

BRIEF REPORT

THE TRIDIMENSIONAL PERSONALITY QUESTIONNAIRE AND THE INHERITED RISK FOR ALCOHOLISM

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Abstract — The Tridimensional Personality Questionnaire (TPQ) (Cloninger, 1987c) was administered to four groups of young men. The first group was composed of nonalcoholic sons of male alcoholics with extensive multigenerational family histories of male alcohol abuse. The second was made up of nonalcoholic men with alcoholic fathers. The third group was composed of non-alcoholic men with no family history of alcoholism, taken from the general population. The fourth group contained male undergraduates with no family history of alcoholism. There were no significant differences between the mean scores obtained by members of all four groups on the three major subscales of the TPQ.

Cloninger (1987b) suggested that personality has a partially heritable, three-dimensional structure. The first of these dimensions, novelty seeking, he described as the tendency to react with exhilaration to novelty, signals of potential reward, and/or signals of potential relief of punishment. The second dimension, harm avoidance, is the proclivity to react intensely to signals of aversive stimuli. The final dimension, reward dependence, is the inclination to respond powerfully to signals of reward, such as social approval. Individuals conventionally described as personality disordered are characterized, in Cloninger's (1987b) view, by extreme variation along one or more of these basic dimensions. Schizoid persons, for example, are hypothesized to be low novelty seekers, low in harm avoidance and reward dependence. Passive-aggressive persons, by contrast, are high novelty seekers, harm avoidant and reward dependent.

The 100-item Tridimensional Personality Questionnaire (TPQ) (Cloninger, 1987a) was designed to provide rapid assessment of such individual variation. Each of the questions which make up the TPQ was chosen on the basis of theory to evaluate behaviors considered to be characteristic of individuals deviant along one dimension and normal along the other two. Preliminary analysis of an 80-question version of the TPQ administered to 101 sophomore medical students indicated that the TPQ was reliable and provided clinically relevant information (Cloninger, 1987b).

Cloninger (1987a) additionally suggested that the TPQ could be used to distinguish individuals prone to the development of the male-limited, more purely heritable Type II alcoholism (Cloninger, Bohman, & Sigvardsson, 1981) from those more likely to develop the milieu-limited, environmentally variable Type I alcoholism (Cloninger et al., 1981) and from normal persons. Those susceptible to Type II alcoholism, which is characterized by early onset, inability to abstain from alcohol use, and antisocial behavior when intoxicated were hypothesized to be novelty seekers, low in harm avoidance and reward dependence. Those likely to develop Type I alcoholism, characterized by late onset, loss of the

ability to control drinking once started, and guilt and fear about alcohol dependence were, in theory, harm avoidant, dependent on reward, and low in novelty seeking.

Cloninger, Sigvardsson, and Bohman (1988) published data testing the predictive utility of this theoretical description derived from a prospective longitudinal study of 233 boys and 198 girls, assessed behaviorally and from teacher interviews at age 11 and re-evaluated at age 27 for alcohol use and abuse. Thirty males and two females developed alcoholism by follow-up. Bidirectional deviations from the mean scores on each of the three personality dimensions, constructed post hoc from information contained in the childhood assessment, were associated with exponential increases in the risk for adult alcohol abuse. The presence of personality characteristics associated with low harm avoidance and high novelty seeking in childhood most strongly predicted development of early-onset, Type II alcoholism.

Cloninger's theoretical discussions and the apparent success of his theory in predicting the development of alcoholism made it appear reasonable to apply the TPQ to men who differed in their risk for alcohol abuse, based on the extent and nature of their family history of alcoholism. It has recently been demonstrated (Finn & Pihl, 1987, 1988; Peterson & Pihl, 1990) that males with multigenerational family histories (MFH) of male alcoholism clearly differ from those with unigenerational (UFH) and negative family histories (FH-) on measures of personality, cardiovascular reactivity, neuropsychological capacity, and in sensitivity to alcohol intoxication. Alcoholism appeared early (before age 25) among affected males in these multigenerational families and was often found in association with antisocial personality disorder (Finn, Kleinman, & Pihl, 1990; Finn & Pihl, 1987). This pattern of alcohol use is clearly reminiscent of Cloninger's Type II alcoholism.

Given Cloninger's (1987a) reasoning and the demonstration that those at various putative genetic risk for alcoholism differ in terms of personality, psychophysiology, and cognitive functioning, it seemed reasonable to hypothesize (a) that the TPQ scores of men with a multigenerational family history of alcoholism would differ from those of men with unigenerational and negative family histories, and (b) that these MFH men would tend to share the personality profile described by Cloninger (1987a) as characteristic of the Type II alcoholic.

SUBJECTS AND METHOD

Four groups of males participated in this experiment. The MFH group was composed of 25 nonalcoholic sons of male alcoholics (SOMAs) who had at minimum, in addition to their father, an alcoholic paternal grandfather and paternal uncle or brother. The UFH group contained 21 nonalcoholic SOMAs whose familial alcoholism was limited to their biological father. The 25 men in the first low-risk (FH-) group were selected from a nonuniversity population and had no known alcoholic relatives in their two previous family generations. The 21 men in the second FH- group were undergraduates enrolled in a sophomore psychology class, with no known alcoholic relatives. All subjects in the first three groups scored 5 or less on the short version of the Michigan Alcoholism Screening Test (MAST) (Selzer, 1971). Those in the last group, administered the TPQ as part of another normative investigation, were not given the MAST.

