



## Temperament and character profiles are associated with depression outcome in psychiatric secondary care patients with harmful drinking



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### ABSTRACT

**Background:** Temperament and character profiles have been associated with depression outcome and alcohol abuse comorbidity in depressed patients. How harmful alcohol use modifies the effects of temperament and character on depression outcome is not well known. Knowledge of these associations could provide a method for enhancing more individualized treatment strategies for these patients.

**Methods:** We screened 242 depressed patients with at least moderate level of depressive symptoms. The Alcohol Use Disorders Identification Test (AUDIT) was used for identifying patients with marked alcohol use problems (AUP, AUDIT $\geq$ 11). After 6 weeks of antidepressive treatment 173 patients were assessed using the Montgomery-Åsberg Depression Rating Scale (MADRS), and the Temperament and Character Inventory (TCI-R). Outcome of depression (MADRS scores across three follow-up points at 6 weeks, 6 months and 24 months) was predicted with AUP, gender, and AUP  $\times$  Gender and AUP  $\times$  Time interactions together with temperament and character dimension scores in a linear mixed effects model.

**Results:** Poorer outcome of depression (MADRS scores at 6 weeks, 6 months and 24 months) was predicted by AUP  $\times$  Time interaction ( $p = 0.0002$ ) together with low Reward Dependence ( $p = 0.003$ ). Gender and all other temperament and character traits were non-significant predictors of the depression outcome in the mixed effects model.

**Conclusions:** Possibly due to the modifying effect of alcohol use problems, high Reward Dependence was associated with better depression treatment outcome at 6 months. Harm Avoidance and Self-Directedness did not predict depression outcome when alcohol use problems were controlled.

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### 1. Introduction

It is well known that comorbidity of major depressive disorder (MDD) with substance use disorders (SUDs) can lead to impaired response to treatment, more chronic disease courses or recurrence of depressive episodes [1,2]. Because recurrent and chronic depression constitute a major burden of disease [1,2], more efficient treatment strategies and means for earlier identification of high-risk patients are needed.

Assessment of individual temperament and character traits could provide a method for enhancing preventive and more individualized treatment strategies for these patients because certain traits and temperaments may predispose individuals to recurrence of depression, and are associated with different courses of depression and with

substance use disorder comorbidity and drinking outcomes [3–6]. Individual personality could have pathoplastic effects on recovery from depression; i.e., differences in temperament or character could explain differences in the course of the illness [7]. How harmful alcohol use modifies the effects of temperament and character on depression outcome is not well known.

The Temperament and Character inventory (TCI-R) is a 240-item questionnaire that collects information on human personality in the context of temperament and character. According to Cloninger's psychobiological model, on which the TCI-R was based, temperament is divided into four dimensions: Novelty Seeking (NS), Harm Avoidance (HA), Reward Dependence (RD) and Persistence (P). Character is divided into three dimensions: Self-Directedness (SD), Cooperativeness (C) and Self-Transcendence (ST) [8]. These dimensions are thought to

*Abbreviations:* MDD, major depressive disorder; SUD, substance use disorder; NS, novelty seeking; HA, harm avoidance; RD, reward dependence; P, persistence; SD, self-directedness; C, cooperativeness; ST, self-transcendence; AUP, alcohol use problems; MADRS, Montgomery-Åsberg Depression Rating Scale; TCI-R, Temperament and Character Inventory.

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reflect combinations of different neurocognitive functions (e.g., memory or reward functions), and the biological basis of this model is supported by many findings [9,10].

According to Cloninger's theory, temperament dimensions generally represent a stable part of personality, and only HA has shown clear state-dependent changes during depression [4,5,8]. However, high HA – and more particularly its sub-scores, anticipatory worry (HA1) and fatigability (HA4) – have also manifested as trait-like markers for risk of depression, i.e., index episodes, relapses or recurrent episodes and impaired treatment response [4,5]. High RD could be protective against depression in general population, but no associations have been reported with outcome of depression in clinically depressed patients [4,11–15]. Our earlier study of this patient sample suggested that RD is associated with depression treatment outcome in patients with alcohol use problems as change in RD was strongly associated with acute treatment response (0–6 weeks) to depression when alcohol use was taken into account [16]. High NS is a trait indisputably associated with risk of substance use disorders, more severe symptomatology and poorer outcome in SUD patients, and apparently experienced at a higher level in patients with dual diagnosis (concurrent SUD and mental illness) than in depressed patients [3,6,17–20]. Low P and high HA are associated with more severe alcohol dependence symptomatology [21–23].

Of the character traits, low SD is the trait most clearly predisposing to depression and recurrence of episodes, possibly because individuals with deficiencies in sub-traits such as self-acceptance, responsibility, goal-directedness associated with SD may be more prone to depression due to difficult situations encountered in their daily lives [24,25]. There is less evidence to suggest that low C is associated with the development of depression, whereas findings on the associations between ST and depression in different patient samples have been contradictory [4,15,26,27]. Low SD is also associated with more severe symptomatology and drinking outcomes in SUD patients [6,28,29]. In alcohol dependence character profile with high ST and low SD and C is associated with depression and anxiety [21].

