

Affective Temperaments in Alcohol and Opiate Addictions

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Published online: 1 March 2013
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Abstract Temperament is considered as a biological disposition reflected by relatively stable features related to mood and reactivity to external and internal stimuli, including variability in emotional reactions. The aim of the present study is to test the hypothesis that affective temperaments might differ according to co-occurring mood disorders among patients with alcohol and/or opiate dependence; to explore the relationship between temperaments and dual substance use disorders (SUDs, alcohol and other drugs). Ninety-two patients attending an alcohol addiction treatment facility and 47 patients in an opiate addiction treatment facility were assessed for SUDs, mood disorders and affective temperaments using the Temperament Evaluation of Memphis, Pisa, Paris and San Diego 39-item auto-questionnaire. Comparison of patients with bipolar disorder, depressive unipolar disorder and no (or substance-induced) mood disorder revealed significant differences for the cyclothymic subscale, with highest scores among patients with bipolar disorder. No difference was observed for the depressive, irritable, hyperthymic and anxious subscales. After adjustment for age, gender and bipolar disorder, irritable temperament was a significant risk factor for past or present history of drug use disorders in patients treated for alcohol addiction (odds ratio [OR] 1.42, 95 % confidence interval [CI] 1.05–1.93). Anxious temperament was a significant risk factor for history of alcohol use disorders in patients treated for opiate addiction (OR 3.30, 95 % CI 1.36–7.99), whereas the hyperthymic subscale appeared as a significant protective factor (OR 0.65, 95 % CI 0.42–0.99). The results highlight the need to consider temperamental aspects in further research to improve the long-term outcome of patient with addictive disorders, who often present complex comorbidity patterns.

Keywords Temperament · Bipolar disorder · Substance use disorder · Opiate · Alcohol · Dual substance use disorder

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Introduction

A strong association between substance use disorders (SUDs) and mood and anxiety disorders was found repetitively in epidemiological and clinical studies [1–4]. This association can be tentatively explained in a number of ways. For example, affect plays an important role in motivated behaviors [5], impulsivity and decision-making [6, 7]. In people with SUDs, affective states and emotional distress as well as expectancy of positive affective modifications are associated with substance use or relapse [8]. Moreover, it has been shown that the neural circuitry involved in affective regulation is closely related to the circuitry underlying addictive behaviors [5, 9].

In consideration of the above arguments, factors influencing affective states may be of high importance for the understanding and treatment of SUDs. Among these factors, affective temperaments provide information on individual traits related to tendencies to experience particular affective states [5]. Temperament is defined as a biological disposition reflected by relatively stable features related to mood, attitudes towards the environment and reactivity to external and internal stimuli, including variability and intensity in emotional dispositions [10, 11]. Temperaments might play a role as prognostic and therapeutic variables in patients with affective disorders [10]. Within this framework, Akiskal et al. [12] developed the TEMPS-A (Temperament Evaluation of Memphis, Pisa, Paris and San Diego), a 39-item self-report, which assesses affective temperaments along the five dimensions of cyclothymia, depression, irritability, hyperthymia and anxiety. The TEMPS-A is considered to measure stable traits [13]. The hypothesis was raised that a gradient in subscale scores might exist, from subjects affected with bipolar I disorder, to -II disorder, major depressive disorder and healthy controls, but results have been inconsistent [14].

A limited number of studies focused on the relationship between temperaments and addictive behaviors. On the one hand, patients with alcohol dependence scored significantly higher than controls on the cyclothymic and depressive scales, regardless of comorbid axis I disorders [15]. A recent study [16] found an association between cyclothymic temperament and earlier onset of alcohol abuse and dependence. In addition, anxious temperament was associated with increased probability of previous treatment for alcohol dependence, whereas depressive temperament was associated with previous suicide attempts. On the other hand, patients with heroin addiction displayed significantly higher cyclothymic and irritability scores than controls, independently of the presence or absence of other axis I disorders [17]. It was also reported that patients with heroin addiction obtained higher scores on the anxious, depressive, cyclothymic and irritable temperaments than randomly selected non-users matched by age and sex [18].

