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Gender-related Differences in the Associations between Sexual Impulsivity and Psychiatric Disorders

Galit Erez^{1,2}, Corey E. Pilver³, and Marc N. Potenza^{1,4,5}

¹Department of Psychiatry, Yale University School of Medicine, New Haven, Connecticut

²Shalvata Mental Health Center, Hod Hasharon, Israel, Affiliated to the Sackler Faculty of Medicine, Tel Aviv University, Tel Aviv, Israel

³Department of Biostatistics, Yale School of Public Health, New Haven, Connecticut

⁴Department of Neurobiology, Yale University School of Medicine, New Haven, Connecticut

⁵Child Study Center, Yale University School of Medicine, New Haven, Connecticut

Abstract

Objective—Sexual impulsivity (SI) has been associated with conditions that have substantial public health costs, such as sexually transmitted infections and unwanted pregnancies. However, SI has not been examined systematically with respect to its relationships to psychopathology. We aimed to investigate associations between SI and psychopathology, including gender-related differences.

Method—We performed a secondary data analysis of Wave-2 of the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), a national sample of 34,653 adults in the United States. DSM-IV-based diagnoses of mood, anxiety, drug and personality disorders were

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Corresponding author: Marc N. Potenza, MD, PhD, Yale University School of Medicine, 34 Park Street, New Haven, CT 06519, Tel.: 203 628 6776; fax: 203-974-7366, galit.erez1@gmail.com.

Galit Erez, MD, Shalvata Mental Health Center, Hod Hasharon, Israel, Affiliated with Tel Aviv University, Israel, galit.erez1@gmail.com

Corey E. Pilver, PhD, Yale University School of Medicine, 1 Church Street, New Haven, CT, corey.pilver@yale.edu

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Dr. Erez and Prof. Potenza designed the study. Dr. Erez wrote the first draft of the manuscript. Dr. Pilver conducted the statistical analyses. All authors contributed to the manuscript and approved the final version.

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The authors report no conflicts of interests.

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Dr. Potenza has consulted for Lundbeck and Ironwood pharmaceuticals; has had financial interests in Somaxon pharmaceuticals; received research support from Mohegan Sun Casino, Psyadon pharmaceuticals, the National Center for Responsible Gambling, the National Institutes of Health (NIH), Veterans Administration; has participated in surveys, mailings, or telephone consultations related to drug addiction, impulse-control disorders, or other health topics; has consulted for gambling, legal and governmental entities on issues related to addictions or impulse-control disorders; has provided clinical care in the Connecticut Department of Mental Health and Addiction Services Problem Gambling Services Program; has performed grant reviews for the NIH and other agencies; has guest edited journal sections; has given academic lectures in grand rounds, Continuing Medical Education events, and other clinical or scientific venues; and has generated books or book chapters for publishers of mental health texts.

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assessed using the Alcohol Use Disorder and Associated Disabilities Interview Schedule DSM-IV Version.

Results—The prevalence of SI was considerable (14.7%), with greater acknowledgment by men than women (18.9% versus 10.9%; $p < 0.0001$). For both women and men, SI was positively associated with most Axis-I and Axis-II psychiatric disorders (OR range: Women, Axis-I: 1.89-6.14, Axis-II: 2.10-10.02; Men, Axis-I: 1.92-6.21, Axis-II: 1.63-6.05). Significant gender-related differences were observed. Among women as compared to men, SI was more strongly associated with social phobia, alcohol abuse/dependence, and paranoid, schizotypal, antisocial, borderline, narcissistic, avoidant and obsessive-compulsive personality disorders.

Conclusion—The robust associations between SI and psychopathology across genders suggest the need for screening and interventions related to SI for individuals with psychiatric concerns. The stronger associations between SI and psychopathology among women as compared to men emphasize the importance of a gender-oriented perspective in targeting SI. Longitudinal studies are needed to determine the extent to SI predates, postdates or co-occurs with specific psychiatric conditions.

Keywords

Sexual Impulsivity; Gender; Psychiatric Disorders; Co-Occurrence

Background

Impulsivity has been defined as ‘a predisposition toward rapid, unplanned reactions to internal or external stimuli with diminished regard to the negative consequences of these reactions to the impulsive individual or to others’ (Moeller et al., 2001; Potenza & deWit, 2010). Given that general impulsivity has been associated with multiple adverse consequences, it has been proposed and investigated as an important intermediate phenotype (Fineberg et al., 2014). Impulsivity has been associated with domestic violence (Shorey et al., 2011), addictive behaviors (Leeman and Potenza, 2012), self-injurious behaviors including suicide attempts (Oquendo et al., 2004) and high-risk sexual behaviors (Black et al., 2009). Domain-relevant impulsivity may also represent an important consideration. Sexual impulsivity (SI) may be defined as a tendency to engage in sexual behaviors quickly or without fully thinking through the consequences. While general impulsivity has been assessed and found to be elevated in groups of individuals with a broad range of psychiatric disorders (Moeller et al., 2001) including hypersexual disorder or compulsive sexual behaviors (Miner et al., 2009; Raymond et al., 2003; Reid et al., 2011; Reid et al., 2012; Reid et al., 2012), the extent to which SI relates to psychiatric disorders broadly or other conditions characterized by problematic sexual behaviors (e.g., hypersexual disorder, compulsive sexual behaviors, or sex addiction) has not been examined directly (Kingston and Firestone, 2008; Stein, 2008; Krueger and Kaplan, 2001; Schwartz and Abramowitz, 2003; Barth and Kinder, 1987; Goodman, 2001; Kor et al., 2013). However, as high-risk sexual behaviors are associated with human-immunodeficiency-virus (HIV) infection (Bornoalova et al., 2008) and unintended pregnancies (Kovacs et al., 1994), SI (whether or not related to hypersexuality disorder or other diagnostic conditions characterized by

compulsive/excessive sexual behaviors) may contribute importantly to multiple public-health concerns.

