An Investigation of Temperamental Traits in Patients With Somatoform Disorder: Do They Belong in the Affective Spectrum?

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Background: *About 10% of the general population report multiple and persisting physical symptoms resulting in extensive screening but with no organic explanation found.* **Objective:** *The authors sought to determine whether these somatoform-disorder patients show characteristics of the affective disorder spectrum, with the cyclothymic temperament likely showing the highest specificity for somatoform disorder.* **Method:** *This study examined temperamental traits and current mood states of 44 general-hospital inpatients diagnosed with somatoform disorder.* **Results:** *There was a higher prevalence of abnormal temperamental traits in patients with somatoform disorder.* **Conclusion:** *Based on the idea of a continuum between temperament and affective disorders, the results should trigger further research on this issue possibly leading to novel treatment options in the future.* (Psychosomatics 2009; 50:605–612)

Physical complaints not fully explained by somatic disorders are a common phenomenon in primary care. About 10% of the general population report multiple and persisting physical symptoms, often resulting in extensive, but frustrating diagnostic screening when no organic explanation is found.[1] Patients with somatoform disorder (SD) utilize medical care services approximately twice as often and cause twice the volume of expense for medical care as medically ill patients without SD.[2] Medical staff are often frustrated as SD patients do not readily accept "normal" findings and repeatedly ask for further physical diagnostics.[3] Psychopathologically, patients with SD suffer from persistent affective dysregulation and emotional instability,[4–6] and often lack any insight into the psychological components of their disease (similar to (hypo)manic/mixed patients), which hampers adequate psychosomatic or pharmacological treatment.[7]

The pathogenetic and biological factors underlying the process of somatization are not fully understood to date. Neurocognitive disturbances, for example, difficulties in cognitive-emotional processing, called alexithymia, and personality traits, for example, high Harm-Avoidance scores as measured by the Temperament and Character Inventory (TCI),[8] have been reported in SD.[9] Moreover,

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increased cortisol levels,[10] changes in brain structure,[11] and alterations of regional cerebral function,[12,13] have been found in SD. Hakala et al.[13] recently reported an association of low Novelty-Seeking and high Harm-Avoidance scores with low glucose metabolism in the caudate and putamen as demonstrated by 18-fluordesoxy-glucose positron emission tomography (18FDG-PET) in severe SD. In contrast, another study, also using the TCI, did not find specific temperamental traits in SD patients.[14]

Originally, Emil Kraepelin[15] described four temperamental traits (depressive, manic, irritable, and cyclothymic) and believed that these are not only basic affective dispositions, but also subclinical types of affective psychosis. Later, Akiskal et al. changed the "manic" temperament to "hyperthymic" and added a "generalized anxious temperament."[16–18] The conceptualization of these five temperaments led to the development of an operational instrument, the Temperament Evaluation of Memphis, Pisa, Paris, and San Diego, CA (TEMPS), as well as a self-rating questionnaire (TEMPS–A), with 109 (for men) and 110 (for women) items.[19] The English,[19,20] French,[21,22] Spanish,[23] and German versions[24] show robust psychometric characteristics and good validity. A brief and clinically more practical version, consisting of 35 items (briefTEMPS–M), has been validated in German.[25,26]

Temperament, as an enduring aspect of personality, best captures stable behavior, predicts mood changes, and is influenced in part by genetic constitution.[27–29] The modern concept of affective disorders focuses increasingly on the study of subthreshold conditions that border on manic or depressive conditions. Mendlowicz et al.[30] demonstrated that relatives of patients with bipolar disorder scored higher in the cyclothymic and anxious temperament domains than did normal-controls, but lower than euthymic bipolar patients. Thus, Akiskal et al.[31] suggested classifying the cyclothymic temperament within the bipolar spectrum, termed bipolar disorder II 1/2.

