Emotional Awareness Deficits in Inpatients of a Psychosomatic Ward: A Comparison of Two Different Measures of Alexithymia

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Objective: The TAS 20 has demonstrated strong psychometric properties in a broad variety of studies in healthy populations. Much less work has been done in clinical contexts exploring the validity of the TAS 20 as a measure of the cognitive processing of emotions. The TAS 20, a self-report scale, tends to correlate with self-reported negative affect, but in a clinical context it is important to be able to differentiate between negative affect and the cognitive processing of emotion. We therefore used the TAS 20 and a performance measure, the Levels of Emotional Awareness Scale (LEAS), which in previous studies demonstrated no overlap with measures of negative affect, to explore the ability of the two measures to detect deficits in emotional awareness in a clinical sample. **Methods:** Data from inpatients of a psychosomatic ward were collected at onset ($N = 394$) and at the end of multimodal psychodynamic treatment ($N = 249$). The sample consisted of six diagnostic groups (depression; anxiety and compulsive–obsessive disorders, adjustment disorders, somatoform disorders, psychological factors related to somatic disorders, eating disorders). Changes in the TAS 20 and LEAS were compared at the two time points controlling for the effects of gender, age, educational level, and associations with self- reported negative affect. **Results:** In contrast to the LEAS, the TAS 20 correlated with negative affect at the onset and the end of treatment. The scores of the TAS 20 decreased with treatment in all diagnostic groups but the change in the TAS 20 was not statistically significant when negative affect was controlled. In contrast, LEAS scores increased with treatment in the groups with somatoform disorders and psychological factors related to somatic disorders, and this change was independent of negative affect. **Conclusion:** The LEAS captured a change in emotional awareness due to treatment, whereas the TAS 20 captured a change in negative affect. The LEAS appears to be a more specific measure of change in emotional awareness in clinical contexts than the TAS 20. **Key words:** alexithymia, emotional awareness, negative affect, LEAS, TAS 20, psychosomatic patients.

TAS 20 = Toronto Alexithymia Scale; **LEAS** = Levels of Emotional Awareness Scale; **STAI** = State-Trait Anxiety Inventory; **SCL 90 *R*** = Symptom Check List, revised; **abbreviations diagnostic groups: DEP** = Depression; **ANX** = Anxiety and Compulsive–Obsessive Disorders; **ADJ** = Adjustment Disorders; **SOM** = Somatoform Disorders; **PFS** = Psychological Factors with Somatic Disorders; **ED** = Eating Disorders.

INTRODUCTION

Alexithymia denotes a general impairment in the conscious awareness of emotions. The translation of the Greek term (1): "without words for emotions," indicates its difference from other constructs that relate the processing of affect with mental illnesses: in inhibition, suppression or dissociation, emotions that the individual could potentially become consciously aware of are restrained from consciousness due to the activation of psychodynamic mechanisms. Alexithymia is regarded as a key feature that differentiates psychosomatic illnesses from other mental disorders (2), its underlying mechanisms—e.g., trauma-induced regression from symbolic to somatic representation of affects (3) or dysfunctions in the neuronal processing of affect (4,5)—are hypothesized as causal for the somatic expression of affective disturbances.

To date, there exists no sufficient empirical proof of a specific relation between alexithymia and psychosomatic conditions (6). This may be fostered by a lack of clinical studies in which alexithymia measures with different conceptual and methodological origin are compared in regard to their ability to differentiate patients with a variety of psychiatric and psychosomatic diagnoses. Therefore, investigating the sensitivity of two measures—the self-report questionnaire TAS 20 and the performance task LEAS—to distinguish those diagnostic groups in regard to their emotional awareness, investigates in the same line which psychometric and theoretical concepts could be useful in testing the hypothesis that alexithymia is specific for psychosomatic disorders.

Taylor et al., the authors of the TAS, conceptualize alexithymia as a trait underlying various clinical conditions (7). In a circular model of disease as a biopsychosocial process, they state that the dysregulation of the cognitive processing of emotion may cause dysregulations of behavioral and physiological systems. The TAS (8) was the first instrument in alexithymia research with sufficient psychometric properties (for an overview see ref. 9); its successor, TAS 20 (10,11), demonstrated a stable factor solution in various clinical and nonclinical populations in different languages and cultures (12). With a) difficulty identifying feelings, b) difficulty describing feelings to others, and c) externally oriented thinking (10,11), the TAS 20 factors are in line with central characteristics of alexithymia that were consistently described in alexithymia research.