In spite of a large body of knowledge of different associations separately between temperament and character traits and depression or substance use disorders, we found no follow-up studies addressing the associations between depression outcome and temperament, character and alcohol use. We investigated whether temperament and character trait scores (at 6 weeks) together with harmful alcohol use predict outcome of depression in follow-up from 6 weeks to 6 months and to 24 months in a clinically diverse sample of depressed patients. In light of earlier evidence we hypothesize that high HA and low SD and harmful alcohol use together explain poorer depression treatment outcome (measured as MADRS scores) [4,5,25]. As harmful alcohol use had a modifying effect on both temperament and character dimensions during acute illness, we hypothesize that RD together with alcohol use is also associated with outcome of depression in the long-term follow-up (from 6 weeks to 6 and 24 months) [16]. High NS has been associated with more severe SUDs, and therefore we also hypothesized that this temperament trait might modify treatment outcome together with harmful alcohol use in depression [6].

## 2. Methods

### 2.1. Participants

In the period 2009–2013, 242 patients were screened for the study in the Finnish region of Southern Ostrobothnia (population 200,000). These patients were referred to psychiatric specialized care units (5 outpatients and 1 inpatient) due to depression, anxiety, self-destructiveness, insomnia or alcohol-related problems. To maximize clinical relevance, lenient inclusion criteria were used. Patients with at least moderate depressive symptomatology (Beck Depression Inventory [BDI] Version 1A, score  $\geq 17$ ; [30]) were included in the study. Patients with organic brain disease

or psychotic disorder (ICD-10 F2\* diagnosis) were excluded. Their age range was 17–64 years (mean 38.8 years, SD  $\pm$  12.2). A more detailed description of the sample is presented in Tables 1a and 1b, and of the study setting elsewhere (see ClinicalTrials.gov Identifier NCT02520271, Ostrobothnia Depression Study [ODS] [43]). The study was approved by the local Human Subjects Review Committee, and patients gave their informed written consent.

### 2.2. Procedures

Sociodemographic data were collected and clinical assessments conducted at screening (the Alcohol Use Disorders Identification Test (AUDIT) [31] and the BDI). There was some dropout before the baseline assessment using the Mini International Neuropsychiatric Interview 5.0 (MINI; [32]) and the Montgomery-Åsberg Depression Rating Scale (MADRS) [33] and 228 (94%) patients were assessed with MADRS at baseline. According to the MINI administered to 219 patients (data missing in 23 cases), 88.6% of the patients had MDD, 4.1% dysthymic disorder, 5.5% anxiety disorder and 0.4% alcohol use disorder (AUD) as their main diagnosis, and 1.4% of the patients did not meet any of the diagnostic criteria. Twelve percent (12%) of the patients met the criteria for lifetime diagnosis of (hypo)manic episode. Sixty-three percent (63%) of patients with mood disorder as their main diagnosis had comorbid anxiety disorders, corresponding well to comorbidity proportions found in other samples in Finnish psychiatric secondary services [34]. Six patients (3%) with mood disorder as primary diagnosis had comorbid bulimia nervosa. Patients' categorical personality disorder diagnoses were not assessed. In the total sample, 33.6% of the patients reported that this was their first episode of MDD.

At baseline patients attended an appointment with a psychiatrist, where their medication was evaluated and changed if necessary. Antidepressant medication was prescribed to 206 patients (85%) with mean fluoxetine equivalent daily doses of 33.0 mg (SD  $\pm$  18.3). Of these, 82% had either an SSRI or SNRI as a primary antidepressant. Adherence to antidepressants was monitored during the first six weeks of the study using a paper and pencil diary (for more information see [16]). All patients received behavioral activation therapy with trained clinical staff. The median number of therapy sessions with patients was 6 (IQR = 3–11) with sessions taking place at 1 to 2-week intervals. The treatment of patients with alcohol use problems (AUP, AUDIT scores  $\geq 11$ ) was enhanced with motivational interviewing (median

**Table 1a**  
Sociodemographic data on the patient sample.

	Men		Women		Total	
	N	%	N	%	N	%
Total	94	38.8	148	61.2	242	100
Marital status						
Single	34	36.9	39	29.1	73	32.3
Married or cohabiting	39	42.4	71	53.0	110	48.7
Divorced	19	20.7	21	15.7	40	17.7
Widowed	0	0	3	2.2	3	1.3
Education						
Primary school	4	4.3	3	2.2	7	3.1
Comprehensive school	27	29.3	28	20.7	55	24.2
Tertiary education	10	10.9	25	18.5	35	15.4
Vocational school	33	35.9	54	40.0	87	38.3
Upper secondary education	10	10.9	7	5.2	17	7.5
Polytechnic or university	8	8.7	18	13.3	26	11.5
Work status before sick leave						
Employed	39	42.9	67	50.0	106	47.1
Unemployed	41	45.1	30	22.4	71	31.6
Housewife/husband	0	0	10	7.5	10	4.4
Pensioner	5	5.5	11	8.2	16	7.1
Student	6	6.6	16	11.9	22	9.8
Self-reported history of depression episode	62	67.4	90	65.7	152	66.4
First degree family history of depression	33	35.9	56	41.5	89	39.2
First degree family history of bipolar disorder	4	4.3	10	7.4	14	6.2

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