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Somatoform disorders as disorders of affect regulation A study comparing the TAS-20 with non-self-report measures of alexithymia

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Abstract

Objective: To determine the role of undifferentiated and dysregulated affects in somatoform disorders by using a multimethod assessment approach of alexithymia. **Methods:** Forty patients with ICD-10 somatoform disorders (SoD) and 20 healthy controls, matched for age, education and sex, were included in the study. Alexithymia was assessed using the Toronto Alexithymia Scale (TAS-20), the Affect Consciousness Interview (ACI), and the Levels of Emotional Awareness Scale (LEAS). All classifications were made blinded with regard to clinical status. **Results:** Scores of the ACI and the TAS-20 showed that alexithymia is higher in SoD than in healthy controls. No differences were found on the LEAS. In terms of the multidimensionality of the alexithymia construct, our results indicate a specific positive association between SoD and a proneness to experience undifferentiated affects. The three subfactors of the TAS-20 were differentially related to non-self-report measures of alexithymia and to negative affectivity (NA). Only the cognitive facet of the TAS-20 (externally oriented thinking [EOT]) was related to the LEAS and the ACI. In contrast, the affective facets of the TAS-20—difficulties identifying feelings (DIF) and difficulties describing feelings (DDF)—were substantially related to NA. **Conclusion:** The findings highlight the important role of impaired affect regulation and NA in the process of somatization.

Keywords: Affect regulation; Alexithymia; Negative affectivity; Somatoform disorders

Introduction

Somatizing patients are often characterized by a tendency to experience and communicate psychological distress in form of somatic symptoms and to seek medical help for them [1]. The idea that a diminished capacity to consciously experience and differentiate affects and express them in an adequate or healthy way is an underlying factor of SoD is discussed here.

One of the most elaborated and well-researched constructs for describing personality-related difficulties in the processing and regulation of emotion is alexithymia [2]. Several empirical studies have explored a possible relationship between alexithymia and somatoform disorders (SoD). In two earlier studies using alexithymia only as a dichotomous construct, a high prevalence of alexithymia was found in patients with chronic pain [3,4]. Other studies reported increased levels of alexithymia in SoD as compared to healthy controls [5–7]. Patients with SoD were also found to show elevated alexithymia scores, when compared with medically ill patients [8–10]. Two further studies found no differences in alexithymia between somatizing patients and other clinical control groups [11,12].

Despite the evidence by the abovementioned studies of a link between alexithymia and somatization, the empirical findings remain controversial [13]. Primarily methodological limitations accounted for the difficulties in the interpretation of data. The first concerns the measurement of alexithymia. In the past decade, findings on alexithymia in patients with SoD were mostly based on self-report measures. Although in current research the Toronto Alexithymia Scale (TAS-20) [14–16] is the best validated instrument to measure alexithymia, the exclusive use of self-report measures for assessing alexithymia remains subject to criticism.

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It has been argued that it is to some extent paradoxical to ask alexithymic persons who are characterized by a diminished affective insight to give an accurate estimation of their affective disturbances. Yet, as Lumely [17] commented, although plausible, this must be tested against data. The author as well as the creators of the TAS therefore recommended that studies be conducted using multiple alexithymia measures. To date, studies comparing the TAS-20 with non-self-report measures of alexithymia are few in number.

The interpretation of existing studies concerning the link between alexithymia and somatization is further complicated by the insufficient attention that has been given to the overlap of alexithymia with negative emotional distress. Several studies have found that alexithymia correlated with depression and anxiety [18–20]. Even though alexithymia is separate from the construct of depression [21], it must be tested whether the association between alexithymia and somatization is mediated by depression or anxiety.

In the present study, we assessed alexithymia using the TAS in combination with non-self-report instruments of alexithymia. We also included a measure of negative affectivity (NA) to control for the effect of NA. In addition to these established instruments, new and promising measures of alexithymia-related constructs that avoid self-ratings have recently been introduced. Two of them, an interview-based measure (Affect Consciousness Interview [ACI]) [22] and a performance-based measure of alexithymia (Levels of Emotional Awareness Scale [LEAS]) [23], were used in this study. The ACI is theoretically grounded in Tomkin's affect and script theory [24,25] and in contemporary self-psychology [26,27]. Affect consciousness is considered to reflect a stable pattern of affect (schema) organization. It is operationalized in degrees of awareness, tolerance, emotional and conceptual expression across nine basic affect categories. The LEAS assesses the structural level of affect representation according to a cognitive–developmental model of emotional awareness. The hierarchical model of affect development is based on Piaget's theory of cognitive development [28] and Werner and Kaplan's theories of symbolization and language development [29]. The LEA model postulates five levels of emotional organization ranging from globally organized somatic and action dominated levels to increasingly differentiated organized symbolic levels.

The primary purpose of the present study was to further clarify the associations between alexithymia and somatization. Based on the abovementioned research strategy, we therefore sought to determine whether patients with SoD are more alexithymic then healthy controls. The second aim of the study was to further investigate the convergent and discriminant validity of the TAS-20. We therefore addressed the question of how the TAS-20 and non-self-report measures of alexithymia (ACI, LEAS) and a measure of NA were related to each other. The sample used in this study was already described in an article on attachment representation in SoD, which has been submitted for publication [30].

