

# Novelty Seeking among Relapsed and Non-Relapsed Male Alcohol Dependents during 12 month Follow-up

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## ÖZET

12 Aylık takipte depreşen ve depreşmeyen erkek alkol bağımlılarında yenilik arayışı

**Amaç:** Bu çalışmanın amacı, yatarak tedavi gören alkol bağımlılarında 12 aylık takipte yenilik arayışı (YA) kişilik boyutunu ve onun alt ölçeklerini karşılaştırmaktır.

**Yöntem:** Çalışmaya katılanlar, hastaneye ardışık yatışı yapılan ve 12 ayın sonunda 2. görüşmeleri yapılabilen 102 erkek alkol bağımlısı hastaydı. Hastalar, mizaç ve karakter envanterinin YA boyutu ile değerlendirildi.

**Bulgular:** Yatarak tedavi gören alkol bağımlısı hastaların %61.8'i (n=63) depreşmiş olarak değerlendirildi. Sosyodemografik değişkenler depreşen ve remisyonadaki gruplar arasında fark göstermedi. İlk değerlendirmede YA ve alt boyutların ortalamaları gruplar arasında fark göstermezken, 12 ayın sonundaki değerlendirilmede bu ortalamalar, depreşen grupta, remisyonadaki gruba göre yüksekti (Keşfetmekten heyecan duyma-YA1-alt ölçeği dışında). Remisyonadaki grupta YA ve alt ölçeklerinin ortalamaları (YA1 alt ölçeği dışında) 12 ayın sonunda azalırken, depreşen grupta dürtüsellik alt ölçeği (YA2) ve YA takip süresinde yükselmiştir.

**Sonuç:** Erkek alkol bağımlılarında genetik olarak belirlendiği bildirilen mizaç boyutu YA ve alt ölçekleri ayıklık ile azalırken alkol kullanımının depreşmesiyle yükselmektedir. Buna tek istisna alkol bağımlılığının oluşumuyla ilişkili temel YA özelliği YA1 olabilecek iken, diğer 3 alt ölçeğin, özellikle de YA2'nin alkol kullanım bozuklukları ile iki yönlü nedensel ilişkisi olabilir.

**Anahtar kelimeler:** Alkol bağımlılığı, yenilik arayışı, mizaç

## ABSTRACT

Novelty seeking among relapsed and non-relapsed male alcohol dependents during 12 month follow-up

**Objective:** Aim of this study was to investigate the changes in novelty seeking and its subscales during 12 month follow-up among alcohol dependents.

**Methods:** Participants were 102 consecutively admitted male alcohol dependents, who were available for a second evaluation at the end of 12 months. Patients were investigated with the Novelty Seeking (NS) dimension of the Temperament and Character Inventory (TCI).

**Results:** Among alcohol dependent inpatients 61.8% (n=63) were considered to be relapsed. Sociodemographic variables did not differ between relapse and remission groups. Mean scores of NS and subscales did not differ between groups at the baseline evaluation, whereas they were higher in relapsed group at one year follow-up (other than Exploratory excitability-NS1 subscale). In the remission group, mean scores of NS and subscales decreased at one year follow-up (other than NS1 subscale), whereas in the relapsed group, mean scores of Impulsiveness (NS2) subscale and NS increased during follow-up period.

**Conclusion:** Among alcohol dependent men, temperament dimension NS and subscales, which are suggested to be genetically determined, decreases during abstinence, whereas increases with relapse to alcohol use. Only exception is the NS1, which suggest that it might be the main trait NS subscale related with the occurrence of alcohol dependence, whereas other three subscales, particularly NS2 seems to have bidirectional causal relationship with alcohol use disorders.

**Key words:** Alcohol dependence, novelty seeking, temperament

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## INTRODUCTION

Early descriptions of the Cloninger's model of personality postulated three genetically independent, but functionally interactive personality dimensions: Novelty Seeking (NS), Harm Avoidance (HA) and Reward Dependence (RD) (1). Each trait was considered moderately heritable, normally

distributed, developmentally and situationally stable, and associated with specific neural systems mediating stimulus-response relationships of different types.

