significant findings for this age cohort may also be found in Appendix E, Tables 16Ai through 16Hi). Across all scales, when HD scales flagged males in the middle cohort as problematically hypersexual, there were strong associations with almost all problematic or potentially problematic criterion outcomes. An important piece of contextual information to bear in mind in reviewing the data that follow is that, according to the 5 HD scales with evidence-based cut scores (i.e., Hypersexual Behavior Inventory, Sexual Compulsivity Scale, Sex Addiction Screening Test (SAST), SAST-Male Items, and Hypersexual Disorder Screening Inventory), problematically hypersexual middle cohort males comprised between 22.0% and 37.3% of all middle cohort males surveyed (see Table 17).

Unlike their younger counterparts, middle cohort males across of 6 of 8 HD scales were between 4.40 (CI: 2.00, 9.66, $p< .001$) and 5.99 (CI: 2.89, 12.44, $p< .001$) times more likely to have been diagnosed with an STI; and while only approximately 15.3% of this cohort had an STI diagnosis, problematically hypersexual males accounted for between 17.9% to 74.4% of the men with STI diagnoses. As well, those 25 to 35-year old males flagged as being hypersexual on several of the scales were also approximately 6 to 8

Table 16 A: Criterion Items associated with being HD on the Hypersexual Behavior Inventory Among Middle Cohort Men (25-35 years), *n*=255

			95% CI for Odds Ratio			P	Pseudo-R^2
	BR	B	Lower	Odds	Upper	value	(*Nagelkerke*)
Diagnosed with an STI	.153	1.791	2.892	5.988***	12.442	.001	.130
Unintentional pregnancy	.236	1.347	2.050	3.847***	7.219	.001	.100
Abortion	.196	1.449	2.193	4.259***	8.270	.001	.101
Condomless anal sex with a new partner	.329	1.113	1.677	3.044***	5.534	.001	.076
Someone attempted anal sexual assault by threats, emotional coercion or force	.227	2.603	6.47	12.89***	25.70	.001	.308
Attempted perpetration of vaginal sexual assault against a female using threats, emotional coercion or force	.241	2.404	5.653	11.07***	21.298	.001	.284
Paid for online pornography	.398	1.602	2.660	4.692***	9.255	.001	.157
Paid for online sex chat	.209	1.206	1.740	3.339***	6.407	.001	.072
Paid for a sex worker	.280	1.661	2.832	5.264***	9.749	.001	.159
Concurrent extra dyadic relationship (unknown to primary partner)	.354	1.509	2.459	4.521***	8.312	.001	.138
Relationship termination/distress, re: my infidelity	.218	2.128	4.303	8.398***	16.387	.001	.224
Too much time spent looking for sex partner over last 12 months	.291	1.620	2.716	5.052***	9.397	.001	.154
Waste too much time on sex-related activities	.373	1.140	1.718	3.127***	5.689	.001	.084
Spent more money than intended on sex-related activities (not dating)	.225	2.240	4.798	9.390***	18.377	.001	.246

Regretted amount of money spent on sex-related activities	.240	2.613	6.867	13.641***	27.096	.001	.330
Trouble at work re internet porn	.147	2.304	4.594	10.013***	21.826	.001	.202
Trouble at work more than once sexually inappropriate	.154	2.635	6.325	13.940***	30.721	.001	.264
Fired from work because sex-related activity at work (sex/porn at work, sexual harassment)	.157	2.273	4.571	9.713***	20.640	.001	.206
Legal problems for hiring a sex worker	.111	2.655	5.652	14.220***	35.777	.001	.210
Police questioned me for inappropriate sexual conduct	.135	2.386	4.800	10.866***	24.597	.001	.201

Note. BR= base rate

** p< .01 p< .001***

Table 16 B: Significant Criterion Items associated with being HD on the Sexual Compulsivity Scale Among Middle Cohort Males (25-35 years), *n*=255

			95% CI for Odds Ratio			P	Pseudo-R^2
	BR	B	Lower	Odds	Upper	value	(Nagelkerke)
Diagnosed with an STI	.142	1.579	2.290	4.848***	10.264	.001	.099
Unintentional pregnancy	.235	1.133	3.106	3.106***	5.929	.001	.069
Abortion	.182	1.553	2.368	4.726***	9.432	.001	.113
Attempted victimization by threats, emotional coercion, or physical force	.227	2.774	7.744	16.019***	33.135	.001	.345
Attempted perpetration of sexual assault against a female using force	.241	2.468	5.881	11.802***	23.682	.001	.293
Paid for online pornography	.398	.918	1.364	2.505**	4.600	.003	.054
Paid for online sex chat	.203	1.086	1.514	2.963**	5.799	.002	.059
Paid for a sex worker	.276	1.041	1.536	2.832**	5.221	.001	.067
Concurrent extra dyadic relationship (unknown to primary partner)	.346	1.534	2.391	4.637***	8.992	.001	.121
Relationship termination/distress, re: my infidelity	.215	1.259	1.878	3.521***	6.602	.001	.093
Too much time spent looking for sex partner over last 12 months	.291	1.259	1.878	3.521*	6.602	.011	.093
Waste too much time on sex-related activities	.291	.799	1.203	2.223*	4.108	.011	.040

Spent more money than intended on sex-related activities (not dating)	.220	1.836	3.216	6.269***	12.222	.001	.172
Regretted amount of money spent on sex	.231	1.941	3.584	6.969***	13.539	.001	.194
Trouble at work re internet porn	.135	2.075	3.618	7.964***	17.258	.001	.162
Trouble at work more than once sexually inappropriate	.150	2.819	7.346	16.759***	38.232	.001	.292
Fired from work because sex-related activity at work (sex/porn at work, sexual harassment)	.154	1.951	3.352	7.037***	14.770	.001	.158
Legal problems for hiring a sex worker	.106	2.404	4.479	11.068***	27.351	.001	.175

	Base Rate	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio (if signif.)
HIV+ Diagnosis	.056	13.925**	.001	1	7.79

Note. ** p< .01 p<. 001***

Table 16 C: Significant Criterion Items associated with being HD on the Sexual Addiction Screening Test Among Middle Age Group of Men (25-35 years), *n*=252

			95% CI for Odds Ratio			P value	Pseudo-R^2
	BR	B	Lower	Odds	Upper		Nagelkerke
Diagnosed with an STI?	.153	1.481	2.002	4.398***	9.660	.001	.082
HIV+ Diagnosis	.055	1.875	1.678	6.523**	25.362	.007	.050
Unintentional pregnancy	.235	1.434	2.191	4.194***	8.030	.001	.110
Abortion	.196	1.367	1.940	3.924***	7.937	.001	.085
Condomless anal sex new partner	.329	.845	1.294	2.328**	4.189	.005	.046
Attempted anal sexual assault by threats, emotional coercion or force	.227	2.247	4.554	9.456***	19.633	.001	.227
Attempted perpetration of vaginal sexual assault against a female using threats, emotional coercion or force	.241	2.012	3.742	7.477***	14.938	.001	.192
Paid for online pornography	.396	.906	1.403	2.474**	4.363	.002	.058
Paid for online sex chat	.208	1.359	1.971	3.893***	7.686	.001	.090
Paid for a sex worker	.278	1.254	1.890	3.506***	6.502	.001	.093
Concurrent extra dyadic sexual relationship (unknown to primary partner)	.353	1.223	1.894	3.396***	6.089	.001	.099

Relationship termination/distress, re: my infidelity	.216	1.981	3.619	7.250***	14.532	.001	.191
Too much time spent looking for sex partner over last 12 months	.369	1.587	2.629	4.889***	9.091	.001	.150
Waste too much time on sex-related activities	.369	1.337	2.123	3.809***	6.834	.001	.121
Have spent more money than intended on sex	.224	2.021	3.730	7.545***	15.262	.001	.194
Regretted amount of money spent on sex	.239	2.214	4.476	9.154***	18.772	.001	.229
Trouble at work internet porn	.145	2.768	5.761	15.932***	44.059	.001	.221
Trouble at work more than once sexually inappropriate	.153	2.377	4.376	10.776***	26.536	.001	.185
Fired from work because sex-related activity at work (sex/porn at work, sexual harassment)	.157	2.660	5.550	14.291***	36.796	.001	.223
Legal problems for hiring a sex worker	.109	2.317	3.595	10.145***	28.631	.001	.138
Police questioned me for inappropriate sexual conduct	.133	2.869	5.793	17.622***	53.611	.001	.210

Note. ** p< .01; p<. 001***

Table 16 D: Significant Criterion Items associated with being HD on the Sexual Addiction Screening Test, Male Items Among Middle Cohort Males (25-35 years), *n*=252

			95% CI for Odds Ratio			P value	Pseudo-R^2
	BR	B	Lower	Odds	Upper		Nagelkerke
Worried you would acquire an STI?	.529	1.164 *1.846*	1.810 *3.073*	3.203*** *6.335****	5.670 *12.315*	.001 *.001*	.093 *.137*
Diagnosed with an STI?	.153	1.154	2.247	4.728***	9.950	.001	.095
HIV+ Diagnosis	.055	2.157	2.339	8.643***	31.931	.001	.073
Unintentional pregnancy	.235	1.220	1.835	3.386***	6.250	.001	.083
Abortion	.196	1.825	3.140	6.204***	12.259	.001	.157
Condomless vaginal sex new partner	.588	1.150	1.755	3.186***	5.785	.001	.086
Condomless anal sex new partner	.329	1.237	1.964	3.446***	6.046	.001	.102
Attempted anal sexual assault by threats,	.227	2.128	4.274	8.395***	16.491	.001	.220

emotional coercion or force							
Attempted perpetration of vaginal sexual assault against a female using threats, emotional coercion or force	.241	2.039	3.992	7.687***	14.799	.001	.213
Paid for online pornography	.396	1.691 *1.366*	3.052 *2.191*	5.422*** *3.921****	9.633 *7.017*	.001 *.001*	.188 *.122*
Paid for online sex chat	.208	1.522 *1.734*	2.376 *2.952*	4.582*** *5.664****	8.838 *10.870*	.001 *.001*	.115 *.151*
Paid for a sex worker	.278	2.212	4.845	9.137***	17.233	.001	.265
Concurrent extra dyadic sexual relationship (unknown to primary partner)	.353	1.822	3.455	6.186***	11.077	.001	.210
Relationship termination/distress, re: my infidelity	.216	2.209 *2.273*	4.575 *4.965*	9.108*** *9.711****	18.132 *19.026*	.001 *.001*	.233 *.252*
Too much time spent looking for sex partner over last 12 months	.369	1.454	2.372	4.280***	7.726	.001	.130
Waste too much time on sex-related activities	.369	1.291 *.886*	2.078 *1.373*	3.638*** *2.425***	6.369 *4.283*	.001 *.002*	.115 *.053*
Have spent more money than intended on sex	.224	1.934 *2.130*	3.587 *4.369*	6.914*** *8.416****	13.326 *16.210*	.001 *.001*	.190 *.230*
Regretted amount of money spent on sex	.239	2.390	5.493	10.913***	21.682	.001	.274
Trouble at work internet porn	.145	2.442	4.733	11.499***	27.934	.001	.196
Trouble at work more than once sexually inappropriate	.153	2.599	5.571	13.445***	32.448	.001	.227
Fired from work because sex-related activity at work (sex/porn at work, sexual harassment)	.157	2.227 *2.946*	4.144 *8.116*	9.275*** *19.027****	20.909 *44.605*	.001 *.001*	.181 *.305*
Legal problems for hiring a sex worker	.109	2.357	3.794	10.577***	29.375	.001	.142
Police questioned me for inappropriate sexual conduct	.133	3.108	7.493	22.373***	66.797	.001	.256

Note. Italicized numbers have an HD scale item removed to account for criterion-predictor overlap (See Table 13)

*p< .05** p< .01 p< .001***

Table 16 E: Significant Criterion Items associated with being HD on the Hypersexual Disorder Screening Inventory Among Middle Cohort Males (25-35 years), *n*=255

			95% CI for Odds Ratio			P	Pseudo-R^2
	BR	B	Lower	Odds	Upper	value	(Nagelkerke)
Worried you would acquire an STI	.526	.576	1.065	1.779*	2.970	(.028)	.026
Diagnosed with an STI	.142	1.504	2.155	4.500***	9.399	.001	.090
Unintentional pregnancy	.235	1.430	2.267	4.179***	7.702	.001	.113
Abortion	.182	1.298	1.971	3.662***	6.993	.001	.084
Condomless anal sex with a new partner	.324	1.143	1.824	3.137***	5.396	.001	.090
Attempted victimization by threats, emotional coercion, or physical force	.227	2.216	4.589	9.167***	18.312	.001	.231
Attempted perpetration of sexual assault against a female using force	.241	1.871	3.421	6.494***	12.329	.001	.183
Paid for online pornography	.398	1.231 *1.144*	2.015 *1.829*	3.424*** *3.141***	5.816 *5.392*	.001 *.001*	.110 *.096*
Paid for online sex chat	.203	1.114 *1.046*	1.633 *1.523*	3.048*** 2.847**	5.686 *5.320*	.001 *.001*	.066 *.055*
Paid for a sex worker	.276	1.507	2.521	4.513***	8.080	.001	.138
Concurrent extra dyadic relationship (unknown to primary partner)	.346	1.455 *1.591*	2.481 *2.797*	4.286*** *4.980****	7.404 *8.612*	.001 *.001*	.145 *.164*
Relationship termination/distress, re: my infidelity	.215	1.314 *1.523*	1.991 *2.441*	3.722*** *4.586****	6.959 *8.618*	.001 *.001*	.092 *.124*
Too much time spent looking for sex partner over last 12 months	.291	1.504 *1.470*	2.523 *2.433*	4.502*** *4.350****	8.031 *7.778*	.001 *.001*	.141 *.131*

Waste too much time on sex-related activities	.291	1.328 *1.213*	2.199 *1.947*	3.772*** *3.365****	6.469 *5.817*	.001 *.001*	.124 *.105*
Spent more money than intended on sex-related activities (not dating)	.220	1.921 *1.600*	3.511 *2.646*	6.828*** *4.953****	13.281 *9.271*	.001 *.001*	.183 *.139*
Regretted amount of money spent on sex	.231	2.209 *1.939*	4.629 *3.672*	9.103*** *6.949****	17.900 *13.148*	.001 *.001*	.238 *.194*
Trouble at work re internet porn	.135	1.899 *1.714*	2.989 *2.618*	6.680*** *5.551****	14.929 *11.770*	.001 *.001*	.131 *.116*
Trouble at work more than once sexually inappropriate	.150	2.753	5.873	15.692***	41.931	.001	.226
Fired from work because sex-related activity at work (sex/porn at work, sexual harassment)	.154	2.127	3.839	8.776***	20.063	.001	.168
Legal problems for hiring a sex worker	.106	3.319	6.382	27.625***	119.578	.001	.204
Police questioned me for inappropriate sexual conduct	.131	2.310	3.989	10.077***	25.458	.001	.162

Note. Italicized numbers are recalculated total HD scale scores with criterion-predictor overlap removed (See Table 13).

** p< .01, p<. 001***

p< .05 is noted but not considered significant.

Table 16 F: Significant Criterion Items associated with being HD on the Compulsive Sexual Behavior Inventory, Control subscale Among Middle Cohort Males (25-35 years), *n*=255

			95% CI for Odds Ratio			P	Pseudo-R^2
	BR	B	Lower	Odds	Upper	value	(Nagelkerke)

Unintentional pregnancy	.235	1.71	2.45	5.54**	12.56	.001	.127
Abortion	.182	1.493	1.956	4.45***	10.125	.001	.091
Attempted victimization by threats, emotional coercion, or physical force	.227	2.048	4.014	7.749***	14.960	.001	.213
Attempted perpetration of sexual assault against a female using force	.241	1.700	2.890	5.473***	10.365	.001	.155
Paid for a sex worker	.276	1.254	1.571	3.50**	7.80	.002	.071
Concurrent extra dyadic relationship (unknown to primary partner)	.346	1.175	1.44	3.24**	7.27	.004	.065
Relationship termination/distress, re: my infidelity	.215	1.50	1.977	4.46***	10.08	.001	.096
Too much time spent looking for sex partner over last 12 months	.291	1.55	2.03	4.72***	10.98	.001	.106
Waste too much time on sex-related activities	.291	1.254	1.542	3.51*	7.97	.003	.073
Spent more money than intended on sex-related activities (not dating)	.220	1.62	2.23	5.03***	11.36	.001	.112
Regretted amount of money spent on sex	.231	2.04	3.30	7.66***	17.77	.001	.177
Trouble at work re internet porn	.135	2.125	3.48	8.38***	20.143	.001	.166
Trouble at work more than once sexually inappropriate	.150	2.084	3.44	8.040***	18.80	.001	.164
Fired from work because sex-related activity at work (sex/porn at work, sexual harassment)	.154	2.040	3.30	7.692***	17.93	.001	.159
Legal problems for hiring a sex worker	.106	2.280	3.96	9.78***	24.21	.001	.169
Police questioned me re my sexual behaviour	.135	1.732	2.63	5.66***	13.53	.001	.105

Table 16 G: Significant Criterion Items associated with being HD on the Hypersexual Behavior Consequences Scale Among Middle Cohort Males (25-35 years), *n*=255

			95% CI for Odds Ratio			P	Pseudo-R^2
	BR	B	Lower	Odds	Upper	value	(Nagelkerke)
Diagnosed with an STI	.153	1.517	2.239	4.561***	9.289	.001	.097
Unintentional pregnancy	.277	1.829	3.302	6.226***	11.739	.001	.178
Abortion	.196	2.226	4.661	9.266***	18.442	.001	.230
Condomless anal sex with new partner	.335	1.122	1.721	3.071***	5.507	.001	.080
Attempted anal victimization	.227	1.894	2.704	6.646***	16.338	*.001*	.144
Attempted perpetration	.241	1.807	2.484	6.090***	16.338	.001	.080
Paid for pornography	.418	.948	1.451	2.581***	4.591	.001	.060
Paid for online sex chat	.209	.851	1.230	2.342**	4.459	.010	.037
Paid for a sex worker	.212	1.601	2.700	4.958***	9.107	.001	.150
Concurrent extra dyadic sexual relationship (unknown to primary partner)	.434	1.492 *1.693*	2.453 *3.089*	4.448*** *5.435*	8.065 *9.562*	.001 *.001*	.139 *.189*
Relationship termination/distress, re: my infidelity	.230	2.239	4.791	9.379***	18.361	.001	.245
Too much time spent looking for sex partner over last 12 months	.246	1.609 *1.748*	2.724 *3.173*	4.999*** *5.742***	9.175 *10.392*	.001 *.001*	.153 *.187*
Waste too much time on sex-related activities (non-dating)	.335	.970	1.477	2.639**	4.716	.001	.062
Have spent more money than intended on sex	.204	2.175 *2.269*	4.550 *4.762*	8.803*** *9.494****	17.031 *18.930*	.001 *.001*	.237 *.245*
Regretted amount of money spent on sex	.240	1.990 *1.982*	3.858 *3.811*	7.314*** *7.256****	13.866 *13.817*	.001 *.001*	.209 *.208*
Trouble at work internet porn	.147	2.652	6.137	13.809***	31.070	.001	.253

Trouble at work more than once sexually inappropriate	.154	2.505	5.601	12.246***	26.772	.001	.239
Fired from work because sex-related activity at work (sex/porn at work, sexual harassment)	.157	2.731	6.879	15.343***	34.219	.001	.278
Legal problems for hiring a sex worker	.111	2.771 *3.041*	6.099 *6.102*	15.976*** *20.925****	41.849 *71.429*	.001 *.001*	.218 *.203*
Police questioned me for inappropriate sexual conduct	.135	3.195 *3.372*	9.408 *8.580*	24.400*** *29.145****	63.280 *99.005*	.001 *.001*	.312 *.271*

Note. italicized numbers in the table are the recalculated odds with the potential criterion-predictor overlap items removed (See Table 13).

** p< .01 p< .001***

Table 16 H: Significant Criterion Items associated with being HD on the Total Sexual Outlet Inventory Among Middle Cohort of Males (25-35 years), *n*=255

			95% CI for Odds Ratio			P value	Pseudo-R^2 (Nagelkerke)
	BR	B	Lower	Odds	Upper		
Unintentional pregnancy	.236	1.190	1.286	3.286***	6.364	.001	.072
Abortion	.197	1.367	1.861	3.922***	8.265	.001	.078
Condomless anal sex with a new partner	.330	1.046	1.616	2.846***	5.013	.001	.072
Attempted victimization by emotional, or physical force	.227	-2.513	.031	.081	.211	.001	.209
Attempted perpetration of sexual assault against a female using force	.241	2.371	4.404	10.712***	26.056	.001	.204
Paid for online pornography	.399	.821	1.343	2.273**	3.847	.002	.050
Paid for online sex chat	.209	1.943	3.006	6.978***	16.198	.001	.140
Paid for a sex worker	.281	1.628	2.610	5.091***	9.932	.001	.371
Concurrent extra dyadic relationship (unknown to primary partner)	.356	.884	1.403	2.421***	4.177	.001	.055
Relationship termination/distress, re: my infidelity	.219	1.256	1.746	3.511***	7.059	.001	.074
Waste too much time on sex-related activities	.371	.970	1.528	2.637***	4.552	.001	.066

Regretted amount of money spent on sex	.148	1.746	2.666	5.730***	12.319	.001	.129
Trouble at work re internet porn	.154	3.593	4.893	36.340***	269.880	.001	.187
Trouble at work more than once sexually inappropriate	.158	2.936	4.431	18.849***	80.186	.001	.169
Fired from work because sex-related activity at work (sex/porn at work, sexual harassment)	.158	2.522	3.724	12.450***	41.618	.001	.149
Police questioned me for inappropriate sexual conduct	.111	2.308	2.984	10.052***	33.863	.001	.118

times more likely to have HIV+ status on half of the HD scales (including SCS, [OR=7.79, X^2=13.925, *p*=.001]; SAST-R, [OR=6.52, CI:1.68-25.36, *p*=.007]; SAST, Male items, [OR=8.64, CI:2.34-31.93, *p*< .001], and remaining scales trending toward significance on this variable (*p*< .05). It should be borne in mind when interpreting the HIV+ data, in particular, that base rate for HIV in the middle cohort is .055 (*n*=14), and likely should not be generalized beyond this sample until further replication is completed. Condomless anal sex with a new partner was 2.32 (CI:1.30, 4.19, *p*=.005) to 3.07 (CI:1.72, 5.51, *p*< .001) times more likely among problematically hypersexual men. While the base rate of this sexual behaviour was relatively high in this cohort (32.9%), on 4 of the 5 HD scales with empirically validated cut scores, problematically hypersexual men accounted for 37.0% to 54.8% of the men engaging in condomless anal sex with a new partner, which is a little higher than the percentage of problematically hypersexual middle cohort males across scales who comprised between 22.0% and 37.3% of all middle cohort males surveyed.

Unwanted pregnancies were common in this middle cohort. Across 8 scales, problematically hypersexual middle cohort males' partners were between 3.11 (CI: 2.04, 5.93, *p*< .001) and 6.23 (CI:3.30, 11.74, *p*< .001) times more likely to have unwanted pregnancies; and while only 23.5% of this cohort encountered unwanted pregnancies, problematically hypersexual males accounted for 38.3% to 63.3% of unwanted partner pregnancies (recalling that problematically hypersexual middle cohort males comprised between 22.0% and 37.3% of all middle cohort males surveyed). Relatedly, hypersexual

middle cohort males were 3.66 (CI:1.97, 6.99, $p< .001$) to 9.27 (CI:4.66, 18.44, $p< .001$) times more likely to have a partner who terminated their unwanted pregnancy. And while the abortion base rate within the middle cohort was 19.6%, men with problematic hypersexuality accounted for 44.0% to 64.0% of the men reporting partner pregnancy termination.

On 7 of 8 HD scales, problematically hypersexual middle cohort males were between 2.34 (CI: 1.23, 4.45, $p< .01$) and 6.98 (CI: 3.01, 16.20, $p< .001$) times more likely to pay for online sex chat; and while the base rate for this behaviour was 20.8% among middle cohort males, at the same time, males with problematic hypersexuality comprised between 37.7% to 56.6% of the men paying for sex chat across scales. Paying for a sex worker within the middle cohort had a base rate of 27.8%, while across scales problematically hypersexual males accounted for between 39.5% to 64.8% of the men so reporting, and hypersexual males were 2.83 (CI: 1.54, 5.11, $p< .001$) to 5.26 times (CI: 2.82, 9.75, $p< .001$) more likely to pay for a sex worker across HD scales. Typically within this middle cohort, and across all 8 scales under review, hypersexual middle cohort males were 2.27 (95% CI: 1.34, 3.84, $p=.002$) to 5.40 times more likely to pay for pornography (CI: 3.05, 9.63, $p< .001$), while at the same time, problematically hypersexual men accounted for approximately 36.7% to 53.5% of men who reported paying for pornography, while the base rate of paying for pornography within the cohort is 39.6%.

Clandestine, extra-dyadic relationships are common with problematically hypersexual middle cohort males, and they are 3.24 (CI:1.44, 7.27, $p=.004$) to 6.19 (CI:3.46, 11.08, $p< .001$) times more likely to have an affair than their non-problematically hypersexual age-matched peers. And while 35.3% of all men across the middle cohort have affairs, individuals with problematic hypersexuality comprise between one-third (33.3%) to over half (56.7%) of men having affairs, while problematically hypersexual males comprised between 22.0% and 37.3% of all middle cohort males surveyed. Perhaps unsurprisingly, middle cohort problematically hypersexual males are between 3.64 (CI: 1.97, 6.76, $p=<.001$) to 9.11 (CI: 4.56, 18.13, $p< .001$) times more likely to cause relationship distress or termination as a result of their sexual behaviour. Base rate percentage of

middle cohort males reporting relationship distress/termination from their sexual behaviour is 21.6%, and problematically hypersexual males comprise a large percentage – between 45.5% and 69.1% of men reporting distress/termination. Twenty five to 35 year old males scoring as problematically hypersexual across scales reported wasting too much time on sex at a rate of 2.63 (CI: 1.38, 5.06, p=.004) to 3.81(CI: 2.12, 6.83, p< .001) times relative to their non-problematically hypersexual, age-matched peers (with a base rate of 36.9% across the cohort, and problematically hypersexual males comprising between 29.8% to 58.5% of men reporting wasting time on sex). Problematically hypersexual men also reported regretting the amount of money spent seeking sex at 5.73 (CI: 2.67, 12.32, p< .001) to 13.64 (CI: 6.87, 27.10, p< .001) times their non-problematically hypersexual counterparts; and while only 22.4% of all middle cohort males regretted the amount of money they spent on sex, problematically hypersexual males were a surprising 49.2% to 70.5% of men reporting this belief.