Participants in the first three groups were either members of a long-term subject bank composed of outpatient in-treatment alcoholics and their families established at the McGill-Douglas Hospital Alcohol Research Program (Finn & Pihl, 1987), or were recruited through newspaper advertisements by researchers working at two locations: McGill University, Montreal, Quebec, Canada; and Indiana University, Bloomington, Indiana.

Table 1. TPQ scale and subscale scores \times group

Variable	Risk Group							
	High Risk (25)		Med. Risk (21)		Low Risk 1 (25)		Low Risk 2 (20)	
	\bar{X}	SD	\bar{X}	SD	\bar{X}	SD	\bar{X}	SD
Age(†)	23.1	3.4	23.4	3.3	21.8	2.2	20.1	1.4
Frequency(†)	1.7	1.2	2.4	1.7	2.8	1.7	1.3	0.9
Quantity	4.3	2.3	3.7	1.9	5.5	2.6	4.0	3.0
Novelty seeking	19.5	5.4	17.1	5.3	19.0	6.3	17.3	4.7
NS1	5.6	1.6	5.1	1.5	5.1	2.0	5.4	1.5
NS2	3.7	2.4	2.8	1.7	3.6	2.2	2.9	2.3
NS3	4.3	2.0	3.9	2.1	4.6	1.9	3.8	1.8
NS4	5.8	1.6	5.4	2.2	5.4	2.2	5.2	1.7
Harm avoidance	9.1	6.1	10.9	7.1	9.6	5.3	10.0	4.7
HA1	2.4	2.0	3.3	2.7	2.6	2.2	3.0	1.9
HA2	2.2	1.6	2.6	1.7	2.6	1.4	2.3	1.3
HA3	2.2	2.0	2.6	2.0	2.1	1.9	3.4	2.5
HA4	2.4	2.4	2.4	2.7	2.4	2.2	1.2	1.5
Reward dependence	18.5	5.1	17.2	4.9	16.8	3.2	18.2	4.4
RD1	3.8	1.1	3.6	1.2	3.2	1.1	3.9	1.0
RD2(†)	5.4	2.4	5.6	2.0	4.2	2.0	6.0	2.1
RD3	6.7	2.4	6.0	2.6	6.7	2.3	5.8	3.1
RD4	2.7	1.3	2.0	1.5	2.6	1.4	2.9	1.8

† = The presence of significant group differences. See the "Subjects and Method" section for details.

Twelve MFH, 19 UFH, and 13 FH— subjects were screened at McGill; 13 MFH, 2 UFH, and 12 FH— men at Indiana University. Diagnosis for alcoholism was based on the MAST and DSM-III criteria for family members available for interview. The psychiatric status of unavailable members was determined through use of the Family History Research Diagnostic Criteria (FH-RDC) (Endicott, Andreasen, & Spitzer, 1975). Thirteen of the MFH, 19 of the UFH, and 12 of the FH— subjects were administered the TPQ by telephone; the remainder completed it in person, in laboratories at McGill or at Indiana University. All subjects in the first three groups were paid \$5.00 for their participation.

Subjects in the second FH— group volunteered to complete the TPQ as part of their course work. This group, highly educated and affluent, was included in the study to help exclude the possibility that the first FH— group was composed more purely of novelty seekers looking for an interesting experience and quick money.

RESULTS

Separate one-way ANOVAs completed for the three major TPQ scales demonstrated that the mean scores obtained by members of the four risk groups did not differ significantly. Means and SDs for age, weekly frequency of alcohol consumption, quantity per occasion of alcohol consumption (in beer equivalents), and for the three major scales are given in Table 1. Means and SDs for the theoretically derived subscales are also provided, although Cloninger does not predict that a specific pattern of subscale response characterizes the alcoholic predisposition.

Subjects differed significantly in age, $F(3, 87) = 6.6, p < .001$, frequency of alcohol consumption, $F(3, 87) = 4.7, p < .01$, and in their scores on the second Reward De-

pendence Subscale (RD2), $F(3, 87) = 2.8, p < .05$). Post hoc Tukey Studentized Range Tests indicated that members of the second FH— control group were significantly younger than members of the MFH and UFH risk groups ($Q > 3.7, df = 87, p < .05$) and that members of the two control FH— groups differed significantly from each other in frequency of alcohol consumption ($Q > 3.7, df = 87, p < .05$) and in their scores on the RD2 subscale ($Q > 3.7, df = 87, p < .05$).

Pearson product-moment correlations between each of the three major scales and between those scales and quantity and frequency of drinking were also calculated. Alpha was set at approximately .01 to help control for the effects of multiple comparisons. According to this criteria, harm-avoidance was significantly negatively correlated with reward-dependence ($R = -0.25, p < .016$). No other significant correlations emerged, although there was a weak trend for reward-dependence to vary negatively with weekly frequency of alcohol consumption ($R = -0.23, p < .03$).