Other investigators have also proposed including temperamental traits into the bipolar spectrum, ranging from abnormal temperament (bipolar disorder I and II) to schizoaffective disorder.[32] Furthermore, affective disorders and abnormal temperament are also diagnosed in patients suffering from migraine[33] and bulimia.[34] Therefore, affective temperament might be considered to be an intermediate step between pheno- and genotypes in affective disorders, sharing a common genetic or pathophysiological disposition with various other psychiatric or somatic diagnoses/symptoms.

In our study, we investigated temperamental traits of patients with SD as compared with an age- and gender-matched control group of 44 patients admitted for psychiatric evaluation before a transplantation procedure. The primary hypothesis of the study was that SD patients show a persistent affective dysregulation and emotional instability, also explained by abnormal temperament traits and therefore belonging in the affective spectrum.

METHOD

Between 2004 and 2005, of 323 patients who were routinely assessed by our psychiatric consultation–liaison (C–L) service at the University Hospital Munich, Germany-Grosshadern and who were able to fill out the questionnaires, 51 patients were considered as suffering from SD. The process of diagnosis was established on the basis of an extensive diagnostic interview using ICD–10,[35] DSM–IV[36] criteria, and the Screening for Somatoform Symptoms (SOMS). The SOMS is an established self-rating questionnaire that includes all items relevant for SD, showing high internal consistency and validity.[37]

Also, demographic data were documented, and a complete somatic and psychiatric history was recorded by an experienced psychiatrist (BA, TB, or GL). It should be emphasized that all patients with SD had been investigated thoroughly in several peripheral general hospitals over some years, but no somatic diagnoses accounting for all their symptoms had been found. However, 7 out of 51 patients in the SD group ultimately did not fulfill diagnostic criteria for SD and therefore were excluded of our analysis. The remaining 44 patients were diagnosed following ICD–10 criteria with somatization disorder (N=17), autonomous somatoform disorder (N=8), chronic somatoform pain disorder (N=4), and dissociative disorder (N=15). After being given the ICD–10 SOMS questionnaire, 10 patients were diagnosed with SD and 15 with autonomous somatoform disorder.

The control group consisted of 44 patients who were admitted to our psychiatric C–L service for routine psychiatric assessment before heart, liver, or kidney transplantation. The control group was selected so as to match SD patients in age and gender.

Besides the clinical interview and the SOMS used for diagnosis, all patients were asked to complete the following self-rating battery: The Beck Depression Inventory (BDI),[38,39] the Self-Report Manic Inventory (SRMI),[40,41] and the briefTEMPS–M25, which consists of 35 ques-

tions, with 7 each related to one of the five temperaments. In this self-report questionnaire, cutoff scores were evaluated in the validation study, using the equivalent of ±2 standard deviations to calculate the percentage of individuals who would meet the criterion for dominant temperament that was also applied in our investigation.[25,26]

Statistical analyses were performed with the statistics software SPSS™ Version 12.0 (Statistical Package for the Social Sciences, SPSS Inc, Chicago, IL). Chi-square tests were applied in order to compare the SD and the control group on categorical variables. In the case of 2×2 tables and expected values <5, Fisher's exact tests were chosen. Group differences in rating-scale scores were tested with the Mann-Whitney *U* test; *t*-tests for independent sample comparisons were calculated in order to test differences between the SD and the control group in variables such as age (normal distribution). The significance level was set at $p<0.05$.

RESULTS

No significant differences in demographic data: age, gender, ethnicity, educational level, current work, income, body mass index, and onset of first psychiatric or physical symptoms were found between both groups (Table 1). However, there was a statistical trend toward gender difference, with a preponderance of women in the SD group (56.8%) and preponderance of men in the transplantation group (61.4%; $\chi^2=2.92$; df: 1; $p=0.088$).