An interaction for Tridimensional Personality Questionnaire (TPQ) dimensions indicated that substance use was particularly elevated for persons with high NS, low HA, and low RD (2). There is considerable evidence that high novelty seekers are at increased risk

for using drugs of abuse relative to low novelty seekers (3), whereas findings for the HA and RD TPQ subscales are much less consistent (4). Evidence suggest that exposure to novelty activates, at least in part, the same neural substrate that mediates the rewarding effects of drugs of abuse, known as the mesolimbic dopamine (DA) system of the brain (3).

Individuals high in NS tend to be quick-tempered, excitable, exploratory, curious, enthusiastic, ardent, easily bored, impulsive and disorderly (5). Researches suggest that NS represents a vulnerability factor for substance abuse in general (6,7), risk factor for dropping out of treatment (8), associated with craving scores (9-12) and a predictor of relapse in detoxified male alcohol dependents (13). A recent study revealed that NS temperament, which is directly related with occurrence, maintenance and relapse of alcohol dependence, might also be related with impairments in mental aspect of life quality (but not physical aspect of life quality) among this population, whereas for other populations, such as schizophrenia patients, this dimension might have a protective role for mental life quality (14).

High NS is strongly associated with alcohol dependence in subjects with a parent diagnosed with alcohol dependence, but low NS may protect against the risk associated with familial alcoholism (15). NS predicts early onset alcohol abuse and criminality and discriminates alcoholics exhibiting antisocial behavior and persons with antisocial personality disorder from their nonantisocial counterparts (4). Individuals with "Type 2" early onset alcoholism had high NS and low HA and a significantly higher frequency of drinking than did individuals with "Type 1" late onset alcoholism who were high on HA and low on NS (16). Results also showed that NS is associated with the amount of drinking and severity of dependence (16,17).

NS is the main temperament dimension to be related with alcohol dependence. Also NS is considered as a relatively stable personality trait as are other temperament dimensions. While alcoholism seems to be predominantly influenced by temperament, particularly NS (18), long duration of excessive alcohol consumption has been proposed to have an influence on personality traits in male alcohol-dependent individuals

as well (19). Thus it is important to evaluate the changes in NS dimension in 12 month follow-up according to the relapse and remission status, which was the aim of this study.

## METHODS

### Subjects

The study was conducted in Bakirkoy State Hospital for Psychiatric and Neurological Diseases, Alcohol and Drug Research, Treatment and Training Center (AMATEM) in Istanbul, between January 2007 and January 2008. AMATEM is a specialized center for substance use disorders with 84 inpatient beds, and accepts patients from all over Turkey. The Ethical Committee of the hospital approved the study. Patients' written informed consents were obtained after the study protocol was thoroughly explained.

One hundred and eighty consecutively admitted alcohol-dependent inpatients without history of any other substance abuse were considered for participation in the study. All participants fit the DSM-IV diagnostic criteria for alcohol dependence. Excluding criteria were illiteracy, mental retardation or cognitive impairment and comorbid psychotic disorder. Five patients were excluded due to illiteracy and three patients due to cognitive deficits. Although none of the patients refused to participate in the study, 16 patients were excluded because they left some parts of the scales unfilled, did not give the forms back or left the treatment program prematurely; i.e. before filling the forms. A total of 156 alcohol-dependent inpatients participated in the study. Interviews with the study group were conducted after detoxification period, i.e. 4-6 weeks after the last day of alcohol use. In this first interview, patients were evaluated with 7 dimension of Temperament and Character Inventory (TCI) and studies concerning these data were published previously (14,20).

Patients were invited to the hospital for interview at the end of 12 month. Among 136 patients that could be reached with phone 66.2% (n=90) were considered as relapsed to alcohol abuse during the 12 month period.

