



Published in final edited form as:

J Psychiatr Res. 2012 August ; 46(8): 994–1001. doi:10.1016/j.jpsychires.2012.04.023.

Impulsivity in the general population: A national study

Jaime Chamorro^a, Silvia Bernardi^a, Marc N. Potenza^{b,c,d}, Jon E. Grant^e, Rachel Marsh^a, Shuai Wang^a, and Carlos Blanco^{a,*}

^aDepartment of Psychiatry, Columbia University/New York State Psychiatric Institute, New York, NY, USA

^bDepartment of Psychiatry, Yale University, New Haven, CT, USA

^cDepartment of Neurobiology, Yale University, New Haven, CT, USA

^dChild Study Center, Yale University, New Haven, CT, USA

^eDepartment of Psychiatry, University of Minnesota, Minneapolis, MN, USA

Abstract

Objective—The construct of impulsivity is an important determinant of personality differences, psychiatric disorders, and associated risk-taking behaviors. Most existing knowledge about impulsivity comes from clinical samples. To date, no study has estimated the prevalence of impulsivity and examined its correlates in the general population.

Method—We analyzed data from a large national sample of the United States population. Face-to-face surveys of 34 653 adults aged 18 years and older residing in households were conducted during the 2004–2005 period. Diagnoses of mood, anxiety, and drug disorders as well as personality disorders were based on the Alcohol Use Disorder and Associated Disabilities Interview Schedule—DSM-IV Version.

Results—Impulsivity was common (17% of the sample), particularly among males and younger individuals, and associated with a broad range of axis I and II disorders, particularly drug dependence, cluster B, dependent and schizotypal personality disorders, bipolar disorder and ADHD. It was associated with behavioral disinhibition, attention deficits, and lack of planning. Individuals with impulsivity were more likely to engage in behaviors that could be dangerous to themselves or others, including driving recklessly, starting fights, shoplifting, perpetrating domestic violence and trying to hurt or kill themselves. They were exposed to higher risk of lifetime trauma and to substantial physical and psychosocial impairment.

Conclusion—Given the association of impulsivity with psychiatric disorders and multiple adverse events, there is a need to target impulsivity in prevention and treatment efforts.

Keywords

Impulsivity; Prevalence; Comorbidity; Adverse events; Externalizing disorders; Trauma

© 2012 Elsevier Ltd. All rights reserved.

*Corresponding author. Department of Psychiatry, Columbia University/New York State Psychiatric Institute, 1051 Riverside Drive, Unit 69, New York, NY, USA. Tel.: +1 212 543 6533; fax: +1 212 543 6515. cb255@columbia.edu, cblanco@nyspi.cpmc.columbia.edu (C. Blanco).

Contributors

Drs. Blanco, Chamorro and Bernardi designed the study. Drs. Chamorro and Bernardi wrote the first draft of the manuscript. Dr. Wang conducted the statistical analyses. All authors contributed to the manuscript and approved the final version.

Conflict of interest

No conflicts of interests.

Impulsivity, 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’ (Chamberlain and Sahakian, 2007), contributes importantly to personality differences and externalizing psychiatric disorders (Moeller et al., 2001), such as substance use disorders (Ersche et al., 2010; Moeller et al., 2002), antisocial personality disorder (Swann et al., 2009b), and borderline personality disorder (American Psychiatric Association, 1994). Impulsivity is also common in emotionally labile individuals, including those with borderline personality or bipolar disorders (Swann et al., 2009a) and associated with self-injurious behaviors including suicide attempts (Oquendo et al., 2004). Because impulsivity is associated with risk-taking behaviors, such as driving violations (Paaver et al., 2006), high-risk sexual behaviors (Black et al., 2009), domestic violence (Shorey et al., 2010), gambling (Slutske et al., 2005), kleptomania (Bayle et al., 2003) and with increased probability of adverse outcomes, such as driving-related injuries (Cherpitel, 1999), increased risk of contracting HIV (Bornovalova et al., 2008), being arrested (Nilsson et al., 2010), and undesired pregnancies (Kovacs et al., 1994), impulsivity represents an important construct contributing to many public health concerns.

Most existing knowledge about impulsivity comes from clinical samples or populations, such as adolescents, who have elevated impulsivity (Sterba et al., 2010; Paus et al., 2008). To date, no study has estimated the prevalence of impulsivity and examined its correlates in the general population, thus leaving an important gap in our understanding. Differences in neurobiology (af Klinteberg et al., 1987; Manuck et al., 1999; Ruegg et al., 1997) and cognitive styles and social expectations (Calvete and Cardenoso, 2005) have led to the suggestion that men are typically more impulsive than women. However, findings have been mixed across samples (Gaub and Carlson, 1997; Rinne et al., 2000), leaving open the question of whether the prevalence of impulsivity is different in men and women. Similarly, impulsivity is considered to have developmental aspects (Paulsen and Johnson, 1980; Steinberg, 2010), peaking during adolescence and subsequently decreasing after the development of cognitive control capacities and associated maturation of the prefrontal cortex (Galvan et al., 2006; Gogtay et al., 2004). However, epidemiological studies have not examined whether the prevalence of impulsivity decreases with age. Furthermore, clinical studies have emphasized the association between impulsivity and psychiatric disorders such as alcohol dependence (Rogers et al., 2010), bipolar disorder (Swann et al., 2009a), antisocial (Swann et al., 2009b) and borderline personality disorders (American Psychiatric Association, 1994), pathological gambling (Blanco et al., 1996; Slutske et al., 2005; Vitaro et al., 1997), attention-deficit hyperactivity disorder (ADHD) (American Psychiatric Association, 1994), and schizophrenia (Nolan et al., 2011), but whether those findings extend to individuals in the general population is unknown.

The purpose of this study was to fill these gaps in knowledge drawing on data from the National Epidemiologic Survey on Alcohol and Related Conditions (NESARC), a large, representative sample of the United States adult population. Based on prior work (af Klinteberg et al., 1987; Balodis et al., 2009; Manuck et al., 1999; Mehrotra et al., 2009; Nilsson et al., 2010; Paulsen and Johnson, 1980; Swann et al., 2009a,b), we hypothesized that: 1) impulsivity would be more prevalent among males and inversely related to age; 2) there would be a strong association between impulsivity and externalizing disorders, such as substance use disorders and antisocial personality disorder; 3) after adjusting for the presence of psychiatric disorders, impulsivity would be associated with behaviors characterized by disinhibition, attentional deficits, and lack of planning, such as problems with gambling or spending too much money, troubles paying attention and quitting jobs without knowing what to do next; and, 4) individuals with impulsivity would experience

more adverse events such as greater number of lifetime traumas, more frequent incarceration, higher prevalence of HIV infection, and poorer perceived health.

