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The association between personality disorders with alcohol use and misuse: A population-based twin study

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ABSTRACT

Background: A clearer understanding of the etiological overlap between DSM-IV personality disorders (PDs) and alcohol use (AU) and alcohol use disorder (AUD) is needed. To our knowledge, no study has modeled the association between all 10 DSM-IV PDs and lifetime AU and AUD. The aim of the present study is to identify which PDs are most strongly associated with the phenotypic, genetic, and environmental risks of lifetime AU and AUD, and to determine if these associations are stable across time.
Methods: Participants were Norwegian twins assessed at two waves. At Wave 1, 2801 twins were assessed for all 10 DSM-IV PD criteria, lifetime AU, and DSM-IV AUD criteria. At Wave 2, six of the 10 PDs were again assessed along with AU and AUD among 2393 twins. Univariate and multiple logistic regressions were run. Significant predictors were further analyzed using bivariate twin Cholesky decompositions.
Results: Borderline and antisocial PD criteria were the strongest predictors of AU and AUD across the two waves. Despite moderate phenotypic and genetic correlations, genetic variation in these PD criteria explained only 4% and 3% of the risks in AU, and 5% to 10% of the risks in AUD criteria, respectively. At Wave 2, these estimates increased to 8% and 23% for AU, and 17% and 33% for AUD.
Conclusions: Among a large Norwegian twin sample, borderline and antisocial PD criteria were the strongest predictors of the phenotypic and genotypic liability to AU and AUD. This effect remained consistent across time.

1. Introduction

Research has consistently shown that DSM-IV (APA, 1994) personality disorders (PDs) are linked with alcohol use (AU) and alcohol use disorder (AUD; Compton et al., 2005; Grant et al., 2008; Grant et al., 2004; Morgenstern et al., 1997; Skodol et al., 1999; Trull et al., 2000). The two PDs most consistently associated with AUD criteria are antisocial (Compton et al., 2005; Grant et al., 2004; Morgenstern et al., 1997) and borderline (Grant et al., 2008; Morgenstern et al., 1997; Skodol et al., 1999; Trull et al., 2000). Another study has reported significant associations with histrionic and dependent PDs (Grant et al., 2004). However, which PD offers the best prediction of AU and AUD, and the nature of the etiologic overlap, remains unclear.

Twin studies are a commonly used method to estimate the relative proportions of how much latent genetic and environmental risk factors contribute to the development of a particular trait. These studies provide compelling evidence that AU and AUD (Kendler

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et al., 1994; Reich et al., 1998; Verhulst et al., 2015), and PDs (Kendler et al., 2008a; Reichborn-Kjennerud, 2008) are all complex, heritable phenotypes. Cholesky decompositions, also referred to as bivariate twin models, go beyond the basic univariate twin model and allow us to determine the extent to which genetic and environmental influences are shared by two traits or are trait specific (Neale and Cardon, 1992). Regarding the putative sources of comorbidity between AU and AUD with PDs, evidence suggests that genetic risk factors are shared between borderline PD, alcohol, nicotine, and cannabis misuse (Bornovalova et al., 2013), as well as between antisocial behavior and AU (McAdams et al., 2012). These shared genetic risks account for up to 50% of the total genetic variance in risk in AUD (Fu et al., 2002). One limitation is that these studies have nearly always relied on single PDs (Bornovalova et al., 2013; Fu et al., 2002; McAdams et al., 2012). Until now, fully integrative and genetically informative data have not been available to elucidate the genetic and environmental pathways linking PDs to AU and AUD.

We are not aware of any published studies that have investigated the association between all 10 DSM-IV PDs, AU, and AUD. To address this gap, we examined the following three aims: (1) identify which of the 10 PDs provide the strongest phenotypic prediction of the liabilities to AU and AUD; (2) estimate the degree to which the associations between PDs and AU and AUD are due to shared genetic or shared environmental risks; and (3) determine if the patterns of associations between PDs and AU and AUD are stable across time.

2. Method

2.1. Sample

Twins were recruited by the Norwegian Institute of Public Health (NIPH) Twin Panel from the National Medical Birth Registry of Norway, which was established in 1967 (Harris et al., 2002; Tambs et al., 2009). By mandate the registry receives notification of all births in Norway. The NIPH Twin Panel initially ascertained twins born from 1967 through 1974 who were at least 18 years of age. They were first contacted for a study of health via a mail-out questionnaire (Q1) in 1992. These twins were re-contacted for a longitudinal follow-up using a second health questionnaire (Q2) in 1998. At that time, a younger cohort born 1975–1979 was also recruited and administered the same Q2. Altogether, 8045 twins (63%) including 3334 pairs (53%) responded to Q2.