Lane and colleagues, the authors of the LEAS (13), propose a model of emotional–cognitive development that is structurally parallel to Piaget's stages of cognitive development (14). In a hierarchically ascending order, the five levels of emotional awareness are awareness of a) physical sensations, b) action tendencies, c) single emotions, d) blends of emotions, and e) blends of blends of emotions. Alexithymia as a clinical phenomenon is referred to a nonclinical framework by under-

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standing it as a failure in connecting the implicit or unconscious (levels 1 and 2) and the explicit or conscious processing of affect (levels 3 to 5) (15); this is in line with the original definition of alexithymia as a deficit in, or absence of, conscious emotional experience (2,6). LEAS measures emotional awareness in the five levels mentioned above by asking the subject to write down the feelings that are imagined for oneself and others in each of 20 emotion-evoking scenarios. The answers are rated according to rules based on a theory of cognitive–emotional development (5). The LEAS has proven sufficient psychometric properties, and norms for age, sex, and socioeconomic status have been established (13,16).

To date, alexithymia in empirical research has been mostly measured by the TAS and TAS 20. Connections between alexithymia and various psychiatric or psychosomatic disorders have been demonstrated in a broad variety of studies (7), and in a prospective study on a large community sample, a connection between high alexithymia and risk of death from external causes or diseases over a course of 5 years was demonstrated (17). Evidence for direct causal pathways linking alexithymia and disease has not been generated yet (6), and research on the connection between alexithymia and physiological or visceral signs of affective arousal has shown contradictory findings (6). The factors of the TAS showed different impact on health-related behavior, e.g., difficulty identifying feelings was related to higher use of outpatient treatment (18) and increased pain sensitivity (19), whereas externally oriented thinking correlated with a decreased use of medical and psychotherapeutic treatment (18).

The inconsistencies in research with the TAS may be caused by a methodological problem. There is a high correlation of the TAS 20 with self-report measures of negative affect (20), e.g., in only one of nine recently published studies, alexithymia and depression did not correlate significantly (21–29). Because negative affect plays an important role in poor health outcomes (30), it is crucial to differentiate the degree to which self-reported negative affect and alexithymia differentially influence the onset and course of clinical conditions. Lumley argued that high negative affect may lead to high self-reported alexithymia because negative affectivity is connected with a critical approach to one's own abilities (20); a study that demonstrated a significant correlation between difficulties describing feelings to others (TAS 20 factor 2) and self-reported proneness to shame gives support to the argument that negative affect instead of an impairment in the conscious awareness of emotions may have an impact on self-reported alexithymia (31).

The number of studies where the LEAS is used to measure alexithymia is still small: in a large nonclinical study and in four clinical studies (15,16,31), the level of emotional awareness, measured by the LEAS, and self-reported negative affect were statistically independent. Clinical research showed connections between low emotional awareness and high pain severity or nonspecific somatic complaints in patients with psychosomatic disorders (15), but here, as in studies with the TAS, correlations do not count for causalities.

Both measures have in common that high alexithymia or low emotional awareness in large nonclinical samples is correlated with male gender, older age, low socioeconomic status, and lower educational level (16,32). Both connections remained significant when negative affect was controlled. The moderate but significant correlation of TAS 20 and LEAS in two nonclinical samples (16,33) cannot only be attributed to their identical relation with these variables, because one sample consisted of students and had therefore little sociodemographic variability. In a report on a subsample of the data presented here, we showed that the two measures did not correlate significantly at the onset of treatment ($n = 240$), and that only the TAS 20 correlated significantly with self-reported negative affect. Because pre- and post-treatment data were only available for $n = 164$, the sample was not divided in the six diagnostic groups presented here; significant differences in the means of the two alexithymia tests between the diagnostic groups and the associations between the LEAS, the TAS 20, and self-reported negative affect have not been tested (34).