Previous studies thus strongly suggest that temperaments may play key roles in SUDs. To our knowledge, the influence of temperaments in dual SUDs (i.e. alcohol and other substances) has not been investigated so far, even though factors underlying multiple SUDs might be of particular concern for the treatment of addiction [19]. For example, alcohol dependence in patients treated for opiate addiction has a major impact on outcome: lower response to methadone substitution [20–22], lower quality of life [23], and more impulsive behaviors [24].

Aims of the present study in patients with alcohol and/or opiate dependence were twofold. The first objective was to test the hypothesis that differences in TEMPS-A dimensions according to co-occurring mood disorders would be consistent with observations in non-SUD patients. Its second aim was to investigate temperaments in dual SUDs, whether substance use among patients treated for alcohol addiction or alcohol use among the ones treated for opiate addiction.

Methods

Study Design

The present investigation is part of a study aimed at screening for bipolar disorder among outpatients with SUDs [25]. The study was conducted at the Department of Mental Health and Psychiatry, Geneva University Hospitals, in two community outpatient facilities that are specialized for the treatment of alcohol and opiate dependence, respectively. Participants were recruited among patients newly referred for treatment or already in contact with these facilities.

Inclusion criteria were alcohol or opiate dependence according to DSM-IV. Exclusion criteria were age under 18 years, previous treatment in a specialized unit for mood disorders, insufficient mastery of French, and incapacity to give informed consent.

The study protocol was accepted by the Ethics Committee of the Psychiatry Department of the Geneva University Hospitals. Written informed consent was obtained from each participant before inclusion.

Instruments and Procedure

After providing written informed consent, patients met a research psychologist, who was not involved in patients' care and was well trained with study instruments. Assessments were performed during two sessions within a period of 2–4 weeks. Demographic data were collected at study inclusion and information about medication was retrieved in patients' charts.

The TEMPS-A is a self-report questionnaire designed to measure temperamental variations in psychiatric patients and healthy volunteers [26]. It includes 39 yes/no items used to quantify five affective temperaments: cyclothymic (12 items), depressive (8 items), hyperthymic (8 items), irritable (8 items), and anxious (3 items). The French version of the TEMPS-A has been validated and showed a five-factor structure consistent with the original English version [27].

The Addiction Severity Index (ASI) is a multidimensional semi-structured clinical interview designed to detect and measure the severity of problems in seven areas commonly affected by alcohol and drug dependence: medical, employment/support, alcohol and drug use, legal, family history, family/social relationships and psychiatric problems [28]. Only the section about alcohol and drug consumption was used in the present study. Dual SUD was recorded on the basis of the grid concerned with lifetime use of alcohol and different drugs: it was assumed to be positive when at least 1 of 2 items about alcohol and 1 of 10 items about other substances were checked positive (i.e. at least 1 year of regular or problematic use for both alcohol and other substances, independently of whether or not they co-occurred). Duration of use was estimated as the longest duration if multiple substances were cited.

Diagnosis of alcohol or substance dependence was established according to the DSM-IV criteria by psychiatry residents and a senior psychiatrist. All patients recruited in the alcohol treatment facility met DSM-IV criteria for alcohol dependence, and all patients in the opiate addiction treatment facility met criteria for opiate dependence. Mood disorders were diagnosed according to the Structured Clinical Interview for DSM-IV Axis I Disorders (SCIDs) [29]. Other axes I and II disorders were not assessed.

Statistical Analysis

Group comparison proceeded with the Fisher's exact test for categorical variables and the Mann–Whitney *U* test (two groups) or Kruskal–Wallis analysis of variance (three groups) for continuous and ordinal variables. In the latter case, post hoc analyses were performed using Bonferroni correction for multiple testing. The association between dual SUD and TEMPS-A dimensions was investigated with univariate and multivariate logistic regression. Multivariate models were adjusted for age (<45 vs. \geq 45 years), sex and diagnosis of bipolar disorder. Unadjusted and adjusted odds ratios (ORs) and 95 % confidence intervals (95 % CIs) were estimated. Statistical significance was set at 0.05 (two-tailed tests). Data analysis was performed using SPSS version 17 (SPSS Inc., Chicago IL, USA).