**Table 1: Sociodemographic variables**

	Remission		Relapse		$\chi^2$	sd	p
	N=39	%	N=63	%			
Marital status					0.25	2	0.89
Married	25	64.1	41	65.1			
Divorced, Widow, Separate	4	10.3	8	12.7			
Single	10	25.6	14	22.2			
Employment status					5.65	3	0.13
Unemployed	10	25.6	24	38.1			
Employed	20	51.3	18	28.6			
Part time	2	5.1	7	11.1			
Retired	7	17.9	14	22.2			
	<b>(mean±sd)</b>	<b>(mean±sd)</b>	<b>t</b>	<b>p</b>			
Age	46.44±9.94	43.51±8.20	1.54	0.13			
Duration of education	9.95±4.07	9.48±3.85	0.59	0.56			
Age of onset of regular alcohol use	27.03±9.39	25.97±8.54	0.59	0.56			

$\chi^2$ , chi square; t, Student t test

Among this 136 patient, 102 were able to or accepted to come to interview. Patients were interviewed with NS subscale of TCI at the end of 12 month. There are studies that used only NS dimension of TCI for evaluation (21), particularly genetic studies those investigated association of NS with dopamine (22).

### Assessments

All patients were assessed by using a semi-structured socio-demographic form. The diagnosis of alcohol or drug dependence in each participating patient based on the clinical examination, a screening interview based on the Structured Clinical Interview for DSM-IV (SCID-I) (23), Turkish version (24), conducted by a trained interviewer (CE).

Temperament and Character Inventory (TCI). For evaluation of NS, the TCI of Cloninger et al. (25) was used in the Turkish version, which is a forced-choice, self-report scale (26). Novelty Seeking is a 40 item, multifaceted higher order temperament trait consisting of the following four aspects of lower order traits: Exploratory Excitability vs Stoic Rigidity (NS1) (11 items), Impulsiveness vs Reflection (NS2) (10 items), Extravagance vs Reserve (NS3) (9 items) and Disorderliness vs Regimentation (NS4) (10 items). The reliability and validity of the Turkish version of the TCI were supported by its psychometric properties and construct validity (26). In the Turkish version, Cronbach's Alpha was 0.74 for NS (NS1=0.52,

NS2=0.61, NS3=0.62, NS4=0.45) (26). In the present study, Cronbach's Alpha was 0.84 (0.45, 0.75, 0.75 and 0.58 respectively).

### Data Analysis

The statistical package SPSS 11.5 for Windows was used for all analyses. Categorical variables were compared by means of the chi-square statistics. We used both dependent and independent Student t test to compare the groups on continuous variables, since these variables were normally distributed.

### RESULTS

Among 102 inpatients, sixty three (61.8%) relapsed during 12 month follow-up period. Mean age, duration of education, age onset of regular alcohol use, marital status and employment status did not differ between relapsed and non-relapsed groups (Table 1).

Mean scores of novelty seeking dimension and subscales of NS at baseline evaluation did not differ between relapsed and remission groups. At 12 month follow-up, mean score of Exploratory excitability (NS1) did not differ between groups, whereas mean scores of Impulsiveness (NS2), Extravagance (NS3), Disorderliness (NS4) subscales and Novelty Seeking were higher in relapsed group than non-relapsed (Table 2).

Changes in mean scores between baseline and one year follow-up evaluations were determined for relapsed

**Table 2: Scale scores among alcohol dependent men according to the relapse status at 1 year**

Scale scores	Remission (n=39)		Relapse (n=63)		t	p
	mean	sd	mean	sd		
Baseline						
Exploratory excitability (NS1)	5.44	2.02	5.40	1.69	0.11	0.92
Impulsiveness (NS2)	4.21	1.98	3.65	1.73	1.49	0.14
Extravagance (NS3)	5.36	2.02	5.91	2.26	-1.23	0.22
Disorderliness (NS4)	3.59	1.57	3.65	1.60	-0.19	0.85
Novelty Seeking (NS)	18.59	4.81	18.60	4.26	-0.02	0.99
At 12 month follow-up						
Exploratory excitability (NS1)	5.56	2.37	5.59	1.87	-0.06	0.96
Impulsiveness (NS2)	3.44	1.98	4.91	2.76	-3.12	0.002
Extravagance (NS3)	4.00	2.04	6.22	2.27	-4.99	<0.001
Disorderliness (NS4)	2.85	2.02	4.02	2.02	-2.84	0.005
Novelty Seeking (NS)	15.85	6.27	20.73	6.70	-3.66	<0.001

t, Student t test

**Table 3: Novelty Seeking scores of alcohol dependent men who were in remission and who relapsed at 12 month follow-up**