As well, problematically hypersexual middle cohort males reported having trouble with pornography at work at a rate of 5.89 (CI: 2.74, 8.89, p< .001) to 36.34 times (CI: 24.66, 69.88, p< .001) that of non-problematically hypersexual age matched males. These problematically hypersexual men have gotten into trouble at work more than once for sexual inappropriateness at a rate of 10.78 (CI: 4.38, 26.54, p< .001) to 18.85 times (CI: 4.41, 80.19, p<.001) non- problematically hypersexual males in the middle cohort, or were more likely to have been terminated from their employment because of sex-related problems at 7.04 (CI: 3.32, 14.77, p< .001) to 15.34 (CI: 6.88, 34.22, p< .001) times their non-problematically hypersexual peers. Across all scales, problematically hypersexual males are 10.15 (CI: 3.60, 28.63, p< .001) to 27.63 (CI: 6.38, 119.58, p< .001) times more likely to have had legal problems for hiring a sex worker, and 5.57 (CI: 2.56, 12.10, p< .001) to 24.40 (CI:9.41, 63.28, p< .001) times more likely to have been questioned by the police for inappropriate sexual conduct. Table 17 compares the proportion of middle cohort males (25 to 35 years) who are problematically hypersexual and who have also reported encountering negative behavioural outcomes (as measured by the criterion items) versus those middle cohort males who are not problematically hypersexual yet who also experience negative behavioural outcomes. As Table 17 demonstrates, these 5 criterion items (namely trouble at work for Internet pornography, trouble at work for

being sexually inappropriate, fired from work for sex-related behaviours, legal problems for hiring a sex worker, and police questioning about sexual behaviour) are noteworthy in that problematically hypersexual middle cohort males account for between 54.0% and 85.7% of the men reporting all of these behavioural outcomes across scales with empirically settled cuts cores. Problematically hypersexual middle cohort men account for a rather high proportion of the men reporting these five outcomes, particularly in light of the fact that base rates for these criterion items range from .109 to .157 (*n*=28-40) within the sample as a whole.

Table 17: Middle cohort males (25 to 35 years) who are hypersexual and have a negative life outcome as a percentage of all young males reporting negative life outcome, by scale

	Scales with empirically validated cut scores							
#HD/scale / Base rate in cohort	**HBI** (HD*n*=60) 23.5%	**SCS** (HD*n*=56) 22.0%	**SAST** (HD*n*=73) 28.6%	**SAST-M** (HD*n*=81) 31.8%	**HDSI** (HD*n*=95) 37.3%	**CSBI** (HD*n*=28) 11.0%	**HBCS** (HD*n*=21) 8.2%	**TSO** (HD*n*=143) 56.1%
Worried re STI (BR=.529, *n*=134)	39/134 (29.1%)	32/134 (23.9%)	40/134 (29.8%)	58/134 (43.3%)	59/134 (44.0%)	19/134 (14.2%)	13/134 (9.7%)	81/134 (60.4%)
STI Diagnosis (BR=.153, *n*=39)	21/39 (53.8%)	18/39 (46.2%)	19/39 (48.7%)	23/39 (74.4%)	26/39 (66.7%)	9/39 (23.0%)	7/39 (17.9%)	34/39 (87.2%)
HIV diagnosis (BR=.055, *n*=14)	7/14 (50.0%)	8/14 (57.1%)	8/14 (57.1%)	11/14 (78.6%)	9/14 (62.3%)	4/14 (28.6%)	4/14 (28.6%)	13/14 (92.9%)
Unwanted pregnancy (BR=.235, *n*=60)	27/60 (45.0%)	23/60 (38.3%)	29/60 (48.3%)	31/60 (51.7%)	38/60 (63.3%)	16/60 (26.7%)	10/60 (16.7%)	46/60 (76.7%)
Pregnancy termination (BR=.196, *n*=50)	23/50 (64.0%)	22/50 (44.0%)	23/50 (46.0%)	32/50 (64.0%)	31/50 (62.0%)	13/50 (26.0%)	10/50 (20.0%)	40/50 (80.0%)
Condomless anal with new partner (BR=.329, *n*=84)	32/84 (38.1%)	26/84 (31.0%)	31/84 (37.0%)	42/84 (50.0%)	46/84 (54.8%)	12/84 (14.3%)	11/84 (13.1%)	61/84 (72.6%)

Condomless vaginal sex with new partner (BR=.588, *n*=150)	42/150 (28.0%)	32/150 (21.3%)	51/150 (34.0%)	62/150 (41.3%)	62/150 (41.3%)	21 (14.0%)	15 (10.0%)	92 (61.3%)
Attempted perpetration (BR=.241; n=61)	36/61 (59.0%)	34/61 (55.7%)	33/61 (54.1%)	42/61 (68.9%)	42/61 (68.9%)	16/61 (26.23%)	15/61 (24.6%)	55/61 (90.2%)
Attempted victimization (BR=.227; n=58)	36/58 (62.1%)	35/58 (60.3%)	33/58 (56.9%)	43/58 (74.1%)	43/58 (74.1%)	18/58 (31.03%)	15/58 (25.9%)	53/58 (91.4%)
Sex worker (BR=.278; n=71)	36/71 (50.7%)	28/71 (39.4%)	31/71 (43.7%)	46/71 (64.8%)	43/71 (60.6%)	15/71 (21.13%)	14/71 (19.7%)	58/71 (81.7%)
Paid for porn (BR=.396, *n*=101)	41/101 (40.6%)	32/101 (36.7%)	39/101 (38.6%)	54/101 (53.5%)	54/101 (53.5%)	17/101 (16.8%)	15/101 (14.9%)	69/101 (68.3%)
Paid online sex chat (BR=.208, *n*=53)	23/53 (43.4%)	20/53 (37.7%)	25/53 (47.1%)	30/53 (56.6%)	30/53 (56.6%)	13/53 (24.5%)	12/53 (22.6%)	46/53 (86.8%)
Affair (BR=.353; *n*=90)	40/90 (44.4%)	30/90 (33.3%)	38/90 (42.2%)	51/90 (56.7%)	51/90 (56.7%)	17/90 (19.0%)	11/90 (12.2%)	63/90 (70.0%)
Relationship distress (BR=.216; *n*=55)	32/55 (58.2%)	25/55 (45.5%)	32/55 (58.2%)	38/55 (69.1%)	35/55 (63.6%)	14/55 (25.45%)	12/55 (21.8%)	43/55 (78.2%)
Waste too much time on sex (BR=.369, *n*=94)	35/94 (37.2%)	28/94 (29.8%)	42/94 (44.7%)	46/94 (48.9%)	55/94 (58.5%)	18/94 (19.1%)	14/94 (14.9%)	66/94 (70.2%)
Spent more than intended sex (BR=.224, *n*=57)	33/57 (57.9%)	28/94 (29.8%)	32/57 (56.1%)	37/57 (65.0%)	41/57 (72.0%)	15/94 (16.0%)	14/94 (14.9%)	48/94 (51.0%)
Regret money spent on sex (BR=.239; *n*=61)	41/61 (67.2%)	30/61 (49.2%)	34/61 (55.7%)	42/61 (69.0%)	43/61 (70.5%)	18/61 (29.51%)	18/61 (29.51%)	50/61 (82.0%)
Work trouble Internet porn (BR=.145; *n*=37)	23/37 (62.2%)	20/37 (54.0%)	24/37 (64.9%)	27/37 (73.0%)	28/37 (76.0%)	13/37 (35.1%)	11/37 (30.0%)	36/37 (97.3%)
Work trouble sexually inappropriate (BR=.153; n=39)	28/39 (71.8%)	27/39 (69.2%)	24/39 (61.5%)	30/39 (77.0%)	32/39 (82.0%)	14/39 (35.89%)	14/39 (38.46%)	37/39 (94.9%)

Fired sex-behaviour (BR=.157; *n*=40)	25/40 (62.5%)	22/40 (55.0%)	26/40 (65.0%)	28/40 (70.0%)	31/40 (77.5%)	14/40 (35.0%)	12/40 (32.43%)	37/40 (92.5%)
Legal problems re sex worker (BR=.109, *n*=28)	21/28 (75.0%)	18/28 (64.3%)	18/28 (64.3%)	20/28 (71.4%)	24/28 (85.7%)	12/28 (42.9%)	10/28 (35.7%)	27/28 (96.4%)
Police questioning my sexual behaviour (BR=.133; *n*=34)	22/34 (64.7%)	23/34 (67.6%)	22/34 (64.7%)	28/34 (82.3%)	26/34 (76.5%)	11/34 (32.35%)	10/34 (29.4%)	31/34 (91.2%)

Attempted and completed sexual violence rates, either as a victim or as a perpetrator were surprisingly high in this cohort as well. Attempted victimization within the last year base rates were .227 (*n*=58) and problematically hypersexual middle cohort males were between 6.64 (CI: 2.70, 16.34, $p < .001$) and 16.02 (CI: 7.74, 33.14, $p < .001$) times more likely to have been the victim of attempted anal sexual assault via threats, or emotional or physical coercion. Problematically hypersexual middle cohort men comprised between 62.1% to 74.1% of potentially victimized men. Equally troubling was that attempted sexual violence perpetration against a woman within the last year was between 5.47 (CI: 2.89, 10.37, $p < .001$) to 11.07 (CI: 5.65, 21.30, $p < .001$) times more likely among men captured across problematically hypersexual scales as problematically hypersexual than within non-problematically hypersexual men. On the empirically validated scales, individuals with problematic hypersexuality made up between 54.1% to 68.9% of the attempted perpetrators.

Only condomless vaginal sex with a new partner failed to show any relationship with reaching cut scores for problematic hypersexuality on any of the scales for men in the middle cohort.

3.4.3 Oldest Group of Males (36 to 45 years)

3.4.3.1 Criterion items not distinguishing hypersexual from non-hypersexual oldest cohort men

Results of scale criterion analyses for the oldest cohort males may be found in Tables 18, A through H, with each table corresponding to one of the HD scales discussed in Study One. The criterion items inquiring about worries of having acquired an STI (BR=.586, *n*=112), unplanned pregnancy (BR=.277, *n*=53), condomless vaginal sex with a new partner (BR=.728, *n*=139), and had ever paid for pornography (BR=.414, *n*=79) failed to distinguish HD and non-HD oldest cohort males. All non-significant findings from these analyses may be found in Appendix E, Tables 18A1 through 18Hi.

Table 18 A: Criterion Items associated with being HD on the Hypersexual Behavior Inventory Among Oldest Men (36-45 years), n=191

	Base Rate	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio
Attempted perpetration of vaginal sexual assault against a female using threats, emotional coercion or force	.105	13.599**	.001	1	5.54
Trouble at work re internet porn	.052	22.121***	.001	1	15.09
Trouble at work more than once sexually inappropriate	.037	15.821**	.002	1	14.81
Police questioned me for sexual conduct	.042	10.565**	.007	1	4.40

Note. ** p< .01 p< .001***

			95% CI for Odds Ratio			P	Pseudo-R^2
	BR	B	Lower	Odds	Upper	value	(Nagelkerke)
Unintentional pregnancy	.277	1.266	1.602	3.546**	7.848	.002	.075
Condomless anal sex with a new partner	.336	1.734	2.469	5.665***	12.997	.001	.155
Attempted victimization	.084	1.721	2.045	5.836***	16.652	.001	.087
Paid for online sex chat	.164	1.914	2.846	6.782***	16.159	.001	.154
Paid for a sex worker	.212	1.784	2.603	5.956***	13.625	.001	.150
Concurrent extra dyadic relationship	.429	1.384	1.725	3.993**	9.243	.001	.100

(unknown to primary partner)							
Relationship termination/distress, re: my infidelity	.230	1.428	1.853	4.170***	9.388	.001	.100
Too much time spent looking for sex partner over last 12 months	.248	2.177	3.792	8.822***	20.523	.001	.227
Waste too much time on sex-related activities	.340	1.901	2.854	6.693***	15.695	.001	.182
Spent more money than intended on sex-related activities (not dating)	.204	1.127	1.343	3.088**	7.102	.008	.058
Regretted amount of money spent on sex-related activities	.213	1.957	3.072	7.075***	16.294	.001	.180

Table 18 B: Significant Criterion Items associated with being HD on the Sexual Compulsivity Scale Among Oldest Men (36-45 years), n=191

	Base Rate oldest men	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio
Unintentional pregnancy	.279	13.967***	.001	1	4.51
Condomless anal sex with a new partner	.339	13.584***	.001	1	4.49
Attempted victimization by threats, emotional coercion, or physical force	.084	31.495***	.001	1	13.89
Attempted perpetration of sexual assault against a female using force	.105	32.568***	.001	1	13.14
Paid for online sex chat	.166	28.392***	.001	1	9.06
Paid for a sex worker	.213	20.486***	.001	1	6.23
Concurrent extra dyadic relationship (unknown to primary partner)	.436	13.176***	.001	1	4.88
Relationship termination/distress, re: my infidelity	.234	12.981**	.001	1	4.34
Too much time spent looking for sex partner over last 12 months	.250	32.229***	.001	1	9.96
Waste too much time on sex-related activities	.337	10.766**	.002	1	3.78
Spent more money than intended on sex-related activities (not dating)	.206	13.353***	.001	1	4.50
Regretted amount of money spent on sex	.214	25.033***	.001	1	7.50

Trouble at work re internet porn	.053	16.953**	.001	1	10.65
Trouble at work more than once sexually inappropriate	.038	28.400***	.001	1	42.84
Fired from work because sex-related activity at work	.048	12.231**	.004	1	8.43
Legal problems for hiring a sex worker	.037	10.239**	.010	1	8.72
Police questioned me for inappropriate sexual conduct	.048	19.989***	.001	1	14.27

Note. ** p< .01 p< .001***

Table 18 C: Significant Criterion Items associated with being HD on the Sexual Addiction Screening Test Among Oldest Men (36-45 years), n=191

			95% CI for Odds Ratio			P value	Pseudo-R^2 Nagelkerke
	BR	B	Lower	Odds	Upper		
Condomless anal sex new partner	.335	1.263	1.783	3.537***	7.017	.001	.103
Paid for Online Sex Chat	.162	1.335	1.666	3.799**	8.663	.002	.078
Paid for sex worker	.209	1.360	1.830	3.891***	8.295	.001	.096
Concurrent extra dyadic sexual relationship (unknown to primary partner)	.429	1.253	1.743	3.500***	7.027	.001	.103
Relationship termination/distress, re: my infidelity	.230	1.358	1.872	3.889***	8.080	.001	.103
Too much time spent looking for sex partner over last 12 months	.355	1.723	2.674	5.600***	11.728	.001	.163
Waste too much time on sex-related activities	.335	1.594	4.924	4.924***	9.964	.001	.158
Have spent more money than intended on sex	.204	1.410	4.094	4.094***	8.866	.001	.098
Regretted amount of money spent on sex	.209	1.794	2.747	6.015***	13.172	.001	.159

	Base Rate	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio (when significant)
Attempted anal sexual assault by threats, emotional coercion or force	.105	8.427**	.004	1	4.95
Attempted perpetration of vaginal sexual assault against a female using threats, emotional coercion or force	.084	18.519***	.001	1	4.96

Trouble at work with Internet pornography	.052	10.001**	.005	1	4.13
Trouble at work more than once sexually inappropriate	.037	11.082**	.005	1	( )[9]
Fired from work because sex-related activity at work (sex/porn at work, sexual harassment)		10.105**	.006	1	15.12

Note. ** p< .01 p< .001***

Table 18 D: Significant Criterion Items associated with being HD on the Sexual Addiction Screening Test – Male Items Among Oldest Cohort Males (36-45 years), n=191

	Base Rate	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio (when significant)
Diagnosed with an STI	.021	12.780*** *9.847***	.001 *.002*	1	4.61 *4.17*
Someone attempted anal sexual assault by threats, emotional coercion or force	.086	10.371**	.003	1	5.07
Attempted perpetration of vaginal sexual assault against a female using threats, emotional coercion or force	.108	11.287**	.002	1	7.687
Trouble at work internet porn	.054	9.181**	.006	1	6.74
Trouble at work more than once for being sexually inappropriate	.037	18.383***	.001	1	(-)[10]
Fired from work because sex-related activity at work (sex/porn at work, sexual harassment)*	.049	6.885* *26.937****	(.016) *.001*	1	5.61 *23.74*

[9] The odds ratio cannot be calculated as all participants who reported that they have gotten into trouble at work more than once for sexually inappropriate behaviour also scored HD on the SAST, creating one cell frequency equal to 0.

[10] The odds of *I have gotten into trouble at work more than once for sexual harassment or being sexually inappropriate* could not be calculated because 7 participants reported this and all 7 scored as hypersexual on the SAST-M scale.

Police questioned me for inappropriate sexual conduct	.049	11.550*	.002	1	10.19

			95% CI for Odds Ratio			P	Pseudo-R^2
	BR	B	Lower	Odds	Upper	value	(Nagelkerke)
Worried you would acquire an STI?		1.130	1.494	3.095**	6.411	.002	.077
Condomless anal intercourse with a new partner	.344	1.156	1.632	3.176**	6.180	.001	.088
Paid for online sex chat	.168	2.728 *2.388*	6.001 *4.461*	15.306*** *10.895***	39.041 *26.611*	.001 *.001*	.283 *.233*
Paid for a sex worker	.216	1.689	2.563	5.412***	11.427	.001	.148
Concurrent extra dyadic sexual relationship (unknown to primary partner)	.429	1.326	1.909	3.767***	7.435	.001	.116
Relationship termination/distress, re: my infidelity		1.308 *2.420*	1.809 *4.692*	3.700*** *11.250****	7.567 *26.974*	.001 *.001*	.096 *.267*
Spent too much time on sex-related activities	.254	1.946	3.373	7.000***	14.528	.001	.208
Have spent more money than I intended on sex-related activities	.204	1.619 *1.735*	2.386 *2.454*	5.047*** *5.667****	10.677 *13.086*	.001 *.001*	.135 *.139*
Regretted amount of money spent on sex	.217	2.132	3.879	8.429***	18.316	.001	.225

Note. italicized numbers are those odds ratios that were run once the items with criterion overlap, as assessed by a face valid inspection of items, were removed (See Table 13)

** p< .01 p< .001***;

*p< .05 (Noted but not considered significant)

Table 18 E: Significant Criterion Items associated with being HD on the Hypersexual Disorder Screening Inventory Among Oldest Cohort Males (36-45 years), n=191

	Base Rate among oldest men in sample	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio (when significant)
Unintentional pregnancy	.277	7.478**	.008	1	2.61
Condomless anal sex with a new partner	.337	16.997***	.001	1	4.11

Attempted victimization by emotional, or physical force	.084	27.053***	.001	1	14.44
Attempted perpetration of sexual assault against a female using force	.106	21.874***	.001	1	8.17
Paid for online sex chat	.165	23.747*** *19.551****	.001 *.001*	1	6.67 *5.98*
Paid for a sex worker	.212	9.088**	.006	1	3.06
Concurrent extra dyadic relationship (unknown to primary partner)	.233	13.887*** *9.934***	.001 *.002*	1	3.81 *3.40*
Relationship termination/distress, re: my infidelity	.233	13.887*** *10.078***	.001 *.003*	1	3.81 *3.43*
Too much time spent looking for sex partner over last 12 months	.249	28.280*** *25.584****	.001 *.001*	1	6.55 *6.77*
Waste too much time on sex-related activities	.340	29.923*** *15.612****	.001 *.001*	1	4.90 *4.56*
Spent more money than intended on sex-related activities (not dating)	.205	12.878** *7.961***	.001 *.009*	1	3.77 *3.10*
Regretted amount of money spent on sex	.213	17.922*** *12.928****	.001 .001	1	4.69 *4.08*
Trouble at work re internet porn	.052	32.824*** *48.135****	.001 *.001*	1	(-)* (-)*

* The odds could not be calculated because all participants who had gotten in trouble at work for spending time on Internet pornography, were all flagged as HD on this scale.

* The odds could not be calculated because all participants who had gotten in trouble at work for spending time on Internet pornography were all flagged as HD on this scale.

Trouble at work more than once sexually inappropriate	.037	22.948***	.001	1	(-)*
Fired from work because sex-related activity at work (sex/porn at work, sexual harassment)	.048	15.050***	.001	1	12.99
Legal problems for hiring a sex worker	.037	14.870***	.001	1	21.30
Police questioned me for inappropriate sexual conduct	.048	14.655***	.001	1	12.65

Note. ** p< .01, p< .001***

Table 18 F: Significant Criterion Items associated with being HD on the Compulsive Sexual Behavior Inventory, Control subscale, Among Oldest Cohort Males (36-44 years), n=191

	Base Rate among oldest men in sample	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio (when significant)
Diagnosed with an STI	.126	18.181***	.001	1	7.11
Attempted victimization by threats, emotional coercion, or physical force	.082	13.371**	.002	1	6.35
Attempted perpetration of sexual assault against a female using threats, emotional coercion, or force	.106	19.672***	.001	1	7.82
Paid for online sex chat	.165	11.936**	.002	1	4.94
Paid for a sex worker	.211	16.629***	.001	1	5.96
Spent more money than intended on sex-related activities (not dating)	.215	13.250** *17.834****	.001 *.001*	1 *1*	5.00 *4.595*

* The odds could not be calculated because all participants who had gotten in trouble at work more than once because he had sexually harassed or been sexually inappropriate were all flagged as HD on this scale.

Regretted amount of money spent on sex	.213	12.273***	.001	1	4.72
		*19.165****	*.001*	*1*	*4.82*

Note. Italicized numbers in the table are re-calculated odds with the criterion overlap items removed (See Table 13).

** p< .01 p< .001***

			95% CI for Odds Ratio			P value	Pseudo-R^2 (Nagelkerke)
	BR	B	Lower	Odds	Upper		
Unintentional pregnancy	.279	1.764	2.280	5.833***	14.925	.001	.140
Relationship termination/distress, re: my infidelity	.230	1.622	2.011	5.062***	12.747	.001	.116
Too much time spent looking for sex partner over last 12 months	.248	1.292	1.460	3.639**	9.072	.006	.075

Table 18 G: Significant Criterion Items associated with being HD on the Hypersexual Behavior Consequences Scale Among Oldest Men (36-45 years), n=191

	Base Rate among oldest men in sample	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio (when significant)
Diagnosed with an STI	.125	13.972**	.001	1	5.25
Someone attempted anal sexual assault by threats, emotional coercion or force	.104	10.794**	.007	1	5.91
Paid for Online Sex Chat	.165	11.448**	.002	1	4.247
Trouble at work internet porn	.052	15.397**	.001	1	9.69
Trouble at work more than once sexually inappropriate	.037	27.356***	.001	1	40.12
Fired from work because sex-related activity at work (sex/porn at work, sexual harassment)	.048	19.024***	.001	1	13.57
Police questioned me for inappropriate sexual conduct	.048	11.764** *9.108***	.005 *.007*	1	8.13 *6.95*

			95% CI for Odds Ratio			P value	Pseudo-R^2 (Nagelkerke)
	BR	B	Lower	Odds	Upper		
Condomless anal sex with new partner	.335	1.776	2.501	5.909***	13.960	.001	.157
Paid for a sex worker	.212	1.679	2.329	5.360***	12.334	.001	.132
Concurrent extra dyadic sexual	.434	1.256	1.503	3.513**	8.206	.004	.082

relationship (unknown to primary partner)		*1.436*	*2.055*	*4.206****	*8.608*	*.001*	*.125*
Relationship termination/distress, re: my infidelity	.230	1.577	2.106	4.840***	11.122	.001	.120
Too much time spent looking for sex partner over last 12 months	.246	1.815	2.635	6.139***	14.204	.001	.160
Waste too much time on sex-related activities (non-dating)	.335	1.571 *2.310*	2.078 *4.690*	4.813*** *10.070****	11.148 *21.624*	.001 *.001*	.127 *.273*
Have spent more money than intended on sex	.204	1.553 *1.381*	2.051 *1.761*	4.725*** *3.735****	10.886 *7.920*	.001 *.001*	.112 *.088*
Regretted amount of money spent on sex	.213	2.321 *1.987*	4.249 *3.381*	10190*** *7.294****	24.440 *15.734*	.001 *.001*	.242 *.197*

Note. ** p< .01 p< .001***

Table 18 H: Significant Criterion Items associated with being HD on the Total Sexual Outlet Inventory Among Oldest Cohort Males (36-45 years), n=191

			95% CI for Odds Ratio			P value	Pseudo-R^2 (Nagelkerke)
	BR	B	Lower	Odds	Upper		
Condomless anal sex with a new partner	.337	1.204	1.780	3.333***	6.241	.001	.100
Attempted perpetration of sexual assault against a female	.106	-1.519	1.585	4.567**	13.156	.005	.064
Paid for online sex chat	.164	1.222	1.497	3.395**	7.700	.003	.064
Paid for a sex worker	.212	1.267	1.693	3.550**	7.444	.001	.083
Concurrent extra dyadic relationship (unknown to primary partner)[2]	.434	.924	1.393	2.520**	4.557	.002	.066
Too much time spent looking for sex partner over last 12 months	.249	1.367	1.943	3.925***	7.931	.001	.106

Note. ** p< .01 p< .001***

3.4.3.2 Criterion items distinguishing hypersexual oldest cohort males

An important piece of contextual information to bear in mind in reviewing the data that follow is that, according to the 5 HD scales with evidence-based cut scores (i.e., Hypersexual Behavior Inventory, Sexual Compulsivity Scale, Sex Addiction Screening Test (SAST), SAST-Male Items, and Hypersexual Disorder Screening Inventory), problematically hypersexual oldest cohort males comprised between 14.7% and 27.2% of all oldest cohort males surveyed (see Table 19).