Results

Comparison of patients treated for alcohol dependence ($n = 92$) and opiate dependence ($n = 47$) is provided in Table 1. Patients in the opiate addiction treatment facility were significantly younger, and more frequently single and unemployed. Distribution of comorbid mood disorders significantly differed in the two facilities, with higher frequency of unipolar depressive disorders among patients treated for alcohol dependence (57.6 vs. 29.8 %), but similar frequencies of bipolar disorders (21.7 vs. 23.4 %). Of 31 patients within the bipolar spectrum, 2 were diagnosed with bipolar I disorder, 22 with bipolar II disorder and 7 with bipolar disorder not otherwise specified. Antidepressants were more often prescribed in the alcohol treatment facility. Antipsychotic drugs were more frequent in the opiate addiction facility, where a majority of patients had methadone maintenance treatment (95.7 %). As expected, patients treated for alcohol dependence had significantly higher alcohol use composite scores according to the ASI, with a median 15 years lifetime use of alcohol. Conversely, patients treated for opiate addiction had higher drug use composite scores, with a median 15 years lifetime use of drugs (if multiple substances were used, longest duration was considered). Prevalence of dual SUDs was 52.2 % in the alcohol addiction facility (median lifetime use of drugs 9.5 years, range 1–35), with longest duration most often reported for cannabis (30.4 %) and sedatives, hypnotics and tranquilizers (13.0 %). Prevalence of dual SUDs was 61.1 % in the opiate addiction facility (mostly alcohol: median lifetime use of alcohol 7.5 years, range 1–22).

Patients treated for alcohol and opiate dependence did not significantly differ for any of the five TEMPS-A subscales (not shown). Scores did not significantly differ according to gender, except for higher anxious temperament in women than in men (median 2 vs. 1, $p = 0.014$). Age was not associated with temperament, with the exception of the cyclothymic score that was significantly higher among patients less than 45 years old (median scores 7 vs. 5, $p = 0.030$).

Differences between patients with bipolar disorder, depressive unipolar disorder and no (or substance-induced) mood disorder are documented in Table 2. In both facilities, significant differences were observed across the three diagnostic groups for the cyclothymic subscale and highest scores were obtained among patients with bipolar disorder. No difference was observed for the depressive, irritable, hyperthymic and anxious subscales.

The association between dual SUDs and temperaments is documented in Table 3. In the alcohol addiction treatment facility, use of other substances was associated with cyclothymic and irritable temperaments in univariate models. Irritable temperament remained a significant risk factor for drug use after adjustment for age, gender and bipolar disorder

Table 1 Patient characteristics ($n = 139$)

	Alcohol addiction treatment facility ($n = 92$)	Opiate addiction treatment facility ($n = 47$)	p value ^a
Age (median, range)	49 (29–70)	36 (22–53)	<0.001
Gender (n , %)			0.10
Men	50 (54.3)	33 (70.2)	
Women	42 (45.7)	14 (29.8)	
Marital status (n , %)			0.017
Single	33 (35.9)	29 (61.7)	
Married	19 (20.7)	6 (12.8)	
Separated/divorced/ widowed	40 (43.5)	12 (25.5)	
Occupation (n , %)			<0.001
Employed	39 (42.4)	4 (8.5)	
Unemployed	53 (57.6)	43 (91.5)	
Medication (n , %)			
Antidepressant	58 (63.0)	16 (34.0)	0.002
Antipsychotic	11 (12.0)	17 (36.2)	0.001
Mood stabilizer	7 (7.6)	6 (12.8)	0.36
Tranquillizer	38 (41.3)	23 (48.9)	0.47
Hypnotic	15 (16.3)	9 (19.1)	0.81
Methadone	4 (4.3)	45 (95.7)	<0.001
SCID diagnosis (n , %)			0.005
Bipolar disorder	20 (21.7)	11 (23.4)	
Depressive unipolar disorder	53 (57.6)	14 (29.8)	
Substance-induced mood disorder	7 (7.6)	6 (12.8)	
No mood disorder	12 (13.0)	16 (34.0)	
ASI (median, range)			
Alcohol use composite score	0.21 (0–0.89)	0.03 (0–0.98)	<0.001
Drug use composite score	0 (0–0.38)	0.25 (0.08–0.42)	<0.001
Lifetime use of alcohol (years)	15 (1–50)	2 (0–22)	<0.001
Lifetime use of drugs ^b (years)	1.5 (0–35)	15 (1–30)	<0.001

SCID Structured Clinical Interview for DSM-IV Axis I Disorders, ASI Addiction Severity Index

^a Fisher's exact test for categorical variables; Mann–Whitney U test for continuous variables

^b If multiple substances are used, longest duration is reported

(OR 1.42, 95 % CI 1.05–1.93). In the opiate addiction treatment facility, alcohol use was associated with anxious temperament in univariate models. The anxious subscale remained a significant risk factor for alcohol use in the multivariate model (OR 3.30, 95 % CI 1.36–7.99), whereas the hyperthymic subscale appeared as a significant protective factor (OR 0.65, 95 % CI 0.42–0.99).