Gender-related Differences in SI

Neurobiological (Klinterberg et al., 1987; Manuck et al., 1999), endocrinological (Wood et al., 2004), and cognitive, behavioral and social (Calvete and Cardenoso, 2005) findings suggest that men are typically more impulsive than women. Meta-analytic data suggest that men score higher than women on specific aspects of impulsivity and related measures (Cross et al., 2011). Men tend more frequently to constitute clinical groups characterized by impaired impulse control including substance-use, gambling and hypersexual disorders (Wilsnack et al., 2009; Seedat et al., 2009; Brezing et al., 2010; Black et al., 1997; Miner et al., 2009, Raymond et al., 2003; Reid et al., 2012)

Gender may moderate associations between impulsivity and some risk behaviors (e.g., alcohol consumption), with stronger associations observed in men versus women (Stoltenberg et al., 2008). Specific biological (e.g., genetic) factors may contribute to these gender-related differences (Stoltenberg et al., 2011). Gender-related differences also exist with respect to casual sexual behaviors, observed more frequently amongst men than women (Garcia et al., 2012). In one study, 29% of men versus 14% of women reported their last sexual partner as casual (Eisenberg et al., 2009; although see (Owen, et al., 2010; Garcia and Reiber, 2008) for studies not observing gender-related differences).

Multiple factors might underlie gender-related differences in casual sex and SI. First, a “sexual double standard” implies “that male and female sexual behaviors should be judged by different standards, such as the belief that casual sex is acceptable for men but not for women” (Peterson and Hyde, 2010, p. 26). As a consequence, having many sexual partners may raise men’s status but stigmatize women (Jonason, 2007; Jonason and Fisher, 2009) and make women feel guilty or anxious (Herold & Mewhinney, 1993; Lottes, 1993). Second, men typically have more sexual fantasies than women; on average, they become aroused more easily and have more causal attitudes toward sex (Kafka, 2010). Third, women typically feel more upset than men about “hooking up” (Owen et al., 2010). Despite these explanations and mixed findings across samples (Gaub and Carlson, 1997; Rinne et al., 2000), the prevalence and correlates of SI across genders have not been systematically investigated.

SI and Psychopathology

SI may relate importantly to specific Axis-I and Axis-II disorders. Depressed youth may have sex to regulate their affect (Shrier et al., 2012). Bipolar disorder, characterized by disturbances in impulse control and mood regulation, may also link to SI (Meade et al., 2011). Patients with social anxiety disorder (SAD) may present with aggression, SI and substance-use problems (Kashdan et al., 2012). Among Axis-II disorders, borderline personality disorder (BLPD) has been associated with sexual preoccupation, early sexual exposure, engagement in casual sexual relationships and involvement with multiple sexual partners (Sansone et al., 2011). In one study, 46% of BLPD patients engaged in casual sexual relationships (Hull et al, 1993). In another study, BLPD symptoms were associated

with high-risk sexual behaviors (Lavan and Johnson, 2002). It has been suggested that most, if not all, frequent behaviors in BLPD relate to impulsivity and/or victimization (Sansone et al., 2011a). Generally, impulsivity appears reflected in greater sexual preoccupation, earlier sexual exposure, more casual sexual relationships, more sexual partners and homosexual experiences. Victimization appears reflected in more high-risk sexual behaviors, a greater likelihood of being coerced to have sex, and more sexually transmitted diseases.

Risky sexual behavior (casual sex or “hooking up”) has been linked to psychiatric conditions. College students who had recently engaged in casual sex reported higher levels of general anxiety, social anxiety, and depression compared to college students who had not had recent casual sex (Bersamin et al., 2013). Sexual behaviors have been associated with depression in adolescents (Welsh et al., 2003). Compulsive sexual behavior (CSB) frequently co-occurs with Axis-I psychopathology and personality disorders (PDs) in research populations (Raymond et al. 2003, Black et al., 1997; Kafka and Prentky, 1994; Rinehart and McCabe, 1998; Kafka and Henin, 2002; Carpenter et al., 2013). Although risky sexual behaviors may be more frequently acknowledged by men, they may associate more strongly with psychopathology in women. For example, the relationship between depression and sexual behaviors in adolescents appears stronger in females as compared with males (Welsh et al., 2003). Similarly, women reporting casual sex acknowledged more depressive symptoms compared to men (Grello et al., 2006).