On some criterion items, the oldest males (36 to 45 years) in Study Two were similar to both the youngest and middle cohort males. For example, across all scales, problematically hypersexual older cohort males were 3.80 (CI: 1.67, 8.67, p=.003) to 15.31 (CI: 6.00, 39.04, p< .001) times more likely to pay for sex chat. The base rate of paying for sex chat among all oldest cohort men was .162, and while 14.7% to 27.2% of males in this cohort were problematically hypersexual across HD scales, they comprised between 45.2% to 77.4% of the men paying for sex chat. Like their younger, and middle

Table 19: Oldest cohort males (36 to 45 years) who are hypersexual and have a negative life outcome as a percentage of all oldest cohort males reporting negative life outcome, by scale (n=191)

	Scales with empirically validated cut scores							
HD/scale Base rate in cohort	**HBI (HD*n*=31) 16.3%**	**SCS (HD*n*=28) 14.7%**	**SAST (HD*n*=49) 25.7%**	**SAST-M (HD*n*=52) 27.2%**	**HDSI (HD*n*=43) 22.5%**	**CSBI HD*n*=13 6.8%**	**HBCS HD*n*=18 9.4%**	**TSO HD*n*=83 43.5%**
Worried re STI (BR=.586, *n*=112)	24/112 (21.4%)	22/112 (19.6%)	34/112 (30.4%)	40/112 (35.7%)	30/112 (26.8%)	11/112 (9.8%)	16/112 (14.3%)	83/112 (74.1%)
STI Diagnosis (BR=.126, *n*=24)	9/24 (37.5%)	8/24 (33.3%)	11/24 (45.8%)	14/24 (58.3%)	11/24 (45.8%)	6/24 (25.0%)	7/24 (29.2%)	14/24 (58.3%)
HIV Diagnosis (BR=.021, *n*=4)	2/4 (50.0%)	¼ (25.0%)	¼ (25.0%)	2/4 (50.0%)	¼ (25.0%)	0/4 (0.0%)	¼ (25.0%)	2/4 (50.0%)
Unwanted pregnancy (BR=.277, *n*=53)	16/53 (30.2%)	16/53 (30.2%)	20/53 (37.7%)	20/53 (37.7%)	20/53 (37.7%)	8/53 (15.0%)	10/53 (18.9%)	25/53 (47.2%)

Pregnancy termination (BR=.157, *n*=30)	6/30 (20.0%)	6/30 (20.0%)	8/30 (26.7%)	11/30 (36.7%)	9/30 (30.0%)	2/30 (6.7%)	5/30 (16.7%)	14/30 (46.7%)
Condomless anal sex with new partner (BR=.335; *n*=64)	21/64 (32.8%)	18/64 (28.1%)	27/64 (42.2%)	28/64 (43.6%)	26/64 (40.6%)	8/64 (12.5%)	12/64 (18.8%)	40/64 (62.5%)
Condomless vaginal sex w new partner (BR=.728, *n*=139)	23/139 (15.8%)	20/139 (14.4%)	34/139 (24.5%)	38/139 (27.3%)	28/139 (20.1%)	8/139 (5.8%)	13/139 (9.4%)	62/139 (44.6%)
Attempted perpetration (BR=.105; *n*=20)	9/20 (45.0%)	11/20 (55.0%)	12/20 (60.0%)	12/20 (60.0%)	12/20 (60.0%)	6/20 (30.0%)	6/20 (30.0%)	15/20 (75.0%)
Attempted victimization (BR=.084; *n*=16)	8/16 (50.0%)	10/16 (62.5%)	8/16 (50.0%)	10/16 (62.5%)	12/16 (75.0%)	6/16 (37.5%)	4/16 (25.0%)	16/16 (100.0%)
Sex worker (.209; *n*=40)	16/40 (40.0%)	15/40 (27.5%)	19/40 (47.5%)	23/40 (57.5%)	15/40 (37.5%)	8/40 (20.0%)	10/40 (25.0%)	27/40 (67.5%)
Paid for porn (BR=.414, n=79)	16/79 (20.3%)	13/79 (16.5%)	21/79 (26.6%)	29/79 (36.7%)	23/40 (57.5%)	8/79 (10.1%)	12/79 (15.2%)	38/40 (95.0%)
Paid online sex chat (.162; *n*=31)	14/31 (45.2%)	14/31 (45.2%)	15/31 (48.4%)	24/31 (77.4%)	18/31 (58.0%)	8/31 (25.8%)	8/31 (25.8%)	21/31 (67.7%)
Affair (BR=.429; *n*=82)	22/82 (26.2%)	21/82 (25.6%)	32/82 (39.0%)	35/82 (42.7%)	29/82 (35.4%)	10/82 (12.2%)	17/82 (20.7%)	46/82 (56.1%)
Relationship end or distress (BR=.230, n=44)	15/44 (34.0%)	14/44 (31.8%)	21/44 (47.7%)	22/44 (50.0%)	19/44 (43.2%)	6/44 (13.6%)	11/82 (13.4%)	26/44 (59.0%)
Waste too much time on sex-related activities (.335; *n*=64)	22/47 (46.8%)	17/47 (36.2%)	26/47 (55.3%)	25/47 (53.2%)	26/47 (55.3%)	6/47 (12.8%)	12/47 (25.5%)	31/47 (66.0%)
Spent more money than intended on sex (BR=.204, n=39)	12/39 (31.0%)	13/39 (33.3%)	18/39 (46.1%)	22/39 (56.4%)	17/39 (43.6%)	8/39 (20.5%)	10/39 (25.6%)	21/39 (79.5%)
Regret money spent on sex (.209; *n*=40)	17/40 (42.5%)	16/40 (40.0%)	21/40 (52.5%)	26/40 (65.0%)	20/40 (50.0%)	7/40 (17.5%)	12/40 (30.0%)	24/40 (60.0%)

Trouble at work for Internet porn (.052.; *n*=10)	7/10 (70.0%)	6/10 (60.0%)	6/10 (60.0%)	7/10 (70.0%)	10/10 (100.0%)	3/10 (30.0%)	4/10 (40.0%)	9/10 (90.0%)
Trouble at work for being sexually inappropriate (BR=.037, n=7)	5/7 (71.4%)	6/7 (85.7%)	4/7 (57.1%)	7/7 (100.0%)	7/7 (100.0%)	1/7 (14.3%)	3/7 (42.9%)	6/7 (85.7%)
Fired for sex-related behaviour (BR=.047, n=9)	5/9 (55.6%)	5/9 (55.6%)	5/9 (55.6%)	6/9 (66.7%)	7/9 (77.8%)	3/9 (33.3%)	4/9 (44.4%)	8/9 (88.9%)
Legal problems for hiring a sex worker (BR=.037, n=7)	4/7 (57.1%)	4/7 (57.1%)	3/9 (33.3%)	4/7 (57.1%)	6/7 (85.7%)	1/7 (14.3%)	3/7 (42.9%)	6/7 (85.7%)
Police questioning my sexual behaviour (BR=.048, n=9)	5/9 (55.%)	6/9 (66.7%)	5/9 (55.6%)	7/9 (77.8%)	7/9 (77.8%)	3/9 (33.3%)	3/9 (33.3%)	8/9 (88.9%)

cohort counterparts, problematically hypersexual older cohort males were between 2.52 (CI: 1.39, 4.56, p=.002) to 4.88 ($\chi 2$=13.16, p< .001) times more likely to have an infidelity, and they comprised between 25.6% and 42.7% of men having infidelities. Again while problematically hypersexual males were 14.7% to 27.2% of the oldest cohort, the base rate of the item *wasting too much time on sex-related activities* was .335, and problematically hypersexual older cohort males were more than one third (36.2%) to well over half (55.3%) of the men reporting wasting too much time on sex; as well, they were between 3.64 (CI: 1.46, 9.07, p= .006) to 9.96 ($\chi 2$=32.23, p< .001) times more likely to report feeling that they were spending too much time on sex than non-hypersexual peers.

Similar to their middle cohort counterparts, approximately 20.9% of older cohort males regret the amount of money they have spent on sex. While problematically hypersexual older males are 14.7% to 27.2% of this age group, they are approximately 40.0% to 65.0% of the men reporting regretting money spent on sex-related activities. In fact, the oldest cohort problematically hypersexual men were between 4.72 ($\chi 2$=12.27, p< .001) to 10.19 times (CI: 4.25, 24.44, p< .001) more likely to report regretting the amount of money spent on sex-related activities. Unlike the youngest cohort of problematically

hypersexual males, however, the oldest group of problematically hypersexual males were between 3.89 (CI=1.83, 8.30, $p< .001$) and 6.23 ($\chi 2=20.47$, $p< .001$) times more likely to hire sex workers; across this cohort 20.9% of males reported the had hired a sex worker, and while 14.7% to 25.7% of oldest cohort males are problematically hypersexual, across scales, they comprise between 40.0% to 57.5% of those men hiring sex workers.

In terms of safe sex practices and their sequelae, like their middle cohort counterparts, the oldest problematically hypersexual males are 3.18 (CI: 1.62, 6.18, $p< .001$) to 5.91 (CI: 2.50, 13.90, $p< .001$) times more likely to engage in condomless anal sex with a new partner, and while the base rate of this practice among the cohort is .335, problematically hypersexual men account for 28.1% to 43.6% of those reporting this practice. In a similar vein, the base rate of an STI diagnosis in this cohort is .126, with problematically hypersexual older men accounting for between one third and well over half (58.3%) of those men with an STI. As well, approaching significance (i.e. $p< .05$) on 4 scales, and statistically significant on 3 scales problematically hypersexual older males are between 4.61 ($\chi 2=12.870$, $p< .001$) and 7.11 ($\chi 2=18.181$, $p< .001$) times more likely to have an STI than non-problematically hypersexual older cohort men. Unplanned pregnancy is statistically more likely across half of the scales and is between 2.61 ($\chi 2=7.478$, $p=.008$) and 5.83 (CI: 2.280, 14.93, $p< .001$) times more likely among problematically hypersexual oldest cohort men. Recalling that while individuals with problematic hypersexuality were between 14.7% and 27.2% of all men within this cohort, they comprised between 30.2% to 37.7% of men reporting their partners had unplanned pregnancies. Finally, the base rate of HIV+ status is quite low in this cohort (BR=.021, $n=4$), and findings were too small to be meaningful; for example, across empirically validated HD scales, problematically hypersexual men accounted for one quarter to one half of men with HIV+ status.

Much like the problematically hypersexual youngest and middle cohort males, the oldest group of problematically hypersexual men were 4.95 ($\chi 2=8.427$, $p=.004$) to 14.44 ($\chi 2=27.053$, $p< .001$) times more likely to have been victims of attempted sexual violence in the last 12 months; this finding held across 7 of 8 HD scales (i.e., not the one-item Total Sexual Outlet Inventory). While 8.4% ($n=16$) of the oldest cohort men had

encountered attempted sexual victimization within the last year, individuals with problematic hypersexuality comprised between half to three quarters of the men so reporting. Similarly, strong correlations were revealed between being problematically hypersexual and having attempted sexual perpetration against a woman within the last 12 months; problematically hypersexual males were between 4.96 ($\chi 2$=18.52, p< .001) and 13.14 ($\chi 2$=32.57, p< .001) times more likely to have attempted perpetration of sexual violence. Just over one tenth (BR=.105) of the oldest cohort men reported having attempted sexual violence and while problematically hypersexual males were between 14.7% to 27.2% of the cohort, they represented 45.0% to 60.0% of the men who were attempted perpetrators.

Table 19 compares the proportion of oldest cohort males (36 to 45 years) who are problematically hypersexual and who have also reported encountering negative behavioural outcomes (as measured by the criterion items) relative to those oldest cohort males who are not problematically hypersexual yet who also experience negative behavioural outcomes. As Table 19 highlights, the final five criterion items (namely trouble at work for Internet pornography, trouble at work for being sexually inappropriate, fired from work for sex-related behaviours, legal problems for hiring a sex worker, and police questioning about sexual behaviour) are noteworthy in that problematically hypersexual oldest cohort males account for between 40.0% to 100.0% of the men reporting all of these behavioural outcomes across scales with empirically derived cuts cores. Problematically hypersexual oldest cohort men account for an apparently large percentage of the men reporting these five negative behavioural outcomes, although it must be kept in mind that the base rates for these criterion items are quite low, and range from .037 to .052 (n=7-10) within the sample as a whole.

3.5 Discussion

Study Two was a criterion validity study designed to investigate which, if any, correlations existed between problematic hypersexuality and measurable, problematic hypersexuality-related behaviour, as reported by participants themselves. Criterion validity can assist both researchers and clinicians in deciding which HD scales are likely

to yield the most useful results in clinical and laboratory settings. We found strong criterion validity across all Study Two HD scales in terms of both the number of positive correlations among scales and criterion items, as well as positive correlations between problematic hypersexuality and many of the particularly serious criterion items (i.e., negative public health outcomes, or outcomes related to civil or criminal liability). To examine criterion validity, twenty-three researcher-created criterion items were selected based on an extensive review of the empirical literature, and among the youngest and oldest men, the top three psychometrically strongest scales (Montgomery-Graham, 2016) were also associated with the highest number of criterion items (i.e., the Hypersexual Behavior Inventory was strongly associated with 14 criterion items among the youngest males, and both the Hypersexual Disorder Screening Inventory and the Sexual Compulsivity Scale were both strongly associated with 17 criterion outcomes among the oldest males). As well, when the 5 most severe outcomes among the criterion items are considered (e.g., HIV+ status, attempted anal victimization, attempted sexual violence perpetration against a woman, police questioned the participant's sexual conduct, and termination from work for sex-related activity), among the youngest men once again the Hypersexual Behavior Inventory was associated with 4 of the 5 most severe outcomes (no HD scale was associated with all 5 of the most severe outcomes among young men), and among the oldest men, the Hypersexual Disorder Screening Inventory and the Sexual Compulsivity Scale both selected 4 of 5 of the most severe criterion outcomes. Thus, within the youngest and oldest male cohorts, criterion validity aligns with psychometric strength of the scales.

Among the middle cohort of males, a slightly different pattern of results emerged. Somewhat surprisingly, the six male items from the Sex Addiction Screening Test, Male Items (SAST-M; a research scale intended to capture variance in sex addiction that is unique to men [Carnes, Green & Carnes, 2010]), were strongly associated with all 23 researcher-generated criterion items. The 6-item sex addiction SAST-M is a newer research tool with 4 items inquiring about pornography use, one item about sex with minors, and an item about sex with a sex worker. The 6-item SAST-M selected all of the 5 most severe researcher-generated problematic hypersexuality criterion outcomes within the middle cohort (i.e. most *severe* outcomes are judged as having related public health,

or civil or criminal liability). The SAST-M items had questionable internal cohesion (α=.67), yet the SAST-M and its companion Sex Addiction Screening Test, as well as two of the most psychometrically strong scales – the Hypersexual Behavior Inventory and the Sexual Compulsivity Scale – were associated with the criterion items with the most severe outcomes (as set out above). One plausible explanation for this is the SAST-M and SAST sex addiction scales typically correlate with criminal sexual behaviour (for example, see Marshall & Marshall, 2006) and there are a higher number of sex offenders within the middle cohort (explored in Study One and further discussion below). Alternatively, given that 4 of the 6 SAST-M items inquire about pornography use, which is associated with problematic hypersexuality, as well as with (non-problematic) high sex drive (Klein, Štulhofer, Jurin, & Briken, 2015), the SAST-M is effectively a pornography use scale. Pornography use may be associated with many of the outcomes associated with high sex drive *as well as* with problematic hypersexuality (i.e., feeling of wasting time and money on sex, clandestine, extra-dyadic relationships, or paying for online sex chat). Overall, within the middle cohort of participants, the 3 psychometrically strongest scales are associated with between 19 to 21 of 23 possible researcher-generated negative criterion items, and with 4 to 5 of those items that are the most severe. We hypothesized that the youngest group of males would have the fewest number of negative life outcomes associated with being hypersexual. This hypothesis was based upon an empirical review of both the actual and the hypothesized distressing outcomes associated with hypersexuality in men of various ages within the existing literature (Montgomery-Graham, 2017). When the hypothesis was made, it was informed by Levaque et al.'s (2016) findings that young people were over-selected as being problematically hypersexual across some of the most commonly used problematic hypersexuality scales. We expected that the youngest cohort of males would have the highest proportion of males captured as problematically hypersexual, and we believed that even if the youngest males were over-selected as problematically hypersexual, there would be relatively few negative life outcomes associated with scoring as problematically hypersexual on what appeared to be pathologizing hypersexuality scales. In fact, as Study One revealed, the youngest cohort consistently had the lowest number of problematically hypersexual males across all 8 scales under review. Of the young males who remained in Study Two,

across the 5 scales with empirically derived cut scores, between 8.1% and 23.0% of young males were deemed problematically hypersexual. So, while far fewer young men were selected as problematically hypersexual by HD scales, hypothesis one was partially supported in that young hypersexual men do indeed have the fewest number of negative behavioural outcomes associated with being problematically hypersexual.

Since the DSM-5 HD field trial found that HD was believed to begin prior to age 25, the younger male cohort clearly merits further empirical inquiry. Importantly, Study Two is the first investigation to report on potentially disproportionate STI prevalence in young males experiencing problematic hypersexuality. Within this sample of young men, having an STI diagnosis, and having HIV seropositive status were both of low base rates (BR=.067, *n*=9; BR=,.015, *n*= 2, respectively), and were unrelated to being problematically hypersexual, in general. Likewise, STI risk behaviours including condomless vaginal and condomless anal sex with a new partner – both having low base rates - were not significantly related to problematic hypersexuality within the youngest cohort. Relatedly, unwanted pregnancy, and associated pregnancy termination were not associated with being a young male hypersexual.

In contrast to the lack of relationship between HD and reproductive outcomes, young hypersexual men in Study Two, relative to their non-hypersexual age-matched peers, were more likely to have extra-dyadic relationships, and suffer relationship distress or termination as a result. Similarly, while 28.1% of all young men reported they wasted too much time on sex and sex-related (although non-dating) activities, young problematically hypersexual males account for 50.0% to 60.0% of men reporting this outcome, suggesting that even in a young cohort of males who tend to spend large amounts on sex, and sex-related behaviours, problematically hypersexual young males may still be distinguished in that they report spending even more time than is developmentally typical. The youngest problematically hypersexual males were more likely to pay to access online pornography than their age-matched non-problematically hypersexual peers. At first glance, this finding appears puzzling since PornHub, a free internet pornography website, has been widely available and among the top 10 most popular websites in the United States (Moynithan, 2018) for several years. As well, PornHub (and

multiple similar sites) has been available since the youngest cohort likely would have been curious about sex (they were 7 years though 13 years when PornHub appeared in 2007). Perhaps somewhat paradoxically, the free availability of pornography may motivate young cohort problematically hypersexual males to access paid niche content and may account for their reported belief that they waste too much time and money on sex. When we look at the actual proportion of young men who not only have negative life outcomes, but are also flagged as hypersexual on various scales, paying for online sex chat consistently tends to capture a large percentage of the youngest problematically hypersexual males. For example, while young males with problematic hypersexuality are approximately 8.1% to 23.0% of young men, they account for 30.0% to 50.0% of young men paying for sex chat. Currently, paying for online sex chat by males between 18 and 24 years, may be the best marker of potential problematic hypersexuality and warrants further clinical research.

Examining other negative behavioural outcomes among young males and deciding which of the life outcomes is understood as negative is not always clear. For example, while anti-social outcomes like police involvement for sexual behaviour, termination from work, and sexual violence are clearly negative life outcomes associated with inappropriate or even criminal sexual behaviour, it remains unclear whether paid online sex chat may be interpreted as a negative or a positive life outcome. On the one hand, if the paid sex chat is an outlet that prevents younger men from getting into trouble at work, from unintentional pregnancy, possibly pregnancy termination, and also tends to lower STIs as the data may be interpreted to suggest, then paid online sex chat may be a positive life outcome. On the other hand, and likely more consistent with these data, paid sex chat in the young problematically hypersexual males seems to be related to their reported belief that too much time and money are wasted on sex-related activity, and plausibly the paid sex chat may also be related to relationship distress and termination. On the whole, among the youngest hypersexual men there is a sense of “buyer’s remorse” associated with their sex-related activities; they are apparently more impulsive and more likely to discount the value of future resources (i.e., time, money, a steady relationship), and tend to not defer immediate sexual pleasure. Of course another plausible interpretation of these findings is that hypersexual young males may indeed be engaging

in several of the more anti-social sexual behaviours that the older hypersexual cohorts are engaging in (e.g., sexual harassment, police involvement related to sexual behaviour, attempted perpetration of sexual violence), but the young hypersexual males have not yet been caught, or are unwilling to candidly report such outcomes (base rates of illegal sexual behaviours among the youngest males reporting these behaviours were between 4 to 6 of 135 young males). Thus, overall, the first hypothesis of Study Two was partially supported in that relative to the middle and oldest cohorts of males, the youngest males did, in fact, have the fewest negative life outcomes associated with being hypersexual, although the youngest men also had the fewest men flagged as hypersexual among all cohorts across all HD scales. Perhaps the most likely explanation of these data is that the youngest hypersexual males have not yet lived long enough to engage in riskier sexual behaviours.

Hypothesis two predicted that HD scales would be more strongly associated with negative life outcomes for the middle cohort (25 to 35 years) relative to the youngest age cohort (18 to 24 years), and even more negative outcomes again would be associated with being hypersexual within the oldest cohort (36 to 45 years). The prediction was partially supported by these data. As hypothesized, the middle group of males (25 to 35 years) do indeed have more negative life outcomes associated with being hypersexual than the youngest group of males. Contrary to predictions, however, the middle cohort rather than the oldest cohort of males had by far the highest number of problematically hypersexual males (22.0% to 37.3% across 5 scales with empirically derived cut scores), as well as the highest number of negative behavioural outcomes. The prevalence rates of problematic hypersexuality among the oldest cohort revealed problematic hypersexuality in approximately 14.7% to 27.2% of 36 to 45-year old men, while the oldest cohort also had far fewer negative behavioural outcomes associated with problematic hypersexuality than the middle cohort, but more negative behavioural outcomes than the youngest males. While Study Two contains cross-sectional and not longitudinal data, it may nonetheless posit some unique trends, including the notion that across cohorts all problematically hypersexual males are having clandestine, extra-dyadic relationships, and concomitant relationship distress and termination as a result. As well, all cohorts of problematically hypersexual males reported wasting too much time on sex, and wasting too much money

on sex. Novel findings are also presented in Study Two regarding paid sex chat indicating that problematically hypersexual men across all cohorts are much more inclined to use paid sex chat relative to non-problematically hypersexual age-matched men. Across age cohorts, between 30.0% to 50.0% of problematically hypersexual males engage in sex chat, suggesting it an important and relevant behaviour that warrants further research.

Five negative behavioural outcomes were noteworthy in that they were civilly or criminally prohibited behaviours, including trouble at work for use of Internet pornography, or for being sexually inappropriate, being terminated for sexual behaviours, having legal problems for hiring a sex worker (in some jurisdictions), and police questioning of a man's sexual behaviour. Within the youngest cohort, base rates of these behaviours were quite low, ranging from .030 (*n*=4) to .044 (*n*=6), making the drawing of inferences somewhat conjectural, although individuals with problematic hypersexuality comprised between 1/3 to 100.0% of the men reporting these 5 outcomes. Within the oldest cohort, prevalence of these behaviours was similarly small (ranging from BR=.037, *n*=7, to BR=.052, *n*=10), but more reliable within a larger sample (*n*=191), with those individuals having problematic hypersexuality tending to comprise between 55.0% to 100.0% of the men reporting these behaviours. There is a surprisingly high base rate of these problematic and sometimes illegal behaviours among this middle cohort in general: trouble at work with Internet pornography (BR=.145, *n*=37), trouble at work for being sexually inappropriate (BR=.153, *n*=39), fired for sex-related behaviour (BR=.157, *n*=40), legal problems for hiring a sex worker (BR=.109, *n*=28), and police questioning of sexual behaviour (BR=.133, *n*=34). At the same time, problematically hypersexual middle cohort males comprise over 50.0% of the individuals reporting these five negative behavioural outcomes across all scales. It is curious that the base rate of these outcomes is 2 to 3 times that of base rates within the younger and older cohorts.

Recalling from Study One that a significant minority of males was arrested at least once for sexual behaviour, eighteen of these males remained in Study Two, of which 15 were aged 25 to 35, indicating that a reasonably large group of alleged sex offenders remained within the middle cohort in Study Two. When these 15 males were removed from the middle cohort, and the logistic regression analyses re-analyzed using the Sexual

Compulsivity Scale (which was selected as it has many validation studies supporting its use), HIV+ status, condomless anal sex with a new partner, and paying for online sex chat are no longer related to problematic hypersexuality in men 25 to 35 years. Post hoc analyses of these 15 male sex crime suspects, aged 25 to 35 (who represent 5.88% of the middle group cohort) reveal that while 73.3% (*n*=11) of alleged sex offenders are married, only 20.0% of this alleged sexual offender group report having a monogamous relationship. Specifically, of the 15 alleged sex criminal males, 80.0% (*n*=12) report their relationship status as *one-night stands, booty call, or friends with benefits*, suggesting theses males do not have sexual relationships with their primary romantic partners exclusively. As well, 73.0% (*n*=11) of the small group of alleged sex offender men (aged 25 to 35) are MSM (i.e., only 5 of 15 [26.7%] of alleged sex offender males report they are exclusively heterosexual, with the remaining majority – 11 of 15 [73.3%] - reporting they are at least incidentally homosexual, bisexual, predominantly homosexual, or exclusively homosexual), 66.7% have an HIV diagnosis, and across all hypersexuality scales a strong positive relationship exists with being an alleged sex offender (*r*= .433-.651, *p*< .01). Together, these findings suggest that we have captured a small sample of the largest group of males in the United States whose demographics and reported sexual behaviours are associated with HIV infection status, namely gay, bisexual, and other men who have condomless anal sex with men (CDC, 2019), between the ages of 25 to 34 (CDC, 2019). Having completed these further analyses which are impacting the middle cohort outcomes, the middle group of males still have the highest number and likelihood of negative life outcomes associated with HD across all scales, contrary to the second hypothesis.

One final unexpected result warrants mention. A trend exists across all age cohorts, and is particularly pronounced within the middle and older cohorts, revealing that those males who are problematically hypersexual across scales are significantly more likely to have been victims of attempted anal sexual assault as adults, and they are also significantly more likely to have attempted to perpetrate vaginal sexual assault against a woman. Middle and older cohort males are more likely to have been victimized in the past year – perhaps because their high sex drive and plausible lower inhibitions/increased impulsivity means they are prepared to put themselves in risker situations. By contrast, young

problematically hypersexual males may simply have had fewer opportunities to have sex and, at the same time, found themselves in fewer potentially victimizing situations. Plausibly, the youngest males with problematic hypersexuality may have been less forthcoming and less prepared than their older peers to openly discuss upsetting, and private sexual events in an online survey thus accounting for their lower rates of reported victimization. Or there may indeed have been a cohort effect such that being male and 18 and hypersexual, seeking sex with another man in 2018 (data collection date), does not render a young man as vulnerable to attempted sexual violence as it may have almost three decades ago in 1991 when the 45 year-old men were 18, or almost two decades ago in 2001, when the 35 year-olds were 18.