Participants and methods

Participants

Sixty subjects participated in the study: 40 patients with an ICD-10 diagnosis of SoD and 20 healthy controls matched for age, sex and education. Thirty-five of the SoD patients were recruited from a special outpatient clinic for SoD at the Department of Psychotherapy and Psychosomatic Medicine at the University Hospital, Freiburg. Five patients were recruited from the psychotherapy ward of an affiliated psychosomatic hospital, the Werner-Schwidder-Klinik, Bad Krozingen.

Patients had to fulfill the following criteria: (1) ICD-10 criteria for somatization disorder, undifferentiated somatoform disorder, somatoform autonomic dysfunction, somatoform pain disorder or dissociative disorder; (2) a symptom duration of at least 6 months; (3) exclusion of severe physical or mental disorder which accounts for symptom of somatoform disorder (e.g. psychosis); (4) age between 18 and 65 years; (5) sufficient fluency of language for psychological testing.

The diagnosis was established by a clinical interview checking for the diagnostic criteria according to ICD-10 and additional psychological testing [31,32]. Patients selected for the study usually had an extensive medical assessment including a physical examination, electrophysiological, radiological or neuroradiological procedures before the diagnosis of an SoD was established.

A substantial proportion of the patients treated in the outpatient clinic (amounting to 70%) were not suitable for participation because either the patients did not fulfill the diagnostic criteria for a main diagnosis of SoD or because of somatic comorbidity, a lack of language ability, or a lack of motivation to cooperate in a study, which required extensive psychological testing.

Control subjects were recruited through newspaper advertisement. They were screened for eligibility by a telephone interview. Subjects passing the screening interview were administered the SOMS [32]. Those who were included were matched pairwise with the somatoform patients for age, sex and education. All participants gave informed consent before entering into the study. The study was approved by the local research ethics committee.

Instruments

All measures were administered to somatoform patients and nonclinical comparisons. Only the Mini-DIPS [33] was applied exclusively to the patients.

Alexithymia

Alexithymia was measured using three instruments:

(a)The 20-item version of the Toronto Alexithymia Scale (TAS-20) [15,16]. The TAS-20 is a self-report measure,

assessing three components of the alexithymia construct: (1) difficulty identifying feelings (DIF); (2) difficulty describing feelings (DDF); and (3) externally oriented thinking (EOT). The TAS-20 offers an alexithymia measure with well-established psychometric proprieties.

(b) The Affect Consciousness Interview (ACI) [22]. The ACI is a semi-structured interview designed to assess a person's capacity to consciously be aware of, tolerate and express feelings across a number of nine basic affect categories (interest, joy, fear, anger, rage, shame, sadness, envy, guilt, tenderness). According to Monsen et al., affect consciousness encompasses four affect dimensions which are related to emotion processing: (1) the capacity to be aware of one's emotions (AW); (2) the capacity to tolerate feelings (TOL); (3) the capacity to nonverbally express feelings (NE); and (4) the capacity to conceptually express inner emotional states (CE). In the present study, a short version of the ACI was used including six affect categories (joy, fear, anger, shame, sadness, tenderness) and three affect dimensions (AW, TOL, NE). The present study is the first German study in which the ACI was used. The ACI was translated into German by the first author. The translation was checked and translated back into English by a native English speaker. There exists no previous German version of the ACI. The interview was audiotaped and blinded with respect to clinical status. Two trained raters, who did not conduct the interview, rated the transcripts independently. Evaluation included the rating of the subject's affect consciousness (AW, TOL, NE) for each affect category according to a five-point scale of 1 (*low*) to 5 (*high*). From the resulting 6×3 items matrix, six affect category mean scores, three affect dimension mean scores and one total score were computed. Interrater reliability for total score was high: $r(58) = .94$ (ICC). Analysis of interrater reliability for affect dimension scores and affect category scores yielded a mean of .87 and .78, respectively (ICC). Reported findings on the reliability and validity of the ACI indicated adequate psychometric properties [22].

(c) The Levels of Emotional Awareness Scale (LEAS) [23]. The LEAS consists of 20 emotion-evoking scenarios each involving two persons. Two questions are asked: ''How would you feel?'' (self) and ''How would the other person feel?'' (other). Emotion words relating to self and other were marked and scored separately for each scene on a five-point scale. Three separate ratings were made for each scenario applying to: (1) self, (2) other, and (3) total. Level 0 is assigned for words describing cognitive states or reflecting an act of cognition without emotional content. Level 1 reflects an awareness of bodily sensations. Level 2 responses involve the use of one word describing an action tendency or describing undifferentiated, nonspecific emotions. Level 3 is given for use of an affect expression conveying a single, differentiated emotion. Level 4 is given if two or more Level 3 words are used conveying greater emotional differentiation than one word alone. Thus, there is one ''self'' score ranging from 0 to 4 and one ''other'' score ranging from 0 to 4 for each scene. A total score is generated by taking which is higher from these two (''self'' and ''other'') scores. If the ''self'' and ''other'' scores both meet Level 4 guidelines, the highest score of Level 5 is given. A German version of the LEAS was applied (Subic-Wrana et al., 2000). The translation of the LEAS was done by an expert (Claudia Subic-Wrana) and was checked by a professor of English. The LEAS was scored by two trained raters. Ten LEAS scales of the control group were randomly selected and scored by an expert (Dr. Subic-Wrana, Köln). Interrater reliability for the self, other and total scores was high: intraclass $r(10) = .84$, .90 and .84, respectively.