Current Study

Although studies have independently investigated gender-related differences in impulsivity and sexual behaviors, none have examined gender-related differences in the prevalence of SI and its relationships to psychopathology in women and men. To investigate, data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC) were interrogated (Grant et al., 2001). Based on data described above and elsewhere (Black et al., 1997; Carnes et al., 1991; Raymond et al., 2003; Desai and Potenza, 2008; Opitz et al., 2009), we hypothesized that: 1) SI would be more frequently acknowledged by men than by women; 2) SI would be positively associated with Axis-I and Axis-II disorders in men and women; and 3) gender would moderate the associations between SI and Axis-I and Axis-II disorders such that a stronger relationship between SI and psychopathology would be observed in women as compared with men.

Method

NESARC Sample

The NESARC, sponsored by the National Institute on Alcohol Abuse and Alcoholism (Grant et al., 2001), is a nationally representative survey of US adults that was conducted in two waves. The study surveyed individuals aged 18 years (at Wave 1, conducted in 2001-2002) in the civilian non-institutionalized population living in households and group quarters. Black and Hispanic households were over-sampled as well as surveyees aged 18–24 years. Face-to-face personal interviews were conducted with 43,093 surveyees. In NESARC Wave-2 (Grant et al., 2007a) participants from Wave-1 were re-interviewed face-to-face. Excluding surveyees ineligible for Wave-2 interview (e.g., deceased), the Wave-2

response rate was 86.7%, representing 34,653 completed interviews. The cumulative response rate at Wave-2 (70.2%) signifies the product of the Wave-2 and Wave-1 response rates. The current study is a cross-sectional study. Data for the current study were derived from Wave-2 given the focus on SI, which was assessed only in Wave 2.

NESARC data were weighted to reflect design characteristics of the NESARC and account for oversampling (Chamorro et al., 2012). The nature of the survey was given in writing to all potential NESARC surveyees, as well the statistical uses of the survey data, the voluntary characteristic of their participation, and the federal laws that provided for the strict confidentiality of the identifiable survey information. After receiving this information, the surveyees who consented to participate were interviewed. The US Census Bureau and the US Office of Management and Budget gave the research protocol, including informed consent procedures, a full ethical review and approval (Chamorro et al., 2012). The current study using de-identified data was reviewed by Yale University Human Investigation Committee and exempted from further review.

Analytic Sample

The analytic sample included individuals with valid Wave-2 data, who provided valid data when asked about getting into sexual relationship quickly or without thinking of the consequences, as described below. The final N was 34,357 individuals, including 14,442 men and 19,915 women.

Diagnostic Assessment

The diagnostic interview was the Alcohol Use Disorder and Associated Disabilities Interview Schedule DSM-IV Version [AUDADIS-IV (Grant et al., 2001)] Wave-2 version (Grant et al., 2007a). This is a valid and reliable structured diagnostic interview designed for use by professional interviewers who are not clinicians (Grant et al., 2003; Chamorro et al., 2012). AUDADIS-IV methods to diagnose Axis-I and Axis-II disorders are described in detail elsewhere (Compton et al., 2005; Grant et al., 2004a, 2005a-c, 2006; Hasin et al., 2005; Neufeld et al., 1999; Williams et al., 2003). Consistent with DSM-IV, 'primary' AUDADIS-IV diagnoses excluded disorders that were substance-induced or due to general medical conditions. Post-traumatic stress disorder (PTSD) and borderline, schizotypal and narcissistic PDs were assessed uniquely in Wave 2 (Chamorro et al., 2012). The AUDADIS-IV can distinguish past-year, prior-to-past-year, and lifetime diagnoses (Desai and Potenza, 2008). For Axis-I disorders, we utilized the past-year diagnoses to limit recall bias and for clinical relevance, as previously done (Desai and Potenza, 2008). For Axis-II disorders, we used lifetime diagnoses, given the conceptualization that PDs reflect characteristics that are relatively consistent over time.

Measures

Dependent variables—Variables were coded to denote the presence or absence of Axis-I and Axis-II disorders. Dependent Axis-I-disorders variables included past-year mood disorders: major depressive disorder, dysthymia, mania, and hypomania; past-year anxiety disorders: panic disorder with or without agoraphobia, social phobia, specific phobia, and generalized anxiety disorder; and past-year substance-use disorders: alcohol abuse/

dependence, nicotine dependence, and drug abuse/dependence. Dependent Axis-II-disorder variables included: Cluster A – paranoid, schizoid and schizotypal PDs; Cluster B – histrionic, antisocial, borderline and narcissistic PDs; and Cluster C – avoidant, dependent and obsessive-compulsive PDs.

Independent variable—SI was assessed by the following question: “Have you ever gotten into sexual relationships quickly or without thinking about the consequences?” Individuals who answered affirmatively were considered to have SI.

Covariates—Socio-demographic variables included age, race/ethnicity (White, Black, Hispanic, Other), marital status (married, formerly married, never married), education (less than high-school, high-school, some college education, college education and higher), employment status (full time, part time, other) and household income (0-19,999, 20-34,999, 25-69,999, >70,000, in US dollars).

