

# Personality and Substance Use Disorders: I. Effects of Gender and Alcoholism Subtype

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The relationship between alcoholism and self-rated personality was explored in a community-ascertained sample of 303 male and 103 female alcoholics, and 304 male and 770 female nonalcoholics. Alcoholics met DSM-III-R lifetime criteria for alcohol dependence; personality was assessed using the Multidimensional Personality Questionnaire. Compared with controls, alcoholics scored significantly higher on all indicators of negative emotionality, and consistently lower on all indicators of constraint. Individual effect sizes were moderate in both the male and female samples. A subsample of severe male alcoholics, identified by cluster analysis, was characterized by relatively early onset of problem drinking and relatively high antisociality and familial loading of problem drinking; they were also more extreme than moderate male alcoholics on negative emotionality and constraint. When taken in aggregate, personality risk appears to be associated with a continuum of alcoholic risk such that individuals extreme in both negative emotionality and behavioral disinhibition have especially high rates of alcoholism.

**Key Words:** Alcoholism, Personality, Gender, Alcoholism Subtypes.

ALTHOUGH THE PROPOSITION that alcoholism is associated with a unique constellation of personality characteristics (i.e., the so-called "alcoholic personality") has been widely rejected,<sup>1,2</sup> there is a growing belief among some alcohol researchers that individual differences along selected dimensions of personality may contribute to the cause of alcoholism and other substance use disorders.<sup>3-5</sup> Support for a role of personality in alcoholism etiology comes from contemporaneous comparisons of alcoholics and nonalcoholics that reveal consistent mean differences in personality self-reports,<sup>6</sup> longitudinal studies that indicate that some of these differences predate the onset of alcoholism,<sup>7-9</sup> and studies of the biological offspring of alcoholics that suggest that personality factors may in part mediate the inheritance of alcoholism risk.<sup>10</sup>

Two broad dimensions of personality, behavioral disinhibition and negative emotionality, are most strongly associated with alcoholism.<sup>11</sup> Indicators of behavioral disinhibition, the inability or unwillingness to inhibit behavioral impulses, have consistently exhibited the strongest associ-

ation with alcoholism. Thus, compared with nonalcoholics, alcoholics are more likely to be impulsive and rebellious.<sup>6</sup> Moreover, relatively high levels of behavioral disinhibition characterize prealcoholics,<sup>7-9</sup> and differentiate the offspring of alcoholics from the offspring of nonalcoholics,<sup>10,12</sup> suggesting that deviations in behavioral disinhibition are inherited and may be a contributing cause, rather than merely a consequence, of the development of alcoholism.

Negative emotionality, or the tendency to experience psychological distress and negative mood states, is the second dimension of personality most frequently associated with alcoholism status. Thus, for example, alcoholics score consistently higher than nonalcoholics on self-report measures of emotionality and neuroticism.<sup>13,14</sup> Despite the consistency of the cross-sectional comparisons, however, the evidence linking negative emotionality to alcoholism prospectively is equivocal. Some longitudinal studies suggest that differences in negative emotionality antedate disorder onset,<sup>15</sup> whereas other studies suggest these differences may predate onset.<sup>16</sup> Moreover, studies of the offspring of alcoholics have not consistently reported elevated levels of neuroticism relative to the offspring of nonalcoholics,<sup>17</sup> further suggesting that the relatively high levels of negative emotionality seen with alcoholism may be a consequence rather than a cause of the disorder.

Failure to take gender into account may be one factor contributing to the inconsistency of results from prospective studies linking personality and substance use disorders. An important recent prospective study<sup>18</sup> investigated the relationship between temperamental factors assessed at age 3 years and symptoms of alcohol dependence assessed at age 21. Whereas the age 3 observation ratings of behavioral undercontrol and inhibition (the latter being an indicator of negative emotionality) were significantly predictive of alcohol dependence symptoms in 21-year-old men, early temperament ratings did not predict subsequent alcohol dependence symptoms in women.