Psychiatric diagnosis

In order to screen for somatoform symptoms, the SOMS [32] was used. The SOMS is a self-report instrument, which includes 68 items inquiring into physical symptoms that are common in SoD. The questionnaire is a useful screening instrument and allows us to determine whether a specific somatoform disorder is polysymptomatic or monosymptomatic. The definite diagnosis of an SoD was established according to ICD-10 criteria based on a medical and psychiatric assessment, which was performed by a trained psychiatrist (MD) or clinical psychologist. In addition, all patients were screened for lifetime and current ICD-10 [33] diagnoses using the Mini-Diagnostic Interview for Psychic Disorders [31]. The Mini-DIPS is a reliable and valid interview for psychiatric assessment according to ICD-10. Checklists were applied for the following diagnostic categories: affective and anxiety disorder, somatoform disorder, eating disorder, obsessive–compulsive disorder, substance abuse and psychotic disorder.

Negative affectivity

The Hospital Anxiety and Depression Scale (HADS) [34] was used to measure NA. This construct was considered as a covariate of self-reported physical symptoms. The HADS is a reliable and valid self-report instrument consisting of two subscales, anxiety and depression. Items related to somatic symptoms are excluded, making the questionnaire particularly appropriate to screen for affective disorder among hospital populations. The total sum score of the HADS is an indicator of general emotional distress [35].

Demographic data

Demographic data were determined from questionnaire responses.

Statistical analyses

For statistical analyses, the SPSS version 9.0 software was used. The assumption of a normal distribution was tested for all variables using the Kolmogoroff–Smirnov test.

Multivariate analysis of variance (MANOVA), followed by univariate analysis of variance (ANOVA), was used to compare the groups on the different alexithymia measures. We repeated these analyses this time controlling for NA (MANCOVA, ANCOVA). The association between TAS-20, ACI, LEAS and NA was examined in the somatoform group using Pearson's correlation coefficient. Two separate hierarchical multiple regression models were tested to examine whether either ACI scales or the LEAS is sufficiently independent as predictors of TAS scores. The three TAS-20 subfactors served as criterion variables. The following hierarchical regressions were performed for each of the criterion variables (DIF, DDF, EOT): (1) age and sex as the first predictors, followed by NA and ACI scores; (2) age, sex, NA and LEAS scores. Statistical significance was set at $\alpha = .05$. All tests performed were two-tailed.

Results

Sample description

Two ACIs were not classifiable reducing the total study sample to 38 patients and 20 nonclinical controls. The two groups were similar in terms of age, gender, education, employment and marital status. The somatoform group consisted of 19 men and 19 women. The mean age was 44.05 years (S.D.=10.86). 76.3% had secondary education, 23.7% obtained a high school degree. In the nonclinical control group, the distribution of sexes was also equal. The mean age in this group was 42.75 (S.D.=10.42). Due to matching techniques, the literacy level in controls was unusually low. Eighty-five percent of the comparison group had secondary education, 15% had a high school degree. Females in the sample were older than males [$df(56) = -1.88$; $P < .01$].

Diagnoses (SoD)

Somatoform pain disorder was the most frequent diagnosis (39.5%), somatoform autonomic dysfunction ranked second (26.3%), somatization disorder ranked third (23.7%). The diagnosis of a conversion disorder (dissociative disorder, according to ICD-10) was made only in three patients (7.9%), a diagnosis of undifferentiated somatoform disorder in one patient. Approximately 61% of the patients had a second psychiatric diagnosis. In 10% this was a diagnosis of anxiety disorder, in another 10% a diagnosis of depression while 10.5% of somatoform patients met criteria for a personality disorder. The duration of the leading symptom was 91 months (range 6–240 months).

Physical and psychological symptoms in somatoform patients and controls

A comparison of symptoms between somatoform patients and controls yielded significant differences. Independent sample t tests showed significant differences between groups in the number of medically unexplained symptoms (SOMS-Index) ($t = 5.26$, $df = 56$, $P < .001$), physical impairment (SF-12) ($t = -9.46$, $df = 51.51$, $P < .001$), depression ($t = 5.36$, $df = 55.65$, $P < .001$), anxiety ($t = 5.63$, $df = 54.44$, $P < .001$) and overall psychopathology (GSI of the SCL-90-R) ($t = 6.46$, $df = 53.32$, $P < .001$).

Sociodemographic variables associated with alexithymia

Preliminary analyses explored the relationships between alexithymia variables (TAS-20, ACI, LEAS) and sex, age and level of education. Age correlated negatively with TAS-20 factor ''difficulties describing feelings'' ($r = -.31$, $P < .05$) and was negatively associated with the ACI dimension ''affect awareness'' ($r = -.33$, $P < .05$) and the LEAS ''total'' score and ''self'' score ($r = -.31$, $P < .05$; $r = -.29$, $P \leq .05$, respectively). No association was found for sex. Since females in the sample were older than males, we repeated these analysis this time controlling for age. A positive association between female sex and the LEAS ($r = .31$, $P < .05$) and between female sex and the ACI ($r = .33$, $P < .05$) was found. Educational level was uncorrelated with alexithymia variables. Age and sex were therefore entered in the analysis as covariates where appropriate.