	Baseline		At 12 month follow-up		t	p
	mean	sd	mean	sd		
Remission group (n=39)						
Exploratory excitability (NS1)	5.44	2.02	5.56	2.37	-0.29	0.78
Impulsiveness (NS2)	4.21	1.98	3.44	1.98	2.13	0.04
Extravagance (NS3)	5.36	2.02	4.00	2.04	3.44	0.001
Disorderliness (NS4)	3.59	1.57	2.85	2.02	2.14	0.039
Novelty Seeking	18.59	4.81	15.85	6.27	2.76	0.009
Relapse group (n=63)						
Exploratory excitability (NS1)	5.40	1.69	5.59	1.87	-0.69	0.51
Impulsiveness (NS2)	3.65	1.73	4.91	2.76	-3.46	0.001
Extravagance (NS3)	5.91	2.26	6.22	2.27	-0.93	0.35
Disorderliness (NS4)	3.65	1.60	4.02	2.02	-1.35	0.18
Novelty Seeking	18.60	4.26	20.73	6.70	-2.52	0.014

t, Student t test

**Table 4: Multivariate Covariance Analysis (MANCOVA) with subscale scores of the Novelty Seeking as dependent variables according to the relapse status at 12 month**

Source	Dependent Variable	Type III Sum of Squares	Mean Square	F (df=4, 97)	p
Age	Exploratory excitability (NS1)	1.203 a	1.203	0.285	0.595
	Impulsiveness (NS2)	0.282 b	0.282	0.045	0.833
	Extravagance (NS3)	0.264 c	0.264	0.055	0.814
	Disorderliness (NS4)	0.489 d	0.489	0.118	0.732
Duration of education	Exploratory excitability (NS1)	0.084	0.084	0.020	0.888
	Impulsiveness (NS2)	8.874	8.874	1.407	0.239
	Extravagance (NS3)	13.136	13.136	2.755	0.100
	Disorderliness (NS4)	0.079	0.079	0.019	0.891
Duration of alcohol use disorder	Exploratory excitability (NS1)	10.771	10.771	2.549	0.114
	Impulsiveness (NS2)	1.043	1.043	0.165	0.685
	Extravagance (NS3)	0.174	0.174	0.036	0.849
	Disorderliness (NS4)	2.140	2.140	0.515	0.475
Relapse during 12 months	Exploratory excitability (NS1)	0.439	0.439	0.104	0.748
	Impulsiveness (NS2)	46.619	46.619	7.389	0.008
	Extravagance (NS3)	106.725	106.725	22.384	<0.001
	Disorderliness (NS4)	27.863	27.863	6.708	0.011

R<sup>2</sup> (Adjusted R<sup>2</sup>): a = 0.049 (0.009), b = 0.091 (0.053), c = 0.224 (0.192), d = 0.086 (0.049). Dependent variables were 4 dimensions of Novelty Seeking. Emotional neglect, physical neglect, physical abuse and sexual abuse did not predict any dependent variable.

and remission groups separately. In the remission group, mean scores of NS and subscales decreased at 12 month follow-up. Only Exploratory excitability (NS1) did not differ significantly during follow-up. In the relapsed group, mean scores of Impulsiveness (NS2) subscale and NS increased during follow-up, whereas other subscales did not differ significantly (Table 3).

Multivariate analysis of covariance (MANCOVA) was performed to assess whether relapse status resulted in any differences between the NS subscales while age, duration of education and duration of alcohol use disorder were utilized as covariants. The overall main effect of relapse status was significant for N2, N3 and N4 subscale scores of NS. The covariants had no significant effect on these subscales (Table 4).