1. Method

1.1. Sample

The 2001–2002 NESARC is a survey of a representative sample US adults sponsored by the National Institute on Alcohol Abuse and Alcoholism (Grant et al., 2001). The target population was individuals aged 18 years in the civilian non-institutionalized population residing in households and group quarters. The survey included those residing in the continental United States, District of Columbia, Alaska and Hawaii. Face-to-face personal interviews were conducted with 43 093 respondents. The Wave 1 survey response rate was 81%. Blacks, Hispanics, and young adults (ages 18–24 years) were over-sampled. The 2004–2005 Wave 2 (Grant et al., 2007a) is the second wave of the NESARC. Its design involved face-to-face re-interviews with all participants in the Wave 1 interview. Excluding respondents ineligible for the Wave 2 interview (e.g., deceased), the Wave 2 response rate was 86.7%, reflecting 34 653 completed interviews. The cumulative response rate at Wave 2, which was 70.2%, represents the product of the Wave 2 and Wave 1 response rates. The mean interval between Wave 1 and Wave 2 interviews was 36.6 (S.E. = 2.62) months. Waves 1 and 2 NESARC data were weighted to reflect design characteristics of the NESARC and account for oversampling. Adjustment for non-response across numerous variables, including age, race-ethnicity, sex, region and place of residence, was performed. Wave 2 was also adjusted for and the presence of any lifetime Wave 1 NESARC substance use disorder or other psychiatric disorder was administered at the household and person levels. Weighted data were then adjusted to be representative of the civilian population of the USA on socioeconomic variables including region, age, race-ethnicity and sex based on the 2000 Decennial Census.

All potential NESARC respondents were informed in writing about the nature of the survey, the statistical uses of the survey data, the voluntary aspect of their participation, and the federal laws that rigorously provided for the strict confidentiality of the identifiable survey information. The respondents consenting to participate after receiving this information were interviewed. The research protocol, including informed consent procedures, received full ethical review and approval from the U.S. Census Bureau and the U.S. Office of Management and Budget.

1.2. Diagnostic assessment

Sociodemographic measures included age, sex, race/ethnicity, nativity, marital status, education, insurance type, employment status and individual income.

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), a valid and reliable fully structured diagnostic interview designed for use by professional interviewers who are not clinicians.

In Waves 1 and 2, mood disorders included DSM-IV primary major depressive disorder (MDD), dysthymia, and bipolar I and II disorder. Anxiety disorders included DSM-IV primary panic disorder, social anxiety disorder, specific phobias and generalized anxiety disorder (Williams et al., 2003). AUDADIS-IV methods to diagnose these disorders are described in detail elsewhere (Grant et al., 2005a,b, 2006; Hasin et al., 2005; Neufeld et al., 1999). Consistent with DSM-IV, 'primary' AUDADIS-IV diagnoses excluded disorders that were substance-induced or due to general medical conditions. Diagnoses of MDD also ruled out bereavement.

Diagnoses of attention-deficit/hyperactivity disorder (ADHD) and post-traumatic stress disorder (PTSD) were assessed uniquely in the Wave 2 NESARC. Personality disorders assessed on a lifetime basis at Wave 1 and described in detail elsewhere (Compton et al., 2005; Grant et al., 2004a, 2005c) included avoidant, dependent, obsessive-compulsive, paranoid, schizoid, histrionic and antisocial personality disorders. Borderline, schizotypal and narcissistic personality disorders were measured at Wave 2.

Test–retest reliabilities for AUDADIS-IV mood, anxiety, personality disorders and ADHD diagnoses in the general population and clinical settings were fair to good ($\kappa = 0.40\text{--}0.77$) (Canino et al., 1999). Test–retest reliabilities of AUDADIS-IV personality disorders compare favorably with those obtained in patient samples using semi-structured personality interviews (Zimmerman, 1994). Convergent validity was good to excellent for all affective, anxiety and personality disorder diagnoses (Grant et al., 2005a, 2005c; Hasin et al., 2005), and selected diagnoses showed good agreement ($\kappa = 0.64\text{--}0.68$) with psychiatrist reappraisals (Canino et al., 1999).

Embedded in the borderline personality disorder section was the following question: “Most of the times throughout your life, regardless of the situation or whom you were with, have you often done things impulsively?” All NESARC participants were asked this question. Individuals who answered affirmatively were defined in this study as impulsive. Test–retest reliability of the entire borderline personality disorder section in the NESARC is 0.71 (Grant et al., 2004a, 2007b). Although test–retest reliability of individual items is unavailable, we computed Cronbach’s alpha for the borderline personality disorder symptoms, which was 0.77, indicating very good internal consistency of the borderline personality disorder section. This value was unchanged when the impulsivity item was excluded, suggesting high reliability for the item. Convergent validity of the impulsivity item was assessed by odds ratios (ORs) with each of the conduct disorder criteria as well as with the impulsivity items of the ADHD diagnoses. The ORs were all significant and positive (range of 1.99–4.26), indicating convergent validity. Divergent validity was examined using a chi-square test to examine the association of the impulsivity item with the birth month of subject, as these should be unrelated. The results indicated no association between those two variables (chi-square = 1.04, $df = 11$, $p = 0.42$), supporting the divergent validity of the item.

In addition to psychiatric disorders, the NESARC also included some questions assessing behaviors associated with disinhibition, attentional deficits, and lack of planning, such as having quick sexual relationships without thinking about the consequences, trouble waiting turns or changing jobs without knowing what to do next. Level of psychosocial functioning was assessed with the physical component summary and the social, emotional, and mental health scores of the Short-Form-12v2 (Ware et al., 2002), a reliable and valid measure of impairment commonly used in population surveys (Ware et al., 2002). Adverse events potentially associated with impulsivity included engagement in dangerous activities (e.g., starting fights, reckless driving), diagnoses of sexual transmitted diseases and HIV in the last 12 months, perpetrating domestic violence, attempting suicide or self-harm, and number of lifetime traumas. In order to limit the influence of potential confounders (such as lack of education and comorbidity), the analyses examining the association of impulsivity with other behaviors and potential were adjusted for differences in sociodemographic characteristics and psychiatric comorbidity of the sample.

1.3. Statistical analyses

Weighted percentages and means were computed to derive sociodemographic and clinical characteristics of respondents with and without a lifetime self-reported impulsivity. Logistic regression yielded odd ratios (ORs) and adjusted ORs (AORs), indicating measures of association between impulsivity and: 1) sociodemographic characteristics; 2) lifetime

psychiatric comorbidity; 3) associated behaviors, adjusted for sociodemographic characteristics and psychiatric comorbidity; and 4) associated adverse events, adjusted for sociodemographic characteristics and comorbidity. Because the combined percents of two means is always equal to or less than the sum of the standard errors of those two means, we conservatively consider that two CIs that do not overlap are significantly different from one another (Agresti, 2002). We consider significant odds ratios those whose 95% confidence intervals (CI) do not include 1. All analyses, including estimation of standard errors and 95% CIs, were conducted with SUDAAN (Research Triangle Institute, 2004), to adjust for the design effects of the NESARC.

2. Results

2.1. Sociodemographic, socioeconomic and perceived health characteristics

The lifetime prevalence of self-reported impulsivity in the general population was 16.9% (CI = 16.4–17.5%). The odds of acting impulsively were significantly higher in men than in women (OR = 1.38, CI = 1.28–1.48). Native Americans had higher odds than non-Hispanic whites, whereas blacks, Hispanics, and Asian Americans had lower odds of impulsivity than non-Hispanic whites. Being U.S.-born, never married, divorced or in the youngest cohort (ages 18–29) also increased the odds of impulsivity (Table 1).