Alexithymia in patients with SoD compared with healthy controls

MANOVAs revealed a significant overall difference between patients with SoD and healthy controls on the TAS [$F(3,54) = 13.28$, $P < .001$], ACI dimensions [$F(3,54) = 5$, $P < .01$] and ACI affect categories [$F(6,51) = 3.27$, $P < .01$]. In contrast, the two groups did not differ significantly on the LEAS. As can be seen in Table 1, follow-up ANOVAs revealed a lower mean score for patients with SoD on all of the ACI dimensions and on the ACI affect categories ''joy,'' ''anger,'' ''sadness'' and ''guilt.'' ANCOVAs further showed higher mean scores on the TAS-20 factors DIF and DDF for patients with SoD. Next, one-way MANCOVAs were performed on each of the three affect measures, covarying NA. The overall group effect for the TAS-20 and the ACI dimensions remained significant [$F(3,53) = 3.73$, $P < .05$; $F(3,53) = 3.53$, $P < .05$]. For the ACI affect categories, only a weak effect was demonstrated [$F(6,50) = 1.96$, $P = .09$]. NA emerged as a significant overall predictor only in the MANCOVA equation comparing TAS-20 scores [$F(3,53) = 31.24$, $P < .001$]. An examination of the univariate ANCOVAs showed significant differences between groups regarding TAS-DIF, ACI affect awareness and the two ACI affect categories ''anger'' and ''sadness.'' Only a marginal effect was demonstrated for the ACI affect category ''joy'' [$F(1,57) = 3.08$, $P = .09$] and the ACI dimension ''nonverbal expression of emotions'' [$F(1,57) = 3.62$, $P = .06$].

Table 1
Differences between patients with SoD ($n = 38$) and healthy controls ($n = 20$) on TAS-20, ACI and LEAS

	Patients with SoD ($n = 38$)	Healthy controls ($n = 20$)	ANOVA	ANCOVAs, with NA controlled	NA
$N = 58$	*M* (S.D.)	*M* (S.D.)	*F*(1,57)	*F*(1,57)	*F*(1,57)
TAS-20					
DIF	18.13 (5.36)	9.95 (2.86)	38.59***	6.67*	58.29***
DDF	12.68 (4.01)	10.47 (2.84)	4.60*	2.79	44.58***
EOT	15.79 (4.55)	14.16 (5.05)	1.51	0.56	0.15
TOT	46.61 (8.89)	34.58 (8.93)	19.94***	1.00	36.57***
ACI					
ACI Dimensions					
Awareness	2.73 (0.58)	3.35 (0.71)	12.58**	8.69**	0.10
Tolerance	3.25 (0.63)	3.69 (0.67)	6.15*	0.61	1.40
Nonverbally expressing	2.61 (0.63)	3.32 (0.78)	13.68**	3.62	2.25
ACI Affect categories					
Joy	3.09 (0.74)	3.82 (0.66)	13.45**	3.08	2.84
Anxiety	2.84 (0.85)	3.15 (0.90)	1.68	0.09	1.99
Anger	2.85 (0.72)	3.48 (0.89)	8.62**	4.03*	0.20
Sadness	2.64 (0.50)	3.30 (0.87)	13.31**	8.76**	0.16
Guilt	2.67 (1.22)	3.02 (0.81)	1.32*	0.45	0.07
Tenderness	3.44 (1.47)	3.95 (0.80)	2.05	0.14	0.23
Positive affects	3.27 (0.98)	3.88 (0.71)	4.95*	0.93	2.37
Negative affects	2.75 (0.64)	3.24 (0.68)	3.11**	5.24*	0.37
ACI-TOT	2.86 (0.54)	3.45 (0.66)	13.07**	4.99*	0.77
LEAS					
Self	2.74 (0.64)	2.41 (0.49)	0.00	0.68	0.39
Other	2.04 (0.56)	2.10 (0.40)	0.19	0.05	0.01
Total	2.68 (0.53)	2.74 (0.38)	0.05	0.89	0.76

* $P < .05$.
** $P < .01$.
*** $P < .001$.

Finally, we examined whether patients differed from healthy controls in the recognition, tolerance and expression of negative or positive emotions. The univariate ANOVAs showed significant differences for both types of emotions. When NA was entered as covariate, the effect for positive affects fell to insignificance, whereas the effect for negative emotions remained significant [$F(1,57) = 5.24$, $P < .05$].

Relationships between the TAS-20, non-self-report measures of alexithymia and NA

The relationships between the TAS-20, the two non-self-report measures of alexithymia and NA are reported for the somatoform group. Zero-order correlations are presented in Table 2. Pearson correlation analysis found a significant negative correlation between TAS-20 Factor 3, EOT, and the LEAS and ACI. The affective dimensions of the TAS-20 (DIF, DDF) were negatively associated with the capacity to express feelings (ACI), but unrelated to the LEAS. Both factors were highly correlated with NA. By contrast, TAS-20 factor EOT, LEAS scores and ACI scores were not related to NA. The ACI and the LEAS were not significantly correlated, indicating that they tapped independent aspects of alexithymia.

The intercorrelations between LEAS and other variables were also computed in control subjects. The results were similar except for inconsistent positive correlations between LEAS and TAS-20 scores. Higher alexithymia on the TAS-20 was moderately but not significantly related to higher emotional awareness on the LEAS (TAS total $r = .43$,

Table 2
Intercorrelations between TAS-20, LEAS, ACI and NA for the somatoform group ($n = 38$)

	TAS-20				
	DIF	DDF	EOT	TOTAL	NA
ACI					
Awareness	−.02	−.01	−.42**	−.21	.01
Tolerance	−.25	−.12	−.48**	−.41*	−.17
Expressiveness	−.37*	−.31*	−.41*	−.52**	−.26
Total	−.24	−.17	−.49**	−.43**	−.16
LEAS					
Self	−.02	.13	−.45**	−.17	.01
Other	−.02	.04	−.40*	−.16	.09
Total	−.04	.11	−.49**	−.20	−.003
NA	.73***	.67***	−.06	.64***	–

* $P < .05$.
** $P < .01$.
*** $P < .001$.