As stated above, the TAS 20 and the LEAS show profound differences in both the conceptual and the psychometric approach to alexithymia. When applied to clinical samples, research with the TAS 20 demonstrated contradictory results, and the body of clinical research with the LEAS is limited. We first applied both measures to a large clinical sample in order to test their ability to differentiate between diagnostic groups in regard to their ability to detect differences in emotional awareness. We expect that the LEAS, which focuses on the distinction between implicit/unconscious and explicit/conscious levels of emotional awareness, will be able to differentiate the psychosomatic and psychiatric groups more precisely than the TAS 20, which measures self-reported alexithymia as a dimensional construct that focuses on quantitative differences in emotional awareness, and that the TAS 20 in all groups will be related to self-reported negative affect. Demonstrating these differences between the two measures will support the argument that clinical alexithymia research is not impeded by the misleading empirical finding that alexithymic features did not differentiate psychosomatic conditions from other mental illnesses but rather by difficulties to conceptualize and measure alexithymia properly.

SAMPLE AND METHODS

Sample

In Germany, psychotherapeutic inpatient treatment is offered in psychiatric and in psychosomatic units. Although psychiatric units usually do not treat psychosomatic diseases, in psychosomatic units patients with psychosomatic conditions and with other mental illnesses are treated simultaneously in the same setting. Because we wanted to compare emotional awareness at onset and end of treatment in different diagnostic groups, all patients who were admitted to the psychosomatic wards of two general hospitals between April 1999 and July 2002 were consecutively included in the study. Patients in all diagnostic groups underwent the same treatment with a multimodal psychodynamic therapy for 8 to 12 weeks.

The multimodal treatment program consisted of psychodynamic psychotherapy in individual and group sessions; body-related psychotherapy in individual and group sessions, which fosters the ability to be aware of bodily sensations and to experience the difference between bodily relaxation and tension; creative work—with art material and/or musical instruments—in a psychotherapeutic group setting; and medication for psychic or somatic symptoms if needed. The TAS 20, LEAS, STAI, and SCL 90 R were administered at the onset ($N = 384$) and at the end of treatment ($N = 266$). The reduced sample at end of treatment is due to patients who dropped out of treatment irregularly or who left the hospital without handing back the questionnaires. ICD-10 diagnoses were obtained from the hospital records. The primary ICD-10 diagnosis determined the assignment into one of six diagnostic groups: DEP = depression (F 31 to 34); ANX = anxiety and compulsive-obsessive disorders (F 40 to F 42); ADJ = adjustment disorders (F 43); ED = eating disorders (F 50: anorexia and bulimia nervosa); SOM = somatoform disorders (F 45), and PFS = psychological factors in somatic disorders (F 54). Ancillary diagnoses were documented as well.

Measures

The *TAS 20* asks for the degree of self-reported agreement with 20 statements on a 5-point Likert scale. The cut-off point that differentiates between alexithymic and nonalexithymic individuals is empirically defined: 0 to 51 = nonalexithymic; 52 to 60 = neither nonalexithymic/nor alexithymic; 61 and above = alexithymic.

The performance measure *LEAS* asks for written reactions to 20 emotion-evoking vignettes. Answers are rated and quantified by scoring rules that are based on a theory of cognitive–emotional development (5), with lower scores related to a lower developmental level. There is no cut-off point that differentiates nonalexithymic from alexithymic individuals. The LEAS protocols were rated by S.B. and a subset was independently rated by C.S.W. The inter-rater correlation was $r = .91$ ($p < .001$). The LEAS can be divided into two 10-item parallel half-forms that we applied in our pre/post treatment design. Note that a high concordance between the TAS 20 and LEAS would be demonstrated in a statistically significant negative correlation, because low scores on the LEAS indicate a lower emotional awareness, whereas high TAS 20 scores indicate alexithymia.

The *SCL 90 R* (90 items, 5-point Likert scale), and the *STAI* (20 items, 4-point Likert scale) are widely used self-report questionnaires. The SCL 90 R asks for somatic and psychic complaints. The version of the STAI used here addresses trait anxiety.

Statistical Procedures

A case was excluded from data analysis if more than one item was missing from either the TAS 20, SCL 90 R, STAI, or in the LEAS scales "self" or "other;" when designing the study, a power analysis was not conducted.

Correlations between TAS 20, LEAS, SCL 90 R, and STAI in the whole sample were tested using Pearson's r correlation coefficient. The difference between the pre- and posttreatment measurements and between the means of TAS 20 and LEAS at onset and end of treatment in the six diagnostic groups was tested for significance using analysis of variance (ANOVA). In order to test the associations between the alexithymia measures and self-reported negative affect, we evaluated the influence of self-reported negative affect on pre- versus post-treatment differences in TAS 20 and LEAS by using a general linear model in which the pre/post differences of SCL 90 and STAI were included as independent variables. The influence of gender, age, and educational level on the LEAS scores in the six diagnostic groups was tested with ANOVA, Scheffe procedures, and orthogonal contrasts.