The present study is the first in a series investigating the relationship between personality and substance use disorders. In this first study, we investigate the relationship between self-reported personality and alcoholism status in a large community-ascertained sample of alcoholics and controls, and determine the extent to which these personality differences are moderated by gender and alcoholism subtype. In subsequent publications, we will explore the relevance of a comorbid drug abuse diagnosis, and the

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intergenerational transmission of personality risk in alcoholic and nonalcoholic families. The study was designed to address two limitations of much of the previous research relating personality and alcoholism, the use of nonrepresentative samples (e.g., treatment-ascertained, university students) and the noncomprehensive assessment of personality.

## METHODS

### Sample

The sample was drawn from the parent participants in the Minnesota Twin Family Study (MTFS). The MTFS is an ongoing, prospective study of the etiology of substance use disorders that uses a community-based ascertainment scheme.<sup>18,19</sup> Briefly, families were recruited because they had a pair of adolescent twins, as determined from birth records filed with the state of Minnesota, who turned 11 or 17 during a given study year. Because there were more twin families available in any given year than could be assessed in our laboratory, not all eligible families (i.e., families living within a day's drive of Minneapolis and having no members with a serious cognitive or physical handicap that would preclude completing our assessments) became MTFS participants. Of the eligible families, 16% refused participation; 77% of the nonrefusing families ultimately completing the day-long assessment in our laboratory. Significantly, through brief phone and mail surveys, as well as access to birth record data, we have been able to determine the socioeconomic status and complete a limited self-report mental health assessment on more than 699 of the refusal and nonrecruited families. Comparison of participating and nonparticipating families on these measures revealed that the two groups of families were generally similar. The largest differences occurred on measures of socioeconomic status (e.g., participating parents average 0.6 years more education than nonparticipating parents), the two groups of parents did not differ significantly in their self-reported mental health.

The sample of alcoholic men ( $n = 304$ ) and women ( $n = 103$ ) included MTFS parents who met lifetime DSM-III-R criteria for alcohol dependence and who completed the personality inventory. The nonalcoholic sample consisted of the 303 men and 770 women who did not meet lifetime DSM-III-R criteria, at either a definite or probable level of certainty, for either alcohol dependence, substance dependence, or abuse (other than for nicotine), or anti-social personality disorder (ASPD).

### Measures

**Demographics.** Age, educational attainment, marital status, ethnicity, and occupation were assessed by self-report. Occupational status was coded from the self-reported occupations using the Hollingshead system which ranges from 1 (professional) through 7 (unskilled labor)."

**Clinical Assessment.** Diagnostic information was obtained during in-person interviews completed as part of the day-long intake assessment of MTFS adult participants. Substance use disorders were assessed using an expanded version of the Substance Abuse Module (SAM)" developed as a supplement to World Health Organization's Composite International Diagnostic Interview." Major depression was assessed using the Structured Clinical Interview for DSM-III-R (SCID-R),<sup>23</sup> and an interview developed by MTFS staff that provides detailed assessment of ASPD and conduct disorder. Life-time diagnoses were assigned after a clinical case conference that involved a review of all relevant clinical material. Two levels of diagnostic certainty were used, definite = all diagnostic criteria satisfied, and probable = one of the necessary criteria was absent. The age of onset of alcohol dependence was estimated as the age at which third positive symptom group occurred, as that age correlated maximally with the five separate ages of symptom onset assessed in our interview.

Each adult participant also provided a family history report, modeled after the Family Informant Schedule and Criteria (FISC),<sup>24</sup> for each of their first degree biological relatives. A relative was considered to be

Table 1. Characteristics of the Multidimensional Personality Questionnaire (MPQ) Primary Scales

Scale	Higher-order loading	Reliability	Self-descriptors of high scorers
Well-Being	PE	0.89	Cheerful, happy, feel good about self
Social Potency	PE	0.88	Forceful, decisive, persuasive
Achievement	PE	0.83	Works hard, ambitious, sets high standards
Social Closeness	PE	0.83	Sociable, likes to be with people
Stress Reaction	NE	0.89	Tense, nervous, sensitive
Alienation	NE	0.85	Has been betrayed, feels pushed around
Aggression	NE	0.81	Physically aggressive, vindictive
Control	CN	0.83	Cautious, careful, sensible
Harm Avoidance	CN	0.83	Prefers safe activities
Traditionalism	CN	0.82	Endorses high moral standards
Absorption	—	0.88	Responsive to sights and sounds

Note: Adapted from Tellegen and Waller<sup>26</sup> with permission. PE, Positive Emotionality; NE, Negative Emotionality; CN, Constraint. Absorption does not load principally on any of the three higher-order factors. Reliability values are based on the mean from four independent samples.

positive for drinking problems if he or she either had ever been treated for problem drinking or met two or more symptoms of problem drinking. Because family history effects have been shown to be most robust when the number of affected relatives exceeds rather than equals one," participants were considered to have a positive multi-family history of drinking problems if two or more of their first-degree relatives met problem drinking criteria on the modified FISC.