Table 3
Hierarchical regressions of each of the three TAS-20 factors on age, negative affectivity and non-self-report measures of alexithymia (ACI, LEAS) ($n = 38$)

	DIF			DDF			EOT		
	β	ΔR^2	R^2	β	ΔR^2	R^2	β	ΔR^2	R^2
Step 1									
Age	.07			−.11			.07 (.15)[a]		
Sex	.06			−.10			−.08 (−.01)[a]		
		.08	.08		.17*	.17*		.07	.07
Step 2									
NA	.76***			.62***					
		.45***	.53***		.30***	.47***	−.11 (.04)a	.00	.07
Step 3									
ACI—Awareness									
ACI—Tolerance							−.47**		
ACI—Expressiveness								.18**	.25*
Step 3									
LEAS—Self							−.42*		
LEAS—Other								.15*	.22*

Each non-self-report measure of alexithymia was tested separately in Step 3.
Beta weights are reported from final equation with all variables entered.
[a] Beta weights in regression model with LEAS variables as predictors are reported in parenthesis.
* $P < .05$.
** $P < .01$.
*** $P < .001$.

$P = .06$; DIF $r = .33$, NS; DDF $r = .33$, NS; EOT $r = .42$, $P = .07$).

We next used hierarchical regression models to examine the relationships between the two non-self-report measures of alexithymia (ACI, LEAS) and the three TAS-20 factors, after controlling for age and NA. Age was entered in the first step, followed by NA and then each non-self-report measure (ACI variables, LEAS variables) was tested separately in the third step. As can be seen in Table 3, neither LEAS nor ACI scores were found to be significant predictors of the affective facets of the TAS (DIF, DDF), whereas NA was highly and significantly predictive of both. NA explained 45% of the variance in DIF and 28% of the variance in DDF. In contrast, NA and age did not add to the prediction of TAS-20 factor EOT, whereas the ACI dimension affect tolerance and LEAS ''self'' score each explained significant additional variance in EOT. Affect tolerance was inversely related to EOT and accounted for an additional 18% of the variance in EOT, after controlling for age, sex and NA. Similarly, the LEAS ''self'' score was inversely related to EOT and accounted for an additional 15% of the variance in EOT after controlling for age, sex and NA.

Discussion

The results of the study can be summarized as follows: (1) Patients with SoD are more alexithymic than a nonclinical control group. The TAS-20 and the ACI provided converging results, whereas the LEAS did not. (2) When NA was controlled for, only DIF (TAS-20) and affect awareness (ACI) differentiated the somatoform patients from the nonclinical control group. (3) The subfactors of the TAS-20 were differentially related to the non-self-report measures of alexithymia used in this study. While the cognitive dimension of the TAS-20 (EOT) was predicted by the ACI and the LEAS, the affective facets of the TAS-20 (DIF, DDF) were not. (4) The subfactors of the TAS-20 showed distinct relationships with NA: DIF and DDF were closely related with NA, whereas EOT was not. NA appears to be unrelated to the ACI and the LEAS. We will discuss these results in the following paragraphs.

One major purpose of the present study was to examine alexithymia in patients with SoD. A specific methodological issue of the present study was to further clarify the role of alexithymia in patients with SoD by comparing the self-report TAS with recently introduced non-self-report measures of alexithymia. The results confirm previously reported findings that self-reported alexithymia on the TAS-20 is higher in patients with SoD than in nonclinical subjects [5–7]. The mean score of the TAS-20 was similar to those obtained in previous studies on patients with SoD referred to nonpsychiatric settings [10,11]. Our analysis further indicated that the TAS-20 and the ACI converge in the finding of increased alexithymia in patients with SoD, whereas the LEAS did not. The ACI mean score of SoD

patients in the current study was consistent with that obtained in a study on patients with chronic pain [36]. The lack of differences in LEAS scores is due possibly to the low LEAS scores obtained for the healthy comparison group. The low LEAS score of the SoD patients in our study is consistent with findings from a study conducted by Subic-Wrana et al. [37] with SoD patients. In contrast, control subject scores on the LEAS were substantially lower than previously reported [38,39]. Taking into account the inconsistent correlations between LEAS and TAS-20 scores observed in controls, it is likely that responses from control subjects on the LEAS are questionable altogether. One explanation for these unusual results might be that control subjects may not have been motivated enough to describe the full complexity of their emotions. In incentives subjects are not explicitly asked to give the best possible response. Another explanation might be that the unusual low literacy level in controls is related to low performance on the LEAS. Previous research has shown that alexithymia is weakly associated with lower years of education [41].