Using childhood sexual victimization rates within these data as a blunt instrument to examine the reported percentage of childhood sexual trauma across cohorts, it is noteworthy that the proportion of middle cohort males who were sexually abused as children is 25.0% higher than the oldest males (13.1%, *n*=25), and more than double the youngest males reporting childhood sexual abuse (8.1%, *n*=11). The middle cohort is also the cohort that was 8 to 12 times more likely to have been the victim of attempted anal assault within the last year. Recent research suggests complex developmental trauma in childhood is often strongly correlated with hypersexuality (Courtois & Weiss, 2017; Herman, 1992), suggesting that childhood sexual abuse may prime individuals for challenges with emotion dysregulation, shame and cycles of "sex addiction"/avoidance of overwhelming and unmanageable affect. When read in conjunction with the higher number of middle and older cohorts of problematically hypersexual males having more childhood sexual abuse, it may also provide some support for these middle cohort hypersexual men being groomed to unwittingly re-victimize themselves as adults (Mossman-Moore & Brown, 2004).

Finally, Study Two is the first systematic research to present data on non-paraphilic, problematic hypersexuality and attempted vaginal sexual assault across three cohorts of men. The prevalence of attempted sexual violence across the entire sample (*N*=588) shows that 17.3% of all men have attempted perpetration within this community sample. This percentage is far fewer than College samples using the same scale used in Study

Two, which suggests that between 25.0% to 33.0% of College males have engaged in some form of sexually coercive behaviour against a woman since age 14 (i.e., note that "sexually coercive behaviour" discussed in the Procedures section above includes behaviours ranging from telling lies, and threatening to spread rumors, as well as using force; see Abbey et al., 1998; Abbey et al., 2001; Koss et al., 1987; Rapaport & Burkhart, 1984). Many variables have been investigated to relate a man's tendency to sexually aggress against a woman including hypermasculinity, and a need for power and dominance (Malamuth & Sockloskie, 1991), acceptance of rape myths and holding traditional sex role stereotypes (Bohner, Siebler & Schmelcher, 2006; Koss, Leonard, Beezley, Oros, 1985), condoning violence against women and having negative views about heterosexual relationships in general (Abbey et al., 1998; Abbey et al., 2001). While no research exists to our knowledge relating attempted sexual violence perpetration to non-paraphilic problematic hypersexuality, some past research on problematic hypersexuality within clinical samples cites traits consistent with a tendency to manipulate others, to be deceptive and guarded when it comes to expressing personal feelings, as well as a more casual attitude toward adhering to ethical standards and moral obligations (Reid, Dhuffar, Rarnham & Fong, 2012). Such traits, in addition to replicated findings in hypersexual men including emotion dysregulation, and poor distress tolerance may combine with low impulsivity, making problematically hypersexual males across cohorts more likely to attempt sexual victimization in certain circumstances. Finally, it must be borne in mind that these analyses examined attempted rather than successful perpetration of sexual violence, and perpetration was defined to include a broad range of behaviours including threats, criticism, taking advantage of a woman's intoxication, in addition to asking about using physical force and/or a weapon. Further investigation into this area of inquiry is warranted to disentangle the importance of persistent, characterological traits (i.e. sexual sadism, which may have been tapped into among middle cohort men) from other non-paraphilic problematically hypersexual males.

Study Two was designed as a criterion validity study to test the relationship of hypersexuality scales and problematic hypersexuality outcomes identified within a systematic review of the empirical literature of hypersexuality. Overall, while the scales themselves seem to unexpectedly select too many men of all ages as problematically

hypersexual, at the same time, the scales are indeed related to some of the negative life outcomes associated with out of control sexual behaviour as reflected in the literature, and outcomes do demonstrate different trends across age cohorts – a hitherto unexplored area of problematic hypersexuality. Given the large number of males who were captured as problematically hypersexual within an online community sample, however, the question arises as to whether there are additional individual differences variables, together with – or instead of - the HD construct per se, that could better account for these negative behavioural outcomes associated with hypersexuality.

Chapter 4

4 Study Three – Is Hypersexuality a Surplus Construct? Competitive Testing of Hypersexual Disorder Scales Against Other Relevant Variables in Prediction of HD Associated Outcomes

Study Three explores whether conceptually relevant individual differences - other than HD per se - may be stronger predictors (or at least equally successful predictors) of negative outcomes associated with hypersexual behaviour. Study Three competitively tested ten individual difference variables to examine whether these variables may predict negative hypersexual behaviour outcomes as well as or in addition to existing HD scales. The criterion variable in Study Three, the Hypersexual Behavior Consequences Scale, was selected as it is currently the scale that almost exclusively measures the negative *behavioural consequences* of an individual's problematic hyperseuxality without focusing primarily on affect and cognitions associated with hypersexuality. The Hypersexual Behavior Consequences Scale includes items that query relationship problems, financial difficulties, STIs, job loss, and inability to keep important commitments as a result of problematic hypersexual behaviour. Variables of interest hypothesized as potentially strong and conceptually quite relevant predictors of HD associated problematic outcomes include individual differences in: sexual desire, sexual excitation and sexual inhibition, depression/anxiety, socio-sexual orientation, emotion regulation, religiosity, and erotophobia/erotophilia. The rationale for hypothesizing relationships between these personality variables and HD associated negative outcomes is discussed in the following sections.

4.1 Rationale

4.1.1 Sexual desire

Sexual desire is influenced by biological, psychological and social factors. In a large North American sample (*N*=14,396), Winters, Christoff, and Gorzalka (2010) collected data on both sexual desire and dysregulated sexuality to see if they were distinct constructs. Factor analysis of both male and female participant data revealed one

underlying dimension suggesting that dysregulated sexuality as it is being currently conceptualized and measured, may simply be a marker of high sexual desire and the distress that we might expect to accompany managing a high degree of sexual thoughts, feelings, and behaviours. Sexual desire, frequency of sexual behaviour, and variety of sexual behaviour is known to be higher among younger individuals than among middle aged to senior adults (Herbenick et al., 2017). Thus, it seems plausible that much of what is being labelled as problematic hypersexuality is in fact age-appropriate or age-typical sexual desire in many 18 to 45-year old males.

4.1.2 Sexual excitation and sexual inhibition

The Dual Control model of the regulation of sexual behaviour (Bancroft, 1999; Bancroft & Janssen, 2000; Janssen, Vorst, Finn, & Bancroft, 2002a, 2002b) postulates that sexual arousal and associated behaviour depend upon a neurophysiological balance of sexual excitation and sexual inhibition, and individuals are expected to vary in their propensity for both sexual excitation and sexual inhibition. The ability to inhibit sexual arousal in threatening/non-sexual situations where attention needs to be directed to non-sexual coping is seen as adaptive across species while the ability to become sexually excited in non-threatening sexual situations facilitates both sexual pleasure as well as facilitating human reproduction in some situations (Bancroft & Vukadinovic, 2004). Three dimensions comprise the dual control model: excitation proneness (as assessed by the sexual excitation scale: SES), inhibition in response to threat of performance failure (as assessed by the first sexual inhibition scale: SIS1), and inhibition in response to threat of performance consequences (as assessed by the second sexual inhibition scale: SIS2). Within non-clinical samples of males and females, scores on these three scales show close to normal distributions (Bancroft & Vukadinovic, 2004). Whereas the sexual excitatory system has been described and localized physiologically, the sexual inhibitory system has not, and thus currently the sexual inhibitory systems within the theoretical model depend upon conceptually defined rather than physiologically and anatomically localized systems (Janssen, et al, 2002a; 2002b).

While the dual control model is a well-validated and richly empirically supported model in human sexuality research broadly, we have an emerging, but not yet clear picture of

how this model may help to explain problematic hypersexuality. The positive correlation of high SES (i.e., sexual excitation) with hypersexuality consistency replicates; however, the correlation between hypersexuality and inhibition (SIS1 or sexual inhibition in response to threat of performance failure, and SIS2 sexual inhibition in response to threat of performance consequences) is weaker, and less clear. One large scale study (*N*=1749) found a moderate positive correlation between hypersexuality and sexual excitation (*r*=.30, p< .001), and a weak but stable, -.13, negative association of hypersexuality with sexual inhibition due to threat of performance consequences (i.e., the individual shows no concern for the outcomes of risky or unplanned sex), and a positive but weak relationship between hypersexuality and sexual inhibition due to threat of performance failure (SIS1); these results were stable across gender and sexual orientation (Rettenberger, Klein, & Briken, 2016). Another recent study (*N*=510) found high sexual inhibition due to threat of performance failure (SIS1) to be strongly positively related to hypersexuality, while a weak negative relationship existed with SIS2 (Walton, Cantor, & Lykins, 2017). Together these findings suggest hypersexuality is related to easier sexual arousability (i.e., high SES or sexual excitation), at the same time as accompanying anxiety about maintaining arousal during sexual activity, and some lack of concern with the outcome of sexual activity. As a result, the hypersexual individual may be inclined to experience highly stimulating events/encounters and accompanying sexual arousal without considered planning of potential outcomes.

4.1.3 Depression and anxiety

Kinsey Institute scientists were among the first researchers to note an increased sexual interest during states of depression or anxiety in hypersexual males (Bancroft & Vukadinovic, 2004). This paradoxical increased interest in sexual behaviour during depressed mood is hypothesized as an avoidance or management tactic in the face of unpleasant affect. Thus, when an individual feels the distress of depressive symptoms, it is theorized that sexual fantasies, urges, and behaviours are attempts to cope with or avoid and to temporarily relive such distress (Schultz, Hook, Davis, Penberthy & Reid, 2014). Scholars hypothesize that the mood-enhancing qualities of sexual fantasy and behaviour temporarily relieve the depressive symptoms to motivate the hypersexual

individual to use sex as a coping mechanism (Hook, Hook, & Hines, 2008). Sexual fantasy and behaviour likely relieve distress by creating an intense focus on the competing state of pleasurable arousal and releasing tension through orgasm (Reid, Carpenter, Speckman, & Wiles, 2008). Of course the euphoria of sexual activities is transient, and an individual may have to face the consequences of unplanned sexual behaviour (e.g., relationship stress, negative health implications like sexually transmitted infections, or consequences at work for watching pornography; see McBride, Reece, & Sanders, 2007; Montgomery-Graham, 2016; Reid, Garos, & Fong, 2012). Proponents of sex addiction theory would suggest the aggravation of the initial depression combined with the inadequacy of coping mechanisms may encourage the individual to repeat the cycle of sexual behaviours in an attempt to escape dysphoric affect (Carnes, 2001).

Empirical research bears out some of these hypotheses between mood and sexual arousal. Bancroft and colleagues (Bancroft, Janssen, Strong, Carnes, Vukadinovik, & Long, 2003) reported that heterosexual men in general tended to describe a decrease in sexual desire when sad or depressed, while a minority of these men (9-16%) described an increase in sexual desire while depressed. An even larger proportion of men (21-24%) reported an increase in sexual desire when feeling stressed or anxious. Moreover, recent meta-analytic research using an overall sample of 3783 individuals found a moderate positive effect size between hypersexual behaviour and depressive symptomology (Schultz et al., 2014).

Variable effects of mood and affect on sexuality in different groups of individuals remain issues requiring further research. Criterion A2 of the proposed and rejected HD diagnostic language captured this possible correlation between increased arousability and dysphoric affect: "*repetitively engaging in sexual fantasies, urges, and behaviours in response to dysphoric mood states (e.g., depression, boredom, and irritability"* (APA, 2013). A recent item response theory modelling of the Hypersexual Disorder Screening Inventory (which used the HD diagnostic language) suggested a plausible dimension of *using sex for coping* which included both the A2 criterion (above) as well as criterion A3 from the HDSI, which reads "*I have used sexual fantasies, urges, and behaviors to avoid,*

put off, or cope with stresses and other difficult problems or responsibilities in my life" (Parsons, et al., 2013).

4.1.4 Socio-sexual orientation

Alfred Kinsey first introduced the concept of sociosexual orientation, which describes the inclination to engage in uncommitted sexual relationships (Kinsey et al., 1948). Individuals who are more restricted in sociosexuality tend to engage in less casual sex, and prefer greater love, commitment and emotional closeness before engaging in sex. Individuals who have a more unrestricted sociosexuality have a greater willingness to engage in more casual sex and are more comfortable engaging in sexual activities without emotional closeness, love, or commitment (Simpson & Gangestad, 1991). Unrestricted sociosexuality is associated with earlier sexual debut, more frequent sexual activity, and a greater number of lifetime sexual partners (Yost & Zurbriggen, 2006). Gender tends to moderate this relationship, with men tending toward more unrestricted sociosexual orientation than women, on average, although individual differences in sociosexuality and behaviour within gender exist. While there are no known studies examining sociosexual orientation and hypersexuality, a tendency toward uncommitted sexual relationships is a prominent feature recurring in the HD literature (for example, see Ventuneac et al., 2014; Kalichman & Rompa, 2001; and Dodge, Reece, Cole & Sandfort, 2004). Study Two also demonstrated a strong correlation between hypersexuality and extra-dyadic sexual relationships, paid sex chat, and to a lesser extent, hiring of sex workers. Sociosexual orientation is tested in Study Three as a potentially strong predictor of hypersexuality since it appears probable yet unknown whether a large portion of the variance in problematic hypersexuality may be accounted for by sociosexuality.

4.1.5 Emotion regulation

Broadly speaking, theoretical conceptualizations of emotion regulation suggest that the control of one's own emotions is a dual component process that initially includes the inhibition of strong emotional reactions to events. The second step of emotion regulation is the ability to self-regulate with strategies including self-soothing, refocusing on activities other than the provocative event, reducing and moderating the initial emotion,

and organizing the eventual emotional expression so that it is more consistent with and supportive of individual goals and long-term welfare (Barkley & Murphy, 2010; Martel, 2009). Within the context of the present program of research, emotion *dysregulation* may manifest as the inability to suppress undesired sexual thoughts, failing to practice safe sex, and declining to consider consequences before acting. Emotion regulation is an important component of executive functioning, an overarching set of neurocognitive processes that also regulates inhibition, motivation, impulse control, task switching, judgment, attention, problem solving, and planning. Attention Deficit Hyperactivity Disorder (ADHD) is a disorder in which executive cognitive deficits are present. An individual with ADHD may have issues with impulsivity, poor judgment, impoverished planning capabilities, and risk insensitivity.

A small body of research exists examining whether individuals with ADHD are also individuals likely to become problematically hypersexual (for example see Mulhauser et al., 2014; Reid et al., 2010; Reid et al, 2011). Past empirical investigations have found ADHD to be highly comorbid with hypersexuality, in the range of 17%-67% of individuals flagged as hypersexual reporting some patterns consistent with ADHD (Bothe, Koos, Toth-Kivaly, Orosz & Demetrovics, 2019; Reid, Davitan, & Lenartowicz, 2013). Interestingly, the research investigating whether individuals with ADHD are more likely to exhibit signs of problematic hypersexuality has led to mixed findings, largely as a result of inconsistencies in neuropsychological assessment tools measuring different components of the construct of executive functioning. The emotion dysregulation component of HD is alluded to in the DSM-5 HD diagnostic criteria, which listed repetitive engagement in sexual fantasies, urges, and behaviours in response to dysphoric mood states, or in response to stressful life events, suggesting an inability to appropriately monitor and control affect without resort to escapism into sexual stimuli. Emotion regulation may be an important component of problematic hypersexuality that has been missing from past studies investigating HD and executive functioning.

4.1.6 Religiosity

An emerging and presently under-researched area within the HD literature is the notion of *perceived addiction* in which an individual perceives his or her sexual behaviour or

frequency as hypersexual when the individual's fantasies, urges, and behaviours are, in fact, normophilic (Montgomery-Graham, 2016). Individuals with strict sexual values may self-identify as hypersexual and may feel easily distressed as a result of entirely normative sexual thoughts and behaviours. A recent large-scale Croatian study (*N*=1998) found that high desire males and hypersexual males did not differ in terms of frequency of pornography use, or in frequency of solitary or coupled sexual activity, although the hypersexual men did perceive their sexual desire to be out of control (Stulhofer, Jurin, & Briken, 2016). Researchers attributed these findings to internalized sex negativity associated with high religiosity within this Eastern European, predominantly Catholic sample of males. In Study Three we seek to provide further evidence explaining whether religiosity is an important component of problematic hypersexuality behavioural outcomes.

4.1.7 Erotophobia/erotophilia

Erotophobia/erotophilia is a dimensional personality trait that assesses an individual's propensity to respond to sexual cues with negative to positive affect and avoidance versus approach responses (Fisher, White, Byrne & Kelley, 1988). This trait is conceptualized as a learned disposition to response to sexual stimuli with negative to positive affect, and an individual's evaluation of the sexual stimuli as either negative or positive is believed to determine approach or avoidance responses (Rye, Meaney, & Fisher, 2011). Past research demonstrates strong conceptual overlap between other relevant personality variables hypothesized to be strongly associated with hypersexuality including: erotophilia-erotophobia and sociosexuality (Schmitt, Schackleford, Duntley, Tooke & Buss, 2001), erotophilia-erotophobia and the Dual Control Model (i.e., sexual excitation and sexual inhibition; see Graham et al., 2006; Janssen, Vorst, Finn & Bancroft, 2002a; 2002b; Wilson, Holm, Bishop & Borowiak, 2002), as well as associations between erotophobia-erotophobia and sexual desire (Spector, 1992). Erotophilia-erotophobia will be tested in these analyses using the Sexual Opinion Survey (SOS; Fisher, Byrne White & Kelley, 1988) as an exploratory and as yet unresearched variable which is hypothesized to further elucidate the problematic hypersexuality construct.

4.2 Hypotheses

Study Three aims to assess the relative strength of conceptually relevant individual differences, as opposed to HD measures per se, in predicting problematic hypersexuality criteria (negative outcomes) in a sample of North American males ranging in age from 18 to 45 years.

H1. It is expected that individual differences in sexual desire, erotophobia-erotophilia, sexual excitation and sexual inhibition, socio-sexual orientation, religiosity, mood and desire (i.e., anxiousness/depression), and emotion regulation, will account for a large portion of the variance in hypersexual behavioural outcomes as measured by the Hypersexual Behavior Consequences Scale. Specifically it is expected that high sexual desire, high erotophilia, high sexual excitation, high sexual inhibition as a result of fear of performance failure, low sexual inhibition as a result of performance consequences, high sociosexual orientation, high religiosity, and low emotion regulation will account for a large portion of the variance in the outcome measures, the Hypersexual Behavior Consequences Scale.

H2. Once we determine which of the hypothesis 1 personality variables are the strongest predictors of negative problematic hypersexuality outcomes as measured by the Hypersexuality Behavior Consequences Scale, those personality variables will be competitively tested against the existing problematic hypersexuality scales to see if the strongest personality variables can better account for the negative HD-related behavioural outcomes than a particular HD scale.

Plausibly, if these personality variables predict HD-associated negative hypersexual outcomes as well as or better than problematic hypersexuality scales measuring negative behavioural outcomes associated with hypersexuality, the construct validity of HD becomes questionable.

4.3 Methods

4.3.1 Procedure

Study Three participants were Canadian and American males between the ages of 18 and 45 years who were recruited from among those individuals who completed Study One on Amazon's Mechanical Turk Prime. Participants were contacted anonymously via Mechanical Turk upon completion of Study One and paid US $1.50 to complete the measures used in Studies Two and Three simultaneously. As part of the combined Study Two and Study Three data collection procedure, participants were asked to complete 10 personality scales (for Study Three) in addition to the researcher-generated problematic hypersexuality criterion items (for Study Two). Answering all Study Two and Study Three questions took participants approximately 25 to 35 minutes to complete (See Appendix B for a list of questions participants answered in the combined Studies Two and Three data collection).

4.3.2 Scales

The following scales were used to assess personality variables. Psychometric properties of the scales may be found in Table 20.

Table 20: Factor Structure of Study Three Variables

Replication Scales			
Questionnaire	Scoring	Reliability	Current Sample
Sexual Compulsivity Scale (SCS; Kalichman et al., 1994), 10 questions	4-point Likert scale (*not at all like me* to *absolutely like me*) Range: 10-40 HD cut score: 24+	Internal reliability: α=0.86; Test-retest (3 months): 0.64 (Kalichman & Rompa, 1995) Internal reliability: α=0.88 (Levaque et al., 2016)	Internal reliability: α=0.93 Factors:[11] 1 factor accounting for 56.56% of the variance Factor loadings: .573-.828

[11] Exploratory Factor analysis was conducted using Maximum Likelihood Estimation.

Compulsive Sexual Behavior Inventory-control subscale (Coleman, et al., 2001), 13 questions in subscale	5-point Likert scale (*very frequently* to *never*) Range: 13-65 HD cut score: none; lower is more sexually compulsive	Internal reliability: α=0.88-.96 (Coleman et al, 2001) Internal reliability: α=0.91 (Levaque et al., 2016)	Internal reliability: α=0.95 Factors: 1 factor accounting for 58.04% of the variance Factor loadings: .664-.828.
Hypersexual Behavior Inventory (HBI; Reid et al., 2009), 19 questions	Subscales: control, coping, consequences 5-point Likert scale (*never* to *very often*) Range: 19-95 HD cut score: 53+	Internal reliability: α=.96; test-retest (2 weeks): *r*=.91, and subscale internal reliability: .89-.95; test-retest subscale (2 weeks): r=.88-.90 (Reid, Garos & Carpenter, 2011) Internal reliability: α=0.94, and subscale internal reliability: α=0.81-.91 (Levaque et al., 2016)	Internal reliability: α=95. Subscale internal reliability, control: α=0.94, and coping: α=0.90 Factors: 2 factors accounting for 36.24% (control), and 25.06% (coping) of the variance. Factor loadings: control = .639 -.758, and coping = .660 - 745
Hypersexual Behavior Consequences Scale (HBCS; Reid et al, 2012), 23 questions	5-point Likert scale (*hasn't happened and is unlikely to happen* to *has happened several times*) Range: 19-95; HD cut score: none; higher score means more negative consequences	Internal reliability: α=0.84; test-retest reliability (2 weeks): r=.76 (Reid et al, 2012) Internal reliability: α=0.92 (Levaque et al., 2016)	Internal reliability: α=0.94 Factors: 1 factor accounting for 48.79% of the variance Factor loadings: .471-.775
Total Sexual Outlet Inventory (TSOI; Kafka, 1997), 4 questions; only 1 used as in Levaque et al. (2016)	Total: Number of orgasms per week Range: limitless HD cut score: 7+ orgasms/week	*M*score: 9.9 (*SD*: 12.3) (Levaque, et al., 2016)	Mscore: 9.28 (SD: 7.51)
Extension Scales			
Questionnaire	Scoring	Reliability	Current Sample
Sexual Addiction Screening Test (SAST; Carnes,	Yes/No Range: 0-20 HD cut score: 6+	Internal reliability: α=0.89-.95	Internal reliability: α=0.90 *M*score: 4.48 (*SD*=4.89)

Green & Carnes, 2010), 20 questions		(see review by Montgomery-Graham, 2016)	Factors: 1 factor accounting for 61.67% of the variance when a tetrachoric correlation table was used. Factor loadings: .641-.879 To compare with past research which performed a factor analysis, and used Principal Components Analysis, 1 factor accounted for 33.23% of the variance; factor loadings ranged from .371 to .693 (Marshall, 2010).
Hypersexual Disorder Screening Inventory (HDSI; Reid et al., 2012), 6 questions[12]	5-point Likert scale (0 - *never* true to 4 - *almost always true*) Range: 0-24[13] HD cut score: 17+[14]	Internal reliability: α=.88-.96; test-retest (2 weeks): φ=.81 (Reid, Garos & Carpenter, 2011)	Internal reliability: α=.91. Factors: 1 factor accounting for 63.68% of the variance. Factor loadings: .749-.836

4.3.2.1 Sexual Desire Inventory

The Sexual Desire Inventory (SDI; Spector, Carey, & Steinberg, 1996) is a 14-item scale that measures solitary and dyadic sexual desire, which is defined as interest in solitary and dyadic sexual activity, and measured as a cognitive variable through amount and strength of thought directed toward approaching or being receptive to sexual stimuli (Spector, Carey, & Steinberg, 1998). Internal consistency estimates for the dyadic scale ($r = .86$) and the solitary scale ($r = .96$) are good, with one-month test-retest reliability

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[12] Usually the scale has 7 items.

[13] Typically, the range of HDSI scores is 0-28. The range in this sample was lower as one item (item A6) was unusable. The item read: *I have continued to engage in risky sexual behaviours that could or has caused illness, injury or emotional damage to myself, my sexual partner(s), or a significant relationship*.

[14] The cut score of 20 is typically used on the HDSI. A new tentative cut point was established for this study given data from item A6 was unusable. The revised tentative cut point was calculated by summing the range of points that could be selected under the scale (24) multiplied by the proportion of scores needed to meet the cutoff (20/28).

of $r = .76$ (Spector et al., 1996). Concurrent and discriminant validity scores are also acceptable. Cronbach's alpha of the SDI in Study Three was .917.

4.3.2.2 Sexual Inhibition/Sexual Excitation Scale

The 45-item dual control model scales, the Sexual Inhibition/Sexual Excitation Scales (SIS/SES) were designed for males (Janssen et al, 2002), and a separate SIS/SES inventory exists for women (Graham, Sanders, & Milhausen, 2006). The 45 SIS/SES items cover excitation (SES) by examining type of stimulus (e.g., social, imaginary, visual, and tactile), and type of response (e.g., sexual arousal or genital response elicited by sexual stimuli). The inhibition items (SIS1 and SIS2) are measured as modifications of sexual responses to avoid intrapersonal or interpersonal threat, which may be norms, values, and physical and psychological harm. Cronbach alpha scores for male/female samples range from .88-.89/.87 for SES, .78-.83/.76 for SIS1, and from .69-.75/.70 for SIS2 (Janssen et al, 2002a; 2002b). Cronbach's alphas within Study Three were: SES=.92, SIS1=.90, and SIS2=.82.

4.3.2.3 Mood and Sexuality Questionnaire

The 30-item Revised Mood and Sexuality Questionnaire (MSQ-R; Janssen, Macapagal, & Mutanski, 2013) measures individual differences in the relationship between positive and negative mood and various aspects of sexual experience and behaviour. The MSQ-R asks participants to indicate what happens to sexual responsiveness when they are feeling sad/depressed, anxious/stressed, or happy/cheerful (although items related to the happy/cheerful will not be included in this study). For each of the depressed/sad, and anxious/stressed mood states, participants are asked about the effects of that mood on desire and arousal as well as the ability to become sexually aroused when anxious or depressed. For each of these questions, participants are asked to indicate whether being in a certain mood typically decreases, increases, or does not influence their desire or behaviour.