**Personality.** Personality was assessed by self-report using the 198-item version of the Multidimensional Personality Questionnaire (MPQ). The MPQ is a factor analytically derived self-report instrument consisting of 11 primary and 3 higher-order scales<sup>26</sup> (Tellegen, unpublished manuscript). The higher-order MPQ factors (and the primary scales that load principally on that factor) are Positive Emotionality (Well-Being, Social Potency, Achievement, and Social Closeness), Negative Emotionality (Stress Reaction, Alienation, and Aggression), and Constraint (Control, Harm Avoidance, and Traditionalism). The final MPQ primary scale, Absorption, does not load principally on any of the three higher-order factors. The scales of the MPQ have excellent psychometric properties" (Tellegen, unpublished manuscript), have been associated with substance use disorders in other research," and overlap substantially with the scales of the Tridimensional Personality Questionnaire," an inventory used extensively by alcohol researchers. Given the findings of previous research, we expected to find significant differences between alcoholics and nonalcoholics on the higher-order dimensions of Negative Emotionality and Constraint (the complement of Behavioral Disinhibition) along with their primary scale indicators. A brief description of the MPQ primary scales, along with estimates of their internal consistency reliability is included in Table 1. The MPQ was mailed to participants before their scheduled in-person interview. Nearly 90% of those participating in the in-person assessment completed their MPQ; with response rates being significantly higher among women (92.0%,  $n = 949$ ) than men (86.09%,  $n = 706$ ), and among nonalcoholics (92.0%,  $n = 1166$ ) compared with the alcoholics (83.2%,  $n = 489$ ) (both  $p$ 's < 0.001).

## RESULTS

### Demographic and Clinical Characteristics of the Alcoholic and Nonalcoholic Samples

Table 2 provides a demographic and clinical description of the alcoholic and control samples. Compared with the nonalcoholics, the alcoholics were somewhat younger and less well educated. Consistent with Minnesota state demo-

Table 2. Demographic and Clinical Characteristics of the Control and Alcoholic Samples

		Female		Male		Male Alcoholism Type	
		Control (n = 770)	Alcoholic (n = 103)	Control (n = 303)	Alcoholic (n = 304)	Moderate (n = 250)	Severe (n = 54)
Demographic							
Age	M	41.6	38.9*	44.2	42.7	42.9	42.0
	SD	(5.5)	(5.7)	(6.7)	(7.1)	(7.3)	(6.3)
Education (yr)	M	13.7	12.9*	14.4	13.4	13.5	13.0
	SD	(1.6)	(1.5)	(2.2)	(1.9)	(2.3)	(1.8)
Occupational status	M	3.8	4.2	3.4	4.2*	4.1	4.4
	SD	(1.6)	(1.6)	(1.6)	(1.6)	(1.6)	(1.6)
Married	(%)	89.8	73.7	93.7	87.6	87.8	86.8
Caucasian	(%)	99.3	100	98.9	98.3	97.8	100
Rate (%) DSM-III-R							
Conduct Disorder		0.0	11.3*	0.0	24.2*	17.8	52.2*
ASPD		0.0	2.4	0.0	9.3*	2.7	38.8*
Nicotine Dependence		21.5	68.0*	18.8	58.9*	54.0	61.5*
Substance Abuse		0.0	33.9*	0.0	31.5*	24.2	64.6*
Substance Dependence		0.0	19.4*	0.0	18.0	12.5	43.1*
Major Depression		19.8	37.1*	11.6	16.6	14.7	25.4
Other Alcoholism treatment	(%)	0.0	10.9*	0.0	22.5*	15.2	56.7*

Note: Substance Abuse and Substance Dependence diagnoses do not include alcohol or nicotine. Rates of clinical disorders based on definite diagnoses only.