RESULTS

No significant correlation was observed between the two alexithymia measures at onset ($n = 386$ valid data from $n = 394$; $r = -0.072$) and at the end of treatment ($n = 264$ valid data from $n = 266$; $r = -0.101$) for the whole sample (Table 1). The LEAS total score and the TAS 20 factor 3 (external-oriented thinking) correlated significantly ($r = -0.186$ at

TABLE 1. Correlations TAS 20, LEAS, SCL 90 R, STAI (Whole Sample; Onset and End of Treatment)

	LEAS	TAS 20	SCL 90 R
LEAS			
Onset of tr.			
End of tr.			
TAS 20			
Onset of tr.	−0.072 ($n = 386$)		
End of tr.	−0.101 ($n = 264$)		
SCL 90 R			
Onset of tr.	0.056 ($n = 335$)	0.365** ($n = 329$)	
End of tr.	0.082 ($n = 238$)	0.357** ($n = 237$)	
STAI			
Onset of tr.	0.148** ($n = 388$)	0.335** ($n = 383$)	0.567** ($n = 32$)
End of tr.	−0.103 ($n = 265$)	0.426** ($n = 263$)	0.485** ($n = 237$)

tr. = treatment.
*$p = .05$, two-tailed; ** $p = .01$, two-tailed.

onset; $r = -0.190$ at the end of treatment; both $p < .01$). The negative correlation between LEAS and TAS 20 was anticipated, as noted above. TAS 20, SCL 90 R, and STAI correlated significantly at onset and end of treatment (onset: TAS 20–SCL 90 R, $r = 0.356$, $p = .01$, $n = 329$; TAS 20–STAI, $r = 0.335$, $p = .01$, $n = 383$; end: TAS 20–SCL 90 R, $r = 0.375$, $p = .01$, $n = 237$; TAS 20–STAI, $r = 0.426$, $p = .01$, $n = 263$). The LEAS correlated significantly with the STAI at onset of treatment ($r = 0.148$, $p = .01$, $n = 388$); the correlations between LEAS, STAI, and SCL 90 R at end of treatment, and for LEAS and SCL 90 R at onset of treatment were not significant (onset: LEAS–SCl 90 R, $r = 0.056$, $n = 335$; end: LEAS–SCL 90 R, $r = 0.082$, $n = 238$; LEAS–STAI, $r = -0.103$, $n = 265$; Table 1). From onset to end of treatment, individuals who scored as alexithymic on the TAS 20 decreased from 35.5% to 23.6% in the whole sample (neither nonalexithymic/nor alexithymic = onset: 31%, end: 26.8%; not alexithymic = onset: 33.5%, end: 49.6%).

Our data demonstrate that the LEAS differentiates between different levels of emotional awareness if the sample is divided into six diagnostic groups (Tables 2 and 3). At onset of treatment, the LEAS mean scores in SOM *and* in PFS are significantly lower than in patients with the mental disorders ANX, ADJ, and ED (SOM and 1. ANX: $p = .054$; 2. AJD: $p = .012$; 3. ED: $p = .000$; PFS and 1. ANX: $p = .069$; 2. AJD: $p = .032$; 3. ED: $p = .000$). The LEAS mean score of SOM is also significantly lower than in DEP ($p = .05$). At the end of treatment, only SOM and PFS patients score significantly higher in LEAS than at the onset of treatment ($p = .05$). ANOVA analyses reveal that the group differences in the LEAS mean scores are not influenced by gender, age, or educational level.

Significant diagnosis-related differences were *not* observed between TAS 20 mean scores of the six diagnostic groups at onset of treatment (Tables 2 and 3). The TAS 20 mean scores decrease significantly with treatment in DEP, PFS, and ED (DEP $p = .001$; PFS and ED $p = .05$). This is paralleled by a decrease in self-reported anxiety and bodily and psychic complaints in all groups at the end of treatment (STAI: onset of treatment: range from x = 53.3 to x = 59.83/ end: x = 47.80 to x = 51.63; SCL 90 R: onset of t.: range from x = 1.17 to x = 1.46/ end of t.; range from x = 0.79 to x = 0.99).