Impulsivity was significantly more common among individuals with high school or lower educational attainment than among individuals with at least some college education. Having public or no health insurance increased the odds of impulsivity. Impulsivity was also significantly less common among individuals with income over \$35 000 than with individuals with income below \$19 999.

2.2. Lifetime comorbidity

The vast majority of individuals with impulsivity (83.32%, CI = 81.84–84.71%) had a lifetime history of at least one psychiatric disorder, compared to 61.77% (CI = 60.42–63.10%) individuals without impulsivity (AOR = 2.78, CI = 2.54–3.05). Responders with impulsivity were significantly more likely than those without to have a lifetime axis I disorder (AOR = 2.36, CI = 2.17–2.57) and a personality disorder (AOR = 3.95, CI = 3.68–4.25) (Table 2).

Although all psychiatric disorders were significantly associated with impulsivity, the highest odds were with ADHD, drug dependence, and bipolar disorder, with AORs of 3.21, 3.19 and 4.46, respectively. Impulsivity was also associated with increased prevalence of all personality disorders, with dependent, schizotypal, narcissistic, borderline, and histrionic personality disorder having the highest AORs.

2.3. Behavioral disinhibition, attentional deficits and lack of planning

Individuals with impulsivity were more likely than those without impulsivity to engage in behaviors reflecting behavioral disinhibition, attentional deficits and lack of planning both in the unadjusted and adjusted analyses (Table 3). For both groups, the most common behavior was “engaging in quick sexual relationship without thinking about the consequences”, which had a prevalence of 33.79% (95% CI = 32.37–35.24%) among individuals with impulsivity versus 10.64% (CI = 10.15–11.16%) among those without (AOR = 3.05, CI = 2.79–3.34). The behaviors more strongly associated with impulsivity were having problems with gambling or spending too much money (AOR = 3.95, CI = 3.46–4.53) and having sudden changes in personal goals, career plans and other important aspects of life (AOR = 3.58, CI = 3.22–3.97).

2.4. Adverse events

Compared to those without impulsivity, individuals with impulsivity were significantly more likely to engage in behaviors that could be dangerous to themselves or others, including driving recklessly, starting fights, shoplifting, perpetrating domestic violence and trying to hurt or kill themselves (Table 4). All findings, except increased risk of being diagnosed with sexually transmitted diseases remained significant after adjusting for sociodemographic characteristics and comorbidity.

Increased odds among individuals with impulsivity versus those without it were observed for starting fights (AOR = 3.53, CI = 2.03–6.14) and shoplifting (AOR = 2.77, CI = 1.83–4.20). Individuals with impulsivity also increased odds of lifetime traumas and scored significantly lower at all the subscales of the SF-12 compared to non-impulsive individuals.

3. Discussion

In a large, nationally representative sample of US adults, impulsivity was common, particularly among males and younger individuals, and associated with all axis I and II disorders assessed by the AUDADIS, particularly drug dependence, cluster B, dependent and schizotypal personality disorders, bipolar disorder and ADHD. Impulsivity was also associated with multiple risk-taking behaviors and negative outcome measures.

Consistent with our first hypothesis, the prevalence of impulsivity was higher among males and young adults. Because age differences between genders could explain gender differences in impulsivity, we adjusted the model to account for age effects. The results remain essentially the same (AOR = 1.36, CI = 1.26–1.46). Several reasons may explain gender differences in impulsivity (Struber et al., 2008). Gender differences in serotonin-related gene polymorphisms (Williams et al., 2003), density of certain serotonin receptor sites (Rubinow et al., 1998) and binding capacity of serotonin receptors in several brain regions, including the anterior cingulate cortex and orbitofrontal cortex (Parsey et al., 2002) may partly explain gender differences in impulsivity. Higher levels of testosterone in males, which shifts in decision making toward a reduction in punishment sensitivity and heightened reward dependency (van Honk et al., 2004) may also contribute. Sex differences in fear of harm or injury (Else-Quest et al., 2006) may lead women to make less risky decisions than men, especially when the risks are physical or life-threatening (Stoltenberg et al., 2008). Differences in cognitive strategies coping with negative affects and cultural expectations (Eagly and Steffen, 1986) may also explain differences in the expression of impulsivity across genders.

The odds of impulsivity were increased in the youngest cohorts in the sample. Decreases in impulsivity with age have been attributed to differences in the timing of development of different brain regions, specifically to the maturational gap between the protracted development of the prefrontal cortex (PFC)-based control system and the more advanced development of subcortical pro-motivational circuitry (Casey and Jones, 2010). Increased ability to delay gratification and to use cognitive control strategies with age (Mischel et al., 1989), and decreased sensitivity to rewards as individuals mature (Cauffman et al., 2010), may partly explain this inverse association between age and impulsivity. Age-related maturation of the ability to attribute valence to wins and losses and decreased salience of peer pressure (Romer and Hennessy, 2007) may also contribute to decreased impulsivity over time among older individuals. Lower odds of impulsivity in older age groups may also be partially explained by lower survival rates among individuals with impulsivity and associated risk-taking behaviors.

Consistent with our second hypothesis, impulsivity was associated with all psychiatric disorders assessed by the AUDADIS, suggesting that impulsivity may be a trait that cuts across traditional psychopathological categories. However, the associations appeared particularly robust with externalizing disorders, including substance use disorders, pathological gambling, and antisocial personality disorder, which often co-occur (Grant et al., 2004b; Krueger et al., 2002). Although impulsivity is associated with the development of externalizing disorders (Moeller et al., 2001, 2002; Swann et al., 2009a) and is a candidate endophenotype for substance use disorders (Ersche et al., 2010), it also contributes, although more weakly, to internalizing psychopathology (Peluso et al., 2007). Our results are consistent with theories that do not conceptualize internalizing and externalizing disorders as opposite poles of a spectrum, but rather as positively correlated constructs (Krueger, 1999; Lahey et al., 2011). In this view, risk factors for externalizing disorders would generally be expected to also increase the risk for internalizing disorders. It is also possible, as recently suggested, that internalizing and externalizing disorders may be related to a latent factor (such as a set of pleiotropic genetic influences) etiologically associated to varying degrees with risk of both internalizing and externalizing disorders (Lahey et al., 2011). Alternatively, impulsivity may directly predispose to externalizing disorders, which may lead to comorbidity with internalizing disorders through traumatic events and difficulties associated with lack of inhibitory control and risk-taking behaviors. Neuroimaging and longitudinal studies of individuals at risk for externalizing and internalizing disorders may help clarify the relationships among impulsivity and these disorders.

Consistent with our third and fourth hypotheses, impulsive individuals were more likely than non-impulsive individuals to engage in a broad range of behaviors characterized by disinhibition, attentional deficits and lack of planning, and to acknowledge multiple adverse outcome measures, even when accounting for the effects of comorbidities. Our findings suggest the need, as recently suggested (Insel et al., 2010), to move beyond traditional nosological categories and identify dimensions or endophenotypes that may better capture the underlying components of mental disorders and allow the development of better targeted treatments.