\* Control sample and alcoholic sample differ significantly at  $p < 0.01$ , two-tailed.

\* Male moderate alcoholics differ significantly from male severe alcoholics at  $p < 0.01$ , two-tailed.

graphics, the overwhelming majority of the sample is Caucasian. Alcoholics had relatively high rates of other DSM-II-R disorders (rates reported in the table are for definite diagnoses), and, consistent with other research showing that the vast majority of alcoholics never seek professional help for their drinking problems,<sup>30</sup> few of the alcoholics had ever been treated for alcoholism.

#### Personality Differences between Alcoholics and Non-Alcoholics

Table 3 gives the mean and standard deviations for male and female alcoholics and nonalcoholics on the 11 primary and 3 higher-order MPQ scales. To facilitate interpretation and comparison of results across dimensions, scores for each scale are transformed so that male nonalcoholics had a mean of 50 and a standard deviation (SD) of 10 (i.e., a T-score metric). The relationship between alcoholism status and personality self-report was investigated using a two-factor (sex by alcoholism status) multivariate analysis of variance (MANOVA), with follow-up univariate ANOVAs of significant MANOVA effects. Because the three higher-order personality scales are linear composites of the 11 primary scales, all 14 scale scores were not analyzed in a single MANOVA. Consequently, two MANOVAs were completed, one in which the primary scales were the dependent variables and a second in which the higher-order scales served as the dependent variables. Because age was only weakly correlated with each of the MPQ scales (no correlation exceeded 0.15 in absolute value), statistical adjustment for age had no appreciable effect on the MANOVA results presented here, despite the small but significant age difference between alcoholics and nonalcoholics in the female sample.

The MANOVA of the 11 primary scales produced significant sex (Wilks'  $\lambda = 0.733$ ,  $p < 0.001$ ) and alcoholism status ( $A = 0.940$ ,  $p < 0.001$ ) main effects, as well as a significant sex by alcoholism status interaction ( $\lambda = 0.980$ ,  $p = 0.002$ ). Follow-up ANOVAs (summarized in Table 3) indicated that alcoholics scored significantly higher on all three of the primary scales that load principally on the higher-order dimension of Negative Emotionality, and significantly lower on all three of the primary scales that load principally on the higher-order dimension of Constraint. For each of these scales, the difference between the two groups was moderate in magnitude (i.e., approximately one-third to one-half SD). The only other primary scale significantly associated with alcoholism status was Well-Being, where alcoholics scored approximately one-fourth SD lower than nonalcoholics. The ANOVA interaction effect was significant only for Aggression. Male, but not female, alcoholics rated themselves as significantly more aggressive than nonalcoholics.

The MANOVA and follow-up ANOVA analysis of the higher-order MPQ scales generally paralleled that which was found with the primary scales. Both the sex ( $A = 0.972$ ,  $p < 0.001$ ) and alcoholism status ( $A = 0.948$ ,  $p < 0.001$ ) main effects were statistically significant, although in this case the alcoholism status by sex interaction effect was not ( $A = 0.998$ ,  $p = 0.39$ ). Follow-up ANOVAs revealed that alcoholics scored nearly one-half SD higher on Negative Emotionality and nearly one-half SD lower on Constraint when compared with nonalcoholics. The personality ratings of alcoholics who reported being asymptomatic at the time of assessment ( $n = 240$  males and 78 females) did not differ significantly from the ratings of the alcoholics who reported being symptomatic ( $n = 64$  males and 25 females) on both