Statistical Analysis

We first examined the binary associations between SI and socio-demographic characteristics, separately for men and women. Next, we calculated the unadjusted weighted prevalence of psychiatric disorders according to SI, for the total sample and separately for men and women. Finally, we fit a series of logistic regression models using PROC RLOGIST, where psychiatric disorders were the dependent variables of interest. All models included SI, gender, and the SI-by-gender-interaction, as well as socio-demographic covariates. To limit multiple comparisons, we first examined the general categories of any Axis-I disorder and any Axis-II disorder as outcomes. If significant findings were observed, groupings within each category were examined: any mood disorder, any anxiety disorder, and any substance-use disorder for Axis-I categories, and any cluster A, B and C PDs for Axis-II disorders. Finally, we pursued further analysis to identify individual disorders contributing to the findings. We present multivariate-adjusted odds ratios (ORs) and their associated 95% confidence intervals (95% CIs), as well as interaction ORs and their associated 95% confidence intervals (CIs). The interaction OR is a ratio of the gender-specific associations between SI and the outcome of interest ($IOR = OR \text{ women} / OR \text{ men}$); 95% CIs that do not include 1.0 indicate a statistically significant gender difference ($p < .05$). Due to the design elements of the study sample, we analyzed data using SUDAAN software [Research Triangle Institute, Research Triangle Park]; the NESARC-calculated weights were included at all stages of analysis. Statistical significance was determined with the Wald Chi-Square Test.

Results

Bivariate Associations between SI and Socio-demographic Characteristics, by Gender

Among both women and men, SI was associated with marital status, employment, and age (Table 1). Specifically, SI was positively associated with being unmarried, full-time work, and younger age.

Gender-related Differences in the Prevalence of SI

The prevalence estimate of SI in the total sample was 14.7%. Men were more likely than women to acknowledge SI (18.9% vs. 10.9% ; $X^2=104.8$, $p<0.0001$).

SI and the Prevalence of Axis I and Axis II Disorders, Overall and by Gender

Sixty-one percent (N=3157) of individuals with SI had one or more Axis-I disorder, and 46.2% had one or more Axis-II disorder (Table 2). Among women and men, the prevalence rates of Axis-I and Axis-II disorders were higher among persons with SI compared to persons without SI.

Multivariate-adjusted Associations between SI and Axis-I and Axis-II Psychopathology among Women and Men

SI was positively associated with any Axis-I and any Axis-II disorders among women and men, independently of socio-demographic covariates (Table 3). Within these categories, SI was positively associated with all clusters of Axis-I (mood, anxiety and substance-use disorders) and Axis-II (cluster A, B and C disorders). Similarly, within each cluster, elevated odds were observed in women and men for each psychiatric condition except for dependent PD in men.

SI and Axis-I Disorders

ORs were robust, ranging from 1.89 to 6.14 among women and from 1.92 to 6.21 among men, indicating that individuals with SI were more likely than those without SI to display Axis-I psychopathology (Table 3).

SI and Axis-II disorders

ORs were robust, ranging from 2.10 to 10.02 among women and from 1.56 to 6.05 among men, indicating that individuals with SI were more likely than those without to display Axis-II psychopathology (Table 3).

Gender-related differences in the Associations between SI and Axis-I and Axis-II Psychopathology

The associations between SI and psychopathology were stronger in women as compared to men (significantly elevated IORs) with respect to social phobia, alcohol abuse/dependence, paranoid PD, schizotypal PD, antisocial PD, borderline PD, narcissistic PD, avoidant PD and obsessive-compulsive PD (Table 3).

Discussion

The present study represents the first to our knowledge to investigate systematically the prevalence of SI in a nationally representative sample of adults, the relationships between SI and psychopathology in women and men, and gender-related differences in the associations between psychiatric disorders and SI. The findings largely support our *a priori* hypotheses that men would be more likely than women to report SI, psychiatric disorders would be

found in association with SI in women and men, and the strength of associations between SI and psychopathology would typically be stronger in women compared to men.

Gender-related Differences in SI

A considerable proportion of people (14.7%) acknowledged SI in our sample. Consistent with our hypothesis, more men (18.9%) than women (10.9%) acknowledged SI. SI may be less prevalent than casual sex that has been reported to range from 14% to 64% in emerging-adult samples (Eisenberg et al., 2009; Garcia and Reiber, 2008; Owen et al., 2010) and more prevalent than hypersexuality or related behaviors/disorders which in the published literature has estimates ranging from 3-10%, depending on the criteria used and the study samples (Carnes et al., 2012; Coleman, 1992; Garcia & Thibaut, 2010; Långström and Hanson, 2006). As men appear more likely to acknowledge engagement in these sexual behaviors (Eisenberg et al., 2009), the current findings raise questions as to the extent to which SI might relate to casual sex and its correlates. In that SI might relate to unplanned pregnancies and sexually transmitted infections (Bornovalova et al., 2008, Kovacs et al., 1994), the considerable prevalence estimate suggests the need for further gender-informed investigation of the health correlates of SI.