Table 2 Temperament profiles according to co-occurrence of mood disorders ($n = 139$)

	Bipolar disorder	Depressive unipolar disorder	No or substance-induced mood disorder	p value ^a
Alcohol addiction facility	($n = 20$)	($n = 53$)	($n = 19$)	
TEMPS-A cyclothymic	7 (2–12) ^b	4 (0–12)	4 (0–10)	0.005
TEMPS-A depressive	2 (0–8)	2 (0–8)	2 (0–7)	0.59
TEMPS-A irritable	2 (0–8)	1 (0–6)	1 (0–8)	0.069
TEMPS-A hyperthymic	4.5 (1–8)	4 (0–8)	5 (0–8)	0.71
TEMPS-A anxious	1 (0–3)	2 (0–3)	1 (0–3)	0.38
Opiate addiction facility	($n = 11$)	($n = 14$)	($n = 22$)	
TEMPS-A cyclothymic	10 (1–12) ^c	6.5 (1–11)	6 (1–12)	0.041
TEMPS-A depressive	4 (1–8)	2 (0–7)	2.5 (0–7)	0.19
TEMPS-A irritable	2 (0–6)	2 (0–7)	1.5 (0–8)	0.22
TEMPS-A hyperthymic	6 (4–8)	5 (2–8)	4.5 (0–8)	0.14
TEMPS-A anxious	2 (0–3)	1.5 (0–3)	1 (0–3)	0.47

TEMPS-A Temperament Evaluation of Memphis, Pisa, Paris and San Diego

^a Kruskal–Wallis ANOVA

^b Post hoc tests: $p = 0.015$ versus depressive unipolar disorder; $p = 0.010$ versus no or substance-induced mood disorder

^c Post hoc tests: $p = 0.44$ versus depressive unipolar disorder; $p = 0.035$ versus no or substance-induced mood disorder

Discussion

As previously reported [2, 4, 30], mood disorders were frequent in the present study. Cyclothymic temperament was associated with mood disorders in both addiction treatment facilities, with highest scores among patients with bipolar disorder (mostly bipolar II). This result is in line with a review of TEMPS-A data showing significant differences between bi- and unipolar disorders in most studies [14]. In a large sample of more than 900 subjects, Di Florio et al. also tested the hypothesis of a gradient in affective temperaments from bipolar I, to -II, major depressive disorder, and normal control group. In contrast with this hypothesis, patients with bipolar II disorder had higher median cyclothymic scores than patients with either bipolar I or recurrent major depressive disorder, but differences were not significant after adjustment for potential confounders. In patients with recurrent depressive disorder, cyclothymic temperament was associated with factors considered as predictive of bipolarity, such as early age of onset, high number of depressive episodes, psychotic and atypical features and suicidal behavior [31]. Several familial genetic investigations and treatment responses studies in clinical populations suggested a continuum between cyclothymic temperament, bipolar II disorder and -I disorder [32, 33]. According to Hantouche et al. [34] assessing cyclothymic temperament might be a major clue for differentiating bipolar II from unipolar patients.

In the present study, a dual SUD was present in more than 50 % of patients attending alcohol and opiate treatment facilities. A recent review revealed that comorbidity of alcohol and illicit SUDs is consistently high across studies and emphasized that complex patterns of comorbidity remained a significant challenge to clinicians and researchers [35].