Table 3. Personality Differences between Alcoholics and Nonalcoholics

MPQ Scale		Male		Female		ANOVA <i>p</i> values		
		Control	Alcoholic	Control	Alcoholic	Sex	Alcoholic	Alcoholic × Sex
<b>Primary</b>								
Well-Being	M	50.0	47.9	50.4	46.9			
	SD	(10.0)	(9.4)	(10.4)	(10.4)			<0.001
Social Potency	M	50.0	49.8	46.6	47.6	<0.001		
	SD	(10.0)	(9.5)	(9.6)	(10.0)			
Achievement	M	50.0	49.1	46.0	47.7	0.001		
	SD	(10.0)	(11.1)	(10.1)	(11.9)			
Social Closeness	M	50.0	49.0	55.1	53.4	<0.001		
	SD	(10.0)	(10.0)	(9.6)	(9.4)			
Stress Reaction	M	50.0	53.4	54.7	58.0	<0.001	<0.001	
	SD	(10.0)	(9.5)	(9.8)	(10.2)			
Alienation	M	50.0	53.3	49.7	53.3		<0.001	
	SD	(10.0)	(10.3)	(9.9)	(11.8)			
Aggression	M	50.0	56.5	46.5	48.6	co.001	<0.001	0.001
	SD	(10.0)	(11.2)	(8.5)	(9.7)			
Control	M	50.0	45.1	49.9	46.1		<0.001	
	SD	(10.0)	(9.6)	(9.2)	(9.6)			
Harm Avoidance	M	50.0	47.5	57.3	56.2	co.001	0.003	
	SD	(10.0)	(9.9)	(8.0)	(8.1)			
Traditionalism	M	50.0	47.2	48.9	46.4		co.001	
	SD	(10.0)	(9.3)	(9.5)	(8.6)			
Absorption	M	50.0	50.5	53.2	55.4	co.001		
	SD	(10.0)	(11.2)	(11.5)	(12.8)			
<b>Higher-Order</b>								
Positive Emotion	M	50.0	48.7	48.4	47.5			
	SD	(10.0)	(9.9)	(10.2)	(9.8)			
Negative Emotion	M	50.0	53.9	50.6	55.1		<0.001	
	SD	(10.0)	(9.9)	(9.8)	(10.5)			
Constraint	M	50.0	45.4	52.7	50.3	<0.001	<0.001	
	SD	(10.0)	(9.0)	(8.9)	(9.7)			

Note: Personality scores are scaled so that the mean is 50 and the SD is 10 in the male control sample. Only *p* values less than 0.01 are reported.

the 11 primary ( $\lambda = 0.969$ ,  $p = 0.37$ ) and three higher-order ( $A = 0.985$ ,  $p = 0.12$ ) scales, suggesting that the association of alcoholism with personality did not reflect an effect of current drinking problems only. Moreover, **Recency**, coded as number of years since the individual last experienced an alcohol dependence symptom, correlated significantly, but only modestly, with only three of the 14 MPQ scales (-0.13 with Well-Being, 0.14 with Alienation, and 0.10 with Negative Emotionality).

#### Effect of Alcoholism Subtype

The personality scores of empirically derived clusters of alcoholics were compared to determine whether personality was differentially associated with alcoholic subtype. Alcoholic subtypes were identified using a K-means clustering algorithm modeled after the approach taken by Babor et al.<sup>31</sup> Ten variables were used in the cluster analysis: four alcohol symptom scales derived from a factor analysis of the 59 SAM alcohol abuse or dependence items—Guilt (representative item = “Felt guilty about drinking,”  $\alpha = 0.84$ ), Social Impairment (“Experienced trouble at work because of drinking,”  $\alpha = 0.82$ ), Dependence (“Needed alcohol to function,”  $\alpha = 0.74$ ), and Antisocial (“Arrested because of drinking,”  $\alpha = 0.73$ ); three DSM-III-R symptom count scales from the interviews covering Conduct Disorder, Adult Antisocial Behavior, and Major Depressive Disorder; and three additional vari-

ables—age of alcoholism onset, number of illicit substances used, and multi-family history of problem drinking.

Cluster analysis of the sample of male alcoholics resulted in the identification of two interpretable clusters, designated as moderate alcoholics ( $n = 250$  or 82.2% of the alcoholic sample) and severe alcoholics ( $n = 54$ , 17.8%). A similar cluster analysis of the sample of female alcoholics did not reveal multiple clusters that each contained at least 10 cases. The means of the two samples of male alcoholics on the 10 variables used in the cluster analysis are given in Table 4; the demographic and clinical characteristics of the two samples of male alcoholics are reported in Table 2. Compared with the group we labeled moderate alcoholics, severe alcoholics scored higher on the four alcohol scales, the three DSM-III-R symptom scales, and the illicit drug use scale; they also had a significantly earlier age of alcoholism onset, were significantly more likely to report a positive multi-family history of problem drinking, and were much more likely to have symptoms of other DSM-III-R disorders. The group we have labeled severe alcoholics thus appear to correspond to the early onset, high-family loading, antisocial cluster that emerges in most typological models of alcoholism.<sup>3,31,32</sup> Significantly, this group appears also to be relatively overrepresented in treatment populations, because nearly four times as many of the severe alcoholics reported having been treated for alcoholism than the moderate alcoholics (56.7 vs. 15.2%).