SI and Psychopathology

Arguably the most important findings from the present study are the significant relationships between SI and Axis-I and Axis-II psychiatric disorders. For both women and men, SI was positively associated with the prevalence of all Axis-I and Axis-II psychiatric disorders, except for dependent PD in males. The robust associations between SI and mood, anxiety, and substance-use disorders within each gender have multiple clinical implications. First, they suggest a need for screening for and identifying individuals with SI in order to explore the extent to which SI may be contributing to their psychopathology or other risk behaviors. Second, they raise the possibility that targeting SI in psychiatric treatment may help general outcomes and potentially outcomes in specific psychiatric domains. Third, they highlight the need for future studies to investigate the extent to which SI may worsen psychopathology, psychopathology may make individual vulnerable to SI, whether the two share common etiologies or other possibilities. Fourth, they suggest that SI may represent an intermediary phenotype relevant broadly to psychopathology. The research-domain-criteria (RDoC) conceptual framework (Insel et al., 2010), one that is agnostic to traditional nosological categories and generates classifications stemming from basic behavioral neuroscience, seeks to grasp better the underlying elements of mental disorders, to characterize further endophenotypes and to enable the development of more suitable treatments. The extent to which SI represents a clinically relevant intermediary phenotype, consistent with the RDoC approach, warrants consideration.

Gender, SI and Psychopathology

Among men, strong associations were found between SI and all Axis-I and Axis-II disorders except for dependent PD. These findings have clinical implications for men's health. The significant associations suggest the importance of considering SI in men with psychiatric diagnoses in order to reduce risky sexual behaviors, and possibly influence the courses of

the disorders. The data also suggest the need of psychoeducational programs aimed at reducing SI and SI-related risk behaviors in men.

Among women, significant associations were found between SI and all Axis-I and Axis-II disorders. However, the associations between SI and psychopathology among women were stronger comparing to men for specific disorders. Among Axis-I disorders, these included social phobia and alcohol abuse/dependence. The strong association between social phobia and SI resonates with Kashdan et al.'s work (2009) that showed a connection between social anxiety, aggression, substance-use problems and SI. The current findings suggest that women, more than men, may turn to SI when experiencing anxiety states as part of social phobia, although this possibility remains speculative as individuals may also experience more social phobia following sexually impulsive encounters.

The findings further contribute to an understanding of the relationships between alcohol use and sexuality-related behaviors. Prior studies suggest that alcohol use may lead to a lower likelihood of inquiring if new partners have sexually transmitted infections (Moore et al., 2006) and lead to unwanted sexual intercourse (Flack et al., 2007), high-risk sexual behaviors (Fierros-Gonzalez et al., 2002), unplanned and unprotected sex (Hingson et al., 2003), a lower likelihood of condom use (Abbey et al., 2005), and sex with more partners (Sansone et al., 2008). The extent to which frequent and heavy drinking performed by women with alcohol abuse/dependence may lead to SI, SI may lead to heavy drinking or other possibilities exist warrants additional study. The stronger relationship between SI and alcohol-use disorders in women versus men suggests that these endeavors are particularly relevant to women's health.

With respect to Axis-II disorders, stronger relationships were observed in women (versus men) between SI and most PDs, and particularly antisocial, borderline and avoidant PDs. Gender-related differences in the association of antisocial PD with risky sexual behavior, psychopathic traits and delinquency have been observed, in which an impulsive-irresponsible dimension had a stronger influence on sexual behavior among girls compared with boys (Rucevic et al., 2010), theoretically consistent with the current findings. Problematic sexual behaviors link strongly to borderline PD (Lavan et al., 2002, Sansone et al., 2011), and the stronger association between SI and borderline PD in women versus men suggests that SI may be particularly relevant for women's health. The extent to which other features of borderline PD (e.g., emotional dysregulation) relate to SI warrants investigation, as does the extent to which interventions targeting SI may be helpful for women with borderline PD in reducing hospitalizations, sexually transmitted infections, and unintended pregnancies. Similarly, the extent to which SI may relate to functioning in women with avoidant PD needs further study.

The findings indicate the importance of a gender-oriented perspective for screening for SI and suggest that programs aimed at preventing risk behaviors consider SI. Given the high co-occurrence rates of SI and other psychopathologies, it will be important for future research to examine the influence of SI on both treatment-seeking and clinical outcomes of multiple psychiatric disorders. Our results raise the possibility that SI may impact the course of psychiatric disorders more greatly among women than men. Furthermore, common

biological mechanisms might underlie the development of both risky sexual behaviors and certain psychiatric disorders (Zietsch et al., 2010). Further research is needed to identify genetic and environmental explanations for the co-occurrence of SI and PDs.

The finding that SI in women is associated with more psychiatric symptoms than in men parallels other findings related to conditions characterized by impulsivity including gambling (Desai and Potenza, 2008; Blanco et al., 2006) and substance (Chou et al., 2011; Goodwin et al., 2011) addictions. In these studies, stronger relationships with psychopathology (particularly with respect to internalizing disorders or features) were observed in women versus men. Together, these studies suggest that gender-related differences in impulsivity might relate to mood/affect regulation, and further studies should examine the effects of targeting mood regulation in clinical populations of women with SI.