Table 3 Association of dual SUDs and temperament profiles in patients treated for alcohol or opiate addiction ($n = 139$)

	Dual SUDs (univariate logistic regression)			Dual SUDs (multivariate logistic regression ^a)		
	OR	95 % CI	<i>p</i> value	OR	95 % CI	<i>p</i> value
Alcohol addiction treatment facility ($n = 92$; $n = 48$ with dual SUDs)						
TEMPS-A cyclothymic	1.14	1.00–1.30	0.046	0.95	0.77–1.17	0.63
TEMPS-A depressive	1.18	0.98–1.42	0.088	1.16	0.86–1.55	0.33
TEMPS-A irritable	1.38	1.09–1.74	0.007	1.42	1.05–1.93	0.024
TEMPS-A hyperthymic	0.96	0.81–1.15	0.67	0.90	0.72–1.13	0.37
TEMPS-A anxious	0.88	0.61–1.26	0.48	0.68	0.42–1.09	0.11
Opiate addiction treatment facility ($n = 47$; $n = 32$ with dual SUDs)						
TEMPS-A cyclothymic	1.09	0.91–1.31	0.36	1.14	0.86–1.50	0.36
TEMPS-A depressive	1.16	0.89–1.52	0.27	0.85	0.55–1.31	0.46
TEMPS-A irritable	1.07	0.79–1.44	0.68	0.94	0.58–1.53	0.81
TEMPS-A hyperthymic	0.79	0.58–1.08	0.13	0.65	0.42–0.99	0.046
TEMPS-A anxious	2.08	1.13–3.85	0.020	3.30	1.36–7.99	0.008

TEMPS-A Temperament Evaluation of Memphis, Pisa, Paris and San Diego, OR odds ratio, CI confidence interval

^a Adjusted for sex, age and bipolar disorder

Studies about the possible association of affective temperaments and substance use have been sparse and, as far as we know, the role of temperament in relation with dual SUDs has not been investigated so far. After adjustment for age, gender and bipolar disorder, we observed that past or present use of other substances was associated with irritable temperament among patients recruited in the alcohol treatment facility, whereas alcohol use was associated with anxious temperament among patients treated in the opiate addiction facility. It should be pointed out that possible confounding effects of anxiety and/or personality disorders cannot be excluded in the present study, in the absence of a more thorough structured assessment of these diagnoses. On the one hand, irritable and cyclothymic temperaments allowed distinguishing between a sample of people with heroin addiction and control subjects [17]. Irritable temperament was associated with self-reported nicotine dependence, alcohol abuse and cannabis use among Austrian college students [36]. In a study on psychiatric aspects of HIV-related diseases, an irritable-explosive temperament was associated with heavy use of alcohol, cocaine, and other stimulants [37]. On the other hand, several studies addressed the self-medication hypothesis of alcohol or drugs being used in an attempt to reduce anxiety. According to a large epidemiological study, prevalence of self-medication with alcohol was 18.3 % for generalized anxiety disorder, whereas self-medication with both alcohol and drugs was 14.9 % for panic disorder with agoraphobia [38]. Among patients enrolled in a methadone maintenance treatment program, screening positive for social phobia was significantly associated with alcohol use, whereas both generalized anxiety disorder and social phobia were associated with the use of non-prescribed benzodiazepines [39]. The hypothesis that associations between dual SUDs and temperaments might be, at least in part, linked to attempts to “self-medicate” deserves further investigation in prospective studies and large, well-characterized samples.

Several limitations of this study deserve consideration. First, representativity of the study samples might be limited, due to non-random recruitment in specialized facilities. Second, sample size and statistical power were limited, in particular with respect to the investigation of complex comorbidities. A third limitation is related to the cross sectional design of the study, that did not allow considering the time course of the association between dual SUDs and temperaments. Fourth, in the absence of a comprehensive diagnostic assessment, the study did not allow distinguishing between the roles of actual anxiety or personality disorders and the ones of subthreshold stable traits such as temperaments.

Conclusion

In conclusion, the present results support the relevance of the cyclothymic temperament as a possible marker of comorbid bipolar disorder, and bipolar II in particular, among patients attending alcohol and opiate treatment facilities. Furthermore, they suggest that irritable and anxious affective temperaments, irrespectively of a comorbid bipolar disorder, may play a key role in dual SUDs. Our results highlight the need to consider temperamental aspects in further research to improve the long-term outcome of patient with addictive disorders, who often present complex comorbidity patterns.

Conflict of interests The authors have no conflict of interests in connection with the submitted article.

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