The average age in the SD group was 41.6 years (standard deviation: 16.6 years; range: 15–83 years) and in the control group, 44.1 years (standard deviation: 7.8 years; range: 21–52 years; $t=-0.90$; df: 1, 61.183; $p=0.37$). In SD patients, we found a statistical trend toward a higher rate of psychiatric comorbidity: 28 of 44 (63%) of SD patients reported having been diagnosed with

TABLE 1. Demographic and Clinical Characteristics of 44 Somatoform Disorder (SD) Patients and 44 Control Subjects

	SD Group (N=44)	Control Group (N=44)
Age, years	41.6 (16.6; 15–83)	44.1 (7.8; 21–52)
Sex (female), N total, (%)	25 (56)	17 (38)
Body Mass Index	25.3 (5.5; 18–43)	24.2 (4.8; 18–39)
Psychiatric comorbidities, total N, (%)	28 (63)	19 (43)
Affective episodes, N	14	8
Adaptive disorder, N	5	0
Anxiety disorder, N	5	1
Personality disorder, N	3	1
Obsessive-compulsive disorder, N	1	0
Alcohol dependency, N	0	9
Family history, total	11	8
Affective disorders, N	4	2
Schizophrenia, N	0	1
Addiction, N	3	4
Suicide, N	4	1
Age at first physical symptoms	34.4 (16.4; 7–65)	33.5 (13.6; 10–55)
Age at first psychiatric symptoms	33.5 (15.1; 7–65)	32.6 (12.6; 16–54)
Self-Report Manic Inventory (SRMI)	6.0 (6.6; 0–24)	4.5 (5.1; 0–23)
Beck Depression Inventory (BDI)	12.5 (7.6; 0–29)	11.2 (7.9; 0–35)
High school education, N (%)	15 (34)	11 (25)
Occupation, N (%)		
School/visitor	6 (14)	1 (2)
Full-time job	23 (52)	21 (47)
Part-time job	1 (2)	3 (6)
Without occupation	14	19
Marital status, N (%)		
Living together	24 (54)	30 (68)
Single	16 (36)	10 (23)
Divorced/separated	2 (4)	4 (9)
Widowed	2 (4)	0 (0)

Values are mean (standard deviation; range), unless otherwise indicated.

TABLE 2. Mean Differences Between Patients With Somatoform Disorder (N=44) and the Control Group (N=44) in Temperament Scale Sum Scores

Temperament Traits	Total Group (N=88)	Patients With Somatization Disorder (N=44)	Control Group (N=44)	Mann-Whitney *U* Test
Depressive	13.61 (6.14)	14.91 (7.00)	12.32 (4.87)	Z=–1.72 p≤0.085
Cyclothymic	13.00 (5.99)	14.73 (6.88)	11.27 (4.37)	Z=–2.34 p≤0.02
Hyperthymic	19.80 (6.05)	21.18 (5.88)	18.41 (5.97)	Z=–2.05 p≤0.04
Irritable	14.16 (5.86)	15.50 (6.51)	12.82 (4.84)	Z=–2.08 p≤0.04
Anxious	13.75 (5.52)	15.27 (5.84)	12.23 (4.76)	Z=–2.58 p≤0.01

Values are mean (standard deviation), unless otherwise indicated.

psychiatric illness, versus 19 of 44 (43%) in the transplantation candidates (χ^2=3.7; df: 1; p=0.054). Fourteen SD patients suffered from unipolar depressive disorders, five from adaptive disorders, five from anxiety disorders, three from personality disorders, and one from obsessive-compulsive disorder, whereas, in the control group, eight patients suffered from depressive episodes, nine from alcohol dependency, and one patient each of anxiety and personality disorder. The family history of mental illness was positive in 11 of 44 SD patients (25%), as compared with 8 of 44 (18%) in the control group (χ^2=0.6; df: 1; p=0.44). Interestingly, four patients in the SD, versus two patients in the control group, had a positive family history of affective disorders (p=0.68; Fisher's exact test; two-sided) and four, versus one, committed suicide (p=0.36; Fisher's exact test; two-sided). As expected, patients in the SD group were somewhat less likely to be married (18 versus 26; χ^2=2.91; df: 1; p=0.088) and more often single (36.4% in the SD group versus 22.7% in the control group), but this variable was not statistically significant (χ^2=1.97; df: 1; p=0.16).