Alexithymia encompasses both cognitive (EOT) and affective processes (DIF, DDF). According to our data only TAS-20 factor DIF was associated with SoD when NA was controlled for. The same factor (not DDF or EOT) was significantly different in patients with SoD when compared with medically ill patients [8,10]. In a recent study by Bankier et al. [40], DIF was significantly associated with SoD and depression, whereas other psychiatric disorders showed elevations in one of the other factors of the TAS-20. As such, it seems that patients with SoD judge themselves as having a particularly limited capacity to differentiate their emotions from bodily sensations. Further support for a specific proneness to undifferentiated affects in patients with SoD was provided by the finding of a low level of affect awareness on the non-self-report measure (ACI). Low AC levels on awareness indicate that patients, when questioned as to how they experience emotions, describe states of tension and unease rather than distinct and separate emotions. Furthermore, instead of localizing their emotions in the psychic domain or in their body, they focus on external events or actions. Thus, our study supports the proposal that patients with SoD have substantial difficulties in elaborating on their emotions: They are poorly able to link their feelings with accompanying bodily sensations, motor activity or fantasies. The somatic sensations associated with emotional arousal may then be amplified and misinterpreted as symptoms of disease. Our data further suggest that patients with SoD have difficulties in elaborating on negative rather than on positive emotional states. Consistent with the finding of Monsen and Monsen [36], SoD subjects show a higher AC level on positive affects and a lower AC level on negative affects. As such, our study shows that patients with SoD are characterized by a ''conflict-avoiding'' style of emotion regulation. In terms of the variety of affect categories, patients particularly lack the ability to perceive and identify states of anger and sadness. These findings appear consistent with models of SoD that emphasize the role of unmentalized and unregulated affects in the pathogenesis of SoD [2].

A second purpose of the study was to investigate how the TAS-20 and non-self-report measures of alexithymia as well as a measure of NA were related to each other. The reader has to keep in mind that the following discussion refers only to results obtained in the somatoform group. As mentioned before, data observed in controls on the LEAS are questionable and possibly reflect an artefact. Therefore, we decided to omit them from any further discussion regarding the interrelationships between alexithymia measures.

Our analysis of the subfactors of the TAS-20 indicated that only EOT, but not DIF or DDF, corresponds with non-self-report measures of alexithymia (ACI, LEAS). This finding is consistent with results of other studies showing a specific relationship between TAS-20 factor EOT and the LEAS [38,41]. Thus, it might be suggested that EOT is more closely associated with objective measures of alexithymia than the other TAS-20 factors. This view is supported by previous research indicating that EOT correlated highest with an independent measure of alexithymia [42]. Furthermore, only EOT correlated with levels of physiological arousal, for example, cortisol response [43] and baseline heart rate [42]. As such, it could be speculated whether self-ratings on EOT may be a more accurate indicator of alexithymia than TAS-20 ratings on DIF and DDF. EOT is defined as a personality trait characterized by concrete, practical and action-oriented thinking, a lack of fantasy, and an interest in external rather than in psychological phenomena. Our finding that EOT is related to restricted affect tolerance supports the view that EOT captures a general proneness to avoid emotional experience. It is worth noting in this context that there is evidence of a strong association between EOT and dismissing attachment representation [44,45]. Dismissing attachment is linked to a type of psychopathology that involves the diverting away of attention from internal feelings of distress [46]. The positive association between EOT and a low level of emotional awareness (LEAS) parallels findings from other studies that found EOT to be associated with a limited capacity to become aware and represent feelings [47] and decreased introspectiveness [48].

The fact that the TAS-20 subfactors differentially correlated with NA further underscores the distinctness of the TAS-20 dimensions. It was found that EOT was unrelated to NA, whereas NA was the best predictor of DIF and DDF. This last finding has been consistently found in earlier research [18,19,49]. There are several possible views of the observed relationship between the affective facets of the TAS-20 and NA. Measures of NA and the affective dimensions of the TAS-20 both rely on the person's beliefs about his or her emotional functioning, whereas EOT items refer more to skills or habits. Thus, high correlation

between NA and TAS-20 factors DIF and DDF may be partly explained by shared variance due to negative self-beliefs in the area of emotional functioning or due to a general tendency toward self-criticism. Alternatively, the relationship between NA and alexithymia may be explained by regarding alexithymia as a state-dependent phenomena [20]. A previous study by Saarijärvy et al. [19] found that the TAS-20 factors DDF and DIF changed with mood, whereas EOT did not. Although these views seem plausible, it must be kept in mind that the affective components of alexithymia may be inherently linked with NA because they tap emotional deficits that may give rise to unregulated dysphoric affective states.

Taken together, our results on the TAS-20 are consistent with findings demonstrating the distinctness of the two facets of the TAS-20 that are labeled the affective (DIF, DDF) and the cognitive–attentional (EOT) aspects of the alexithymia construct. The evidence of our study suggests that the cognitive–attentional aspect of alexithymia (EOT) comes closest to the notion of affective constraint and unmentalized emotional experience, whereas the affective facets (DIF, DDF) are related to a heightened level of reported emotional distress. DIF and DDF scores were unrelated to more objective measures assessing the degree of differentiation in experiencing and expressing feelings. One might speculate whether the TAS-20 identifies two heterogeneous groups of alexithymics that vary along the dimension of absence of affects or absence of structure for regulating affects. The idea of distinguishing two main forms of alexithymia is supported by recent research in the field of neurobiology [50]. Further research should consider the factors of the TAS-20 separately in order to investigate their different correlates.

A number of limitations has to be considered. The study included a selected population recruited from a tertiary referral center. The results may not be generalized to patients with SoD drawn from other sources. Furthermore, the SoD sample was comparatively heterogeneous following diagnostic issues. Further studies should include a more specific group of SoD to better characterize the relationship of SoD to affect organization. A major weakness of the study relates to the control group used in this study. Due to matching techniques, the literacy level in healthy controls was unusually low, making generalization of the results problematic. It is important to note, however, that unusual results in controls were observed only on the LEAS. Scores on measures assessing health variables and on other measures of alexithymia (TAS-20) are consistent with findings reported in the literature. Nevertheless, results must be considered with caution. A patient comparison group with physically explained symptoms is lacking. Thus, it remains unclear, if findings of increased alexithymia in patients with SoD may have been confounded by physical suffering. Findings of several studies comparing patients with SoD with a patient control group on alexithymia are less clear [8–12]. Due to the cross-sectional and retrospective design of the study, it remains unclear what these findings mean in terms of the causal connection between alexithymia and SoD. Longitudinal studies are needed to shed light on this issue.