It should also be noted, for methodological purposes, that phone- and write-in subjects did not differ from one another on the basis of one-way ANOVA in terms of their mean scores on the three major TPQ scales.

DISCUSSION

There are at least six possible reasons why the TPQ failed to discriminate between members of the different risk groups who participated in this study.

1. The samples analyzed were not of sufficient size to provide such discrimination.
2. Neither the MFH nor UFH subjects were truly at heightened risk for alcoholism.
3. The sample selection procedure was biased.
4. The MFH males were not truly at risk for Type II alcoholism specifically but were at risk for either Type I or II. Had this been the case, then the mean scores of the MFH group could have remained comparable to those of the controls (since Type Is and IIs theoretically score in opposite directions on the TPQ) even while the TPQ performed its discrimination accurately.
5. Those at heightened risk for alcoholism do not in fact differ from those at low risk in terms of the traits assessed by the TPQ.
6. The theoretically derived scales of the TPQ do not measure what they are supposed to measure.

With respect to the first possibility, failure to reject the null hypothesis cannot be considered conclusive on the basis of analyses conducted on an insufficient sample. Such failure might be considered particularly distressing if such analyses produce weak but consistent trends supporting rejection, or if there were reason to believe effect sizes were likely to be very small. Trends supporting rejection did not occur in the course of the analyses reported in this article. In addition, use of two risk groups provided some control for potentially small effect size. Members of the MGH group came from families with extensive multigenerational histories of male alcoholism. If the TPQ cannot pick up differences between individuals with this saturated family history and nonalcoholic, negative-family-history university students, then its clinical ability may be limited.

Concerning the second possibility, it might be argued that the MFH and/or UFH subjects who participated in this study were not truly at heightened risk for alcoholism. The fact that their MAST scores were relatively low provides support for this hypothesis. However, the families of the MFH subjects were saturated with alcoholism, and substantial differences in personality and other characteristics between members of the two at-risk groups and/or between the at-risk groups and control subjects have been demonstrated

in the past, when the group members were selected according to identical criteria (Finn & Pihl, 1987, 1988).

Regarding the third possibility, it may be that the control subjects in the present study had abnormally high tendencies to novelty seek. It is interesting to note, in this regard, that (a) most of the subjects in the first control were recruited by newspaper advertisement and may have been sensation seekers looking for new experiences, and (b) all the group mean scores on the Novelty-Seeking scale reported in this investigation are higher than those reported for white males ($\bar{X} = 13.66$, $SD = 5.2$) by Cloninger (1987c). However, there were two control groups in this study, and their scores did not differ significantly. Members of the second were sophomores who completed the TPQ during their course work in university, and there is no a priori reason to assume that they were abnormal in any respect. It is more difficult, therefore, to attribute the lack of differences in this study to sample bias.

The potential validity of the fourth possibility was explored and eliminated empirically. The MFH group was arbitrarily divided into two groups, composed of the 10 who attained the highest scores on the Novelty-Seeking subscale and the 10 who attained the lowest. The remainder were excluded from consideration. If the MFH group was composed partially of those predisposed to Type I and partially of those predisposed to Type II alcoholism, then the low novelty seekers (more likely, theoretically, to develop Type I alcoholism) should have scored highly in terms of harm-avoidance and reward-dependence. This was not the case, according to one-way ANOVA. The low novelty-seeking MFH males actually attained lower scores on harm avoidance than the high novelty seekers, while their scores on reward dependence differed minimally.

With respect to the fifth possibility, previous work has suggested that novelty or sensation seekers are more likely to abuse alcohol and/or other drugs (Barnes, 1979; Schwartz, Burkhart, & Green, 1978). Those at heightened genetic risk for alcoholism (Cloninger et al., 1981) and Type II alcoholics (von Knorring, von Knorring, Smigan, Lindberg, & Edholm, 1987) have also been described, behaviorally, as novelty seekers. It seems more plausible to assume, therefore, that claims for the existence of a relationship between novelty seeking and substance abuse are valid, and that it is the TPQ measure of novelty seeking that may be flawed.

It is therefore possible that the psychometric properties of the TPQ — particularly its predictive and construct validity — need further refinement and development. Although few investigations of such properties exist, Earleywine, Finn, Peterson, and Pihl (in press) found, using both exploratory and confirmatory factor analysis, that the structure of the TPQ did not fit well into a three-factor solution.

Since the application of Cloninger's general theory is predicated on the identification of temperamental traits theorized to exist in association with risk for alcohol abuse, it is essential that the measure of these traits be reliable and valid. There is only limited evidence suggesting that this is the case. The psychometric properties and validity of the TPQ could conceivably be further tested and/or improved by (a) standardization on a large population, (b) factor analysis of the results and item analysis of the factor loadings, with some refinement at the item level; (c) a multitrait, multimethod approach to testing construct, predictive, and discriminant validity; and (d) further application of the TPQ to members of populations assumed to be at heightened risk for substance abuse.

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