Our study has limitations common to most large-scale surveys. First, subtle distinctions between assessments of impulsivity with structured interviews or severity scales and reliance on interviewed self-report, raise the possibility of misclassification and increased error variance, which would decrease statistical power and bias the results toward the null (Leon et al., 1995). Thus, our results may underestimate the strength of associations between impulsivity and some psychiatric disorders or correlates. Second, estimates of impulsivity were collected retrospectively and may be subject to recall bias. Third, because the NESARC sample included only civilian household's populations, information was unavailable on individuals in prison, who may have higher rates of impulsivity. Fourth, the assessment of impulsivity was limited to a self-report dichotomous question and did not include information about the nature of the impulsive acts. However, affirmative response to this question was associated with acknowledgment of behavioral disinhibition, inattention, and non-planning, aspects of impulsivity captured in other widely used measures (Patton et al., 1995). Furthermore, in addition to face validity, the question showed good convergent and divergent validity. This suggests that the single-item question captures respondents typically deemed impulsive in other studies. Even with these limitations, the results of this study suggest that self-reported impulsivity is strongly associated with psychopathology, poorer physical and mental health, and potentially dangerous risk-taking and aggressive behaviors.

The NESARC constitutes the first nationally representative survey to date to include information on impulsivity. Our results suggest that impulsivity is relatively common and

associated with substantial rates of psychiatric disorders and psychosocial impairment. Given findings that impulsivity and related constructs such as poor self-control may predict poor outcomes (Mischel et al., 1989) and psychiatric disorders such as substance use disorders (Belin et al., 2008), future efforts should target impulsivity for prevention and treatment (e.g., through interventions increasing the ability to delay gratification or inhibit behaviors). As preliminary data indicate that self-reported impulsivity may change during treatment (Blanco et al., 2009), measures of impulsivity should be considered for inclusion in clinical trials involving impulsive populations. Since impulsivity fractionates into multiple independent components (Meda et al., 2009) and behavioral and self-report measures of the same constructs may not correlate (Krishnan-Sarin et al., 2007), a broad range of measures assessing impulsivity and related constructs appears warranted in these endeavors. As our understanding of impulsivity continues to deepen, it may be possible to develop better preventive and treatment strategies to diminish adverse consequences of impulsive behaviors.

Acknowledgments

Role of the funding source

The funding sources had no role in the design or analyses of this study or in the decision to publish it.

Funding/support: The National Epidemiologic Survey on Alcohol and Related Conditions was sponsored by the National Institute on Alcohol Abuse and Alcoholism with supplemental support from the National Institute on Drug Abuse. Work on this manuscript was supported by NIH grants DA019606, DA020783, DA023200, DA023973, and MH082773 to Dr. Blanco, DA028279 to Dr. Grant, and AA017539 and DA027844 to Dr. Potenza.

References

- af Klinteberg B, Schalling D, Edman G, Orelund L, Asberg M. Personality correlates of platelet monoamine oxidase (MAO) activity in female and male subjects. *Neuropsychobiology*. 1987; 18(2):89–96. [PubMed: 3451079]
- Agresti, A. *Categorical data analysis*. Hoboken, NJ: John Wiley & Sons; 2002.
- American Psychiatric Association. *Diagnostic and statistical manual of mental disorders*. Washington, DC: American Psychiatric Association; 1994.
- Balodis IM, Potenza MN, Olmstead MC. Binge drinking in undergraduates: relationships with sex, drinking behaviors, impulsivity, and the perceived effects of alcohol. *Behavioural Pharmacology*. 2009; 20(5–6):518–26. [PubMed: 19730367]
- Bayle FJ, Caci H, Millet B, Richa S, Olie JP. Psychopathology and comorbidity of psychiatric disorders in patients with kleptomania. *American Journal of Psychiatry*. 2003; 160(8):1509–13. [PubMed: 12900315]
- Belin D, Mar AC, Dalley JW, Robbins TW, Everitt BJ. High impulsivity predicts the switch to compulsive cocaine-taking. *Science*. 2008; 320(5881):1352–5. [PubMed: 18535246]
- Black RA, Serowik KL, Rosen MI. Associations between impulsivity and high risk sexual behaviors in dually diagnosed outpatients. *American Journal of Drug and Alcohol Abuse*. 2009; 35(5):325–8. [PubMed: 20180659]
- Blanco C, Orensanz-Munoz L, Blanco-Jerez C, Saiz-Ruiz J. Pathological gambling and platelet MAO activity: a psychobiological study. *American Journal of Psychiatry*. 1996; 153(1):119–21. [PubMed: 8540570]
- Blanco C, Potenza MN, Kim SW, Ibanez A, Zaninelli R, Saiz-Ruiz J, et al. A pilot study of impulsivity and compulsivity in pathological gambling. *Psychiatry Research*. 2009; 167(1–2):161–8. [PubMed: 19339053]
- Bornoalova MA, Gwadz MA, Kahler C, Aklin WM, Lejuez CW. Sensation seeking and risk-taking propensity as mediators in the relationship between childhood abuse and HIV-related risk behavior. *Child Abuse & Neglect*. 2008; 32(1):99–109. [PubMed: 18155295]