All complete pairs from the Q2 study in which both twins were willing to be contacted again for new studies ($N = 3153$ twin pairs) were invited by mail to participate in the Wave 1 interviews of mental health used in the present analyses. Due to technical problems, an additional 68 pairs were accidentally drawn from twin pairs that had not completed the Q2. The Wave 1 structured and semi-structured diagnostic interviews were carried out between 1999 and 2004 and assessed DSM-IV lifetime Axis I and Axis II disorders. Wave 1 interviews were mostly conducted face-to-face, with a small amount conducted by telephone (8.3%).

Data for Wave 2 came from a follow-up telephone interview administered between 2010 and 2011 (Nilsen et al., 2013). Of the 3221 twin pairs eligible for Wave 1, there were 1391 complete pairs (43.2%) and 19 single twins (0.6% pairwise), totaling 2801 twins who participated (43.4%) and comprising 63% females ($M_{age} = 28$ years, range = 19–36). Of the 2801 twins eligible for Wave 2, there were 2393 twins (85.43%), comprising 1063 complete twin pairs and 267 single twins who participated, including 64% females ($M_{age} = 38$ years, range = 30–44). For more detailed information about the sampling process and twin sample, please see Tambs et al. (2009) and Nilsen et al. (2013).

Monozygotic (MZ) males and females as well as dizygotic (DZ) males, females, and opposite sex twins were included in all analyses. The sample sizes for each group by sex are as follows: MZ males = 225; MZ females = 453; DZ males = 120; DZ females = 267; DZ opposite sex = 345.

Different interviewers assessed each twin pair member. Interviewers at Wave 1 were mostly advanced psychology students, or experienced psychiatric nurses, who received standardized training and supervision during data collection. Interviewers at Wave 2 included senior clinical psychology graduate students, psychiatric nurses, and experienced clinical psychologists who were interviewers at Wave 1. Written informed consent was obtained from all participants who received stipends of $35 and $70 at Waves 1 and 2, respectively. Ethical approval for both assessments came from the Regional Ethical Committee.

2.2. Measures

2.2.1. Predictors – personality disorder criteria. Lifetime DSM-IV PDs were assessed using a Norwegian version of the Structured Interview for DSM-IV Personality (SIDP-IV; Pfohl et al., 1995). The SIDP-IV is a comprehensive, semi-structured diagnostic interview that includes non-pejorative questions organized into topical sections rather than by individual PD thereby improving the flow of the interview. The number of criteria for each of the DSM-IV PDs used in the analyses were as follows: schizotypal (9 criteria); schizoid (8 criteria); paranoid (7 criteria); histrionic (8 criteria); borderline (9 criteria); obsessive-compulsive (8 criteria); dependent (8 criteria); avoidant (7 criteria); narcissistic (9 criteria); and antisocial (7 criteria). The SIDP-IV considers the behaviors, cognitions, and feelings that are reported to be predominately present over the past five years of a participant's life to be representative of the individual's personality. Importantly, the SIDP-IV interview was conducted after the Composite International Diagnostic Interview (CIDI; Wittchen, 1994; Wittchen and Pfister, 1997), which assesses Axis 1 disorders. This order of assessment allowed us to conclude that the symptoms of PDs were due to the PD, and not a temporary effect of an Axis I disorder. All 10 PDs were assessed face-to-face at Wave 1.

At Wave 2, six of the 10 PDs were assessed by telephone interview: paranoid, schizotypal, borderline, obsessive-compulsive, avoidant, and antisocial. Each criterion was scored on a 4-point scale (absent, sub-threshold, present, or strongly present), dichotomized (0 = absent, 1 ≥ sub-threshold), and summed into a PD trait score. However, because very few participants endorsed most PD criteria, the PD scores had strong positive skewness with a predominance of zero values. Therefore, for analytic purposes, each PD score was recoded onto a 3-point ordinal scale (0 criteria, 1–2 criteria, ≥3 criteria). This was also done to establish a common frame of reference to facilitate interpreting comparisons between odds ratios. Complete PD data were available from 2793 twins for Wave 1 and 2282 for Wave 2.

2.2.2. Outcome variables – alcohol use and alcohol use disorder criteria. Lifetime AU and AUD based on the number of DSM-IV criteria for alcohol abuse and dependence were assessed using a Norwegian version of the Composite International Diagnostic Interview (Wittchen and Pfister, 1997). The CIDI has good test-retest and inter-rater reliability (Rubio-Stipec et al., 1999; Wittchen, 1994; Wittchen et al., 1998), and the Norwegian version has been used previously (Landheim et al., 2003). Lifetime AU was assessed for the 12-month period where consumption was highest using a 3-point ordinal scale (0 = never tried; 1 = less than 1 time per month, and 1–3 times per month; 2 = 1–2 times per week, 3–4 times per week, and almost every day). This was followed by questions covering the 11 DSM-IV criteria and one craving item. Criteria sum