The primary analysis compared group differences in the mean sum scores of the various temperaments by use of the Mann-Whitney *U* test. Patients in the SD group showed higher scores on all temperamental traits than did the control group. Statistically significant results were shown on all temperament measures in the SD group except the depressive temperament measure, which showed only a statistical trend (Table 2).

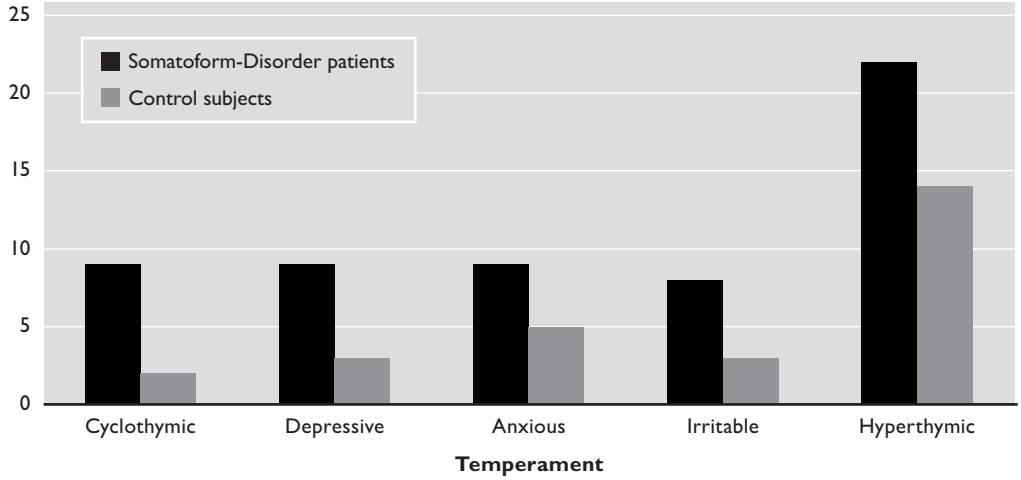
Using the chi-square test, we furthermore compared the proportions of pathological temperament traits in the SD group with the control group; 31 patients (70%) in the SD, but only 19 patients (43.2%) in the control group had at least one abnormal temperament rating (χ^2=6.67; df: 1; p=0.0098). Of these 31 SD patients, 17 patients (54.8%) had one abnormal trait rating; 6 patients (19.4%) had two; 4 patients (12.9%) had three; and 4 patients (12.9%) had four abnormal trait rating, whereas 12 patients in the control group (63.2%) had one abnormal, 6 patients (31.6%) had two, and 1 patient (5.3%) had three abnormal trait ratings. Both groups significantly differed regarding the number of abnormal temperament traits (SD group: mean: 1.3; standard deviation: 1.25; control group mean: 0.61; standard deviation: 0.81; t=3.03; df: 1, 73.875; p=0.003). In total, 22 patients in the SD group were classified as abnormal in the hyperthymic, 9 in the cyclothymic, 9 in the depressive, 9 in the anxious, and 8 in irritable temperament. In the control group, 14 patients exhibited a hyperthymic, 2 a cyclothymic, 5 an anxious, 3 a depressive, and 3 an irritable temperament (Figure 1).

Statistically significant differences between SD patients and controls were restricted to cyclothymic temperament (χ^2=5.09; df: 1; p=0.024). There were only statistical trends regarding depressive (χ^2=3.47; df: 1; p=0.062) and hyperthymic temperament (χ^2=3.01; df: 1; p=0.083).