- Calvete E, Cardenoso O. Gender differences in cognitive vulnerability to depression and behavior problems in adolescents. *Journal of Abnormal Child Psychology*. 2005; 33(2):179–92. [PubMed: 15839496]
- Canino G, Bravo M, Ramirez R, Febo VE, Rubio-Stipec M, Fernandez RL, et al. The Spanish alcohol use disorder and associated disabilities interview schedule (AUDADIS): reliability and concordance with clinical diagnoses in a Hispanic population. *Journal of Studies on Alcohol*. 1999; 60(6):790–9. [PubMed: 10606491]
- Casey BJ, Jones RM. Neurobiology of the adolescent brain and behavior: implications for substance use disorders. *Journal of the American Academy of Child & Adolescent Psychiatry*. 2010; 49(12):1189–201. [PubMed: 21093769]
- Cauffman E, Shulman EP, Steinberg L, Claus E, Banich MT, Graham S, et al. Age differences in affective decision making as indexed by performance on the Iowa gambling task. *Developmental Psychology*. 2010; 46(1):193–207. [PubMed: 20053017]
- Chamberlain SR, Sahakian BJ. The neuropsychiatry of impulsivity. *Current Opinion in Psychiatry*. 2007; 20(3):255–61. [PubMed: 17415079]
- Cherpitel CJ. Substance use, injury, and risk-taking dispositions in the general population. *Alcoholism Clinical and Experimental Research*. 1999; 23(1):121–6.
- Compton WM, Conway KP, Stinson FS, Colliver JD, Grant BF. Prevalence, correlates, and comorbidity of DSM-IV antisocial personality syndromes and alcohol and specific drug use disorders in the United States: results from the national epidemiologic survey on alcohol and related conditions. *Journal of Clinical Psychiatry*. 2005; 66(6):677–85. [PubMed: 15960559]
- Eagly AH, Steffen VJ. Gender and aggressive behavior: a meta-analytic review of the social psychological literature. *Psychological Bulletin*. 1986; 100(3):309–30. [PubMed: 3797558]
- Else-Quest NM, Hyde JS, Goldsmith HH, Van Hulle CA. Gender differences in temperament: a meta-analysis. *Psychological Bulletin*. 2006; 132(1):33–72. [PubMed: 16435957]
- Ersche KD, Turton AJ, Pradhan S, Bullmore ET, Robbins TW. Drug addiction endophenotypes: impulsive versus sensation-seeking personality traits. *Biological Psychiatry*. 2010; 68(8):770–3. [PubMed: 20678754]
- Galvan A, Hare TA, Parra CE, Penn J, Voss H, Glover G, et al. Earlier development of the accumbens relative to orbitofrontal cortex might underlie risk-taking behavior in adolescents. *Journal of Neuroscience*. 2006; 26(25):6885–92. [PubMed: 16793895]
- Gaub M, Carlson CL. Gender differences in ADHD: a meta-analysis and critical review. *Journal of the American Academy of Child & Adolescent Psychiatry*. 1997; 36(8):1036–45. [PubMed: 9256583]
- Gogtay N, Giedd JN, Lusk L, Hayashi KM, Greenstein D, Vaituzis AC, et al. Dynamic mapping of human cortical development during childhood through early adulthood. *Proceedings of the National Academy of Sciences of the United States of America*. 2004; 101(21):8174–9. [PubMed: 15148381]
- Grant, B.; Dawson, D.; Hasin, D. The alcohol use disorder and associated disabilities interview schedule–DSM-IV version. Institute on Alcohol Abuse and Alcoholism; 2001. [Serial online]. Available from: <http://www.niaaa.nih.gov>
- Grant BF, Hasin DS, Stinson FS, Dawson DA, Chou SP, Ruan WJ, et al. Prevalence, correlates, and disability of personality disorders in the United States: results from the national epidemiologic survey on alcohol and related conditions. *Journal of Clinical Psychiatry*. 2004a; 65(7):948–58. [PubMed: 15291684]
- Grant BF, Stinson FS, Dawson DA, Chou SP, Ruan WJ, Pickering RP. Co-occurrence of 12-month alcohol and drug use disorders and personality disorders in the United States: results from the national epidemiologic survey on alcohol and related conditions. *Archives of General Psychiatry*. 2004b; 61(4):361–8. [PubMed: 15066894]
- Grant BF, Hasin DS, Blanco C, Stinson FS, Chou SP, Goldstein RB, et al. The epidemiology of social anxiety disorder in the United States: results from the national epidemiologic survey on alcohol and related conditions. *Journal of Clinical Psychiatry*. 2005a; 66(11):1351–61. [PubMed: 16420070]
- Grant BF, Hasin DS, Stinson FS, Dawson DA, June RW, Goldstein RB, et al. Prevalence, correlates, co-morbidity, and comparative disability of DSM-IV generalized anxiety disorder in the USA:

- results from the national epidemiologic survey on alcohol and related conditions. *Psychological Medicine*. 2005b; 35(12):1747–59. [PubMed: 16202187]
- Grant BF, Hasin DS, Stinson FS, Dawson DA, Patricia CS, June RW, et al. Co-occurrence of 12-month mood and anxiety disorders and personality disorders in the US: results from the national epidemiologic survey on alcohol and related conditions. *Journal of Psychiatric Research*. 2005c; 39(1):1–9. [PubMed: 15504418]
- Grant BF, Hasin DS, Stinson FS, Dawson DA, Goldstein RB, Smith S, et al. The epidemiology of DSM-IV panic disorder and agoraphobia in the United States: results from the national epidemiologic survey on alcohol and related conditions. *Journal of Clinical Psychiatry*. 2006; 67(3):363–74. [PubMed: 16649821]
- Grant, B.; Dawson, D.; Hasin, D. The wave 2 national epidemiologic survey on alcohol and related conditions alcohol use disorder and associated disabilities interview schedule—DSM-IV version. National Institute on Alcohol Abuse and Alcoholism; 2007a. [Serial online]. Available from: <http://www.niaaa.nih.gov>
- Grant, B.; Kaplan, K.; Stinson, F. Source and accuracy statement: the wave 2 national epidemiologic survey on alcohol and related conditions. National Institute on Alcohol Abuse and Alcoholism; 2007b. [Serial online]. Available from: <http://www.niaaa.nih.gov>
- Hasin DS, Goodwin RD, Stinson FS, Grant BF. Epidemiology of major depressive disorder: results from the national epidemiologic survey on alcoholism and related conditions. *Archives of General Psychiatry*. 2005; 62(10):1097–106. [PubMed: 16203955]
- Insel T, Cuthbert B, Garvey M, Heinssen R, Pine DS, Quinn K, et al. Research domain criteria (RDoC): toward a new classification framework for research on mental disorders. *American Journal of Psychiatry*. 2010; 167(7):748–51. [PubMed: 20595427]
- Kovacs M, Krol RS, Voti L. Early onset psychopathology and the risk for teenage pregnancy among clinically referred girls. *Journal of the American Academy of Child & Adolescent Psychiatry*. 1994; 33(1):106–13. [PubMed: 8138508]
- Krishnan-Sarin S, Reynolds B, Duhig AM, Smith A, Liss T, McFetridge A, et al. Behavioral impulsivity predicts treatment outcome in a smoking cessation program for adolescent smokers. *Drug and Alcohol Dependence*. 2007; 88(1):79–82. [PubMed: 17049754]
- Krueger RF. The structure of common mental disorders. *Archives of General Psychiatry*. 1999; 56(10):921–6. [PubMed: 10530634]
- Krueger RF, Hicks BM, Patrick CJ, Carlson SR, Iacono WG, McGue M. Etiologic connections among substance dependence, antisocial behavior, and personality: modeling the externalizing spectrum. *Journal of Abnormal Psychology*. 2002; 111(3):411–24. [PubMed: 12150417]
- Lahey BB, Van Hulle CA, Singh AL, Waldman ID, Rathouz PJ. Higher-order genetic and environmental structure of prevalent forms of child and adolescent psychopathology. *Archives of General Psychiatry*. 2011; 68(2):181–9. [PubMed: 21300945]
- Leon AC, Marzuk PM, Portera L. More reliable outcome measures can reduce sample size requirements. *Archives of General Psychiatry*. 1995; 52(10):867–71. [PubMed: 7575107]
- Manuck SB, Flory JD, Ferrell RE, Dent KM, Mann JJ, Muldoon MF. Aggression and anger-related traits associated with a polymorphism of the tryptophan hydroxylase gene. *Biological Psychiatry*. 1999; 45(5):603–14. [PubMed: 10088047]
- Meda SA, Stevens MC, Potenza MN, Pittman B, Gueorguieva R, Andrews MM, et al. Investigating the behavioral and self-report constructs of impulsivity domains using principal component analysis. *Behavioural Pharmacology*. 2009; 20(5–6):390–9. [PubMed: 19724194]
- Mehrotra P, Noar SM, Zimmerman RS, Palmgreen P. Demographic and personality factors as predictors of HIV/STD partner-specific risk perceptions: implications for interventions. *AIDS Education and Prevention*. 2009; 21(1):39–54. [PubMed: 19243230]
- Mischel W, Shoda Y, Rodriguez MI. Delay of gratification in children. *Science*. 1989; 244(4907):933–8. [PubMed: 2658056]
- Moeller FG, Barratt ES, Dougherty DM, Schmitz JM, Swann AC. Psychiatric aspects of impulsivity. *American Journal of Psychiatry*. 2001; 158(11):1783–93. [PubMed: 11691682]