Table 4. Cluster Means for Male Alcoholic Subtypes

Variable	Alcoholic Subtype		p value	
	Moderate (n = 250)	Severe (n = 54)		
<b>Alcohol Symptom Scales:</b>				
Guilt	M	3.7	0.2	co.001
	SD	(3.0)		
Social Impairment	M	0.7	3.8	<0.001
	SD	(1.3)		
Dependence	M	0.5	2.4	<0.001
	SD	(0.9)		
Antisocial	M	2.2	4.5	co.001
	SD	(1.7)		
<b>DSM-III-R Symptom Scales</b>				
Conduct Disorder	M	1.3	2.7	<0.001
	SD	(1.4)		
Adult Antisocial	M	1.9	4.0	<0.001
	SD	(1.0)		
Depression	M	1.4	2.2	<0.001
	SD	(2.5)		
<b>Other</b>				
Age of Onset	M	22.5	20.2	0.002
	SD	(5.5)		
Illicit Substances	M	1.3	4.0	co.001
	SD	(1.5)		
Multi-family History	(%)	10.1	20.9	0.01

Note: *p* values are two-tailed and refer to comparison of subtype means or proportions. Multi-family history entries give percent of individuals having two or more problem drinking first-degree relatives.

The effect of alcoholic subtype was not significant in a MANOVA of the 11 primary MPQ scales ( $\Lambda = 0.959$ ,  $p = 0.35$ ), but was significant in a MANOVA of the 3 higher-order scales ( $\lambda = 0.965$ ,  $p = 0.015$ ). Follow-up ANOVAs revealed significant subtype effects on the higher-order scales of Negative Emotionality and Constraint (Table 5). Although not always significant, it is interesting to note that the severe alcoholics score more extremely than the moderate alcoholics on all of the primary indicators of negative emotionality and constraint.

### The Overall Association of Personality and Alcoholism

Discriminant function analysis was used to identify linear composites of the personality scales that maximally differentiated the alcoholic and nonalcoholic groups. Analyses were completed separately for males and females, and involved only those scales with a significant alcoholism main effect in the follow-up ANOVAs summarized in Table 2 (in this way, we could overcome the strict linear dependencies between the higher-order and primary scales and complete a single analysis). For males, three groups were used, (nonalcoholics, moderate alcoholics, and severe alcoholics), whereas for females, a two-group analysis was completed. In males, the first discriminant function was statistically significant ( $\Lambda = 0.867$ ,  $p < 0.001$ ), but the second was not ( $\lambda = 0.993$ ,  $p = 0.81$ ). The finding that a single linear composite of personality variables sufficed to differentiate the three male groups provides additional support for our characterization of the groups as being graded on a single dimension of severity. Stepwise analysis of the individual personality scales revealed that all of the

Table 5. Personality Characteristics of Moderate and Severe Male Alcoholics

Variable	Alcoholic Subtype		p value	
	Moderate (n = 250)	Severe (n = 54)		
<b>Primary MPQ Scales</b>				
Well-Being	M	47.9	47.8	
	SD	(9.0)		
Social Potency	M	49.6	50.9	
	SD	(9.5)		
Achievement	M	49.1	48.9	
	SD	(10.9)		
Social Closeness	M	48.9	49.4	
	SD	(9.8)		
Stress Reaction	M	53.0	54.9	
	SD	(9.5)		
Alienation	M	52.8	55.7	
	SD	(10.3)		
Aggression	M	55.0	59.2	0.04
	SD	(11.5)		
Control	M	45.5	42.8	0.05
	SD	(9.6)		
Harm Avoidance	M	47.8	46.3	
	SD	(9.9)		
Traditionalism	M	47.6	45.5	
	SD	(9.1)		
Absorption	M	50.0	53.2	
	SD	(11.3)		
<b>Higher-Order Scales</b>				
Positive Emotionality	M	48.4	50.0	
	SD	(9.6)		
Negative Emotionality	M	53.4	56.7	0.03
	SD	(10.0)		
Constraint	M	45.9	43.1	0.04
	SD	(8.9)		