Current affective symptoms, as measured by the BDI and SRMI, were observed at similar percentages in both groups, and no statistically significant differences were found (Table 1). Interestingly, cyclothymic, depressive, and anxious temperament traits were significantly correlated with BDI and SRMI scores in SD patients (Table 3). In the control group, this was true for BDI scores, and SRMI scores were correlated with cyclothymic temperament (ρ=0.36; p=0.017).

We also addressed the question of whether various affective temperaments were mainly found in patients with comorbid depression in their history in the SD or in the control group. Therefore, in both groups, patients with and without comorbid depression were compared, using one-sided Fisher's exact tests, regarding the rate of patients with abnormal temperament scores. In the group of SD patients, the rates of abnormal temperament were comparable in patients with and without comorbid depression (p≥0.30).

FIGURE 1. Comparison of Number of Abnormal Temperament Trait Ratings Between Somatoform-Disorder (SD) Patients (N=44) and Control Subjects (N=44) and Associated p Values



Cyclothymic: $p<0.02$; Depressive: $p=0.06$; Anxious: NS; Irritable: NS; Hyperthymic: $p=0.08$.

In the control group, 3 of 8 patients with comorbid depression in their history (37.5%) had an abnormally high depressive temperament score, but none of the patients without depressive comorbidity ($p=0.004$). Similarly, 2 of 8 patients with comorbid depression (25%) were characterized by abnormal cyclothymic temperament scores, but none of the patients without comorbid depression ($p=0.03$). In contrast, 14 of 36 patients without comorbid depression (38.9%) fulfilled the criterion for a hyperthymic temperament, but none of the patients with depressive comorbidity ($p=0.03$). The group differences in the rates of irritable and anxious temperaments were not significant ($p\geq0.54$).

DISCUSSION

In this study, we were able to confirm our primary hypothesis that patients with SD show a higher rate of pathological temperament, as defined by the brief-TEMPS–M, versus a control group of patients undergoing routine psychiatric assessment before heart, liver, or kidney transplantation. The prevalence of 70% abnormal temperament traits in SD patients is clearly higher than one would expect in the general population. Prevalence rates in the general population vary between 12.9% in Turkey,[42] 16.4% in Hungary,[43] and 19.7% in

TABLE 3. Spearman-Brown Correlations (ρ) Between Temperament Traits and Severity of Affective Disorders in 44 Somatoform-Disorder Patients and 44 Control Subjects

	Temperament Traits				
	Depressive	**Cyclothymic**	**Hyperthymic**	**Irritable**	**Anxious**
			Patients With Somatoform Disorder		
BDI total score	0.47	0.398	–0.15	0.07	0.398
	p=0.001	p=0.008	p=0.32	p=0.65	p=0.007
SRMI total score	0.595	0.72	0.18	0.52	0.54
	p<0.001	p<0.001	p=0.26	p<0.001	p<0.001
			Control Group		
BDI total score	0.39	0.63	0.02	0.34	0.47
	p=0.008	p<0.001	p=0.90	p=0.02	p=0.001
SRMI total score	0.29	0.36	0.08	0.21	0.18
	p=0.06	p=0.02	p=0.63	p=0.17	p=0.24
	(N=43)	(N=43)	(N=43)	(N=43)	(N=43)

BDI: Beck Depression Inventory;[36,37] SRMI: Self-Report Manic Inventory.[38,39]