In addition to the SOM and PFS groups, patients with eating disorders (ED) show differences between TAS 20 and LEAS scores (Tables 2 and 3). Although there are no significant differences between the mean TAS 20 scores of the ED group and the other diagnostic groups at onset and end of treatment, the ED group scored significantly higher on the LEAS than all other diagnostic groups, both at onset and at the end of treatment (Tables 2 and 3). For the sociodemographic data of the diagnostic groups see Table 4.

Using a general linear model, we observed that the decrease in the TAS 20 at the end of treatment is due to its covariation with self-reported negative affect (Table 5). If the associations between the TAS 20 and STAI ($p = .000$) and between the TAS 20 and SCL 90 R ($p = .026$) are removed with partial correlations, the change in TAS 20 from onset to end of treatment becomes insignificant ($p = .478$). There are no significant interaction effects between the LEAS and STAI ($p = .526$) or the LEAS and SCL 90 R ($p = .231$). The overall decrease in alexithymia as measured by the LEAS at the end of treatment ($p = .001$) is due to a significant onset/end of treatment difference in the SOM and PFS groups. The pre/post differences in LEAS scores were not significant in the other diagnostic groups.

CONCLUSIONS

We first applied the TAS 20 and the LEAS to a large clinical sample in order to test their ability to differentiate between diagnostic groups in regard to their ability to detect differences in emotional awareness. We expected that the LEAS, which focuses on the distinction between implicit/

TABLE 2. Means and Standard Deviation of LEAS and TAS 20 Scores at Onset and End of Treatment in Six Diagnosis Related Groups

	DEP Depression ($n = 54$)	ANX Anxiety and Compulsive-Obsessive Disorders ($n = 20$)	AJD Adjustment Disorders ($n = 31$)	SOM Somatoform Disorders ($n = 68$)	PFS Psychological Factors With Somatic Disorders ($n = 38$)	ED Eating Disorders ($n = 38$)
LEAS onset of treatment	x = 27.29 SD = 4.6	x = 28.9 SD = 3.85	x = 29.47 SD = 6.36	x = 25.86 SD = 6.52	x = 26.24 SD = 5.57	x = 31.86 SD = 5.24
LEAS end of treatment	x = 27.66 SD = 7.33	x = 28.01 SD = 5.21	x = 29.96 SD = 4.70	x = 27.70 SD = 7.12	x = 28.33 SD = 6.55	x = 32.57 SD = 7.00
Change: onset/end	ns[a] ns[b]	ns[a] ns[b]	ns[a] ns[b]	$p = .05$[a] $p = .05$[b]	$p = .05$[a] $p = .05$[b]	ns[a] ns[b]
TAS 20 onset of treatment	x = 56.67 s = 11.84	x = 54.41 s = 13.04	x = 55.03 s = 12.06	x = 52.69 s = 11.93	x = 54.97 s = 11.36	x = 55.64 s = 10.28
TAS 20 end of treatment	x = 50.69 s = 11.23	x = 51.16 s = 12.23	x = 52.18 s = 11.07	x = 50.98 s = 12.18	x = 51.45 s = 11.25	x = 51.30 s = 11.37
Change: onset/end	$p = .001$[a] ns[b]	ns[a] ns[b]	ns[a] s**[b]	ns[a] ns[b]	$p = .05$[a] ns[b]	$p = .05$[a] ns[b]

[a]Not controlled for negative affect; [b]controlled for negative affect.
s** = statistical artifact as onset/end change for the whole group is not significant.

TABLE 3. Significant Differences in TAS 20 and LEAS Between the Diagnostic Group

		DEP		ANX		AJD		SOM		PFS		ED	
		T1	T2	T1	T2	T1	T2	T1	T2	T1	T2	T1	T2
DEP	TAS 20												
	LEAS							+		+		+	+
ANX	TAS 20												
	LEAS							+		+		+	+
AJD	TAS 20												
	LEAS							+		+		+	+
SOM	TAS 20												
	LEAS	+		+		+						+	+
PFS	TAS 20												
	LEAS			+		+						+	+
ED	TAS 20												
	LEAS	+	+	+	+	+	+	+	+	+	+		

T1 = onset of treatment; T2 = end of treatment; + = difference significant.