## DISCUSSION

Consistent with the rate of 57% found in the previous study (27) for relapse rate in 12 months, this rate was 38.2% in the present study. Since there were no significant differences between relapsed and remission groups according to sociodemographic variables, findings on the relationship of NS with the relapse is more reliable. Indeed, the overall main effect of relapse status on NS subscales was significant for N2, N3 and N4 scores, whereas age, duration of education and duration of alcohol use disorder had no significant effect on these subscales as covariants. The main finding is that NS decreases during 12 months if the patient stays in remission and increases if the patient relapses to alcohol use. The advantages of high NS are enthusiastic and quick engagement with whatever is new and unfamiliar, which leads to exploration of potential rewards. The disadvantages are related to excessive anger and quick disengagement whenever their wishes are frustrated, which leads to inconsistencies in relationships and instability in efforts (28).

Thus the main finding of the present study is that among alcohol dependent men, temperament dimension NS and subscales, which are suggested to be genetically determined, decreases during abstinence, whereas increases with the relapse to alcohol use. This supports the results of Berglund et al., (19) whom

suggested that long duration of excessive alcohol consumption may have an influence on personality traits in male alcohol-dependent individuals. Only exception is the NS1, which suggest that this subscale might be the main trait subscale among other NS subscales related with the occurrence of alcohol dependence. These people are typically intolerant of routine and try to introduce a change. Hence, they are sometimes described as unconventional or innovative (28,29). Individuals who score high on NS1 subscale get excited about new ideas and activities easily, for they tend to seek thrills, excitement, and adventures. Other three subscales, particularly NS2 may also be related with the long duration of excessive alcohol consumption. Individuals who score high on the NS2 subscale tend to be excitable, dramatic, impressionistic, and moody individuals who make decisions quickly on incomplete information and control their impulses poorly. Typically, these persons act on their momentary instincts and instinctive premonitions. Hence, they have to revise their decisions and opinions frequently when unanticipated events or information develop. They are often distractable and have short spans of attention (28,29). NS2 was related with early onset alcoholism, suicide attempt history and broad range of psychopathology and trait anxiety, whereas it was predicted by the severity of alcohol-related problems in the previous study (30). Thus, this suggest that in contrast with NS1, which seems to be trait factor related with alcohol dependence, causal relationship of other subscales with alcohol dependence may be bidirectional.

Other two subscales which decreased in remission group were NS3 and NS4. Individuals who score high on the NS3 subscale tend to be extravagant with their money, energy, and feelings. They may impress others as gallant, flamboyant, and unrestrained. For example, they prefer spending money rather than saving it. Consequently, it is hard for them to save money, even for special plans or vacations. They like to live "at the edge", that is pushing at the limits of their resources and financial capacities (28,29). High scorers on NS4 subscale tend to be quick tempered and disorderly. In other words, they are quick to lose their temper, so they often

show and express anger outwardly when they do not get what they want when they want it. They typically prefer activities without strict rules and regulations. They do not like fixed routines and rules. They run away from whatever is frustrating, boring or uncomfortable for them physically or psychologically (28,29).

The present study had several limitations. First, NS subscale used in the present study was self-reported. Patients are perhaps unable to evaluate themselves correctly at this stage because of their difficulties in cognitive processing. We conducted the study after the detoxification phase to eliminate this potential confound. Nevertheless relapsed group might still have these problems at the follow-up evaluation, although they were not under the effect of alcohol at the time. Another limitation of the present study was that all the

patients were male. The study group was restricted to a treatment-seeking population, and it was not possible to generalize the present findings to non-treatment groups.

Among alcohol dependent men, temperament dimension NS and its subscales, which are suggested to be genetically determined, decreases during abstinence, whereas increases with the relapse to alcohol use. Only exception is the NS1, which suggest that it might be the main trait subscale related with alcohol dependence, whereas other three subscales, particularly NS2 seems to have bidirectional causal relationship with alcohol use disorders. Further follow-up studies including other temperament and character dimensions should evaluate the stability of these dimensions particularly among alcohol dependents.

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