Limitations and Strengths

The survey methodology is subject to recall and other biases. The cross-sectional nature limits the ability to identify specific factors that might mediate the identified associations, and to determine whether SI may contribute to poor mental health, poor mental health to SI, or whether a common factor may underlie the co-occurrence. Further longitudinal research will best help to address these issues. The NESARC did not assess all psychiatric diagnoses; the absence of assessments for psychotic disorders, somatization disorders, and multiple impulse-control disorders is a limitation. Also, the data regarding some Axis-II disorders (paranoid, schizoid, histrionic, dependent, obsessive-compulsive and avoidant PDs) was drawn from Wave-1, while SI was assessed at Wave-2. However, the nature of associations between SI and Axis-II disorders was generally the same for disorders assessed at Wave-2 compared to Wave-1, which increases the confidence in the validity of our findings. Nonetheless, future research is needed to address this issue. SI was based on one question regarding the subject's history of getting quickly into sexual relationships. One question may not accurately assess sexual behavioral patterns and future studies should develop valid, reliable scales to assess SI. The single question used to assess SI might have led to some false positive results. The single question also does not allow for examination of specific facets of sexual impulsivity or how these facets might factor and relate to individual psychiatric disorders or clusters thereof. Furthermore, the single item used does not permit investigation of the timing of the SI-related behaviors; e.g., whether the SI behaviors might be committed within the context of specific psychiatric disorders like mania in bipolar disorder. Additional research is needed to investigate these areas as well as others (e.g., relationship to hypersexual disorder, state-dependency, quantity/frequency of SI-related behaviors) given the limitations of the current study. However, the large, nationally representative sample and thorough assessment of most Axis-I and Axis-II disorders represent important strengths and the findings that SI is related to a broad range of psychiatric disorders is consistent with findings of multiple psychiatric conditions relating to general impulsivity (Chamorro et al., 2012) or poorly controlled behaviors within a specific domain (e.g., problem-gambling severity (Desai and Potenza, 2008)). Importantly, the findings provide a foundation for future studies of SI in psychiatric populations.

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Table 1
Bivariate associations between sexual impulsivity and socio-demographic characteristics, by gender

Study characteristics	Women				Men			
	SI=Yes		SI=No		SI=Yes		SI=No	
	N	%	N	%	N	%	N	%
Race/ethnicity								
White	1367	71.9	9850	70.6	1804	70.6	6981	71.4
Black	564	14.9	3667	11.6	619	14.6	1688	71.4
Hispanic	91	5.4	767	6.6	109	4.2	546	6.9
Other	289	7.8	3320	11.3	461	10.6	2234	12.7
Marital status								
Married	887	47.3	9131	62.2	1269	49.0	7445	71.7
Formerly married	817	28.9	5564	23.8	768	19.7	1895	11.2
Never married	607	23.8	2909	14.1	956	31.3	2109	17.1
Education								
Less than high school	264	10.0	2928	14.2	363	11.8	1870	14.6
High school	601	26.1	4904	28.0	809	26.6	3055	27.2
Some college	883	40.3	5481	31.8	1033	36.4	3331	28.9
College +	563	23.6	4291	26.0	788	25.2	3193	29.3
Employment								
Full time	1232	51.7	7424	41.4	1950	67.4	7108	63.9
Part time	314	14.4	2307	14.4	232	7.8	798	7.1

Study characteristics	Women						Men					
	SI=Yes			SI=No			SI=Yes			SI=No		
	N	%		N	%		N	%		N	%	P
Other	765	34.0		7873	44.2		811	24.9		3543	29.0	
Income												0.0701
\$0-19,999	626	23.5		4811	22.0		537	16.0		1943	14.0	
\$20,000-34,999	514	21.0		3622	19.3		540	17.4		2148	17.3	
\$35,000-69,999	696	30.4		5220	31.6		1015	34.8		3819	34.3	
70,000	475	25.1		3951	27.1		901	31.7		3539	34.4	
M SE M SE M SE												
Current Age	40.53	0.33		49.96	0.21		42.08	0.33		48.38	0.22	<.0001

n's represent actual number of respondents in each category

Table 2
Sexual Impulsivity and the prevalence of Axis I and Axis II Disorders, overall and by gender