- Moeller FG, Dougherty DM, Barratt ES, Oderinde V, Mathias CW, Harper RA, et al. Increased impulsivity in cocaine dependent subjects independent of antisocial personality disorder and aggression. *Drug and Alcohol Dependence*. 2002; 68(1):105–11. [PubMed: 12167556]
- Neufeld KJ, Swartz KL, Bienvenu OJ, Eaton WW, Cai G. Incidence of DIS/DSM-IV social phobia in adults. *Acta Psychiatrica Scandinavica*. 1999; 100(3):186–92. [PubMed: 10493084]
- Nilsson T, Bromander S, Anckarsater R, Kristiansson M, Forsman A, Blennow K, et al. Neurochemical measures co-vary with personality traits: forensic psychiatric findings replicated in a general population sample. *Psychiatry Research*. 2010; 178(3):525–30. [PubMed: 20619466]
- Nolan KA, D'Angelo D, Hoptman MJ. Self-report and laboratory measures of impulsivity in patients with schizophrenia or schizoaffective disorder and healthy controls. *Psychiatry Research*. 2011; 187:301–3. [PubMed: 21106252]
- Oquendo MA, Galfalvy H, Russo S, Ellis SP, Grunebaum MF, Burke A, et al. Prospective study of clinical predictors of suicidal acts after a major depressive episode in patients with major depressive disorder or bipolar disorder. *American Journal of Psychiatry*. 2004; 161(8):1433–41. [PubMed: 15285970]
- Paaver M, Eensoo D, Pulver A, Harro J. Adaptive and maladaptive impulsivity, platelet monoamine oxidase (MAO) activity and risk-admitting in different types of risky drivers. *Psychopharmacology (Berlin)*. 2006; 186(1):32–40. [PubMed: 16557416]
- Parsey RV, Oquendo MA, Simpson NR, Ogden RT, Van HR, Arango V, et al. Effects of sex, age, and aggressive traits in man on brain serotonin 5-HT1A receptor binding potential measured by PET using [C-11]WAY-100635. *Brain Research*. 2002; 954(2):173–82. [PubMed: 12414100]
- Patton JH, Stanford MS, Barratt ES. Factor structure of the Barratt impulsiveness scale. *Journal of Clinical Psychology*. 1995; 51(6):768–74. [PubMed: 8778124]
- Paulsen K, Johnson M. Impulsivity: a multidimensional concept with developmental aspects. *Journal of Abnormal Child Psychology*. 1980; 8(2):269–77. [PubMed: 7400471]
- Paus T, Keshavan M, Giedd JN. Why do many psychiatric disorders emerge during adolescence? *Nature Reviews Neuroscience*. 2008; 9(12):947–57.
- Peluso MA, Hatch JP, Glahn DC, Monkul ES, Sanches M, Najt P, et al. Trait impulsivity in patients with mood disorders. *Journal of Affective Disorders*. 2007; 100(1–3):227–31. [PubMed: 17097740]
- Research Triangle Institute. Software for survey data analysis (SUDAAN), version 9.0. Research Triangle Park, NC: 2004.
- Rinne T, Westenberg HG, den Boer JA, van den Brink W. Serotonergic blunting to meta-chlorophenylpiperazine (m-CPP) highly correlates with sustained childhood abuse in impulsive and autoaggressive female borderline patients. *Biological Psychiatry*. 2000; 47(6):548–56. [PubMed: 10715361]
- Rogers RD, Moeller FG, Swann AC, Clark L. Recent research on impulsivity in individuals with drug use and mental health disorders: implications for alcoholism. *Alcoholism Clinical and Experimental Research*. 2010; 34(8):1319–33.
- Romer D, Hennessy M. A biosocial-affect model of adolescent sensation seeking: the role of affect evaluation and peer-group influence in adolescent drug use. *Prevention Science*. 2007; 8(2):89–101. [PubMed: 17286212]
- Rubinow DR, Schmidt PJ, Roca CA. Estrogen–serotonin interactions: implications for affective regulation. *Biological Psychiatry*. 1998; 44(9):839–50. [PubMed: 9807639]
- Ruegg RG, Gilmore J, Ekstrom RD, Corrigan M, Knight B, Tancer M, et al. Clomipr-amine challenge responses covary with tridimensional personality questionnaire scores in healthy subjects. *Biological Psychiatry*. 1997; 42(12):1123–9. [PubMed: 9426882]
- Shorey RC, Brasfield H, Febres J, Stuart GL. The association between impulsivity, trait anger, and the perpetration of intimate partner and general violence among women arrested for domestic violence. *Journal of Interpersonal Violence*. 2010
- Slutske WS, Caspi A, Moffitt TE, Poulton R. Personality and problem gambling: a prospective study of a birth cohort of young adults. *Archives of General Psychiatry*. 2005; 62(7):769–75. [PubMed: 15997018]

- Steinberg L. A dual systems model of adolescent risk-taking. *Developmental Psychobiology*. 2010; 52(3):216–24. [PubMed: 20213754]
- Sterba SK, Copeland W, Egger HL, Jane CE, Erkanli A, Angold A. Longitudinal dimensionality of adolescent psychopathology: testing the differentiation hypothesis. *Journal of Child Psychology and Psychiatry*. 2010; 51(8):871–84. [PubMed: 20345843]
- Stoltenberg SF, Batién BD, Birgenheir DG. Does gender moderate associations among impulsivity and health-risk behaviors? *Addictive Behaviors*. 2008; 33(2):252–65. [PubMed: 17913380]
- Struber D, Luck M, Roth G. Sex, aggression and impulse control: an integrative account. *Neurocase*. 2008; 14(1):93–121. [PubMed: 18569735]
- Swann AC, Lijffijt M, Lane SD, Steinberg JL, Moeller FG. Increased trait-like impulsivity and course of illness in bipolar disorder. *Bipolar Disorder*. 2009a; 11(3):280–8.
- Swann AC, Lijffijt M, Lane SD, Steinberg JL, Moeller FG. Trait impulsivity and response inhibition in antisocial personality disorder. *Journal of Psychiatric Research*. 2009b; 43(12):1057–63. [PubMed: 19345957]
- van Honk J, Schutter DJ, Hermans EJ, Putman P, Tuiten A, Koppeschaar H. Testosterone shifts the balance between sensitivity for punishment and reward in healthy young women. *Psychoneuroendocrinology*. 2004; 29(7):937–43. [PubMed: 15177710]
- Vitaro F, Arseneault L, Tremblay RE. Dispositional predictors of problem gambling in male adolescents. *American Journal of Psychiatry*. 1997; 154(12):1769–70. [PubMed: 9396963]
- Ware, J.; Kosinski, M.; Turner Bowker, D.; Gandek, B. How to score version 2 of the SF-12 health survey. Lincoln, RI: Quality Metrics; 2002.
- Williams RB, Marchuk DA, Gadde KM, Barefoot JC, Grichnik K, Helms MJ, et al. Serotonin-related gene polymorphisms and central nervous system serotonin function. *Neuropsychopharmacology*. 2003; 28(3):533–41. [PubMed: 12629534]
- Zimmerman M. Diagnosing personality disorders. A review of issues and research methods. *Archives of General Psychiatry*. 1994; 51(3):225–45. [PubMed: 8122959]

Table 1

Sociodemographic and socioeconomic characteristics in individuals with and without impulsivity in the national epidemiologic survey on alcohol and related conditions. Bolded results are significant at $p < 0.05$.