In sum, the data collected in the present study call attention to both the occurrence of high levels of negative affective states and a limited ability to differentiate emotions as being central aspects of SoD.

According to the LEAS and ACI model of emotional development [22,51], the observed deficits point to vulnerabilities in the structural organization of affects. Therefore, interventions should be aimed at changing emotional schemata. Patients specifically need assistance in transforming emotional schemata which are fragmentary and dominated by subsymbolic components into more complex mental representations of emotional states [52,53]. Bucci [52] stated that focus on somatic symptoms may be the first step in symbol construction. Other authors suggest interventions that focus on educating patients about their emotions along with fostering emotional experience and helping the patient to develop better emotional skills [53,54]. These approaches differ substantially from traditional psychodynamic psychotherapy. However, the issue of modified psychotherapeutic interventions for patients with deficits in emotion regulation remains poorly explored. Further empirical studies are needed to investigate to what extent such modified interventions may reduce the vulnerability to high levels of emotional and somatic distress.

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References

[1] Lipowsky ZJ. Somatization: medicine's unresolved problem. Psychosomatics 1987;28:294–7.
[2] Taylor G. Somatoform disorders. In: Taylor GJ, Bagby RM, Parker JDA, editors. Disorders of affect regulation: alexithymia in medical and psychiatric illness. Cambridge: University Press, 1997. pp. 114–37.
[3] Cox BR, Kuch K, Parker JDA, Shulman ID, Evans RJ. Alexithymia in somatoform disorder patients with chronic pain. J Psychosom Res 1994;38:523–7.
[4] Millard RW, Kinsler BL. Evaluation of constricted affect in chronic pain: an attempt using the Toronto Alexithymia Scale. Pain 1992;50:287–97.
[5] Fernandez A, Siram TG, Rajkumar S, Chadrasekar AN. Alexithymic characteristics in rheumatoid arthritis: a controlled study. Psychother Psychosom 1989;51:45–50.