Cronbach's alphas among the Mood and Sexuality scales were as follows: effect of anxiety and stress on desire=.848, effect of negative mood on sexual response=.648, and effect of sadness and depression on desire=.769.

4.3.2.4 Revised Socio-sexual Orientation Inventory

The revised Sociosexual Orientation Inventory (SOI-R) is a 9-item scale measuring interindividual differences in the tendency to engage in sexual relationships without deeper emotional commitment. The SOI-R contains 3 dimensions measuring behaviour, attitude, and desire. A 9-point scale is used to measure amount of sexual activities (0-none to 8-twenty or more), attitudes (1-strongly disagree to 9-strongly agree), and frequencies of behaviours (1-never to 9-at least once a day). The SOI-R contains good facet and total internal consistencies, and good one-year test-retest reliability; predictive and discriminant validity are also good for the SOI-R (Penke & Asendorph, 2008). Cronbach's alpha of the scale in Study Three was .849.

4.3.2.5 Barkley Deficits in Executive Functioning Scale (BDEFS, 2011)

The BDEFS is a theoretically and empirically based non-diagnostic measure of executive functioning (Barkley, 2011). While five broad dimensions of self-motivation, self-restraint, self-management to time, self-organization/problem-solving, and self-regulation of emotion are all measured, only the 13 items of the final subscale, self-regulation of emotion, will be measured. Cronbach's alpha of the subscale in Study Three was .934.

4.3.2.6 Duke University Religion Index

The Duke University Religion Index (DUREL) is a brief 5-item measure of religiosity used in epidemiological surveys to examine the relationship between religion and health outcomes (Koenig & Parkerson, 1997). The instrument assesses three dimensions of religiosity including organizational religious activity, non-organizational religious activity, and intrinsic religiosity or subjective religiosity. The total scale has high test-retest reliability (intra-class correlation=.91), high internal consistency (Cronbach's alphas=78-.91), high convergent validity with other measures of religiosity (r=.71-.86), and consistent factor structure has been confirmed by several research teams (Koenig & Bussing, 2010). Cronbach's alpha of the DRI in Study Three was .907.

4.3.2.7 Sexual Opinion Survey

The SOS (Fisher, et al., 1988) is a 21-item scale measuring affective and evaluative responses to auto-, homo- and heterosexual behaviour, fantasy, and visual sexual stimuli. Each item presents a sexual situation and asks participants to indicate agreement or disagreement with a statement on a 7-point scale (1-strongly agree to 7-strongly disagree). Items tap affective responses to sexual situations, for example: *almost all sexually explicit material is nauseating,* and *engaging in group sex is an entertaining idea.* Internal consistency of the full scale in adult samples has been high (Cronbach's alpha=.76-.89)(Smith & Nave, 2007) and the construct validity of the SOS continues to be well validated in research with theoretically relevant variables. In particular, SOS scores are predictive of sexual media exposure (Bogaert, 2001), subjective sexual arousal (Nobre, et al., 2004), self-reported sexual behaviour (e.g., masturbation, multiple partners, unprotected sex (Durnat, Carey, & Schroder, 2002), homonegativity (Mahaffey, Bryan, & Hutchison, 2005), condom application (Sanders et al., 2006), short-term unrestricted mating orientation (Schmitt, Shackelford, Duntley, Tooke, & Buss, 2001), protective sexual health behaviours (Fisher, 1998), and sexual activity during pregnancy and postpartum (Fisher & Gray, 1985). Cronbach's alpha of the scale in Study Three was .88.

4.3.3 Sample Description

The sociodemographic characteristics of the participants taking part in Studies Two and Three are shown in Table 11. Out of 758 participants in Study One, 581 remained for Studies Two and Three, representing a retention rate of 76.6%, which is an average retention rate for longitudinal research, as reported by recent meta-analytic findings (Teague et al., 2018). As noted in Study Two, retention rates did improve across age cohorts as follows: 68.95% of 18 to 24-year-olds remained across Studies One to Two/Three, 74.7% of the 25- to 35-year-olds remained, and 86.4% of the 36 to 45-year old cohorts were retained for Studies Two/Three. Almost identically to Study One, the majority of participants who remained across studies were White (72.6%), and heterosexual or predominantly heterosexual (76.4%). Most participants identified as Christian (48.1%), Agnostic (21.3%), or Atheist (20.6%). Participants were reasonably

well educated, as almost two thirds (65.3%) of the participants had completed at least a bachelor's degree. Study Two/Three participants fell into the following age categories: 18-24 years (23.2%, *n*=135), 25-35 years (43.9%, *n*=255), and 36-45 years (32.9%, *n*=191). Inferences may be drawn from the responses to an item regarding political affiliation that the vast majority of participants was American (73.7%, *n*=428) in Studies Two/Three, as was the case with Study One. The results of the number of men captured as problematically hypersexual across various scales and age cohorts are set out in Tables 12A ("Replication Scales", as labelled in Study One), and 12B ("Extension Scales" as labelled in Study One). The proportion of participants scoring as problematically hypersexual who remained in Studies Two and Three are similar to the proportion of problematically hypersexual males reported in Study One. Approximately 8.0% to 9.0% of the youngest males are captured as problematically hypersexual across replication scales, and approximately 12.6% to 23.0% on extension scales. Within the middle cohort approximately 22.0% to 23.5% were captured as problematically hypersexual on replication scales and 31.1% to 37.8% on extension scales. Among the oldest cohort of males approximately 14.7% to 16.3% were problematically hypersexual on replication scales and 22.9% to 27.8% on extension scales. Note that the scores for the Compulsive Behavior Inventory-control subscale, and the Hypersexual Behavior Consequences Scale are not empirically derived but are based on extreme top and bottom deciles from Study One. The Total Sexual Outlet Inventory (TSOI), which measures orgasmic output in a week, is not a robust measure of anything other than orgasmic output, and tends to capture almost half of all males across cohorts when using the cut score of at least 7 orgasms per week (Kafka, 1997; Levaque et al., 2016).

4.3.4 Data Analysis Plan

Linear regression will be used to first determine which personality variables account for the largest portion of the variance in negative HD-related behavioural outcomes (hypothesis 1); and a second regression analysis will be conducted to competitively test those personality variables from hypothesis 1 that are most strongly associated with negative hypersexual behavioural outcomes against the remaining 7 HD scales in predicting negative HD-associated outcomes (hypothesis 2). We began with 8 HD scales

in Studies One and Two. One scale – the Hypersexual Behavioral Consequences Scale – which captures negative behavioural consequences associated with problematic hypersexuality will be the criterion (DV) in the upcoming analyses.

4.3.4.1 Preliminary Analyses

Before any regression analyses were conducted, a correlation matrix revealed that the Sexual Excitation Scale and the Sexual Desire Inventory were strongly positively correlated, r=.703, p< .01. Table 20 presents Pearson correlations among all Study Three variables, and Table 21 presents descriptive statistics of Study Three variables. It was concluded that the variables resulted in singularity (Tabachnick & Fidell, 2014), which occurs when two variables correlate at $r \geq .70$, and create a logical problem of being redundant, inflating error terms, and weakening the overall analysis. Given the existing research in the HD literature using the Sexual Excitation Scale, it was preferred, and the Sexual Desire Inventory was excluded from further analyses.

4.3.4.1.1 Test of Assumptions for Multiple Linear Regression

The assumptions of multiple linear regression were investigated prior to analyzing the data. These assumptions indicate whether the data are appropriate for the planned analyses.

4.3.4.1.1.1 Univariate and Multivariate Normality

Although normality of the variables is not always required for analysis, the solution is usually quite a bit better if the variables are all normally distributed (Tabachnich & Fidell, 2014). Accordingly, all variables were assessed using histograms, expected normal probability plots and Z scores. The dependent (criterion) variable, the total score on the Hypersexual Behavior Consequences Scale, was positively skewed (Skewness=1.324), with heavy tails (Kurtosis=1.032), and the independent variables: Sexual Compulsivity Scale, Sexual Addiction Screening Test, and Total Sexual Output, were all positively skewed with the following skewness scores, respectively = 1.19,1.39, and 1.64 According to Tabachnick and Fidell (2014) with large samples (i.e., over 200), the significance of skewness is not as important as its actual size and the shape of the

Table 21: Pearson Correlations Among all Variables in Study Three

	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.	13.	14.	15.	16.	17.	18	19.
1.	-																		
2.	.508**																		
3.	.262**	.166**	-																
4.	-.082*	-.169**	.376**	-															
5.	.270**	.261**	-.133**	-.374**	-														
6.	.206**	.182**	.513**	.420**	.027	-													
7.	.287**	.231**	.502**	.396**	.073	.703**	-												
8.	.294**	.401**	.004	-.280**	.275**	.058	.192**	-											
9.	.064	.124**	-.192**	-.138**	.061	-.057	.028	.356**	-										
10.	.813**	.548**	.316**	-.007	.266**	.366**	.381**	.321**	.092*	-									
11.	.720**	.563**	.303**	-.075	.297**	.308**	.347**	.366**	.041	.806**	-								
12.	.765**	.481**	.209**	-.035	.284**	.264**	.273**	.273**	.108*	.770**	.685**	-							
13.	.568**	.399**	.327**	-.091*	.189**	.370**	.374**	.247**	.094*	.607**	.527**	.649**	-						
14.	.703**	.585**	.263**	-.065	.313*	.345**	.355**	.365**	.076	.841**	.806**	.702**	.559**	-					
15.	-.745**	-.571**	-.255**	-.064*	-.320**	-.272**	-.309**	-.330**	-.073	-.839**	-.850**	-.700**	-.542**	-.877**	-				
16.	.319**	.361**	.184**	-.703*	.180**	.259**	.241**	.223**	.044	.371**	.371**	.367**	.352**	.392**	-.405**	-			
17.	.286**	.301**	.238**	.005	.138**	.322**	.302**	.101*	-.137**	.387**	.363**	.269**	.257**	.425**	-.327**	.140**	-		
18.	.258**	.284**	.212**	-.021	.088*	.207**	.187**	.073	-.108**	.349**	.322**	.236**	.217**	.352**	-.313**	.211**	.622**	-	
19.	.289**	.370**	.317**	-.008	.106**	.343**	.303**	.157**	-.082*	.411**	.411**	.306**	.272**	.455**	-.365**	.243**	.650**	.616**	-

Note. 1. HBCS-Hypersexual Behavior Consequences Scale; 2. BEF-Russell Barkley Executive Functioning Subscale; 3. SOI-Sociosexual Orientation Inventory; 4. SOS-Sexual Opinion Survey; 5. DRI-Duke Religion Inventory; 6. SDI-Sexual Desire Inventory; 7. SES-Sexual Excitation Scale; 8. SIS1- Sexual Inhibition – Threat of Performance Failure; 9. SIS2 – Sexual Inhibition Scale – Threat of Performance Consequences; 10. HBI-Hypersexual Behavior Inventory; 11. SCS-Sexual Compulsivity Scale; 12. SAST-Sex Addiction Screening Test; 13. SAST-M-Sex Addiction Screening Test, Male Items; 14. HDSI-Hypersexual Disorder Screening Inventory; 15. CSBI-c-Compulsive Sexual Behavior Inventory, control subscale; 16. TSOI-Total Sexual Outlet Inventory; 17. EASD - Effect of Anxiety and Stress on Desire; 18. NMSR - Negative Mood and Sexual Response; 19. EDDS - Effect of Sadness and Depression on Desire.

** Correlation is significant at the 0.01 level (2 tailed); * Correlation is significant at the 0.05 level (2 tailed).

Table 22: Descriptive Statistics of Study Three Variables

	1	2	3	4	5	6	7	8	9
M	3.45	20.81	33.27	82.26	11.77	80.31	55.37	30.51	29.16
Med	3.30	19.00	32.00	81.00	11.00	81.00	56.00	30.00	29.00
SD	0.42	7.55	12.76	19.81	6.13	19.40	10.21	7.80	5.88
Skew	1.32	0.78	0.42	-0.07	0.42	-0.58	-0.36	-0.05	-0.14
Kurt	1,03	-0.18	-0.33	-0.34	-0.10	0.74	0.41	-0.43	-0.05

	10	11	12	13	14	15	16	17	18	19
M	36.91	16.44	4.13	1.75	13.14	43.00	9.28	7.33	4.90	6.84
Med	33.0	14.01	3.00	2.00	12.00	46.00	7.00	7.00	5.00	6.00
SD	15.60	6.65	4.46	1.52	6.03	11.20	8.00	2.88	1.67	2.94
Skew	0.92	1.19	1.39	0.86	0.63	-0.72	1.64	0.21	0.13	0.41
Kurt	0.25	1.59	1.59	0.31	-0.52	-0.42	2.13	-0.63	0.04	-0.52

Note. 1. HBCS-Hypersexual Behavior Consequences Scale; 2. BEF-Russell Barkley Executive Functioning Subscale; 3. SOI-Sociosexual Orientation Inventory; 4. SOS-Sexual Opinion Survey; 5. DRI-Duke Religion Inventory; 6. SDI-Sexual Desire Inventory; 7. SES-Sexual Excitation Scale; 8. SIS1- Sexual Inhibition – Threat of Performance Failure; 9. SIS2 – Sexual Inhibition Scale – Threat of Performance Consequences; 10. HBI-Hypersexual Behavior Inventory; 11. SCS-Sexual Compulsivity Scale; 12. SAST-Sex Addiction Screening Test; 13. SAST-M-Sex Addiction Screening Test, Male Items; 14. HDSI-Hypersexual Disorder Screening Inventory; 15. CSBI-c-Compulsive Sexual Behavior Inventory, control subscale; 16. TSOI-Total Sexual Outlet Inventory; 17. EASD - Effect of Anxiety and Stress on Desire; 18. NMSR - Negative Mood and Sexual Response; 19. EDDS - Effect of Sadness and Depression on Desire.

distribution. Here, the slight positive skewness in the DV is not considered significant. The kurtosis of the independent variables, and the underestimate of variance associated with positive kurtosis (distributions with thick, short tails) disappears in a large sample; similarly, with a large sample, the negative kurtosis, and associated underestimation of variance disappears (Waterman, 1976).

To check multivariate normality among the personality variables, normal probability plots (PP plots) were assessed to examine whether the residuals were normally distributed. First the 10 personality variables were examined and while the observed cumulative probability deviated slightly from the normality line, these data were within normal limits. A second PP plot was analyzed to examine whether the residuals from the HD scales were normally distributed, and upon visual inspection, the PP plot showed a

distinct “S” curve about the normality line, suggesting the HD scales, when tested together, deviate from normality. Only the ten personality variables met the assumption of normality. Malhalanobis statistics were run with all HD scales (except the one-item Total Sexual Outlet Scale), and personality variables to assess multivariate normality. The TSO – the one-item HD scale - was excluded from all regression analyses as it had no cap on number of orgasms per week, was creating too many multivariate outliers, and was not important to Study Three analyses. Once the TSOI was removed, Malhalanobis statistics were calculated to detect multivariate outliers, and 15 data points were removed for the dataset.

4.3.4.1.1.2 Linearity

Independent variables plotted against the dependent variable were inspected using bivariate scatterplots, which demonstrated linearity among the variables. This assumption was met.

4.3.4.1.1.3 Multicollinearity

Multicollinearity was initially assessed by examining the Pearson’s correlations among the independent variables in a correlation matrix. One of the HD predictor scales, the HBI, and the outcome (dependent variable) scale, the HBCS, had a bivariate correlation that was higher than r=.80, achieving the highest correlations among independent variables, r=.813, p< .01. The Variance Inflation Factor of all independent variables ranged from 1.01 to 6.72, far below the point at which collinearity becomes problematic (i.e., >10). The average variance inflation factor of 2.87 was somewhat elevated above the recommended average of 1 (Bowerman & O’Connell, 1990). However, the tolerance statistics (1/VIF) across the independent variables were not below 0.2 (Menard, 1995) which would indicate a serious problem with multicollinearity. Cook’s Distance was examined to assess whether any individual case was influential, with the minimum and maximum of all independent variables being .000 - .046, well below 1. Thus, the assumption was met.

4.3.4.1.1.4 Homoscedasticity

A scatterplot of residual versus predicted values was conducted to check for homoscedasticity among the data. There were clear cone-shaped patterns in the distribution indicating the data are heteroscedastic, meaning that uneven standard deviation of the error term exists across the values of the predictor variables. This assumption was not met.

As a result of the heteroscedasticity of the data, and the positive skew of the DV, a log transformation of the data was performed (Tabachnick & Fidell, 2014). Prior to the transformation, the Skewness=1.324, and kurtosis=1.032; following log transformation skewness fell within the acceptable range (skewness=.749), but kurtosis was not completely corrected (kurtosis=-.686). Since the log transformation did not correct the heteroscedasticity of the DV, and the kurtosis of the untransformed DV was not so skewed as to harm analysis, the DV was used untransformed (Tabachnick & Fidell, 2014).

4.4 Results

Before testing the hypotheses, we explored the relationship among the personality variables and the 8 hypersexuality scales with Pearson correlations (see Table 20 above). Scatterplots of each correlation were examined to ensure linearity between relationships. Cohen's (1992) recommendations to identify effect sizes of coefficients were used to indicate small (0.1), medium (0.3), and large (0.5) effect sizes. The pattern and strength of association between HD scales (excluding the one-item TSO), and some of the personality variables, in particular, was consistent across all HD scales: emotion dysregulation having the strongest associations with HD scales, specifically medium to large effect sizes, with all HD scales (r=.39 to .59, p< .001), followed by small to medium effect sizes with personality variables sociosexual orientation (r=.21 to .33, p< .01), small to medium effect sizes with sexual excitation (SES) (r=.27 to .38, p< .01), small to medium effect sizes with sexual inhibition resulting from fear of performance failure (SIS1) (r=.25 to .37, p< .01), and small to medium effect sizes with religiosity (r=.19 to .32, p< .01) and HD scales. Somewhat inconsistent with past research findings,

sexual inhibition due to threat of performance consequences had no significant associations with any of the HD scales (SIS2) (whereas past research has tended to find weak but stable negative relationships between SIS2 and HD). Contrary to Study Two hypothesis two however, erotophobia/erotophilia (SOS), had no significant associations with any of the HD scales.

Interestingly, among the mood and sexual desire and sexual arousal variables, one of the variables, effect of sadness and depression on sexual desire, showed some stronger associations with the HD scales, including the Sexual Compulsivity Scale (r=.41, p< .01), the Hypersexual Disorder Screening Inventory (r=.46, p< .01) and the Hypersexual Behavior Inventory (r=.41, p< .01), compared with the other HD scales.

To test the first hypothesis, multiple linear regression analysis using Ordinary Least Squares (OLS) was used to test whether several theoretically informed individual difference variables could account for negative hypersexuality behavioural outcomes as measured by the Hypersexual Behavior Consequences Scale; these variables included: emotion dysregulation, sociosexuality, erotophilia, religiosity, sexual excitation, sexual inhibition (both threat of performance failure [SIS1] as well as threat of performance consequences [SIS2]), and the 3 desire and mood variables - Effect of Anxiety and Stress on Desire, Negative Mood and Sexual Response, and Effect of Sadness and Depression on Desire. The results of the regression analysis indicated that four predictors, emotion dysregulation, sociosexuality, religiosity, and sexual inhibition: threat of performance failure (SIS1), explained 32.3% of the variance (R^2=.323, F(7, 574) = 39.248, p< .001) in predicting negative HD behavioural consequences as measured by the criterion scale, the Hypersexual Behavior Consequences Scale. Specifically, emotion dysregulation (β=.380, p< .001), sociosexuality (β=.212, p< .001), religiosity (β=.117, p= .002), and sexual inhibition: threat of performance failure (β=.112, p= .005) significantly predicted a large portion of the variance in hypersexual behaviour consequences. See Table 23 for further details.

To test the second hypothesis, multiple linear regression analysis using OLS was used to test whether the 4 statistically significant theoretically informed personality variables (accounting for 32.3% of the variance in problematic hypersexuality-related negative

Table 23: Study 3, Hypothesis 1. Linear model of predictors of Hypersexual Behavior Consequences Scale using Ordinary Least Squares Regression

Variable	*b*	*SE B*	*B*	*p*
Model One				
Constant	1.867	3.886		.631
BDEF	.817	.087	.380	.000
DRI	.268	.087	.117	.002
SOI	.213	.044	.212	.000
SIS[1]	.165	.059	.112	.005
SOS	-.021	.028	-.033	.461
SES	.028	.050	.028	.568
SIS[2]	-.083	.071	-.043	.238
ESAD	.185	.226	.042	.414
NMSR	.367	.356	.048	.303
ESDD	.025	.227	-.006	.911

Note. R^2 for Model one= .323. BDEF – Barkley Deficits in Executive Functioning; DRI – Duke Religion Index; SOI – Sociosexual Orientation; SIS1 = Sexual Inhibition (fear of performance failure); SOS – Erotophilia-erotophobia, SES – Sexual Excitation, SIS2 = Sexual inhibition (fear of performance consequences); ESAD – Effect of Anxiety and Stress on Desire, NMSR – Negative Mood and Sexual Response, ESDD – Effect of Sadness and Depression on Desire

outcomes) continued to contribute to hypersexual outcomes when measured against each of the HD scales under review throughout this program of research. The four variables contributing significantly to hypersexuality from hypothesis 1 included: emotion dysregulation, sociosexuality, religiosity, and sexual inhibition as a result of threat of performance failure (SIS1). The four personality variables were entered simultaneously as Block 1 into an OLS regression, and the HD scales were entered simultaneously as Block 2. The HD scales entered in Block 2 were the Hypersexual Behaviour Inventory (HBI), the Sexual Compulsivity Scale (SCS), the Compulsive Sexual Behavior Inventory - control subscale (CSBI-c), the Sex Addiction Screening Test (SAST), its 6 male items (SAST-M), the Hypersexual Disorder Screening Inventory (HDSI); and the criterion measure the Hypersexual Behavior Consequences Scale (HBCS). As explained above,

the one-item Total Sexual Outlet Inventory was excluded as it created multivariate outliers with its uncapped scale. The results of the 2 Block OLS regression indicated that four predictors, the HBI, the HDSI, the CSBIc, and the SAST explained 65.7% of the variance (R^2=.657, F(11, 569)=100.10, p <.001) in negative HD-related behavioural outcomes. The results of the model became unreliable however as suppressor variables were clearly changing the expected direction of the relationship between some of the variables (e.g., the predictor variable - HDSI and the outcome scale the - HBCS, have a significant positive relationship, r=.703, p <.01), but within this model the beta for the HDSI became negative, β= -.441, p= .004. The planned hypothesis 2 regression analysis was discontinued, both because there were too many variables in the model to see expected and reliable outcomes, and because the high associations between all of the HD scales made the planned regression analyses unstable.

When six separate multiple regression analyses were conducted to test the strength of a particular HD scale against the four strongest personality variables contributing to hypersexual behavioural outcomes, and the four best personality predictors were added as Block One for each of the 6 multiple regression analyses, all personality variables contributed significantly to the negative HD-related behavioural outcomes: emotion dysregulation significantly predicted negative HD-related outcomes (β=.389, p< .001), sociosexuality significantly predicted negative HD-related outcomes (β=.239, p< .001), religiosity significantly predicted negative HD-related outcomes (β=.169, p< .001), and SIS1 (sexual inhibition as a result of fear of performance failure) significantly predicted negative HD-related outcomes (β=.102, p= .009), see Tables 24 through 29; in sum, these four personality variables explained a significant proportion of variance in negative hypersexuality-related behavioural outcome scores on the criterion measure, Adj. R^2=.34, p< .01, F (4, 555) = 73.24, p<.001. When the 6 separate regression analyses were conducted to add (one by one) each HD scale to the personality variable regression analysis above (i.e., each HD scale was added as Block Two for six separate analyses), three patterns of outcomes surfaced. Across all regression analyses, the added HD scales always contributed a significant portion of the variance to the predicted HD-related

Table 24: Study 3, Hypothesis 2. Linear Model of Predictors of Hypersexual Behavior Consequences using Ordinary Least Squares Regression

Block 1										
	R^2	Adjusted R^2	Strd Error/Est.	R^2 change	Signif R^2 Δ		*b*	*SE B*	*β*	*p*
	.345	.341	13.57	.345	.000					
						Const.	-6.08	2.88		.035
						DEF	.877	.088	.389	.000
						SOI	.315	.047	.239	.000
						DRI	.465	.101	.169	.000
						SIS1	.220	.083	.102	.009
Block 2										
	R^2	Adjusted R^2	Strd Error/Est.	R^2 change	Signif R^2 Δ		*b*	*SE B*	*β*	*p*
	.671	.668	9.49	.325	.000					
						Const.	-1.43	2.03		.479
						DEF	.216	.069	.097	.002
						SOI	.045	.035	.034	.096
						DRI	.116	.072	.043	.109
						SIS1	-.021	.059	-.010	.727
						HBI	.791	.034	.741	.000

Note. Block 1 includes DEF – emotion regulation, SOI – sociosexuality, DRI – religiosity, and SIS1 – sexual inhibition as a result of performance failure. Block 2 adds the Hypersexual Behavior Inventory (HBI) to the Block 1 OLS multiple regression analysis.

Table 25: Study 3, Hypothesis 2. Linear Model of Predictors of Hypersexual Behavior Consequences Scale using Ordinary Least Squares Regression

Block 1										
	R^2	Adjusted R^2	Strd Error/Est.	R^2 change	Signif R^2 Δ		*b*	*SE B*	*β*	*p*
	.345	.341	13.57	.345	.000					
						Const.	-6.08	2.88		.035
						DEF	.877	.088	.389	.000
						SOI	.315	.047	.239	.000
						DRI	.465	.101	.169	.000
						SIS1	.220	.083	.102	.009
Block 2										

	R^2	Adjusted R^2	Strd Error/Est.	R^2 change	Signif R^2 Δ		*b*	*SE B*	*β*	*p*
	.568	.564	10.98	.226	.000					
						Const.	-.278	2.35		.239
						DEF	.283	.080	.125	.000
						SOI	.108	.040	.082	.007
						DRI	.168	.084	.061	.047
						SIS1	.001	.070	.001	.99
						SCS	1.58	.098	.672	.000

Note. Block 1 includes DEF – emotion regulation, SOI – sociosexuality, DRI – religiosity, and SIS1 – sexual inhibition as a result of performance failure. Block 2 adds the Sexual Compulsivity Scale to the Block 1 OLS multiple regression analysis.