TABLE 4. Sociodemographic Data for the Diagnostic Groups

	DEP Depression (n = 54)	ANX Anxiety and Compulsive-Obsessive Disorders (n = 20)	AJD Adjustment Disorders (n = 31)	SOM Somatoform Disorders (n = 68)	PFS Psychological Factors With Somatic Disorders (n = 38)	ED Eating Disorders (n = 38)
Sex in %	w = 71.7 m = 28.3	w = 80.0 m = 20.0	w = 64.5 m = 35.5	w = 58.8 m = 41.2	w = 65.8 m = 34.2	w = 92.1 m = 7.9
Age (means and SD)	x = 43.09 SD = 12.85	x = 43.25 SD = 12.68	x = 42.16 SD = 12.72	x = 44.26 SD = 12.56	x = 48.58 SD = 12.05	x = 27.76 SD = 8.61
Educational level in %						
Low	22.3	45.0	19.9	32.4	23.7	13.2
Middle	35.2	5.0	32.3	22.1	31.6	34.2
Average	33.3	35.0	32.3	39.7	31.6	42.1
	(9.3)	(10.0)	(6.5)	(5.9)	(13.2)	(2.6)

Low = school not finished or elementary school; Middle = junior high school graduate; Average = senior high school graduate; parentheses = missing data; w = women; m = men.

TABLE 5. Associations Between Alexithymia Scales and Self-rated Negative Affect (Entire Sample n = 237)

	TAS 20	LEAS
Change: onset/end of treatment; negative affect not controlled	p = .000*	p = .001*
Association with STAI	p = .000*	p = .526
Association with SCL 90 R	p = .026*	p = .231
Change: onset/end of treatment; negative affect controlled	p = .478	p = .001*

*Difference onset/end significant; correlation alexithymia measure with STAI, SCL 90 R significant.

unconscious and explicit/conscious levels of emotional awareness, would be able to differentiate the psychosomatic and psychiatric groups more precisely than the TAS 20, which focuses on self-reported alexithymia as a dimensional construct. We also expected that the TAS 20 in all groups would be related to self-reported negative affect.

In fact, our data do support these expectations. The TAS 20 and the LEAS did not correlate significantly in the whole sample. When the sample was divided into six diagnostic groups, the LEAS detected significant differences in emotional awareness that are consistent with the hypothesized role of alexithymia in somatoform and psychosomatic disorders, whereas the TAS 20 failed to demonstrate sensitivity to these differences. Furthermore, the TAS 20 showed significant pre/post-treatment changes for the whole sample that were no longer significant when its association with self-reported negative affect was partialed out, whereas the changes in the LEAS were independent of self-reported negative affect and captured diagnosis-related changes due to treatment. Overall, our data reveal more differences than similarities between the two alexithymia measures when used in a clinical sample. These differential findings reflect differences in the way that each measure assesses deficits in the cognitive processing of emotions as well as differences in their discriminant and construct validity.

As Lane et al. have pointed out (6,16), different methods for measuring alexithymia can lead to different results, e.g., rating one's own ability to identify and to express emotions (TAS 20) may reflect different features of alexithymia compared with one in which this ability is needed to complete the task (LEAS). These different approaches in measurement—a self-

report scale versus a performance measure—may gain even greater salience in a clinical sample. If alexithymia is seen as a dimensional construct where "more" or "less" alexithymia makes only a quantitative difference in the ability to be aware of one's own emotions, a self-report questionnaire would be a suitable instrument to evaluate emotional awareness in "low" or "high" alexithymics. If alexithymia—at least in its more severe form—is seen as a clinical category in which severe expression of the trait alters not only the quantity but also the quality of the ability to be aware of one's own emotions, it could be impossible for truly high alexithymics to accurately rate their impairment. Similar issues arise in the measurement of general intelligence: extremely low intelligence alters the quality of cognitive processing, whereas differences in intellectual ability in the average range are adequately described as "more" or "less" of a dimensional capacity.

Another factor contributing to a difference in the two measures may be the item content of the TAS 20. Although lack of fantasy and daydreaming was viewed by Sifneos as a key characteristic of alexithymia (1,2), items addressing this facet of alexithymia were dropped because of their unreliability (7). Fantasy and daydreaming were viewed as important by Sifneos and Nemiah because they reflected the capacity to symbolize affect. It is possible that the direct measurement of the words used to convey affect, inherent in the LEAS scoring system, somehow captures this deficit in symbolizing capacity to a greater degree than does the TAS 20.