[6] Porcelli P, Zaka S, Leoci C, Centonze S, Taylor GJ. Alexithymia in inflammatory bowel disease. Psychother Psychosom 1995;64: 49–53.
[7] Sriam TG, Chatuverdi SK, Gopinath PS, Shanmugam V. Controlled study of alexithymic characteristics in patients with psychogenic pain disorder. Psychother Psychosom 1987;47:11–7.
[8] Bach M, Bach D. Alexithymia in somatic disease: a comparative study. Psychother Psychosom 1996;65:150–2.
[9] Lumely MA, Asselin LA, Norman S. Alexithymia in chronic pain patients. Compr Psychiatry 1997;38:160–5.
[10] Kooiman CG, Bolk JH, Brand R, Trijsburg RW, Rooijmaans HGM. Is alexithymia a risk factor for unexplained physical symptoms in general medical outpatients? Psychosom Med 2000;62:768–78.
[11] Kosturek A, Gregory RJ, Sousou AJ, Trief P. Alexithymia and somatic amplification in chronic pain. Psychosomatics 1998;39:399–404.
[12] Cohen K, Auld F, Brooker H. Is alexithymia related to psychosomatic disorder and somatizing. J Psychosom Res 1994;38:119–27.
[13] Kooiman CG. The status of alexithymia as a risk factor in medically unexplained physical symptoms. Compr Psychiatry 1998;39:152–9.
[14] Taylor GJ, Ryan DP, Bagby RM. Toward the development of a new self-report alexithymia scale. Psychother Psychosom 1985;44:191–9.
[15] Bagby RM, Parker JDA, Taylor GJ. The Twenty-Item Toronto Alexithymia Scale I. Item selection and cross validation of the factor structure. J Psychosom Res 1994;38:23–32.
[16] Bagby RM, Taylor GJ, Parker JDA. The Twenty-Item Toronto Alexithymia Scale: II. Convergent discriminant, and concurrent validity. J Psychosom Res 1994;38:33–40.
[17] Lumely MA. Alexithymia and negative emotional conditions. J Psychosom Res 2000;49:51–4.
[18] Hendryx MS, Haviland MG, Shaw DG. Dimensions of alexithymia and their relationships to anxiety and depression. J Pers Assess 1991; 56:227–37.
[19] Saarijärvi S, Salimnen JK, Toikka TB. Alexithymia and depression: a 1-year follow-up study in outpatients with major depression. J Psychosom Res 2001;729–33.
[20] Wise TN, Mann LS, Mitchell JD, Hryvniak M, Hill B. Secondary alexithymia: an empirical validation. Compr Psychiatry 1990;31:284–8.
[21] Parker JDA, Bagby RM, Taylor GJ. Alexithymia and depression: distinct or overlapping constructs? Compr Psychiatry 1991;32:387–94.
[22] Monsen JT, Eilersten DE, Melgård T, Ødegård P. Affects and affect consciousness: initial experience with the assessment of affect integration. J Psychother Pract Res 1996;5:238–49.
[23] Lane RD, Quinlan DM, Schwartz GE, Walker PA, Zeitlin SB. The Levels of Emotional Awareness Scale: a cognitive–developmental measure of emotion. J Pers Assess 1990;55:124–34.
[24] Tomkins SS. Script theory. Differential magnification of affects. In: Howe HE, Dientsbier RS, editors. Nebraska symposium on motivation, vol 26. Lincoln (NE): University of Nebraska Press, 1979. pp. 201–36.
[25] Tomkins SS. Affect, imagery and consciousness. The negative affects: anger and fear, vol 3. New York: Springer, 1991.
[26] Lichtenberg JD, Lachmann F, Fosshage JL. Self and motivational systems: toward a theory of psychoanalytic technique. Hillsdale (NJ): The Analytic Press, 1992.
[27] Storolow RD, Atwood GE. Context of being: the intersubjective foundations of psychological life. Hillsdale (NJ): The Analytic Press, 1992.
[28] Piaget J. Intelligence and affectivity. Palo Alto, (CA): Annual Reviews, Inc., 1962.
[29] Werner H, Kaplan B. Symbol formation: an organismic–developmental approach to language and the expression of thought. New York: Wiley, 1963.
[30] Waller E, Scheidt E. Attachment representation and illness behavior in patients with somatoform disorders. J Nerv Ment Dis (submitted for publication).
[31] Margraf J. Diagnostisches Kurzinterview bei psychischen Störungen (Mini-DIPS). Berlin: Springer-Verlag, 1994.
[32] Rief W, Hiller W, Heuser J. SOMS. Das Screening für Somatoforme Störungen. Bern: Huber, 1997.
[33] Dilling H, Mombour W, Schmidt MH. Internationale Klassifikation psychischer Störungen, ICD-10. Bern: Huber, 1991.
[34] Zigmond AS, Snaith RP. The Hospital Anxiety and Depression Scale. Acta Psychiatr Scand 1983;67:361–70.
[35] Herrmann C. International experiences with the Hospital Anxiety and Depression Scale—a review of validation data and clinical results. J Psychosom Res 1997;42:17–41.
[36] Monsen K, Monsen JT. Chronic pain and psychodynamic body therapy: a controlled outcome study. Psychotherapy 2000;37: 257–69.
[37] Subic-Wrana C, Bruder S, Thomas W, Gaus E, Merkle W, Köhle K. Verteilung des Persönlichkeitsmerkmals Alexithymie bei Patienten in stationärer psychosomatischen Behandlung-gemessen mit TAS-20 und LEAS. PPmP 2002;52:454–60.
[38] Subic-Wrana C, Thomas W, Huber M, Köhle K. Levels of emotional awareness scale (LEAS). Psychotherapeut 2001;46:176–81.
[39] Lane RD, Sechrest L, Reidel R, Weldon V, Kaszniak A, Schwartz GE. Impaired verbal and nonverbal emotion recognition in alexithymia. Psychosom Med 1996;58:203–10.
[40] Bankier B, Aigner M, Bach M. Alexithymia in DSM-IV disorders. Psychosomatics 2000;43:235–40.
[41] Lane RD, Sechrest L, Riedel R. Sociodemographic correlates of alexithymia. Compr Psychiatry 1998;39:377–85.
[42] Wehmer F, Brejnak C, Lumely C, Stettner L. Alexithymia and physiological reactivity to emotion-provoking visual scenes. J Nerv Ment Dis 1995;183:351–7.
[43] Scheidt C, Waller E, Malchow H, Ehlert U, Becker-Stoll F, Schulte-Mönting J, Lücking CH. Attachment representation and cortisol response to the adult attachment interview in idiopathic spasmodic torticollis. Psychother Psychosom 2000;69:155–62.
[44] Scheidt C, Waller E. Alexithymia and attachment representation in idiopathic spasmodic torticollis. J Nerv Ment Dis 1999;187:46–51.
[45] Waller E, Scheidt CE. Attachment representation and affect regulation in patients with somatoform disorders. In preparation.
[46] Dozier M, Stovall KC, Albus EA. Attachment and psychopathology in adulthood. In: Cassidy J, Shaver PR, editors. Handbook of attachment: theory, research, and clinical applications. New York: The Guilford Press, 1999. pp. 497–519.
[47] Cohen K, Auld F, Brooker H. Is alexithymia related to psychosomatic disorder and somatizing? J Psychosom Res 1994;38:119–27.
[48] Kirmayer LJ, Robbins JM. Cognitive and social correlates of the Toronto Alexithymia Scale. Psychosomatics 1993;34:41–52.
[49] Lumely MA, Smith JA, Longo DJ. The relationship of alexithymia to pain severity and impairment among patients with chronic myofascial pain. Comparisons with self-efficacy, catastrophizing, and depression. J Psychosom Res 2002;53:823–30.
[50] Larsen JK, Brand N, Bermond B, Hijman R. Cognitive and emotional characteristics of alexithymia. A review of neurobiological studies. J Psychosom Res 2003;54:533–41.
[51] Lane RD, Schwarz GE. Levels of emotional awareness: a cognitive–developmental theory and its application to psychopathology. Am J Psychiatry 1987;144:133–43.
[52] Bucci W. Psychoanalysis and cognitive science: a multiple code theory. New York: The Guillford Press, 1987.
[53] Lane RD, Pollermann BZ. Complexity of emotion representations. In: Barrett LF, Salovey P, editors. The wisdom in feeling: psychological processes in emotional intelligence. New York: The Guillford Press, 2002.
[54] Krystal H. Alexithymia and psychotherapy. Am J Psychother 1979; 33:17–33.