Table 26: Study 3, Hypothesis 2. Linear Model of Predictors of Hypersexual Behavior Consequences Scale using Ordinary Least Squares Regression

Block 1										
	R^2	Adjusted R^2	Strd Error/Est.	R^2 change	Signif R^2 Δ		*b*	*SE B*	*β*	*p*
	.345	.341	13.57	.345	.000					
						Const.	-6.08	2.88		.035
						DEF	.877	.088	.389	.000
						SOI	.315	.047	.239	.000
						DRI	.465	.101	.169	.000
						SIS1	.220	.083	.102	.009
Block 2										
	R^2	Adjusted R^2	Strd Error/Est.	R^2 change	Signif R^2 Δ		*b*	*SE B*	*β*	*p*
	.621	.618	10.33	.276	.000					
						Const.	71.20	4.40		.000
						DEF	.155	.076	.069	.042
						SOI	.095	.037	.072	.011
						DRI	.057	.079	.021	.471
						SIS1	.037	.064	.017	.563
						CSBI	-1.00	.050	-.722	.000

Note. Block 1 includes DEF – emotion regulation, SOI – sociosexuality, DRI – religiosity, and SIS1 – sexual inhibition as a result of performance failure. Block 2 adds the Compulsive Sexual Behavior Inventory, control subscale to the Block 1 OLS multiple regression analysis.

Table 27: Study 3, Hypothesis 2. Linear Model of Predictors of Hypersexual Behavior Consequences Scale using Ordinary Least Squares Regression

Block 1										
	R^2	Adjusted R^2	Strd Error/Est.	R^2 change	Signif R^2 Δ		*b*	*SE B*	*β*	*p*
	.345	.341	13.57	.345	.000					
						Const.	-6.08	2.88		.035
						DEF	.877	.088	.389	.000
						SOI	.315	.047	.239	.000
						DRI	.465	.101	.169	.000
						SIS1	.220	.083	.102	.009
Block 2										
	R^2	Adjusted R^2	Strd Error/Est.	R^2 change	Signif R^2 Δ		*b*	*SE B*	*β*	*p*
	.546	.542	11.31	.201	.000					
						Const.	-.956	2.42		.693
						DEF	.273	.083	.121	.001
						SOI	.155	.040	.117	.000
						DRI	.169	.086	.062	.050
						SIS1	.032	.070	.015	.653
						HDSI	1.68	.107	.595	.000

Note. Block 1 includes DEF – emotion regulation, SOI – sociosexuality, DRI – religiosity, and SIS1 – sexual inhibition as a result of performance failure. Block 2 adds the Hypersexual Disorder Screening Inventory, control subscale to the Block 1 OLS multiple regression analysis.

Table 29: Study 3, Hypothesis 2. Linear Model of Predictors of Hypersexual Behavior Consequences Scale using Ordinary Least Squares Regression

Block 1										
	R^2	Adjusted R^2	Strd Error/Est.	R^2 change	Signif R^2 Δ		*b*	*SE B*	*β*	*p*
	.345	.341	13.57	.345	.000					
						Const.	-6.08	2.88		.035
						DEF	.877	.088	.389	.000

						SOI	.315	.047	.239	.000
						DRI	.465	.101	.169	.000
						SIS1	.220	.083	.102	.009
Block 2										
	R^2	Adjusted R^2	Strd Error/Est.	R^2 change	Signif R^2 Δ		*b*	*SE B*	*β*	*p*
	.637	.634	10.07	.292	.000					
						Const.	8.65	2.24		.000
						DEF	.361	.069	.161	.000
						SOI	.168	.035	.128	.000
						DRI	.137	.076	.050	.073
						SIS1	.033	.062	.015	.594
						SAST	2.40	.113	.648	.000

Note. Block 1 includes DEF – emotion regulation, SOI – sociosexuality, DRI – religiosity, and SIS1 – sexual inhibition as a result of performance failure. Block 2 adds the Sex Addiction Screening Test, to the Block 1 OLS multiple regression analysis.

Table 29: Study 3, Hypothesis 2. Linear Model of Predictors of Hypersexual Behavior Consequences Scale using Ordinary Least Squares Regression

Block 1										
	R^2	Adjusted R^2	Strd Error/Est.	R^2 change	Signif R^2 Δ		*b*	*SE B*	*β*	*p*
	.345	.341	13.57	.345	.000					
						Const.	-6.08	2.88		.035
						DEF	.877	.088	.389	.000
						SOI	.315	.047	.239	.000
						DRI	.465	.101	.169	.000
						SIS1	.220	.083	.102	.009
Block 2										

	R^2	Adjusted R^2	Strd Error/Est.	R^2 change	Signif R^2 Δ		*b*	*SE B*	*β*	*p*
	.454	.449	12.26	.112	.000					
						Const.	1.06	2.70		.694
						DEF	.617	.084	.275	.000
						SOI	.169	.045	.129	.000
						DRI	.300	.093	.110	.001
						SIS1	.138	.076	.064	.069
						SAST-M	4.24	.400	.390	.000

Note. Block 1 includes DEF – emotion regulation, SOI – sociosexuality, DRI – religiosity, and SIS1 – sexual inhibition as a result of performance failure. Block 2 adds the Sex Addiction Screening Test, Male Items, to the Block 1 OLS multiple regression analysis.

negative behavioural (criterion) outcomes, over and above the contribution of the personality variables; as well, the statistical significance of the personality variables to the negative HD-related behavioural outcomes fell into three patterns across the 6 separate analyses.

On one HD scale, the Hypersexual Behavior Inventory, once the Hypersexual Behavioral Inventory was added in Block 2, 67.0% of the total variance was accounted for in HD-related negative outcomes. The HBI contributed significantly to the outcome (β=.741, p< .001), although the personality variable of emotion dysregulation remained a significant predictor of negative HD-related behavioural outcomes as well (β=.097, p=.002). Together both variables – the Hypersexual Behavioral Inventory and emotion dysregulation explained a significant proportion of the variance in negative hypersexual behavioral outcomes, Adj. R^2=.67, p< .01 F(5, 553)=225.21, p< .001.

The second and largest grouping of regression analyses included those four scales for which the added HD scale (the IV) significantly predicted negative HD-behavioural outcomes, but interestingly, two personality variables – emotion dysregulation and sociosexuality – also remained significant predictors of negative hypersexual behavioural outcomes. The HDSI significantly predicted negative HD-related behavioural outcomes, β=.595, p<.001, and two personality variables, emotion dysregulation, β=.121, p< .001 and sociosexuality β=.117, p< .001 also significantly predicted negative HD behavioural outcomes. Together these variables explained a significant proportion of the variance in negative HD-behavioural outcomes, Adj. R^2=.54, p< .01 F(5, 554)=133.34, p< .001. A

similar pattern emerged with Sex Addiction Screening Test. When the SAST was added to the second block of the regression analyses following the four personality variables, the SAST significantly predicted negative HD-related behavioural outcomes, β=.648, p< .001, and two personality variables, emotion dysregulation, β=.161, p<.001 and sociosexuality β=.128, p< .001 also significantly predicted negative HD behavioural outcomes. Together these variables explained a significant proportion of the variance in negative HD-behavioural outcomes, Adj. R^2=.63, p< .01 F(5, 561) = 196.91, p< .001. This pattern emerged on a third scale, the Sexual Compulsivity Scale (SCS). When the SCS was added to the second block of the regression analyses following the four personality variables, the SCS significantly predicted negative HD-related behavioural outcomes, β=.627, p< .001, and two personality variables, emotion dysregulation, β=.125, p< .001 and sociosexuality β=.082, p< .001 also significantly predicted negative HD behavioural outcomes. Together these variables explained a significant proportion of the variance in negative HD-behavioural outcomes, Adj. R^2=.56, p<.01 F(5, 552) = 143.87, p< .001. Finally, the same pattern of results emerged in the Compulsive Sexual Behavior Inventory, control subscale (CSBIc). When the CSBIc was added to the second block of the regression analyses following the four personality variables, the CBSI significantly predicted negative HD-related behavioural outcomes, β=-.722, p< .001, and two personality variables, emotion dysregulation, β=-.069, p= .042 and sociosexuality β=-.072, p= .011 were marginally significant predictors of negative HD behavioural outcomes. Together these variables explained a significant proportion of the variance in negative HD-behavioural outcomes, Adj. R^2=.62, p< .001 F(5, 567) = 184.08, p< .001.

The third and final pattern of outcomes was seen on one scale, the Sex Addiction Screening Test, Male items, which significantly predicted negative HD-behavioural outcomes, β=.390, p< .001, but interestingly, three of four regressed personality variables – emotion dysregulation, β=.275, p<.001, sociosexuality, β=.129, p< .001, and religiosity, β=.110, p< .001 – also remained significant predictors of negative hypersexual behavioural outcomes. Together the SAST, Male items, plus three personality variables explained a significant proportion of the variance in negative HD-behavioural outcomes, Adj. R^2=.45, p< .001 F(5, 560) = 91.37, p< .001.

4.5 Discussion

Study Three investigated whether theoretically relevant personality variables may better account for negative hypersexual behavioural outcomes than existing scales that purport to assess behavioural outcomes associated with hypersexuality. In other words, we explored whether the negative life outcomes associated with being hypersexual could be largely accounted for by high sexual desire, high sociosexuality, erotophilia, religiosity, combined with low sexual inhibition, and high emotion dysregulation. In analyses of the relation of personality variables with negative behavioural outcomes, emotion dysregulation, sociosexuality, religiosity and sexual inhibition due to threat of performance failure combined to explain 32.3% of the variance in negative hypersexual behaviour consequences. In this analysis, emotion dysregulation alone predicted a large portion of the variance in negative hypersexual behavioural consequences when personality variables were entered in regression analysis. Hypothesis 2 examined the extent to which personality variables may better account for problematic hypersexual behavioral outcomes than the HD scales themselves. Results of these regression analyses showed that HD scales uniformly accounted for unique variance in the negative hypersexual behaviour outcomes criterion, over and above the contribution to prediction of personality variables. Among all personality variables examined, emotion dysregulation was of particular interest as it is one of several variables comprising the umbrella construct of executive cognitive functioning and more specifically, has been noted as a potentially fruitful area of inquiry that may account for some of the variance in what has been labelled “problematic hypersexuality”. Given these regression findings, and the medium effect size of emotion dysregulation with all HD scales, it appears that while emotion dysregulation may be an important component of problematic hypersexuality, it is likely a distinct construct from HD.

It is worthwhile noting that the emotion dysregulation measure used was a subscale within an Executive Functioning measure that may be employed as part of a comprehensive assessment of Attention-Deficit/Hyperactivity Disorder (ADHD). Hypothesis 1 emotion dysregulation findings, in particular, are consistent with recent research, which found within a large non-clinical sample that ADHD symptoms

explained 22.0% of the variance in hypersexuality with a positive moderate association between ADHD and HD (β=.500, 95% CI .0475-.0520)(Bothe, Koos, Toth-Kiraly, Orosz & Demetrovics, 2019). At the same time, however, a recent review article of several behavioural addictions suggested that the associations between behavioural addictions (i.e, sex, gambling, Internet gaming) and several "Axis 1" disorders, including depression, anxiety, and ADHD to a lesser extent, are strong and non-specific, meaning they are not confined to only some behavioural addictions (Starcevic & Khazaal, 2017). Thus it may be that those individuals who experience dysregulated emotions resulting from depression, anxiety, or a lifelong neurocognitive developmental disorder like ADHD, are inclined to behave in any number of ways that may become problematic, either via an exogenous addictive substance, or through a repeated behaviour (i.e., sex, or gambling). In short, overwhelming dysregulated emotions may lead to any number of unspecified behaviours, that could at different times throughout an individual's lifetime, be relied upon to ameliorate or avoid negative affective experiences, even as they pose risk for negative outcomes that could, paradoxically, elicit negative emotions and problematic coping behaviours. Of relevance here is that when high emotion dysregulation is combined with high sex drive in a given individual, sexual release may become the learned coping mechanism for coping with negative affect/emotion dysregulation.

Sociosexuality was also thought to be a potentially important contributor to negative HD behavioural outcomes and Study Three is the first study in the HD literature to examine how sociosexual orientation, or an individual's tendency to prefer casual, uncommitted sexual relationships with others, interacts with hypersexuality. Sociosexuality remained a separate predictor significantly contributing to HD-related negative behavioural outcomes, even when analyzed against another HD scale. Study Three findings do not suggest that sociosexuality is explaining a large portion of the variance in negative HD-related behavioural outcomes, and importantly, HD appears to be a distinct construct from sociosexuality.

Findings for the sexual inhibition variables, SIS1 - sexual inhibition as a result of performance threat - replicated prior research (Rettenberger, Klein & Briken, 2016;

Walter, Cantor & Lykins, 2017) and weakly confirmed Study Three's hypothesis, with SIS1 demonstrating a weak but positive relationship with the criterion measure (r=.29, p< .01). However, SIS1 did not significantly predict HD-related negative behavioural outcomes. Contrary to expectation, the second sexual inhibition variable, SIS2 – sexual inhibition as a result of threat of performance consequences – did not replicate, and rather than the expected weak relationship between SIS2 and the criterion, no relationship of significance was observed with SIS2 and the criterion, nor with any of the HD scales. Perhaps the most interesting finding among the Dual Control Model SIS/SES scales was that sexual excitation (SES) alone did not play a larger role in negative behavioural outcomes associated with the criterion (r=.29, p< .01) and it did not remain a significant predictor of problematic negative hypersexuality-related behavioural criterion outcomes. Common sense might suggest that hypersexual behaviour is fueled largely by high desire/high sexual excitation. In fact, past research has suggested that a sole latent construct accounts for both sexual compulsivity and sexual desire in treatment and non-treatment seeking men and women, suggesting that dysregulated sexuality is indistinguishable from high sexual desire (Winters, Christoff & Gorzalka, 2010). Such a view questions whether hypersexuality is simply at the extreme end of normophilic sexual functioning (Montgomery-Graham, 2016; Walton, Cantor, Bhullar & Lykins, 2017). Within our sample, this was not the case, and in fact, neither sexual excitation (SES), nor sexual desire (measured by the Sexual Desire Inventory and excluded from analyses because of multicollinearity between sexual excitation (SES) and sexual desire (SDI)), significantly contributed to any of the analyses examining the HD construct in Study Three.

Religiosity was also explored as a potential predictor variable in negative hypersexual behavioural outcomes in regression analyses. While religion correlated significantly in the expected direction with the Hypersexual Behavior Consequences Scale (r=.270, p< .01), and achieved small effect sizes with the HD predictor (IV) scales, religiosity failed to contribute significantly to HD outcomes when tested against any of the HD scales in the Block 2 analyses. Although religiosity did significantly predict hypersexual outcomes in the linear model in hypothesis one, the R^2 change with the addition of the variable was only .035, and the squared partial correlation was .02, indicating religiosity accounted for

a small unique portion of the relative variance in hypersexual behavioural consequences (not reported here). This modest relationship between religiosity and negative hypersexual behavioural outcomes was hypothesized in light of recent studies that support the notion that religiosity and moral disapproval of pornography may contribute to the self-perception of being addicted to pornography in a non-clinical, non-treatment seeking sample (Gola, Lewczuk & Skorko, 2016; Grubbs, Exline, Pargament, Hook & Carlisle, 2015; Grubbs, Volk, Exline & Pargament, 2015). Study Three is a community sample and findings are consistent with findings in a clinical sample where assessed subjects met the criteria for hypersexual disorder, but no relationship with religiosity was found (Reid, Carpenter, & Hook, 2016).

4.6 Conclusion

Study Three findings suggest that various theoretically and empirically relevant personality variables do not appear to better account for negative behavioural outcomes associated with hypersexuality than the current HD scales. While the most common HD scales are all significantly positively correlated among one another (with Pearson correlations ranging from .53-.88, $p < .01$), each HD scale may capture a slightly different portion of the HD construct. Some authors have suggested that hypersexual behaviour is likely rooted in several differing variants of hypersexual taxa (Walton, Cantor, and Lykins, 2017), and we propose that Study Three has likely captured and affirmed but one taxon of HD, namely high emotion dysregulation, which may contribute to, but appears to remain distinct from problematic hypersexuality. As well, Study Three adds to the body of HD literature that suggests that problematic hypersexuality has strong construct validity, and is not simply high normophilic sexual desire in and of itself, nor is hypersexuality better explained by theoretically relevant personality variables, but is distinct from individual differences.

Chapter 5

5 Discussion, Limitations of the Current Research and Future Directions

This program of research set out to examine the utility of the hypersexual disorder construct, as measured by the most common HD measurement instruments, to test various scales' ability to predict negative life outcomes associated with HD, as well as to examine whether other variables may better predict the negative consequences of out-of-control sexual behaviour. Study One reviewed the extent to which problematic hypersexuality scales are pathologizing normative sexual behaviour in males of various age cohorts, with a particular interest in the youngest males, aged 18 to 24. Overall, most of the HD scales captured far too many men across all age cohorts as problematically hypersexual, thereby calling into question the utility of an HD diagnosis as currently measured. Only one scale, the Sexual Compulsivity Scale, produced a reasonable prevalence estimate of sexual compulsivity/hypersexuality in both the youngest (aged 18 to 24) and oldest groups (35 to 45) of males.

Study One also contributed novel discriminant and convergent validity evidence regarding the problematic hypersexuality scales. One discriminant validity measure, social desirability, performed as expected, with weak but significant negative associations across all hypersexuality scales, suggesting that when participants were answering questions about their sexual feelings, and behaviours, they were not markedly inclined to answer in a socially desirable light. The second discriminant validity measure – empathy – demonstrated a weak but stable positive relationship across all hypersexuality scales. Findings that increased empathy correlated with higher hypersexuality lend support to the conceptualization of non-paraphilic, problematic hypersexuality as quite distinct from those paraphilic disorders with hypersexual (and possible anti-social) features, (i.e., specifically voyeuristic, exhibitionistic, and frotteuristic disorders). The convergent validity measure – masculinity - showed weak but significant positive associations across the problematic hypersexuality scales. These findings suggest that hypersexuality scales are not simply capturing traditional notions of masculinity, but capture a distinct concept

emphasizing distress at how one experiences their sexual fantasies, urges, and behaviours.

Study Two in this program of research examined whether, regardless of the apparent over-selection of males as problematically hypersexual, these commonly used scales were related to age-appropriate negative life outcomes associated with feelings of out-of-control sexual behaviour. Across all age cohorts (18 to 45 years inclusive), those individuals flagged as problematically hypersexual across various scales are, in fact, associated with negative behavioural outcomes, including: a tendency to have secretive, extra-dyadic sexual relationships, relationship distress, as well as the feeling that too much time and money are being wasted on sex-related activities. The oldest hypersexual males (36 to 45 years) in Study Two were likely to have all of these above noted outcomes, as well as being more likely to engage in condomless anal sex with a new partner, to encounter discipline at work from sex-related behaviours, pay a stranger for sex, and be subject to police questioning of their sexual behaviours. The middle age HD cohort (25 to 35 years), which was also discovered post hoc to have the highest proportion of alleged sexual offenders, was likely to experience all of the negative consequences of hypersexual behaviour that the youngest and oldest cohorts encountered, as well as experiencing difficulties at work for watching pornography. The middle cohort of problematically hypersexual males were the only group that was likely to have HIV+ status across many of the scales.

We found evidence of strong criterion validity across all Study Two HD scales in terms of both the number of positive correlations among scales and criterion items, as well as positive correlations between problematic hypersexuality and many of the particularly serious criterion items (i.e., negative public health outcomes, or outcomes related to civil or criminal liability). Importantly, Study Two revealed that among both the youngest and oldest cohorts of men, the top three psychometrically strongest scales (Montgomery-Graham, 2016) were also associated with the highest number of criterion items. The psychometrically strongest scales are the Hypersexual Behavior Inventory, the Hypersexual Disorder Screening Inventory and the Sexual Compulsivity Scale. Thus, within the youngest and oldest male cohorts, criterion validity aligns with psychometric

strength of the scales. Within the middle cohort of males (25 to 35 years), an unusually large number of alleged sex offenders was sampled and is hypothesized to have impacted results within this cohort. Overall, within the middle cohort of participants, the 3 psychometrically strongest scales are associated with between 19 to 21 of 23 possible researcher-generated negative criterion items, and with 4 to 5 of those items that are the most severe. Unexpectedly, 6 items that are adjunct to the main Sex Addiction scale (the Male items), were strongly associated with all severe negative behavioural outcomes associated with problematic hypersexuality. These 6 sex addiction items are proposed to have performed well because the Sex Addiction scales (unlike the other HD scales) are strongly historically associated with anti-social and criminal sexual behaviour (Marshall & Marshall, 2006).

Study Three examined whether certain theoretically and conceptually related personality variables could account for negative HD-associated outcomes as well as, or perhaps, better than the HD scales themselves. Study Three successfully ruled out some variables that had been hypothesized to be related to negative outcomes associated with hypersexuality. Specifically, erotophilia, and sexual inhibition as a result of performance consequences (SIS2) are unrelated to being hypersexual in this sample of North American men. In particular, the modest negative relationship between hypersexual behaviour and erotophilia is interesting and suggests that hypersexual behaviour may be egodystonic in hypersexual males, much like an individual's sexual obsessions can be an upsetting feature of OCD. In other words, weak negative correlations between erotophilia and hypersexuality suggest that sex and sexuality may not be experienced as positive and life affirming for individuals with problematic hypersexuality. This makes sense given that non-exclusive heterosexual orientation, and/or high religiosity, and/or internal moral conflict about one's own sexual desires, have been hypothesized to be the combined impetus behind a supposed erotic conflict that creates distress for some individuals with problematic hypersexuality (Braun-Harvey & Vigorito, 2015). SIS2 or *sexual inhibition as a result of performance consequences,* was not related to HD within this sample. Instead, in this study SIS1 or *inhibition as a result of performance failure* findings are consistent with prior research and suggests that sexual behaviour may be linked to "self-treatment" to aid the fear of performance failure (Rettenberger, Klein & Briken, 2016).

Past research has linked SIS1 to risky sexual behaviour and sexual sensation seeking, which may be explained by individuals with HD seeking riskier and sensationally oriented sex in an effort to not lose sexual arousal (Bancroft, Janssen, Strong, Carnes & Long, 2003; Bancroft & Vukadinovic, 2004).

Study Three findings also confirmed past research suggesting emotion dysregulation is highly correlated with hypersexual behaviour. Studies have existed in the HD literature for almost a decade suggesting the clear links between the emotion dysregulation of ADHD, and problematic hypersexuality (Mulhauser et al., 2011; Reid et al., 2014; Reid et al., 2011a; 2011b; Soek & Sohn, 2018). As discussed following Study Three, it seems likely that those individuals who experience dysregulated emotions resulting from a lifelong neurocognitive developmental disorder like ADHD, are individuals who are also inclined to engage in any number of repeated behaviours that may ultimately become problematic (i.e., gambling, shopping, eating, exercising). Whether or not we conceptualize these compulsive, repetitive behaviours as "behavioural addictions", we do know from longitudinal data that those children with childhood ADHD (and associated emotion dysregulation), are also significantly more likely to develop substance use disorders later in life than individuals without ADHD (Lee, Humphreys, Flory, Liu & Glass, 2012). The relationship between HD and ADHD remains a fruitful area for further sustained empirical inquiry. Research investigating HD and emotion dysregulation/ADHD would benefit from consistent use of measurement instruments across studies so new research builds upon prior research. Research into this area would also benefit from a clear parsing of which type of ADHD is being studied, as it is unclear whether the inattentive type of ADHD would give rise to the same emotion dysregulation and HD outcomes that hyperactive/impulsive or mixed subtypes would present.

It was unsurprising that the Sex Addiction Screening Test over-selected participants as potential "sex addicts". Study One in particular provided an opportunity to examine the sex addiction scales more closely. Across age cohorts, approximately 1/3 of men were screened as potential "sex addicts" using the Sex Addiction Screening Test-Revised. Of all 4 scales with empirically established cut scores examined in Study One, the sex addiction screening test selected the highest number of men as sex addicts within each

age cohort. Looking at the sex addiction scale at an item level, 5 of 20 items on the sex addiction test ask about shame related to sexual behaviours. A score of 6 is needed to reach the cut score, suggesting that feelings of shame related to sexual thoughts, feelings and behaviours alone could lead to self-labeling as a sex addict. Similarly, the adjunct scale contains the 6 "Male items", that scale authors suggest are included to assist in discriminating components of addictive behaviour (Carnes, Green & Carnes, 2010). Four of 6 Male items query pornography use and the 2 remaining items query hiring a sex worker and having sex with a minor. The Male Items scale range is 0-6, and the cut score is 3, suggesting a large percentage of North American males who have ever used pornography reasonably often would likely meet this cut score.

Indeed, this socially conservative conceptualization of *sex addiction* might be creating "spill-over effects" by labelling large numbers of men as problematically hypersexual/*sex addicted*, and allowing those men who engage in any form of anti-social sexual behaviour to claim they are suffering from an addiction, rather than engaging in behaviour for which they are wholly to blame. The socially conservative cultural underpinning to the sex addiction scale is important since the sex addiction scale was the first scale to create a cultural awareness and the nomenclature of "sex addiction". Treatment facilities for sex addiction have become a multi-million-dollar industry over the past several decades. Sex addiction treatment facilities are sometimes used to manage the public outcry in response to internationally known famous individuals who have been accused of sexual harassment and/or sexual assault, including Tiger Woods (Donegan, 2010), and more recently Kevin Spacey (Dovey, 2017), and Harvey Weinstein (Hamblin, 2017). These sex addiction treatment facilities appear to be relied upon to cleanse one's public image following a sex scandal, rather than to treat their "sex addiction".

Relatedly, the ideology underpinning the notion of sex addiction may be observed via comparison with the ICD-11's (WHO, 2018) proposed diagnosis of *Compulsive Sexual Behaviour Disorder* (CSBD). The ICD is the European and UK diagnostic code used in place of the largely North American DSM-5. The proposed ICD-11 diagnostic language for *Compulsive Sexual Behaviour Disorder* is housed within *Impulse Control Disorders* rather than under the category of *Other sexual dysfunctions not due to substance or*

physiological conditions. Like the sex addiction framework, CSBD includes an inability to control intense, sexual impulses and sexual behaviour; symptoms may include repetitive sexual activities becoming a central focus of one's life, unsuccessful efforts to stop repetitive sexual behaviour, and continued sexual behaviour despite poor outcomes or deriving no satisfaction from sexual behaviour. Importantly, like HD, CSBD requires associated distress, but explicitly excludes "distress that is entirely related to moral judgments and disapproval about sexual impulses, urges or behaviours…" (ICD, 2018). Plausibly, this diagnostic exclusion is the crux of the distress in many instances of sex addiction (and even the more evidence-based HD diagnosis) in North America.