Note: Personality scores are scaled so that male non-alcoholics have a mean of 50 and a SD of 10. MANOVA subtype effect was significant for three higher-order scales but not for 11 primary scales. To be consistent, however, all *p* values  $\geq 0.05$  (two-tailed) are reported.

significant discriminant function variance could be accounted for by three scales, Negative Emotionality, Constraint, and Aggression. In the female sample, only one discriminant function was derivable, and it was also significant ( $\lambda = 0.954$ ,  $p < 0.001$ ). The female discriminant function also included the Negative Emotionality, Constraint, and Aggression scales, although, consistent with the significant interaction effect reported earlier, the discriminant function weight for the Aggression scale was negative in the female sample but positive in the male sample.

Linear discriminant function scores were computed separately for males and females using gender-specific weights, standardized by subtracting the gender-specific mean and dividing by the gender-specific SD, and categorized as low if  $-1.0$  or less ( $n = 111$  males and 133 females), moderate if between  $-1.0$  and  $+1.0$  ( $n = 393$  males and 604 females), and high if more than  $+1.0$  ( $n = 103$  males and 136 females). Figure 1 plots the risk of alcoholism as a function of this personality risk classification. Although these rates need to be interpreted with caution (both because the discriminant function is not cross-validated and because the proportions are in part a function of a base rate of alcoholism that reflects how the control and alcoholic groups were defined for this study rather than the base rate in the general population), the Figure does demonstrate that

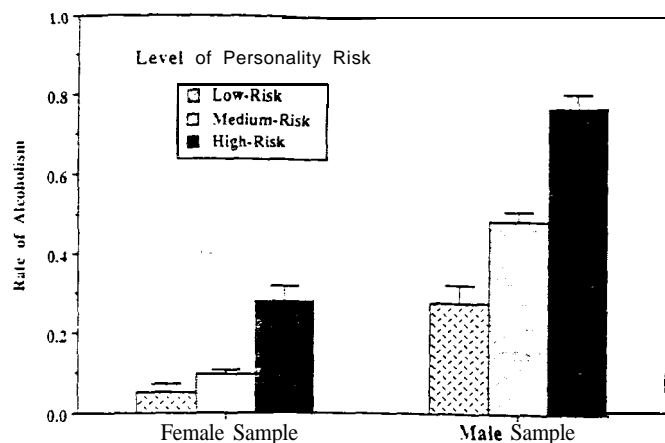


Fig. 1. Rate of DSM-III-A alcohol dependence as a function of personality risk. Low-risk score, 1 or more SD below mean on personality composite; medium-risk score,  $\pm 1$  SD of mean; and high-risk score, 1 SD or more above the mean. Rates are given separately for the female and male samples, and in both cases are based on the discriminant function derived in that sample. Error bars demarcate one standard error of the proportion.

moderate effect sizes are not incompatible with relatively high rates of alcoholism among those who are especially extreme in personality risk. In males, the rates of DSM-III-R alcohol dependence increased from 78.1% in the low-risk personality group to 77.7% in the high-risk personality group; for females, the rates of alcoholism in the two extreme personality risk groups are 5.2 and 27.9%, respectively.

#### DISCUSSION

Previous research had lead us to expect personality differences between alcoholics and nonalcoholics on two broad dimensions of personality? behavioral disinhibition (or its MPQ complement of constraint), and negative emotionality. Our findings clearly confirmed this expectation. Significantly, the hierarchical organization of the MPQ allowed us to evaluate the consistency of the association of alcoholism and personality; expected differences were observed not only on the two higher-order scales, but also on every one of the six primary scales that loaded principally on the higher-order factors associated with these scales. The mean difference between alcoholics and nonalcoholics on each of these scales was moderate in magnitude (between one-third and one-half SD), indicating that there is substantial overlap in the personality scores of the two groups. Except for the Aggression subscale, the pattern of personality differences between alcoholics and nonalcoholics was comparable for men and women. Although our design did not allow us to determine whether these personality differences predated alcoholism onset, we were able to investigate whether personality differences of alcoholics with nonalcoholics were greater for alcoholics who reported symptoms of alcohol dependence at the time of assessment versus alcoholics who did not report any current symptoms. Unlike Martin and Sher,<sup>33</sup> who did find signif-