	Total Sample					Women					Men				
	Sexually Impulsive					Sexually Impulsive					Sexually Impulsive				
	Yes	No	N(%)	X ²	p	Yes	No	N(%)	X ²	p	Yes	No	N(%)	X ²	p
Diagnosis															
Any Axis-I Disorder	3157 (61.0)	8894 (30.6)	160.82	<.0001		1454 (64.2)	5601 (31.6)	144.40	<.0001		1703 (58.9)	3293 (29.3)	133.51	<.0001	
Any Mood Disorder	1109 (20.2)	2670 (8.7)	110.74	<.0001		675 (29.4)	1990 (11.1)	105.31	<.0001		434 (14.5)	680 (5.9)	73.03	<.0001	
Depression	868 (15.8)	2140 (7)	97.76	<.0001		557 (24.4)	1633 (9.2)	88.53	<.0001		311 (10.4)	507 (4.4)	57.55	<.0001	
Dysthymia	142 (2.5)	333 (1)	26.41	<.0001		88 (4.1)	252 (1.2)	21.76	<.0001		54 (1.4)	81 (0.6)	10.74	0.0017	
Mania	278 (5.2)	465 (1.5)	60.71	<.0001		160 (7)	316 (1.7)	47.64	<.0001		118 (4)	149 (1.3)	33.68	<.0001	
Hypomania	157 (3.1)	327 (1.1)	41.30	<.0001		80 (3.2)	214 (1.2)	21.14	<.0001		77 (3)	113 (1)	24.68	<.0001	
Any Anxiety Disorder	1505 (27.7)	4458 (14.5)	126.11	<.0001		908 (39.9)	3367 (18.8)	119.35	<.0001		597 (19.6)	1091 (9.3)	74.09	<.0001	
Panic Disorder*	279 (5.3)	666 (2.1)	47.56	<.0001		183 (8)	518 (2.8)	34.70	<.0001		96 (3.6)	148 (1.3)	21.20	<.0001	
Agoraphobia	16 (0.4)	23 (0.1)	9.69	0.0028		9 (0.5)	19 (0.1)	4.05	0.0483		7 (0.3)	4 (0.04)	3.42	0.0689	
Social Phobia	339 (6.3)	604 (1.9)	66.51	<.0001		203 (9.2)	408 (2.2)	72.17	<.0001		136 (4.5)	196 (1.5)	25.80	<.0001	
Specific Phobia	638 (11.9)	2115 (6.8)	58.62	<.0001		412 (18.2)	1638 (9)	51.57	<.0001		226 (7.9)	477 (4.2)	24.46	<.0001	
Generalized Anxiety Disorder	409 (7.4)	947 (3.2)	71.31	<.0001		261 (11.1)	733 (4.3)	58.35	<.0001		148 (5.1)	214 (1.8)	38.39	<.0001	
PTSD ^d	728 (13)	1760 (5.4)	92.22	<.0001		475 (20.7)	1347 (7.3)	92.00	<.0001		253 (8.1)	413 (3.2)	43.26	<.0001	
Any Substance-Use Disorder	2167 (44.3)	4709 (17.3)	153.52	<.0001		810 (38)	2340 (13.7)	116.05	<.0001		1357 (48.2)	2369 (21.6)	128.59	<.0001	
Alcohol Abuse/Dependence	1187 (24)	1940 (7.2)	129.33	<.0001		353 (16)	693 (4)	82.45	<.0001		834 (29)	1247 (11)	106.64	<.0001	
Nicotine Dependence	1352 (27.8)	3146 (11.6)	130.25	<.0001		570 (27.4)	1778 (11)	91.25	<.0001		782 (28)	1368 (12.8)	95.66	<.0001	
Drug Abuse/Dependence	404 (9)	339 (1.3)	88.01	<.0001		136 (7.4)	135 (0.8)	47.44	<.0001		268 (10)	204 (1.8)	69.84	<.0001	
Any Axis-II Disorder	2508 (46.2)	5228 (17.3)	149.53	<.0001		1186 (50.9)	3081 (16.2)	139.72	<.0001		1322 (43.3)	2147 (18.6)	119.48	<.0001	
Cluster A															
Paranoid PD ^c (W ^{1d})	522 (9)	1152 (3.5)	88.39	<.0001		306 (12.7)	796 (4)	72.60	<.0001		216 (6.7)	356 (3)	34.78	<.0001	
Schizoid PD (W ^{1d})	301 (5.5)	835 (2.7)	47.89	<.0001		150 (6.5)	521 (2.6)	35.42	<.0001		151 (4.9)	314 (2.7)	16.92	0.0001	
Schizotypal PD ^c (W ^{2h})	681 (12.1)	845 (2.6)	136.56	<.0001		338 (13.6)	508 (2.5)	93.13	<.0001		343 (11.1)	337 (2.7)	94.84	<.0001	

	Total Sample				Women				Men			
	Sexually Impulsive				Sexually Impulsive				Sexually Impulsive			
	Yes	No			Yes	No			Yes	No		
	N(%)	N(%)	X ²	p	N(%)	N(%)	X ²	p	N(%)	N(%)	X ²	p
Cluster B												
Histrionic PD ^c (W1 ^a)	257 (4.8)	389 (1.3)	65.53	<.0001	136 (6)	241 (1.3)	42.56	<.0001	121 (4.1)	148 (1.3)	28.90	<.0001
Antisocial PD ^c (W2 ^b)	530 (10.7)	691 (2.7)	103.45	<.0001	166 (7.6)	240 (1.3)	56.31	<.0001	364 (12.7)	451 (4.4)	67.11	<.0001
Borderline PD ^c (W2 ^b)	1193 (21.9)	1029 (3.2)	159.02	<.0001	671 (29.2)	661 (3.4)	138.93	<.0001	522 (17.3)	368 (2.9)	118.15	<.0001
Narcissistic PD ^c (W2 ^b)	1029 (17.3)	1410 (4.3)	109.02	<.0001	433 (15.8)	788 (3.5)	70.25	<.0001	596 (18.3)	622 (5.2)	97.20	<.0001
Cluster C												
Dependent PD ^c (W1 ^a)	46 (0.9)	98 (0.3)	9.91	0.0025	32 (1.5)	72 (0.4)	11.15	0.0014	14 (0.6)	26 (0.2)	2.37	0.1288
Obsessive Compulsive PD ^c (W1 ^a)	678 (13)	2057 (7.2)	55.18	<.0001	327 (15.1)	1241 (7.2)	45.70	<.0001	351 (11.7)	816 (7.3)	25.66	<.0001
Avoidant PD ^c (W1 ^a)	241 (4.7)	569 (1.9)	51.96	<.0001	148 (7.1)	396 (2.2)	38.22	<.0001	93 (3.2)	173 (1.5)	16.66	0.0001