Germany, the last assessed by the TEMPS–M.[25,26] SD patients scored higher on all temperament traits than the control group. However, the control group also showed a high percentage of abnormal temperament traits and a peak in the hyperthymic trait. The specificity of the hyperthymic trait is arguable. On one hand, a recent investigation showed that both bipolar patients and their relatives have a significantly higher prevalence of hyperthymic temperament than control subjects.[44] On the other hand, in another investigation, hyperthymic scores were higher in normal-controls than in bipolar patients and their healthy relatives.[30] Furthermore, the validity of the hyperthymic temperament can be also questioned because of the results of genetic studies. The S allele of the 5HTTLPR polymorphism in the serotonin-transporter gene was found to be associated with higher TEMPS scores of depressive, anxious, irritable, and, particularly, cyclothymic temperaments, but not with higher scores of hyperthymic temperament.[45] Thus, the high prevalence (43%) of abnormal temperament traits in our controls, with 74% of them presenting with hyperthymic temperament, is difficult to explain, and problems of construct validity may limit further interpretation. However, comorbid depression in the control group might have influenced results. In fact, within the SD group, outlying affective temperaments were mainly found in patients without comorbid depression. Therefore, it is unlikely that only the SD subgroup with a comorbid depressive disorder belongs to the affective spectrum. In contrast, within the control group, an association between affective temperaments and comorbid depression was found, and it cannot therefore be definitively excluded that the control group was contaminated by patients with obscured affective disorders and abnormal affective temperaments.

Interestingly, no differences in the scores of current affective symptoms (BDI and SRMI) were noted between groups. Thus, abnormal temperament traits may truly be regarded as chronic and predisposing subthreshold conditions. However, a positive correlation between BDI or SRMI and depressive, anxious, irritable, and cyclothymic temperament scores was observed in SD patients. Both correlations of temperament and (hypo)mania scores on the SRMI as well as the correlation between cyclothymic temperament and mania scores in SD support the hypothesis that SD patients may belong to the bipolar affective spectrum. Also, an early investigation revealed a higher expression of denial and somatization in bipolar as compared with unipolar depression.[46] Our findings converge with hypotheses and data from previous studies; for instance, Cloninger et al.[29] proposed that abnormal temperament may be often associated with mood swings; 61% of SD patients are suffering from mental comorbidities and show a relevant proportion of affective episodes in their past. Moreover, a high prevalence of psychiatric comorbidity, especially affective disorders, has been found in other investigations.[47,48]

Limitations of our study include the small sample size and the wide spectrum of diagnoses summarized among somatoform disorder patients. It is also possible that mood and other emotional factors at the time of completing the questionnaire may have influenced self-rating scores, even though the scores were generally low.

Also, the control group was thought to be psychiatrically healthy, but the clinical interview of several patients revealed a history of depressive episodes ($N=8$), alcohol dependence ($N=9$), and personality disorder ($N=1$). Because alcohol dependency has a high comorbidity with bipolar disorders,[49] one would therefore expect to find an increased prevalence of affective temperaments in patients eligible for liver transplantation in our control group. This would increase the likelihood of a Type II error; that is, that insignificant results are false-negative. As a matter of fact, higher group differences would have been expected if psychiatrically healthy controls had been studied; however, this limitation was not pronounced, since Kolmogorov-Smirnov tests revealed that the distribution of affective temperament scores in the control group was not uneven ($Z=1.07$; $p\geq0.20$). Moreover, post-hoc power analysis revealed the power to detect a medium effect size (Cohen's δ: 0.50), given the sample sizes (SD: $N=44$; control group: $N=44$) and assuming a one-tailed test for independent-sample comparison, with an α of 0.05 was 0.75. Thus, the Type II error probability, although not optimal, was in an acceptable range.

Furthermore, we used the TEMPS–M, which was validated with a student population. However, based on the idea that temperament is a genetically determined and stable factor, we do not consider this to be an influence on our results in this respect.

In a recent metaanalysis of systematic reviews in key areas of C–L psychiatry, the authors stated that the number of high-quality trials in the treatment of SD is still not sufficient.[50] Cognitive-behavior therapy and antidepressant pharmacotherapy are among the most

established treatment options. Our data further support the hypothesis that patients with SD who show an abnormal temperament may belong to the bipolar affective spectrum and require alternative treatment strategies, for example, the application of mood stabilizers. Future studies are needed to test this hypothesis and to investigate the use of pharmacological strategies established in bipolar disorder in SD as well. A new conceptualization of SD in terms of its "subthreshold" affective symptoms would be of broad public health significance and may reduce costs and improve outcome and quality of life in patients with SD.

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