	Impulsive		Non-impulsive		OR				
	%	CI	%	CI					
N = 5949, 16.97%									
N = 28 704, 83.03%									
Sex									
Male	54.52	52.91	56.13	46.57	45.82	47.32	1.38	1.28	1.48
Female	45.48	43.87	47.09	53.43	52.68	54.18	1.00	1.00	1.00
Race/ethnicity									
White	72.18	68.98	75.17	70.65	67.38	73.72	1.00	1.00	1.00
Black	11.94	10.17	13.96	10.87	9.68	12.19	1.07	0.97	1.19
Native American	2.94	2.32	3.72	2.04	1.72	2.41	1.42	1.12	1.79
Asian	3.02	2.07	4.38	4.53	3.57	5.73	0.65	0.50	0.86
Hispanic	9.92	8.06	12.15	11.91	9.65	14.63	0.81	0.72	0.92
Nativity									
US-born	91.11	88.93	92.89	85.12	81.92	87.83	1.00	1.00	1.00
Foreign-born	8.89	7.11	11.07	14.88	12.17	18.08	0.56	0.49	0.64
Age									
18–29	21.67	20.29	23.11	15.25	14.61	15.91	1.00	1.00	1.00
30–44	30.08	28.67	31.52	29.67	28.90	30.45	0.71	0.64	0.79
45–64	30.85	29.47	32.27	35.38	34.69	36.08	0.61	0.56	0.68
65+	17.41	16.11	18.78	19.70	19.00	20.43	0.62	0.55	0.70
Marital status									
Married/cohabiting	53.75	52.16	55.33	65.84	64.82	66.85	1.00	1.00	1.00
Separated/divorced/widowed	23.37	22.01	24.78	17.94	17.40	18.50	1.59	1.47	1.73
Never married	22.88	21.29	24.56	16.22	15.33	17.14	1.73	1.58	1.89
Individual income									
0–19K	45.64	43.74	47.55	41.48	40.28	42.69	1.00	1.00	1.00
20–34K	25.42	23.89	27.01	22.64	21.89	23.40	1.02	0.92	1.13
35–69K	22.01	20.62	23.47	24.76	23.95	25.59	0.81	0.73	0.89

	Impulsive		Non-impulsive		OR				
	%	CI	%	CI	OR	CI			
>70K	6.93	5.96	8.04	11.12	10.20	12.11	0.57	0.48	0.67
Education									
<High school	14.65	13.47	15.91	13.89	12.90	14.95	1.14	1.00	1.29
High school	30.35	28.75	32.00	26.90	25.81	28.01	1.21	1.13	1.31
College	55.00	53.16	56.83	59.21	57.87	60.54	1.00	1.00	1.00
Insurance									
Private	73.08	71.53	74.57	78.29	76.95	79.58	1.00	1.00	1.00
Public	13.06	11.99	14.21	10.45	9.73	11.22	1.34	1.19	1.51
No insurance	13.87	12.72	15.10	11.26	10.42	12.15	1.32	1.17	1.49
Currently employed									
Yes	64.29	62.64	65.91	65.22	64.32	66.10	0.96	0.89	1.03
No	35.71	34.09	37.36	34.78	33.90	35.68	1.00	1.00	1.00

Table 2

Lifetime psychiatric comorbidity of individuals with and without impulsivity in the national epidemiologic survey on alcohol and related conditions. Bolded results are significant at $p < 0.05$.

	Impulsive		Non-impulsive		OR		AOR ^a					
	%	CI	%	CI	OR	CI	AOR	CI				
	N = 5949, 16.97%		N = 28 704, 83.03%									
Any psychiatric diagnosis	83.32	81.84	84.71	61.77	60.42	63.10	3.09	2.83	3.38	2.78	2.54	3.05
Any axis I disorder	79.42	77.68	81.06	59.39	57.96	60.80	2.64	2.43	2.86	2.36	2.17	2.57
Any substance use disorder	62.10	60.02	64.14	41.66	40.06	43.28	2.29	2.12	2.48	2.04	1.88	2.20
Nicotine dependence	36.62	34.78	38.49	20.37	19.35	21.41	2.26	2.09	2.45	1.91	1.77	2.08
Any alcohol use disorder	49.34	47.23	51.45	31.52	30.03	33.05	2.12	1.96	2.28	1.92	1.77	2.07
Alcohol abuse	21.50	20.07	23.00	18.85	17.80	19.93	1.18	1.09	1.28	1.11	1.02	1.21
Alcohol dependence	27.84	26.25	29.49	12.67	11.96	13.43	2.66	2.44	2.90	2.23	2.04	2.43
Any drug use disorder	23.30	21.43	25.28	9.69	9.12	10.31	2.83	2.54	3.15	2.37	2.13	2.64
Drug abuse	18.90	17.37	20.54	8.37	7.83	8.95	2.55	2.29	2.85	2.13	1.91	2.38
Drug dependence	8.82	7.60	10.22	2.26	2.02	2.52	4.19	3.47	5.06	3.21	2.66	3.88
Any mood disorder	37.53	35.66	39.43	21.31	20.60	22.05	2.22	2.05	2.40	2.13	1.96	2.33
Major depressive disorder	20.47	19.10	21.90	15.60	15.03	16.19	1.39	1.28	1.51	1.37	1.25	1.49
Dysthymia	4.31	3.70	5.02	3.25	3.02	3.51	1.34	1.11	1.61	1.25	1.04	1.50
Bipolar disorder	16.23	15.01	17.54	5.01	4.66	5.39	3.67	3.27	4.13	3.19	2.81	3.61
Any anxiety disorder	41.87	40.06	43.69	25.26	24.36	26.18	2.13	1.99	2.28	2.17	2.01	2.33
Panic disorder	13.27	12.21	14.40	6.20	5.81	6.61	2.31	2.07	2.59	2.22	1.97	2.50
Social anxiety disorder	12.17	11.05	13.38	5.98	5.60	6.37	2.18	1.96	2.43	1.98	1.77	2.21
Specific phobia	21.80	20.31	23.36	13.78	13.09	14.50	1.74	1.60	1.90	1.75	1.60	1.92
Post-traumatic stress disorder	11.92	10.94	12.98	5.29	4.97	5.64	2.42	2.17	2.70	2.36	2.11	2.64
Generalized anxiety disorder	13.84	12.65	15.11	6.40	6.00	6.82	2.35	2.11	2.62	2.29	2.05	2.56
Psychotic disorder	5.18	4.47	6.01	2.69	2.36	3.06	1.98	1.64	2.38	1.79	1.48	2.17
ADHD	7.57	6.71	8.52	1.47	1.30	1.67	5.48	4.61	6.51	4.46	3.74	5.32
Pathological gambling	0.95	0.68	1.33	0.31	0.23	0.41	3.13	1.99	4.91	2.58	1.63	4.08
Conduct disorder	1.61	1.24	2.08	0.92	0.78	1.09	1.75	1.31	2.34	1.53	1.15	2.04
Any personality disorder	46.06	44.42	47.70	16.51	15.80	17.25	4.32	4.01	4.65	3.95	3.68	4.25