% indicate weighted percentages

Axis-I Disorders are cross sectional at Wave 2 and reflect past year diagnoses

Axis-II Disorders were assessed at Wave 1 and Wave 2 (as indicated) and are lifetime diagnoses

^a W1=Wave 1

^b W2=Wave 2

^c PD=Personality Disorder

^d PTSD=Post Traumatic Stress Disorder

Table 3
Multivariate-adjusted associations between sexual impulsivity and Axis I and Axis II Disorders among Men and Women

	Women			Men			Interaction Women vs. OR Men		
	Yes vs. No	OR	95% CI	Yes vs. No	OR	95% CI	Yes vs. No	OR	95% CI
Diagnosis									
Any Axis I									
	3.09	2.72-3.51	2.94	2.63-3.28	1.05	0.89-1.25			
Any Mood Disorder									
	2.70	2.35-3.09	2.24	1.92-2.60	1.21	0.99-1.47			
Depression	2.60	2.23-3.03	2.10	1.76-2.51	1.24	0.98-1.56			
Dysthymia	3.05	2.12-4.37	1.92	1.22-3.02	1.59	0.95-2.66			
Mania	3.28	2.51-4.29	2.52	1.83-3.45	1.31	0.89-1.91			
Hypomania	1.89	1.34-2.67	2.29	1.62-3.25	0.83	0.51-1.33			
Any Anxiety Disorder									
	2.47	2.17-2.81	2.16	1.87-2.50	1.14	0.94-1.38			
Panic Disorder ^a	2.37	1.85-3.04	2.36	1.70-3.27	1.01	0.67-1.52			
Agoraphobia	3.81	1.41-10.28	6.21	1.44-26.86	0.61	0.09-4.06			
^a Social phobia	3.57	2.87-4.46	2.46	1.81-3.35	1.45	1.02-2.07			
Specific phobia	1.98	1.68-2.33	2.18	1.91-2.48	1.13	0.85-1.50			
Generalized Anxiety Disorder	2.34	1.93-2.84	2.12	1.72-2.62	0.91	0.66-1.26			
PTSD ^d	2.88	2.45-3.38	2.39	1.94-2.95	1.20	0.94-1.55			
Any Substance-Use Disorder									
	2.94	2.56-3.36	2.83	2.51-3.18	1.04	0.87-1.24			
Alcohol abuse/dependence	3.27	2.76-3.88	2.54	2.23-2.89	1.29	1.04-1.59			
Nicotine dependence	2.53	2.19-2.93	2.27	1.99-2.60	1.11	0.93-1.34			
Drug abuse/dependence	6.14	4.61-8.20	4.37	3.37-5.68	1.41	0.93-2.12			
Any Axis-II									
	4.55	4.09-5.06	2.93	2.63-3.26	1.55	1.34-1.80			
Cluster A PDs^c									
^a ParanoidPD ^c (WI ^d)	2.71	2.24-3.27	1.87	1.49-2.36	1.45	1.08-1.94			
Schizoid PD ^c (WI ^d)	2.18	1.75-2.72	1.56	1.22-2.00	1.40	1.00-1.96			
^a SchizotypalPD ^c (W2 ^b)	5.21	4.33-6.27	3.82	3.15-4.62	1.37	1.05-1.78			
Cluster B PDs^c									

	Women		Men		Interaction Women vs. OR Men	
	Yes vs. No		Yes vs. No		Yes vs. No	
Histrionic PD ^c (W1 ^a)	3.48	2.62-4.61	2.36	1.73-3.23	1.47	0.95-2.29
* Antisocial PD ^c (W2 ^b)	4.98	3.78-6.54	2.69	2.21-3.26	1.85	1.30-2.64
* Borderline PD ^c (W2 ^b)	10.02	8.61-11.67	6.05	5.01-7.32	1.66	1.32-2.07
* Narcissistic PD ^c (W2 ^b)	4.42	3.76-5.20	3.47	2.99-4.03	1.27	1.02-1.59
Cluster C PDs ^c						
* Avoidant PD ^c (W1 ^a)	2.63	2.01-3.44	1.70	1.24-2.33	1.55	1.03-2.33
Dependent PD ^c (W1 ^a)	2.64	1.59-4.40	2.02	0.78-5.18	1.31	0.48-3.56
* Obsessive Compulsive PD ^c (W1 ^a)	2.10	1.78-2.48	1.63	1.37-1.93	1.29	1.02-1.63

Axis-I Disorders are cross sectional at Wave 2 and reflect past year diagnoses
Axis-II Disorders were assessed at Wave 1 and Wave 2 (as indicated) and are lifetime diagnoses Models were adjusted for age, race/ethnicity, marital status, education, employment status, household income

^aW1=Wave 1
^bW2=Wave 2
^cPD=Personality Disorder
^dPTSD=Post Traumatic Stress Disorder
^eSocial Phobia= With or without agoraphobia
* Disorders in which 95% confidence intervals that do not include 1.0, indicating a statistically significant gender difference (p<.05)