A surprising finding in the three studies was that a large percentage of the middle age group of men (aged 25-35) had unexpected patterns throughout the studies – all scores were higher across scales, and a much larger percentage of the 25-35-year old males were captured as being problematically hypersexual. As a result, within Study Two, the criterion validity study, HD men aged 25 to 35 were more likely to encounter all possible negative outcomes associated with hypersexual behaviour. For an unknown reason, more alleged sex offenders were sampled in the middle cohort, and a large number remained for Studies Two and Three. Even when alleged sex offenders were excluded from analyses, however, the unusual "bump" in the data remained, with a very large percentage of the middle cohort being problematically hypersexual. The possibility of a cohort effect remains plausible as a means to interpret these unexpected cohort findings. From 1983 to 1993, during the George W. Bush Administration in the United States, federal funding increased substantially for abstinence-only-until-marriage education (Sexuality Information and Education Council of the United States, 2019). Meta-analytic research has confirmed that the abstinence-only education had the unintended effect of increasing adolescent birth rates within conservative States (Fox, Himmelstein, Khalid & Howell, 2019). More importantly to these research findings is the possible negative impact that heteronormative sex education has on the education and cultural climate of LGBTQ youth (Elia & Eliason, 2010). It is not hard to imagine that the high unrestricted sociosexuality associated with testosterone surges of adolescence, combined with the heteronormative values promoted behind abstinence-only education in the Red States may have created the perfect storm for a cultural concern with perceived hypersexuality.

These three studies suggest that hypersexuality has strong construct validity, and strong criterion validity. Findings also suggest that negative hypersexual behavioural outcomes cannot be better explained by clusters of theoretically relevant and empirically informed personality variables. This cannot, of course, be taken as evidence that hypersexual disorder should be accepted as a diagnosis – it remains quite possible that some other personality variable not measured in these studies, better explains negative outcomes associated with hypersexual behaviour. Indeed, we suspect this is the case. The fact that a surprisingly high number of men across age cohort met cut scores for problematic hypersexuality across scales reinforces this suspicion. Likely something other than a true pathology is being detected by these scales, and one wonders how we might account for this unexpected outcome? Tentatively and somewhat speculatively, we suggest a two-part model as to what has been revealed by this series of studies (see Figure 2). First, a transdiagnostic construct that underlies many of the disorders with which problematic hypersexuality typically co-occurs is likely present. For example, strong research evidence suggests that mood disorders (Bancroft et al., 2003; Janssen, Macapgal & Mustanski, 2013), and attention deficit hyperactivity disorder (ADHD; Bothe, Koos, Toth-Kivaly, Orosz & Demetrovics, 2019; Reid, Davitan & Lenartowicz, 2013) tend to co-occur with problematic hypersexuality. Similarly, emerging evidence suggests that obsessive compulsive spectrum disorders (Levi et al., 2020), and substance use disorders (SUD; Wan, Finlayson & Rowles, 2000) may also co-occur with problematic hypersexuality. Thus, plausibly mood disorders, ADHD, OCD, and SUDs may share a common underlying dimension. Second, shame about one's sexual fantasies, urges, and behaviours, and/or emotion dysregulation are proposed as critical components that may underlie the distress associated with sex and sexual behaviour. In other words, it is not simply a common transdiagnostic construct that leads to feelings and beliefs that one's sexuality is problematic. Instead, in some instances of ADHD, or a mood, substance, or obsessive-compulsive disorder, when an individual also feels distress about sex, that individual likely also requires one or both of: (a) shame about one's sexual desires, and (b) emotion dysregulation. For example, if an individual is one of the 10.0 -15.0 % of men who becomes hypersexual with depression/anxiety, this alone is not sufficient to reach cut scores on one of the problematic hypersexuality scales. The individual with

depression/anxiety, and increased sexual desire also requires *distress* associated with these increased sexual fantasies, urges, and behaviours. We posit that the distress is related to the individual's interpretation of their sexual behaviour and may, in fact, be rooted in shame and/or emotion dysregulation. Increased frequency of sexual fantasies, urges, and behaviours in and of themselves, is not necessarily problematic. One also needs the distress that we speculate is related to shame and emotion dysregulation (Figure 2).

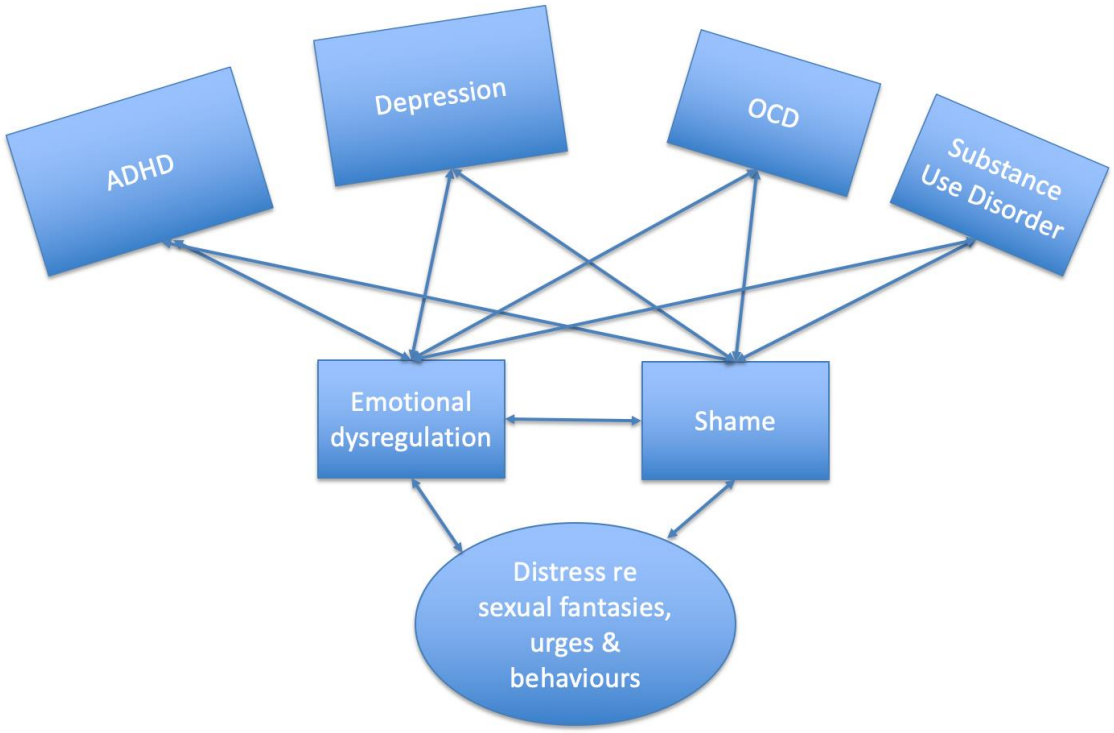

Figure 2: Transdiagnostic novel model explaining study outcomes

5.1 Limitations

While every effort was made to rigorously conduct this research, all studies may benefit from improvement. One of the most obvious limitations to the generalizability of this research was the use of MTurk workers as participants. While Amazon provides some reassurance to researchers that we are accessing only those participants who have been

highly rated as participants who provide reliable data, we never can truly be certain whom it is we are accessing online. Relatedly, while past research has demonstrated that attention paid by MTurk participants is as good as, if not superior to, typical undergraduate populations from which psychology has historically drawn, in general MTurk workers do tend to be younger, more highly educated, with less stable employment and lower household incomes than the average American family (Ross, Zaldiva, Irani & Tomlinson, 2010). Of course, while research has suggested that MTurk samples are not nationally representative of the US population as a whole, neither are the College, Internet and community samples upon which psychology has historically relied (Keith, Tay & Harms, 2017). Relatedly, only those males who are computer literate and who have access to a computer could be sampled for this TurkPrime online research. Arguably, some of the most marginalized men (i.e., low SES racialized men, and sexual minorities) who may have been able to provide richness to the data were simply not able to participate in this research as such individuals do not have Internet access. These specific limitations in the current data are unfortunate given that recent epidemiological estimates of HD hint that minority health status and sociocultural norms are very relevant to distress regarding one's sexual behaviour (Dickenson, et al., 2018). Future research targeting marginalized racial/ethnic, income, and sexual minority groups will help to parse out how internalized minority stressors impact one's feelings that their sexual behaviours are out-of-control.

While we do have a good deal of high caliber research investigating gay, bisexual and MSMs and out-of-control sexual behaviour, much of it was completed in a different era when both the untreatability and stigma of HIV+ status, which was a death sentence, and impacted sexual behaviours in different ways than it would today. The impact of STIs, including HIV+ status in light of pre-exposure prophylaxis before intercourse, and daily antiretroviral therapy for those with acquired immune deficiency syndrome, remain a fruitful area for further HD research inquiry. Similarly, research is warranted among compulsive sexual behaviour and *chemsex* which is the use of psychoactive substances including methamphetamine, cocaine, or ketamine, or alkyl nitrates (*poppers*) to facilitate, intensify, and prolong sexual activity and performance (Maxwell, Shahmanesh & Gafos, 2019). In young MSM communities in particular, chemsex deserves research

attention to better understand how compulsive sexual behaviours combine with substance use disorders and are likely complicated by minority stressors.

Another limitation in this research includes the heteroscedasticity of the Study Three dataset, which was identified by examining the scatterplot of the residuals (i.e., the error terms), and observing a clear cone shape in the data. An assumption of linear regression is homoscedasticity, meaning the standard deviation of the errors of prediction are approximately equal around the regression line, indicating that the variation in the residuals is similar at each point across the model (Tabachnick & Fidell, 2013). Tabachnick and Fidell (2013) note that heteroscedasticity does not invalidate, but rather weakens the analyses. Thus, it is possible that the coefficient estimates in Study Three, in particular, are less precise, and this may increase the likelihood that the coefficients are further than expected from the true population values. As well, the heteroscedasticity may have led to smaller *p* values than warranted, as well as *t*-values and *F* values that were calculated with underestimates of variance. For this reason, a more stringent *p* value of $p < .01$ was used, rather than $p < .05$.

A limitation of these studies which is true of all sex research is the possibility that only particularly erotophilic participants self-selected into the research, leaving an unrepresentative sample. For example, the study title posted on TurkPrime indicated that participants were going to be asked about their personal sexual feelings, cognitions, and behaviours, and plausibly those participants who opted to complete the research may have been qualitatively different (i.e., more erotophilic), than those who opted not to complete the studies. Having said that, however, erotophilia findings were consistent with past research indicating the male participants in these studies were similar on this dimension to many other samples, both within and outside of North America (Gilbert & Gamache, 2010).

Finally, young men aged 18 to 24, who were the most important group for Study One, were difficult to access during the recruitment period of these studies in the fall of 2018. While initial Study One recruitment and data collection began very quickly, it tapered off quickly as well, and no further participants could be recruited. Small sample size may

have increased false positives and decreased the power of the findings among this young group of men. Future research that samples young community males from multiple sources including through social media, blog sites, as well as through sustained crowd sourcing, would be a welcome addition to the literature as the presentation of hypersexual disorder in young men remains unclear outside of undergraduate participants.

Chapter 6

6 Conclusion

Among the existing HD instruments that have been investigated in this program of research, HD is a robust construct with high correlations among the most commonly used scales. While some research exists suggesting that problematic hypersexuality is simply the high end of the normophilic desire spectrum that does not warrant a diagnosis, other research suggests that problematic hypersexuality is, in fact, a replicable, and distinct cluster of distressing symptoms. This series of studies suggests that problematic hypersexuality is more than a facet of high desire alone; problematic hypersexuality appears to be high desire combined with emotional lability with some unrestricted sociosexual orientation. It appears that this particular combination of traits may fuel an erotic conflict that may underlie the distress that these scales all consistently capture. Whether Hypersexual Disorder becomes a diagnosis in DSM-6 remains to be seen. In the meantime, a great deal of robust and replicated research needs to be conducted to thoroughly understand how combinations of sexual desire, emotion dysregulation, sex-negativity, and erotic conflicts lead to distress, before we may confidently conclude that Hypersexual Disorder warrants its own diagnosis.

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Appendices

Appendix A:

Potential Indicators of Hypersexuality (abbreviation of Levaque et al., 2016)

1. Average desire for sexual contact per month
2. Average number of sexual contacts per month
3. Number of sexual contacts last month
4. Lifetime number of male sexual partners
5. Number of male sexual partners in the last 12 months
6. Lifetime number of female sexual partners
7. Number of female sexual partners in the last 12 months
8. Lifetime number of female sexual partners
9. Number of female sexual partners within the last 12 months
10. Number of new sexual partners within the last 12 months
11. Simultaneous sexual partners within the last 12 months
12. Lifetime group sex
13. Number of occurrences of solo masturbation within the last month
14. Average weekly solo masturbation
15. Lifetime number of sexual partners with whom you have had penetrative intercourse
16. Number of sexual partners with whom you have had penetrative intercourse over the last week

Scale for questions 17 and 18:

(1-never)(2-less than once per month)(3-once per month)(4-once per week)(5-many times during a week)(6-once per day)(7-many times per day)

17. Frequency of sexual thoughts per month over the last year
18. Frequency of sexual thoughts during non-sexual activities

Appendix B:

List of Instruments to be used with each Study

Study One – Replication and Extension	**Purpose**	**Items**
Demographic questions	Basic info re subjects	10
Sexual Compulsivity Scale	HD scale	10
Compulsive Sexual Behavior Inventory	HD scale	28
Hypersexual Behavior Inventory	HD scale	19
Hypersexual Behavior Consequences Scale*	HD scale	23
Kinsey's Total Sexual Outlet	HD scale	1
Composite Hypersexuality Measure + HD indicators	HD scale	23
Hypersexual Disorder Screening Inventory	HD scale	7
Sexual Addiction Screening Test	HD scale	25
Bem Sex Role Inventory	Discriminant validity	13
Empathy Scale	Discriminant validity	22
Marlow-Crowne Scale	Social Desirability	13
Honesty Question	Honesty in reporting	1
Total Study One Items		**195**

Studies Two and Three are administered to participants as one set of questions			
Study Two – Criterion Validity	**Purpose**	**Items**	**Totals**
Demographic Questions	Ascertain who remained	9	
Researcher generated criterion items in Appendix D	Criterion validity of 8 HD scales	25	
Total Study Two Items			**34**

Study Three – Competing Variables to predict HD	**Purpose**	**Items**	
Sexual Desire Inventory	Sexual desire	14	
Dual Control Model	Combination of sexual inhibition and excitation	45	
Mood and Sexuality Questionnaire	Depression/anxiety associated with hypersexuality	30	
Revised Sociosexual Orientation Inventory	Tendency toward liberal sexual values, behaviours, beliefs	9	
Barkley Deficits in Executive Functioning Scale (regulation of emotion dimension)	Emotional regulation within executive dysfunction	13	
Duke University Religion Index	Religiosity	4	
Sexual Opinion Survey	Erotophilia/erotophobia	21	
Hypersexual Behavior Consequences Scale*	Criterion item	-	
Total Study Three Items		**136**	
Total Study Two + Study Three Items			**170**

Note. the Hypersexual Behavior Consequences Scale is administered in Study One, and used as a criterion item in Study Three, which is why it does not add to the total number of items administered in Study Three.

Appendix C:

Study One Advertisement, Letter of Information, Consent and Debriefing Form

MTurk Advertisement (Study One)

Researchers at Western University in London, Ontario, Canada are studying attitudes and behaviors in relation to sexual behavior, attitudes, and personality. If you choose to participate, you will be asked to answer a series of questionnaires about your sexual attitudes and behaviors.

If this sounds interesting to you, and you are **male**, between **18-45 years** of age, **speak English fluently**, and have an active MTurk account with at least **97% approval** from previous experiments, we would like to hear from you.

This study should take approximately 30 minutes to complete and you will be compensated with $1.00 for participation. Following participation in this study, you will be invited to participate in a second shorter study (approximately 15 to 20 minutes), with compensation of $1.50 for the second study.

If you would like to contact the researcher, you may contact PhD student Stephanie Montgomery-Graham via electronic mail at: XXXX, or by telephone at XXXX.

{link will be provided here}

LOI-INS 1.

Exploring Assessments, Consequences, and Basic Personality Underpinnings of Hypersexuality

Investigators: Doctoral Candidate, Stephanie Montgomery-Graham, LL.M., M.Sc. XXX, and William Fisher, Ph.D., Principal Investigator XXX.

1. Invitation to Participate

We invite you to participate in a research study of personality, and sexual thoughts, feelings, and behaviors conducted by Ph.D. Candidate, Stephanie Montgomery-Graham, LL.M., M.Sc., under the guidance of Dr. William Fisher (the Principal Investigator) of the Department of Psychology at the University of Western Ontario. You have been invited to participate because you expressed an interest in participating through Amazon's Mechanical Turk (MTurk).

2. Purpose of this Letter

The purpose of this letter is to provide you with information in order to allow you to make an informed decision regarding participation in this research. Participation may involve exposure to sensitive questions, and it is advised that you conduct the study in a private place. You have the option to decline to take part or to withdraw from the study at any time without threat of penalty.

3. Purpose of this Study

The purpose of this study is to better understand personality and sexual behavior. The findings from this study will be used to better understand the relationships, if any, between personality factors, and thoughts and attitudes towards sexual behaviors. Responses are completely anonymous.

4. Inclusion Criteria

Individuals interested in joining the study must be male, between 18-45 years of age, must speak English fluently, and have an active MTurk account with at least 97% approval from previous experimenters in whose studies they have participated.

5. Exclusion Criteria

Individuals who are female, 17 years of age or under, 46 years of age or older, or who do not speak English fluently, and/or do not have an active account with MTurk with at least a 97% approval rating are not eligible to participate in this study.

6. Study Procedures

This study takes place online and participants will be given up to $2.50 US in total <u>if participants take place in both a longer initial study ($1.00 US), and then agree to participate in a second much shorter-study ($1.50 US).</u> You will be asked to answer a

short questionnaire that assesses demographic information. Next, you will be asked to complete several scales that assess personality characteristics and attitudes and behaviors concerning sexuality. If you agree to complete the short, second part of the study, you will be asked questions about various personality characteristics. Once the questionnaire(s) is/are complete, you will be directed to a debriefing page and will be assigned an anonymous code used to claim compensation. The first part of this study will take approximately 30 minutes to complete. The second part of the study will take about 10 minutes to complete. If you choose to leave the study early, please contact the researchers to obtain your debriefing information.

7. Possible Risks and Harms

Please be aware that certain questions are of a personal nature and could potentially occasion minor discomfort. If for any reason you experience discomfort, you are free to withdraw at any time. Additionally, if you experience discomfort and would like to talk with someone about any emotions that the study may have evoked, we recommend contacting a local mental well-being hotline.

8. Possible Benefits

You may not directly benefit from participating in this study, although participation may be interesting and educational, and your participation will contribute meaningfully to the body of knowledge in psychology, and will also benefit society by providing greater understanding of how an individual's personality, attitudes, and behaviors towards sex may interact.

9. Compensation

If you meet the eligibility criteria, and you participate in the survey, you will receive $1.00 for the first part of the survey. You will then be invited to complete the second part of the survey. If you complete the second part of the survey also, you will receive an additional $1.50 US. You will be provided with an anonymous code that you will use to claim Mturk compensation. You will not be required to complete all of the questions to receive compensation. If you exit the survey before the end, you must contact the researchers at XXXX to request compensation.

10. Voluntary Participation

Participation in this study is voluntary. You may refuse to participate, refuse to answer any questions, or withdraw from the study at any time.

11. Confidentiality

All data collected are anonymous. If you choose to withdraw from this study and you close the program prior to submitting your answers, your data up until that point will automatically be saved in the system and therefore will exist in our database. However, if you choose to terminate your participation in the study, regardless of how much of the study you have completed, you can request to have your data removed from the database by emailing the

researchers at the email address noted below. Given that all data are anonymous, note that it may not be possible for us to remove your specific data although a reasonable, good faith effort will be made to do so. In accord with academic guidelines, the anonymous database may be made available to other academic researchers who would like to analyze it. Representatives of The University of Western Ontario Non-Medical Research Ethics Board may require access to study-related records to monitor the conduct of the research, but please be advised that your data are completely anonymous. You do not waive any rights by consenting to this research.

12. Contacts for Further Information

After you complete this study you will receive debriefing information explaining the nature of the research. If you would like any further information regarding this research project or your participation in the study, you may contact the researcher XXXX, or at XXXX. You can also contact the study's Principal Investigator, Dr. William Fisher, by email XXXX). If you have any questions about your rights as a research participant or the conduct of this study, you may contact the University of Western Ontario Office of Research Ethics by phone XXX or email XXXX.

13. Publication

If you would like to receive a copy of any potential study results, you may contact the researcher by email XXX.

14. Privacy

We are collecting no identifying personal information about you when you participate in this study. Once collected, all data are anonymous and will be stored on an encrypted hard drive accessible only by the PhD student researcher. All data will be destroyed after 7 years. None of the data will be stored on any electronic clouds.

15. Consent

Please indicate your consent by clicking "I have read the letter of information and I meet the inclusionary criteria (I am male and between the ages of 18 and 45), and I agree to participate" at the bottom of the screen. If you select "I do not meet the inclusion criteria (I am female, and/or I am 17 years of age or younger, and/or I am 46 years of age or older)", or "I do not agree to participate" you will exit the survey. Participants who consent will have to confirm that they are male and between the ages of 18-45.

LOI-01

❍ I have read the Letter of Information above and I meet the inclusionary criteria (I am male and between the ages of 18 and 45), and I agree to participate.

LOI-02

- ❍ I do not meet the inclusionary criteria (I am female and/or I am 17 years of age or younger and/or I am 46 years of age or older).

LOI-03

- ❍ I do not agree to participate.

DEBRIEF-01 Debriefing Form

Thank you for participating in this research. You have made an important contribution to a developing body of knowledge in clinical psychology. Now that your participation is complete, we would like to tell you more about the study you have just participated in.

The purpose of this study is to better understand the basic personality underpinnings and behaviors that contribute to hypersexuality (i.e., feelings of out-of-control sexual behavior) in males.

While the prevalence of problematic hypersexuality is unknown, a significant number of people seek help as they experience their sexual thoughts, urges, and behaviors as out-of-control, and as causing significant distress in their personal, family, and professional lives. Previous research instruments that measure hyperseuxality have tended to incorrectly label too many of people as problematically hypersexual. This study aims to determine how various sexual behaviors, any negative life events resulting from sexual behavior, and relevant factors in an individual's personality may help us understand factors that contribute to distinguishing problematic hypersexuality from typical and healthy sexuality.

Here are some references if you would like to read more:

Levaque, E., Sawatsky, M.L., & LaLumière, M.L. (2016). Hypersexualité chez les étudiants universitaires hétérosexuels. *Canadian Journal of Behavioural Science, 48*(3), 182-192. http://psycnet.apa.org/doi/10.1037/cbs0000042

Montgomery-Graham, S. (2016). Conceptualization and assessment of hypersexual disorder: A systematic review of the literature. *Sexual Medicine Reviews, 5*(2), 146-162. http://doi.org/10.1016/j.sxmr.2016.11.001

All your responses are anonymous and the results of this research are published anonymously. Your responses and participation are much appreciated. Without your involvement, it would not be possible to conduct this research. Thank you for taking the time to participate.

If you have any further questions about this research you may contact the researchers by email XXX). If you have any questions about your rights as a research participant or

the conduct of this study, you may contact The Office of Research Ethics XXXX, email: XXXX.

YOUR HIT CODE WILL BE ON THE FOLLOWING PAGE.

DEBRIEF-02 YOUR HIT CODE IS ${e://Field/Hit_Code}

Appendix D:

Study Two Criterion Items

STI Diagnosis

1. Have you even worried you would acquire a sexually transmitted infection (e.g., chlamydia, gonorrhea, genital warts/herpes, human papillomavirus [HPV])?
2. Have you even been diagnosed with a sexually transmitted infection (for example, chlamydia, gonorrhea, genital warts/herpes, human papillomavirus [HPV])?
3. Have you even been diagnosed with the HIV virus?

Unwanted Pregnancy

4. Has a female sexual partner of yours ever become pregnant when you did not wish to be pregnant?
5. Has a female partner of yours ever become pregnant and terminated a pregnancy because you or she did not wish to have a baby at that time?

Non-contraceptive Intercourse

6. Have you ever had penis-in-vagina sexual intercourse within a new partner without using a condom?
7. Have you ever has penis-in-anus sexual intercourse with a new partner without using a condom?

Sexual Coercion of Another Person (Koss, Sexual Experiences Scale, 2006)

8. Even though it did not happen, I tried to put my penis or my fingers, or objects into a woman's vagina without their consent by:
    a. Telling lies, threatening to end the relationship, threatening to spread rumors about them, making promises about the future I knew were untrue, or continually verbally pressuring them after they said they didn't want to.
    b. Showing displeasure, criticizing their sexuality or attractiveness, getting angry but not using physical force after they said they didn't want to.
    c. Taking advantage when they were too drunk or out of it to stop what was happening.
    d. Threatening to physically harm them or someone close to them.
    e. Using force, for example holding them down with my body weight, pinning their arms, or having a weapon.

Sexual Victimization

9. Within the past 12 months, a man tried to put his penis in my butt, or someone tried to stick objects or fingers in my butt without my consent by:
    a. Telling lies, threatening to end the relationship, threatening to spread rumors about me, making promises about the future I knew were untrue, or continually verbally pressuring me after I said I didn't want to.
    b. Showing displeasure, criticizing my sexuality or attractiveness, getting angry but not using physical force after I said I didn't want to.

c. Taking advantage when I was too drunk or out of it to stop what was happening.
d. Threatening to physically harm me or someone close to me.
e. Using force, for example holding me down with their body weight, pinning my arms, or having a weapon.

Paid for Sex

10. I have paid for a sex worker to perform sexual acts on me/or for me to perform sexual acts on them
11. I have used erotic images/pornography on the Internet that you have to pay to see/watch.
12. I have paid to participate in online sex chat with other people

Extra-dyadic Sexual Relationships

13. In my lifetime, I have had sexual relationships with another person besides my primary romantic partner and kept that sexual relationship from my primary partner.
14. My partner and I have fought or ended our romantic relationship because my partner found out I was sexually involved with someone else.