The current results are consistent with several other studies that examined the covariation of TAS 20 scores and self-reported depressed affect. In a large epidemiological study (n = 1,888), TAS 20 items and Beck Depression Inventory (BDI) items loaded on separate factors in an explanatory factor analysis when subjects did not score high on both scales. If they scored high on both, however, the factor loadings were highly overlapping (35). TAS 20 mean scores did not change in depressive subjects after 1 year of treatment, but lower depression scores after treatment were statistically associated with a decrease in alexithymia as measured by the TAS 20 (23). In two recent intervention studies—in a sample of 102 patients with functional gastrointestinal disorders with 6 months of unspecified treatment (29), and another sample of 46 patients with major depression with 14 weeks of antidepressant medication (22)—the TAS 20 mean scores did not change from onset to end of treatment when self-reported negative affect was controlled. The authors of these studies interpret their findings as evidence that the TAS 20 measures a relatively stable personality trait if negative affect is partialed out, entirely consistent with the results reported here. It is therefore reasonable to question whether a measure such as the TAS 20 that taps a personality trait that does not differentiate between diagnostic groups and that seems to be unaffected by a comprehensive multimodality treatment program can adequately address the many questions that have been raised in the field of clinical alexithymia research over the past half century.

A crucial question regarding the construct validity of a performance measure is how the targeted construct is operationalized. The LEAS defines alexithymia as a diminished ability to be aware of and to express one's own feelings. This abstract construct is measured by the subject's actual use of emotion words, an operationalization that is in line with early and recent clinical models of what is missing in alexithymic individuals. Ruesch (36), who first described what came to be known as alexithymia, pointed out that these individuals do not have a sufficient model to be able to use sensory, affect-generating cues to understand what is going on inside themselves and others. Bucci (37) sees alexithymia as the result of a failure in "referential activity" that "makes sense" of the psychophysiological activation in linking sensory input with different memory and symbolizing systems. These theory-based formulations of alexithymia support the construct validity of the LEAS, which in turn are supported by our findings that the LEAS differentiates between the diagnostic groups in a theory-concordant manner. The diagnostic groups that would be expected to be more alexithymic—patients with body-related symptoms (SOM) and patients with diseases whose onset or course is influenced by psychological factors (PFS)—score significantly lower on the LEAS than the diagnostic groups with mental disorders (DEP, ANX, AJD, ED). Only the patients in the SOM and PFS groups improved in LEAS-measured alexithymia by the end of treatment.

Although the ED group scored higher on the LEAS than the other diagnostic groups did, our TAS 20 data are consistent with other reports that patients with anorexia and bulimia nervosa show high TAS-measured alexithymia (7,38). The LEAS data are in line with a study on a emotion-related performance task in which these patients "contrary to expectations used more emotional words than controls" (39) and may explain why the TAS 20 and the EDI (Eating Disorder Inventory) showed no significant correlation between alexithymia and scales for eating disorder–related behaviors and attitudes, although the TAS 20 correlated highly with subscales of personality traits that are not specific for eating disorders (40). Further research is needed to determine whether the deficit in emotional awareness described by Bruch in patients with eating disorders is identical with impairments of emotional awareness in psychosomatic conditions and whether they can be substantiated using objective measures such as the LEAS (41).

The LEAS and the TAS 20 are two alexithymia measures with strong psychometric properties, making each important in the field of psychosomatic research in which a lack of psychometrically sound measures has for some time impeded research. With the TAS 20, it is possible to gain knowledge about how alexithymia as a trait is related to sociodemographic factors and health risks in the general population (e.g., 17,32). Contradictory findings with the TAS 20 in clinical populations may not only be caused by its overlap with self-reported negative affect but also by difficulty in tapping deficits in emotional awareness in different diagnostic groups by only looking for a "more or less" of alexithymia. In this regard a measure like the LEAS, which focuses on the dis-

tinction between implicit/unconscious and explicit/conscious processing of affect, may lead to more distinct knowledge that may help to clarify controversial findings with the TAS 20. Therefore, a gold standard in measuring alexithymia will not be established by developing one measure that is suitable to address a broad variety of questions in alexithymia research, but rather by assessing more precisely in which field of alexithymia research the available psychometric sound measures show sufficient construct and discriminant validity. This also implies the decision about which measurement approach—self-report questionnaires, observer-rated clinical interviews, observer rating scales or performance measures—or which combination of different measures is suitable for different fields of interest in alexithymia research. For further elucidation of these questions, additional research using the TAS 20 and the LEAS simultaneously is recommended.

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