	Impulsive			Non-impulsive			OR		AOR ^a		
	%	CI		%	CI		OR	CI	AOR	CI	
	N = 5949, 16.97%			N = 28 704, 83.03%							
Avoidant	4.46	3.77	5.28	1.89	1.67	2.13	2.43	1.96	3.01	2.04	1.64 2.54
Dependent	1.14	0.78	1.66	0.28	0.22	0.36	4.10	2.66	6.34	3.24	2.11 4.99
Obsessive-compulsive	13.15	12.15	14.21	7.03	6.58	7.51	2.00	1.80	2.22	1.93	1.73 2.14
Paranoid	9.30	8.33	10.37	3.32	3.02	3.64	2.99	2.58	3.46	2.54	2.20 2.95
Schizoid	5.96	5.18	6.84	2.47	2.23	2.74	2.50	2.09	2.98	2.15	1.80 2.57
Schizotypal	12.78	11.65	14.00	2.12	1.92	2.35	6.75	5.92	7.69	5.69	4.96 6.52
Narcissistic	19.04	17.70	20.46	3.55	3.26	3.87	6.39	5.74	7.11	5.91	5.31 6.59
Borderline	21.53	20.18	22.95	2.69	2.43	2.97	9.93	8.78	11.23	8.80	7.76 9.98
Histrionic	5.35	4.63	6.17	1.07	0.94	1.22	5.20	4.30	6.30	4.29	3.54 5.22
Antisocial	8.76	7.86	9.77	2.84	2.56	3.15	3.29	2.84	3.81	2.50	2.17 2.89

^a Adjusted for sociodemographic characteristics.

Table 3

Behavioral disinhibition, attentional deficits, and lack of planning in individuals with and without impulsivity in the national epidemiologic survey on alcohol and related conditions. Bolded results are significant at $p < 0.05$.

	Impulsive		Non-impulsive		OR		AOR ^a		AOR ^b						
	%	CI	%	CI	OR	CI	AOR	CI	AOR	CI					
	N = 5949, 16.97%		N = 28 704, 83.03%												
Behavioral disinhibition															
Quick sexual relationships without thinking about the consequences	33.79	32.37	35.24	10.64	10.15	11.16	4.29	3.96	4.64	3.75	3.44	4.09	3.05	2.79	3.34
Problem with gambling or spending too much money	17.75	16.51	19.07	3.56	3.28	3.86	5.85	5.17	6.61	5.01	4.42	5.69	3.95	3.46	4.53
Trouble paying quietly or doing quiet activities like reading for more than a few minutes at a time	19.45	18.11	20.86	6.50	6.09	6.93	3.47	3.12	3.86	3.05	2.73	3.41	2.53	2.25	2.84
Often getting up from seat when not supposed to	17.05	15.88	18.29	5.02	4.65	5.42	3.89	3.48	4.35	3.36	2.99	3.77	2.75	2.42	3.11
Often bursting out answers to other people's questions	26.02	24.51	27.59	9.33	8.83	9.85	3.42	3.12	3.74	3.24	2.97	3.53	2.78	2.54	3.05
Often interrupting other people's conversations	23.25	21.82	24.74	7.65	7.23	8.10	3.66	3.32	4.03	3.39	3.08	3.74	2.91	2.63	3.21
Difficulties controlling anger	19.98	18.61	21.43	4.80	4.49	5.13	4.95	4.46	5.51	4.48	4.04	4.98	3.29	2.94	3.68
Attentional deficits															
Trouble paying attention to details, or a lot of careless mistakes at school or at work	22.99	21.56	24.47	7.25	6.83	7.69	3.82	3.48	4.19	3.32	3.02	3.66	2.70	2.43	3.00
Troubles waiting turns	15.17	14.00	16.42	4.03	3.74	4.33	4.26	3.79	4.79	3.87	3.45	4.36	3.18	2.81	3.60
Lack of planning															
Traveling around without plans	3.23	2.76	3.79	0.64	0.52	0.78	5.22	4.03	6.77	3.82	2.92	5.00	2.77	2.02	3.79
More than once quitting a job without knowing what to do next	9.11	8.14	10.19	2.50	2.29	2.74	3.90	3.36	4.54	3.06	2.62	3.57	2.24	1.91	2.64
Sudden changes in personal goals, career plans or other important aspects of life	21.15	19.93	22.43	4.99	4.66	5.33	5.11	4.61	5.66	4.60	4.14	5.11	3.58	3.22	3.97

^a Adjusted for sociodemographic characteristics.

^b Adjusted for sociodemographic characteristics and psychiatric comorbidity.

Table 4

Adverse events in individuals with and without impulsivity in the national epidemiologic survey on alcohol and related conditions. Bolded results are significant at $p < 0.05$.

	Impulsive		Non-impulsive		OR		AOR ^a		AOR ^b					
	%	CI	%	CI	OR	CI	AOR	CI	AOR	CI				
Having AIDS or STD	1.32	1.02	1.71	0.63	0.78	2.10	1.54	2.86	1.62	1.17	2.24	1.22	0.82	1.80
Doing things that could have easily hurt you/others	9.43	8.39	10.59	2.66	2.39	3.81	3.26	4.46	3.00	2.56	3.53	2.01	1.67	2.41
Perpetrating physical violence on your partner	7.75	7.02	8.55	3.80	3.48	4.13	2.13	1.84	2.46	2.10	1.82	2.43	1.34	1.82
Reckless driving	7.72	6.67	8.92	3.01	2.75	3.29	2.70	3.14	2.16	1.84	2.53	1.80	1.51	2.15
Starting fights	1.13	0.83	1.53	0.15	0.10	0.21	7.73	4.71	12.71	6.02	3.57	10.16	3.53	6.14
Shoplifting	1.53	1.17	2.01	0.28	0.22	0.36	5.49	3.74	8.06	4.16	2.85	6.07	2.77	1.83
Suicidal attempts or threats	8.84	7.92	9.84	1.97	1.77	2.19	4.83	4.13	5.64	4.27	3.63	5.03	2.46	2.95
Number of lifetime traumas SF-12	Mean	S.E.	Mean	S.E.	T score	p-Value								
	4.36	0.05	3.13	0.03	25.14	<0.0001								
Physical component	49.13	0.21	50.49	0.11	-7.06	<0.0001								
Mental component	48.85	0.19	51.95	0.08	-15.84	<0.0001								
Social functioning	49.46	0.20	52.08	0.08	-12.89	<0.0001								
Role emotional	47.06	0.21	49.88	0.10	-13.15	<0.0001								
Mental health scale	49.33	0.20	52.47	0.09	-16.19	<0.0001								

^aAdjusted for sociodemographic characteristics.

^bAdjusted for sociodemographic characteristics and psychiatric comorbidity.