icant personality differences, however, we found no evidence of personality differences between self-reported current and past problem drinkers. The difference in findings from these two studies may owe both to differences in the age of participants (young adults versus middle-age adults) as well as to differences in the definition of problem drinking (DSM-III-R alcohol dependence in the present study versus either DSM-III-R alcohol dependence or abuse in the previous study). Alternatively, our failure to find a current problem drinking status effect may reflect limitations in our self-report methodology; some individuals may have underreported their current problems with alcohol.

Cluster analysis of the male alcoholic sample revealed two clusters: a severe alcoholic group, which was characterized by relatively early age of onset, high family loading, and high rates of symptom endorsement, other substance abuse and dependence, and antisocial behavior; and a moderate alcoholic subgroup, which was intermediate on these clinical measures. Significantly, compared with the moderate alcoholics, severe alcoholics were more deviant on all measures of negative emotionality and all measures of constraint. Whereas the moderate alcoholics differed by about one-third to one-half SD from the nonalcoholics on these scales, the severe alcoholics differed from controls by about one-half to 1.0 SD. These findings thus suggest that a continuum of personality risk is associated with a continuum of alcoholism severity, and that the so-called antisocial form of alcoholism may be characterized not only by relatively low levels of constraint but also by relatively high levels of negative emotionality.

Our findings serve to highlight two methodological limitations of previous research linking alcoholism and personality. First, to ensure statistical power of 0.95 to reject a false null hypothesis of equal group means when the true mean difference is one-third SD would require a sample of at least 250 alcoholics and 250 controls." Our findings suggest that effect sizes of this magnitude are to be expected when relating alcoholism to specific personality scales; nonetheless, few studies of alcoholism and personality have included samples as large as 500. It is thus not surprising to learn that studies linking personality to alcoholism have produced conflicting findings." Second, the association of alcoholism and personality may be overestimated in treatment-ascertained compared with community-ascertained samples. Compared with moderate alcoholics, severe alcoholics in the present study were more deviant in personality risk: they were also much more likely to have sought treatment for their alcoholism.

The proposition that personality differences between alcoholics and nonalcoholics could be usefully summarized along a single continuum of personality risk gained additional support in the linear discriminant function analyses. Personality differences among male nonalcoholics, moderate alcoholics, and severe alcoholics could be reduced to a single linear composite of three MPQ scales, Aggression, Negative Emotionality, and Constraint. The higher the

score on this personality composite the higher the likelihood of alcoholism, with 78% of males who scored at least one SD above the mean on this composite meeting DSM-III-R criteria for alcohol dependence. For females, although the rate of alcoholism was lower in all groups, high personality risk was also associated with a substantially elevated rate of alcoholism.

Although the present cross-sectional design does not allow us to determine whether the observed personality differences predated alcoholism onset, it is interesting to speculate about the possible implications of the present findings for understanding the causes of alcoholism. The associations of alcoholism with negative emotionality and behavioral disinhibition have been interpreted by some as implicating two qualitatively distinct pathways to alcoholism:<sup>11,35</sup> a negative affect pathway, where alcohol is used to moderate the experience of psychological distress,<sup>36</sup> and a deviance proneness pathway, where socialization in the cultural standards governing alcohol use is compromised by possession of a "difficult temperament" (as reflected by high disinhibition).<sup>37</sup> Although our findings are consistent with negative emotionality and behavioral disinhibition both influencing alcoholism risk, they suggest that this influence may be summative and quantitative. That is, whereas rate of alcoholism was relatively high among those who were extreme on either Negative Emotionality or Constraint, it was especially high among those who were extreme on *both* Negative Emotionality and Constraint.

#### SUMMARY

A cross-sectional analysis of the relationship between self-reported personality and alcoholism in a large community-ascertained sample revealed that two broad dimensions of personality, negative emotionality and constraint, were consistently associated with alcoholism status in both males and females. Although the effect sizes for individual personality scales were only moderate in magnitude, substantially elevated rates of alcoholism were associated with an aggregated measure of personality risk.

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