"Wasting time" on Sex-related Activities

15. When I look back over the last 12 months, there are a lot of times when I have spent a lot of my time looking for people to have sex with.
16. I often feel that I have wasted too much of my time on sex-related activities (porn, sex chat, or masturbation, etc.)

Wasting Money

17. Have you ever spent more money than you intended to spend on sex-related activities (not including dating)?
18. Have you ever regretted the amount of money you have spent on sex-related activities (not including dating)?

Work-related Problems arising from Hypersexuality

19. I have gotten in trouble at work because of time I spent on the Internet looking at erotic/sexual pictures.
20. I have gotten into trouble at work more than once because I was told I had sexually harassed or been sexually inappropriate with another person.
21. I have been fired from a job because of sex-related activity (e.g., sex while at work, caught watching porn at work, sexual harassment, etc.).

Legal problems arising from Hypersexuality

22. I have been involved with the police because I hired a sex worker and it's illegal in my State/Province.

23. The Police have questioned me because someone has accused me of sexually assaulting or inappropriately touching them.

Appendix E:

Tables of non-significant results

Appendix E presents tables of results in which findings were not significant (all significant findings are presented in Tables14 A through H [youngest cohort], 16A through H [middle cohort males], and 18 A through H [oldest cohort] of Study Two). The tables in Appendix E present data explaining how many of the men within each age cohort (18 to 24 years, 25 to 35 years, and 36 to 45 years) were non-significantly correlated with a particular criterion item (explained in Study Two). When the cell frequencies are above 5, binary logistic regression is conducted and reported; by contrast, when the cell frequencies are under 5, chi square tests are conducted and reported, using the Fisher's exact test, as explained in the body of the dissertation.

Table 14Ai

Criterion items non-significantly associated with criterion items on the Hypersexual Behavior Inventory, among young men (18 to 24 years) (n=135)

	Base Rate	Chi Square	Fisher's Exact
Worried you would acquire an STI?	.385 (n=52)	.365	.766
Diagnosed with an STI	.067 (*n*=9)	.024	1.00
Unintentional pregnancy	.096 (*n*=13)	.547	.363
Abortion	.067 (*n*=9)	1.028	.600
Condomless vaginal sex with a new partner	.467 (*n*=63)	.298	.771
Condomless anal sex with a new partner	.244 (*n*=33)	6.733*	.016
Paid for a sex worker	.052 (*n*=8)	.177	.519
Trouble at work more than once sexually inappropriate	.030 (*n*=4)	7.643	.047
Fired from work because sex-related activity at work (sex/porn at work, sexual harassment)	.030 (*n*=4)	8.519	.040

Table 14Bi

Non-significant findings of hypersexual negative outcomes (i.e., Study Two criterion items), among young men (18 to 24 years), on the Sexual Compulsivity Scale (n=135)

	Base Rate	Chi Square	Fisher's Exact
Worried you would acquire an STI	.385 (*n*=52)	3.077	.092
Diagnosed with an STI	.067 (n=9)	2.158	.219
HIV+ Diagnosis	.015 (*n*=2)[15]		
Unintentional pregnancy	.096 (*n*=13)	2.196	.161
Abortion	.067 (*n*=9)		
Condomless vaginal sex with new partner	.467 (*n*=63)	.846	.412
Condomless anal sex with a new partner	.244 (*n*=33)	3.841	.082
Attempted victimization by threats, emotional coercion, or physical force	.104 (*n*=14)	3.793	.082
Attempted perpetration of sexual assault against a female using force	.119 (*n*=16)	7.160	.024
Paid for online porn	.259 (*n*=35)	5.579*	(.032)
Paid for a sex worker	.052 (*n*=7)	.305	.475
Trouble at work more than once sexually inappropriate	.029 (*n*=4)	1.466	.250
Trouble at work re Internet porn	.044	6.180*	(.030)
Fired from work for sex-related activity (sex/porn/harassment)	.030	5.802*	(.044)
Legal problems for hiring a sex worker	.044	8.812*	(.012)
Police questioned me for sexual conduct	.045	9.107*	(.011)

*p< .05 is not considered significant but is noted.

[15] The two participants with an HIV+ diagnosis among the youngest cohort also met the cut score for problematic hypersexuality on the Sexual Compulsivity Scale.

Table 14Ci

Non-significant Criterion Items associated with being HD on the Sexual Addiction Screening Test Among Young Men (18-24 years), n=135

				95% CI for Odds Ratio			P value	Pseudo-R^2 (Nagelkerke)
	Base Rate	Number meeting criterion item and SAST cutscore	B	Lower	Odds	Upper		
Worried you would acquire an STI?	.385 (*n*=52)	16/31	.727	.911	2.069	4.698	.082	.035
Condomless vaginal sex new partner	.467 (*n*=63)	17/31	.380	.649	1.463	3.296	.359	.010
Condomless anal sex new partner	.244 (*n*=33)	11/31	.881	.985	2.414	5.915	.054	.041
Paid for pornography	.259 (*n*=35)	13/31	1.023	1.169	2.781*	6.614	(.021)	.060
Trouble at work more than once sexually inappropriate	.030 (*n*=4)	2/31	.960	.354	2.611	19.241	.346	.009

	Base Rate	Chi Square	Fisher's Exact	Odds ratio when marginally significant
Diagnosed with an STI	.067 (*n*=9)	2.158	.219	-
Diagnosed with HIV+	.015 (*n*=2)[16]			-
Unintentional pregnancy	.096 (*n*=13)	2.196	.161	-
Someone attempted anal sexual assault	.104 (*n*=4)	3.793	.082	-
Attempted perpetration of vaginal sexual assault	.119 (*n*=16)	.769	.357	-
Paid for a sex worker	.052 (*n*=7)	.055	1.00	-
Trouble at work with Internet porn	.044	6.180*	(.030)	7.05

[16] The two participants with an HIV+ diagnosis among the youngest cohort also met the cut score for problematic hypersexuality on the Sexual Addiction Screening Test.

Fired from work for sex-related activity	.029	5.802*	(.044)	10.38
Legal problems for hiring a sex worker	.030	8.812*	(.012)	14.22
Police questioned me for sexual behaviour	.045	9.170*	(.011)	14.77

Table 14Di

Non-significant Criterion Items associated with being HD on the Sexual Addiction Screening Test – Male Items Among Young Men (18-24 years), n=135

	Base Rate	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio (when significant)
Diagnosed with HIV	.015 (n=2)	3.154	.242	1	-
Unintentional pregnancy	.096 (*n*=13)	1.370	.373	1	-
Abortion	0.67 (*n*=9)	.021	.623	1	-
Condomless anal intercourse with a new partner	.244 (*n*=33)	1.566	.226	1	-
Attempted victimization	.104 (*n*=14)	3.499	.082	1	-
Attempted perpetration	.119 (*n*=16)	.581	.431	1	-
Paid for a sex worker	.052 (*n*=7)	.013	1.00	1	-
Concurrent extra dyadic sexual relationship	.141 (*n*=19)	3.572	.072	1	-
Too much time spent looking for sex	.215 (*n*=29)	4.290	.056	1	-
Regretted amount of money spent on sex	.133 (*n*=18)	7.887* *21.563*	(.013) *.000*	1	4.73 *22.16*
Trouble at work internet porn	.044 (*n*=6)	7.807* *10.119**	(.028) *.031*	1	8.07 *12.40*
Trouble at work more than once for being sexually inappropriate	.030 (*n*=4)	.610	1.00	1	-
Legal problems for hiring a sex worker	.044 (*n*=6)	.085 *10.119**	.567 *(.031)*	1	- (12.4)
Police have questioned me re sexual conduct	.045 (*n*=6)	9.170*	(.011)	1	-

			95% CI for Odds Ratio			P value	Pseudo-R^2 (Nagelkerke)
	BR	B	Lower	Odds	Upper		
Worried you would acquire an STI?	.385 (*n*=52)	.099	.392	1.104	3.111	.851	.000
Condomless vaginal sex new partner	.467 (*n*=63)	.055	.381	1.057	2.930	.916	.000

*p< .05 (Noted but not considered significant

Table 14Ei

Non-significant Criterion Items associated with being HD on the Hypersexual Disorder Screening Inventory Among Young Men (18-24 years), n=135

	Base Rate among young men in sample	Chi Square	Fisher's Exact	Degrees of Freedom
Worried you would acquire an STI	.385 (*n*=52)	1.485	.223	1
Diagnosed with an STI	.067 (*n*=9)	.003	1.00	1
HIV+ Diagnosis	.015 (*n*=2)			
Unintentional pregnancy	.096 (*n*=13)	1.622	.298	1
Abortion	.067 (*n*=9)			
Condomless vaginal sex with new partner	.467 (*n*=63)	1.074	.401	1
Condomless anal sex with new partner	.244 (*n*=33)	5.735* *4.688**	(.025) *(.038)*	1
Attempted victimization by emotional, or physical force	.104 (*n*=14)	1.027	.335	1
Attempted perpetration of sexual assault against a female using force	.119 (*n*=16)	1.027	.335	1
Paid for a sex worker	.052 (*n*=7)	.236	1.00	1
Trouble at work more than once sexually inappropriate	.030 (*n*=4)	1.955	.204	1
Fired from work for sex-related activity at work	.030 (*n*=4)	7.302* 9.700*	(.029) *(.016)*	

Legal problems for hiring a sex worker	.044 (*n*=6)	.523	.609	1
Police questioned me for inappropriate sexual conduct	.044 (*n*=6)	.588	.605	1

Table 14Fi

Non-significant Criterion Items associated with being HD on the Compulsive Sexual Behavior Inventory, Control subscale, Among Young Men (18-24 years), n=135

	Base Rate among young men in sample	Chi Square	Fisher's Exact
Worried you would acquire an STI	.385 (*n*=52)	.004	1.00
Diagnosed with an STI	.067 (*n*=9)	.607	1.00
HIV+ Diagnosis	.015 (*n*=2)		
Unintentional pregnancy	.096 (n=13)	.906	1.00
Abortion	.067 (n=9)		
Condomless vaginal sex with new partner	.467 (n=63)	.038	1.00
Condomless anal sex with a new partner	.244 (33)	.001	1.00
Attempted victimization	.104 (n=14)	.041	.594
Attempted perpetration of sexual assault	.119 (n=16)	.003	.441
Paid for online pornography	.259 (n=35)	.004	1.00
Paid for online sex chat	.119 (n=16)	5.355	.053
Paid for a sex worker	.052 (n=7)	.469	1.00
Concurrent extra dyadic relationship	.141 (n=19)	3.803	.086
Relationship termination/distress, re: my infidelity	.125 (n=17)	3.793	.063
Too much time spent looking for sex	.215 (n=29)	4.101	.065
Waste too much time on sex	.281 (n=38)	.368	.686
Trouble at work re internet porn	.044 (n=6)	1.299	.312
Trouble at work sexually inappropriate	.030 (n=4)	.262	1.00
Fired from work because sex-related activity at work	.030 (n=4)	2.660	.221
Legal problems for hiring a sex worker	.044 (n=6)	.369	1.00
Police questioning re sexual conduct	.045 (n=6)	.399	1.00

Table 14Gi

Non-significant Criterion Items associated with being HD on the Hypersexual Behavior Consequences Scale Among Youngest Men (18 to 25years), n=135

			95% CI for Odds Ratio			P value	Pseudo-R^2 (Nagel-kerke)
	BR	B	Lower	Odds	Upper		
Worried you had acquired an STI	.385 (*n*=52)	.283	.487	1.327	3.616	.580	.003
Diagnosed with an STI	.067 (*n*=9)	-.221	.094	.801	6.817	.839	.001
Unintentional pregnancy	.096 (*n*=13)	1.253	.932	3.43	12.62	.064	.047
Abortion	.067 (*n*=9)	1.308	.836	3.70	16.37	.085	.049
Condomless vaginal sex new partner	.467 (*n*=63)	.951	.909	2.59	7.366	.075	.033
Condomless anal sex with new partner	.244 (*n*=32)	.201	.401	1.22	3.73	.724	.001
Attempted perpetration	.119 (*n*=16)	-.916	.113	.400	1.412	.155	.026
Paid for pornography	.259 (*n*=35)	.980	.957	2.67	7.43	.061	.036
Paid for online sex chat	.119 (*n*=16)	.916	.708	2.50	8.827	.155	.026
Paid for a sex worker	.052 (*n*=7)	1.021	.496	2.78	15.52	.245	.026
Trouble at work internet porn	.044 (*n*=6)	1.262	.598	3.52	20.86	.164	.040
Trouble at work >1X sexually inappropriate	.030 (*n*=4)	.796	.218	2.216	22.54	.502	.013
Fired because sex-related activity at work	.030 (*n*=4)	1.96	.937	7.125	54.175	.058	.073
Legal problems, re hiring sex worker	.044 (*n*=6)	2.028	1.405	7.60*	41.12	(.019)	.119

	Base Rate	Chi Square	Fisher's Exact	DF	Odds Ratio
HIV+ Diagnosis	.055 (*n*=4)	13.195*	(.017)	1	()[17]

[17] Both participants with HIV+ status also meet the cut score for HBCS (set as the 90th percentile in Study One); odds could not be calculated since there was one cell with 0 frequencies, namely an HIV+ diagnosis and does not meet cut score for Hypersexual Behavior Consequences Scale.

Table 14Hi

Non-significant findings of hypersexual negative outcomes (i.e., Study Two criterion items), among young men (18 to 24 years), on the Total Sexual Outlet (TSO)(n=135)

	Base Rate	Chi Square	Fisher's Exact
Worried you would acquire an STI	.385 (*n*=52)	.102	.859
Diagnosed with an STI	.067 (*n*=9)	.488	.731
HIV+ Diagnosis	.015 (*n*=2)[18]		
Unintentional pregnancy	.096 (*n*=13)	1.027	.386
Abortion	.067 (*n*=9)		
Condomless vaginal sex with new partner	.467 (*n*=63)	.008	1.00
Condomless anal sex with a new partner	.244 (*n*=33)	.036	1.00
Paid for online pornography	.259 (n=35)	3.05	.113
Paid for online sex chat	.119 (*n*=16)	1.204	.299
Paid for a sex worker	.052 (*n*=7)	2.584	.137
Too much time spent looking for sex partner over last 12 months	.215 (*n*=17)	4.061	.057
Waste too much time on sex-related activities	.281 (*n*=29)	.011	1.00
Spent more money than intended on sex-related activities	.133 (*n*=18)	2.122	.202
Regretted amount of money spent on sex	.133 (n=18)	.965	.445
Trouble at work more than once sexually inappropriate	.030 (*n*=4)	.581	.632
Fired from work because sex-related activity at work	.030 (*n*=4)	.581	.632
Legal problems for hiring a sex worker	.044 (*n*=6)	1.908	.229
Police questioned me for inappropriate sexual conduct	.045 (*n*=6)	.310	.693

[18] The two participants with an HIV+ diagnosis among the youngest cohort also met cut score for problematic hypersexuality with ≥7 sexual outlets weekly (one reported 21, and the other reported 50).

Table 16Ai

Criterion items non-significantly associated with being HD on the Hypersexual Behavior Inventory Among Middle Cohort Males (25-35 years), n=255

			95% CI for Odds Ratio			P value	Pseudo-R^2 (Nagelkerke)
	BR	B	Lower	Odds	Upper		
Worried you would acquire an STI	.529	.693	1.098	1.999*	3.639	(.023)	.028

	Base Rate among middle age group	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio (when significant)
HIV+ Diagnosis	.055	5.536*	(.046)	1	3.67

*p< .05 is not considered significant for the purposes of Study Two but is noted.

Table 16Bi

Criterion items non-significantly associated with being HD on the Sexual Compulsivity Scale Among Middle Cohort Males (25-35 years), n=255

			95% CI for Odds Ratio			P value	Pseudo-R^2 (Nagelkerke)
	BR	B	Lower	Odds	Upper		
Condomless anal sex with a new partner	.324	.788	1.192	2.199*	4.056	(.012)	.038

*p< .05 is not considered significant for the purposes of Study Two but is noted.

Table 16Ci

Criterion Items non-significantly associated with being HD on the Sexual Addiction Screening Test Among Middle Cohort Males (25-35 years), n=252

			95% CI for Odds Ratio			P value	Pseudo-R^2 Nagelkerke
	BR	B	Lower	Odds	Upper		
Condomless vaginal sex new partner	.588	.767	1.196	2.153*	3.873	(.011)	.040

There is **no Table 16Di**, as there were no non-significant findings among the SASM-M and criterion items.

Table 16Ei

Criterion Items non-significantly associated with being HD on the Hypersexual Disorder Screening Inventory Among Middle Cohort Males (25-35 years), n=255

			95% CI for Odds Ratio			P value	Pseudo-R^2 (Nagelkerke)
	BR	B	Lower	Odds	Upper		
HIV+ Diagnosis	.049	1.452	1.301	4.270*	14.016	.021	.034
Condomless vaginal sex with new partner	.587	.539	1.016	1.714*	2.893	(.043)	.022

16Fi

Criterion items non-significantly associated with being HD on the Compulsive Sexual Behaviour Inventory Among Middle Cohort Males (25-35 years), n=255

			95% CI for Odds Ratio			P value	Pseudo-R^2 (Nagelkerke)
	BR	B	Lower	Odds	Upper		
Worried you would acquire an STI	.529	.169	.955	1.86	3.61	.068	.022
Diagnosed with an STI	.142	1.135	1.289	3.11	7.51	.012	.044
HIV+ diagnosis	.056	1.286	1.053	3.62	12.421	.041	.027
Paid for online porn	.418	.960	1.168	2.613	5.840	.019	.044
Paid for online sex chat	.203	.902	1.220	2.465	4.979	.012	.038

Table 16Gi

Criterion items non-significantly associated with being HD on the Hypersexual Behaviour Consequences Scale Among Middle Cohort Males (25-35 years), n=255

			95% CI for Odds Ratio			P value	Pseudo-R^2 (Nagelkerke)
	BR	B	Lower	Odds	Upper		
Condomless vaginal sex new partner	.727	.600	1.000	1.821*	3.317	(.050)	.023

	Base Rate among oldest men in sample	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio (when significant)
HIV+ Diagnosis (n=4)	.055	7.814*	(.010)	1	4.30

*p< .05 (noted but not considered significant)

Table 15Hi

Criterion items non-significantly associated with being HD on the Total Sexual Outlet Among Middle Cohort Males (18-24 years), n=255

			95% CI for Odds Ratio			P value	Pseudo-R^2 (Nagelkerke)
	BR	B	Lower	Odds	Upper		
HIV+ Diagnosis	.056	2.398	1.416	11.00*	85.425	(.022)	.051

*p< .05 is not considered significant for the purposes of Study Two but is noted.

Table 18A

Non-significant criterion Items associated with being HD on the Hypersexual Behavior Inventory Among Oldest Cohort Males (36-45 years), n=191

	Base Rate among young men in sample	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio (when significant)
Legal problems for hiring a sex worker	.037	8.799*	(.015)	1	7.65

			95% CI for Odds Ratio			P value	Pseudo-R^2 (Nagelkerke)
	BR	B	Lower	Odds	Upper		
Worried you would acquire an STI?	.586	1.031	1.143	2.805*	6.884	(.024)	.050
Condomoless vaginal sex with new partner	.728	-.078	.396	.925	2.160	.858	.000
Abortion	.196	.235	.480	1.288	3.462	.615	.001
Paid for online pornography	.418	.475	1.608	1.608	3.485	.228	.013
Relationship termination/distress, re: my infidelity	.232	.831	1.154	92.2960*	4.566	(.018)	.040
Regretted amount of money spent on sex[2]	.213	.845	1.140	(2.328)*	4.751	(.020)	.039
Trouble at work re internet porn	.212	2.570	1.621	(13.068)*	105.381	(.016)	.070
Fired from work re sex-related activity at work (sex/porn at work, sexual harassment)[2]	.047	2.452	1.422	(11.616)*	94.873	(.022)	.061

*p< .05 is not considered significant but is noted.

Table 18B

Non-significant Criterion Items associated with being HD on the Sexual Compulsivity Scale Among Oldest Cohort Males (36-45 years), n=191

	Base Rate among oldest men in sample	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio (when significant)
Worried you would acquire an STI	.584	5.489*	(.022)	1	3.00
Diagnosed with an STI	.126	7.561*	(.012)	1	3.65
HIV+ Diagnosis (*n*=4)	.021	.336	.476	1	-

*p< .05 is not considered significant but is noted.

			95% CI for Odds Ratio			P value	Pseudo-R^2 (Nagelkerke)
	BR	B	Lower	Odds	Upper		
Unintentional pregnancy	.277	1.007	1.226	2.737*	6.1009	(.014)	.052
Aboortion	.196	.496	.601	1.643	4.49	.333	.008
Condomless vaginal sex new partner	.727	-.243	.331	.784	1.857	.581	.003
Paid for pornography	.418	.474	.726	1.607	3.556	.242	.013

Table 18C

Non-significant Criterion Items associated with being HD on the Sexual Addiction Screening Test Among Oldest Cohort Males (36-45 years), n=191

			95% CI for Odds Ratio			P value	Pseudo-R^2 Nagelkerke
	BR	B	Lower	Odds	Upper		
Worried you would acquire an STI?	.586	.531	.846	1.700	3.416	.136	.018
Diagnosed with an STI?	.126	1.071	1.192	2.919*	7.148	(.019)	.042
HIV+ diagnosis	.021						
Unintentional pregnancy	.277	.891	1.130	2.269*	4.557	(.041)	.041
Abortion	.157	.098	.451	1.102	2.696	.831	.000
Condomless vaginal sex new partner	.728	-.321	.253	.351	1.500	.386	.006
Paid for pornography	.414	.116	.576	1.123	2.190	.733	.001

*p< .05 but is not considered significant.

	Base Rate	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio (when significant)
Legal problems for hiring a sex worker	.037	1.728	.193	1	-

Police questioned me for inappropriate sexual conduct	.048	7.426*	.015	1	7.56

Table 18D

Significant Criterion Items associated with being HD on the Sexual Addiction Screening Test – Male Items Among Oldest Cohort of Males (36-45 years), n=191

	Base Rate among young men in sample	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio (when significant)
HIV+	.022	.986	.312	1	-
Unintentional pregnancy	.278	4.073*	(.048)	1	(2.01)
Abortion	.161	1.537	.264	1	-
Legal problems for hiring a sex worker	.038	3.035	.099	1	-
Police questioned me for inappropriate sexual conduct	.049	11.550*	.002	1	10.19

			95% CI for Odds Ratio			P value	Pseudo-R^2 (Nagelkerke)
	BR	B	Lower	Odds	Upper		
Condomless vaginal sex new partner	.731	-.003	.484	.997	2.053	.994	.000
Paid for pornography	.416	.803 *.716*	1.164 *.929*	2.233* *2.046*	4.284 *4.505*	(.016) *.075*	.045 *.029*
Waste too much time on sex-related activities	.342	.829 *.637*	1.182 *.856*	2.290* *1.890*	4.439 *4.172*	(.014) *.115*	.046 *.118*

Note. italicized numbers are those odds ratios that were run once the items with criterion overlap, as assessed by a face valid inspection of items, were removed.

Table 18E

Significant Criterion Items associated with being HD on the Hypersexual Disorder Screening Inventory Among Oldest Cohort of Males (36-45 years), n=191

	Base Rate among oldest men in sample	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio (when significant)
Worried you would acquire an STI	.586	1.914	.175	1	-
Diagnosed with an STI	.126	7.102*	(.019)	1	3.191
HIV+ Diagnosis 1	.021				
Abortion	.158	.786	.360	1	-
Condomless vaginal sex with new partner	.732	1.028	.311	1	-
Paid for online pornography	.418	3.935 *3.380*	.059 *.084*	1	-

Table 18F

Non-significant Criterion Items associated with being HD on the Compulsive Sexual Behavior Inventory, Control subscale, Among Oldest Cohort Males (36-44 years), n=191

	Base Rate	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio (when significant)
Worried you would acquire an STI	.586	5.508*	(.021)	1	3.59
HIV+ Diagnosis	.021	.719	.391	1	-
Abortion	.158	.040	1.00	1	-
Condomless vaginal sex with new partner	.732	1.149	.310	1	-
Condomless anal sex with a new partner	.337	2.965	.097	1	-
Paid for online pornography	.418	1.663	.251	1	-
Concurrent extra dyadic relationship (unknown to primary partner)	.434	6.232*	(.020)	1	3.20
Trouble at work re internet porn	.053	3.460	.096	1	-
Trouble at work more than once sexually inappropriate	.037	1.979	.193	1	-
Fired from work because sex-related	.048	4.280	.074	1	-

activity at work (sex/porn at work, sexual harassment)					
Legal problems for hiring a sex worker	.037	6.887*	(.035)	1	6.44
Police questioned me for inappropriate sexual conduct	.048	4.324	.073	1	-

*p< .05 is not considered significant but is noted.

			95% CI for Odds Ratio			P value	Pseudo-R^2 (Nagelkerke)
	BR	B	Lower	Odds	Upper		
Waste too much time on sex-related activities	.340	1.181	1.309	3.257*	8.105	(.011)	.067

Table 18G

Significant Criterion Items associated with being HD on the Hypersexual Behavior Consequences Scale Among Oldest Male Cohort (36-45 years), n=191

	Base Rate among oldest men in sample	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio (when significant)
Worried you would acquire an STI	.591	4.769*	(.042)	1	2.66
HIV+ Diagnosis	.020	.261	.500	1	-
Abortion	.157	1.794	.177	1	-
Condomless vaginal sex with new partner	.728	.306	.650	1	-
Attempted perpetration of vaginal sexual assault using threats, emotional coercion or force	.119	4.108	.064	1	-

Note. that italicized numbers in the table are the recalculated odds with the potential criterion -predictor overlap items removed.

Table 18H

Non-significant Criterion Items associated with being HD on the Total Sexual Outlet Inventory Among Oldest Cohort Males (36-45 years), n=191

	Base Rate	Chi Square	Fisher's Exact	Degrees of Freedom	Odds Ratio (when significant)
Condomless vaginal sex with a new partner	.728	.660	.871	1	-
Attempted victimization	.083	*		1	-
Trouble at work more than once sexually inappropriate	.037	5.324*	(.044)	1	(8.75)
Legal problems for hiring a sex worker	.037	5.302*	(.044)	1	8.40
Police questioned me for inappropriate sexual conduct	.047	7.966*	(.011)	1	11.46

* Nothing is reported since a chi square could not be calculated since none of the 16 men in the oldest age category were victims of attempted sexual violence and also HD on this scale.

Curriculum Vitae

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