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## DIMENSIONAL ASSESSMENT OF CHRONIC FATIGUE SYNDROME

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**Abstract**—The absence of laboratory tests and clear criteria to identify homogeneous (sub)groups in patients presenting with unexplained fatigue, and to assess clinical status and disability in these patients, calls for further assessment methods. In the present study, a multi-dimensional approach to the assessment of chronic fatigue syndrome (CFS) is evaluated. Two-hundred and ninety-eight patients with CFS completed a set of postal questionnaires that assessed the behavioural, emotional, social, and cognitive aspects of CFS. By means of statistical analyses nine relatively independent dimensions of CFS were identified along which CFS-assessment and CFS-research can be directed. These dimensions were named: psychological well-being, functional impairment in daily life, sleep disturbances, avoidance of physical activity, neuropsychological impairment, causal attributions related to the complaints, social functioning, self-efficacy expectations, and subjective experience of the personal situation. A description of the study sample on these dimensions is presented.

### INTRODUCTION

THE chronic fatigue syndrome (CFS) is characterized by severe disabling fatigue of unknown origin. Several operational definitions [1, 2] have proved to be unsatisfactory in identifying cases of CFS [3, 4]. A major problem with these criteria is that they are mainly symptom-based. Fatigue, the main symptom in CFS, is a nonspecific complaint as reported in the general population as such [5] and in a substantial number of patients seen in primary care settings [6, 7]. Moreover, fatigue is a prominent symptom in a variety of physical and psychiatric illnesses. Fatigue is not only nonspecific, but as a phenomenon it is also difficult to understand. Kennedy [8], reviewing the literature on fatigue, concluded that 'the status of fatigue as a physiological response, psychological perception, or symptom of physical and psychiatric diseases remains unclear'. To date, no clear definition of fatigue exists, resulting in problems in measurement [9].

Not only is fatigue highly nonspecific, but so are other symptoms commonly observed in CFS. Patients with CFS show a considerable overlap in symptoms with patients with clinical depression and those with chronic neuromuscular diseases [10] and chronic pain [11]. Thus symptoms alone seem to have little diagnostic value. Neither do laboratory tests contribute to the assessment of CFS [12–15].

The absence of laboratory tests and clear criteria for identifying homogeneous

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(sub)groups in patients presenting with unexplained chronic fatigue and assessing clinical status and disability in these patients calls for other assessment methods [3]. In the present study, a multi-dimensional approach to the assessment of CFS will be used. Behavioural, emotional, social, and cognitive aspects of CFS are measured. The main aims of this study are to identify dimensions of CFS and to provide a description of patients presenting with unexplained chronic fatigue using these dimensions.

## SUBJECTS AND METHOD

### *Subjects*

In the present study the following inclusion and exclusion criteria have been applied [4]: patients had to experience severe disabling fatigue, of definite onset, lasting for more than 1 year; other symptoms may be present. Patients with established medical conditions known to produce chronic fatigue, and patients with a diagnosis of schizophrenia, bipolar-disorder, psychotic depression, substance use disorder, eating disorder, or proven organic brain disease were excluded.

Three-hundred and ninety-five self-referred patients were sent a postal questionnaire. Ninety per cent completed and returned the questionnaire ( $N = 357$ ). Detailed information on present illness, specialist visits, and treatment was obtained. Based on this information, respondents with definite or suspected illnesses that could provide an explanation for the complaints were excluded (e.g. patients taking medication for heart problems). Patients who had not been examined by at least one specialist for their complaints (10 patients) also were excluded from the analyses. These inclusion and exclusion procedures resulted in a study sample of 298 subjects.

### *Instruments*

*Fatigue questionnaire.* We participated in the development of the Checklist Individual Strength (CIS) by the University Hospital of Amsterdam and the University Hospital of Rotterdam. This 24-item questionnaire was designed to measure several aspects of fatigue. Each item is scored on a 7-point Likert scale. Principal components analyses yielded a four-factor solution. Four items that had a low loading on their primary factor or that loaded substantially on more than one factor were deleted. These factors were easy to interpret and were named: (1) subjective experience of fatigue (8 items); (2) concentration (5 items); (3) motivation (4 items); (4) physical activity level (3 items). The final subscales accounted for 67.7% of the variance. Psychometric properties were excellent: Cronbach's alpha reliability coefficient for the entire CIS was 0.90. Gutman split-half reliability coefficient was 0.92. Cronbach's alphas for the subscales were 0.88, 0.92, 0.83 and 0.87 respectively. Data from two comparison groups are available. The first group consists of healthy subjects ( $N = 60$ ; mean age = 32 yr). The second group are patients with functional bowel disorder (FBD) ( $N = 61$ ; mean age = 41 yr).

*Self-reported complaints.* Symptom assessment was based on spontaneous reports by the patient. Patients were asked to write down their complaints. Information concerning the course and duration of the complaints was also obtained.

*Psychological well-being.* The Beck Depression Inventory (BDI) [16] is a standardized self-report questionnaire used to measure depression. Four diagnostic categories are based on the total score: 0–9 = nondepressed; 10–15 = mildly depressed; 16–23 = moderately depressed; 24 or more = severely depressed. A score of 16 or more is indicative of a clinical depression. The Symptom Checklist (SCL-90) [17] is a 90-item indicator of psychopathology and screens for anxiety (SCL-ANX), agoraphobia (SCL-AGO), depression (SCL-DEP), somatization (SCL-SOM), cognitive difficulties (SCL-IN), interpersonal sensitivity (SCL-SEN), hostility (SCL-HOS), and sleep disturbances (SCL-SLP). A total score called the psychoneuroticism score (SCL-PSN) can be obtained. Comparison data are available for normal subjects ( $N = 1009$ ; mean age = 43 yr), for a mixed psychiatric out-patient group ( $N = 2118$ ; mean age = 36 yr) [17], and for a group of patients with functional bowel disorder (FBD) ( $N = 103$ ; mean age = 44 yr).

*Daily functioning.* The effect of the complaints on daily functioning was assessed by the Sickness Impact Profile (SIP) [18, 19], using the following eight subscales: home management (SIP-HM), mobility (SIP-MOB), alertness behaviour (SIP-AB), sleep/rest (SIP-SR), ambulation (SIP-A), social interactions (SIP-SI), work (SIP-W), and recreation and pastimes (SIP-RP). Comparison data are available for two groups of patients registered at five family practices situated in urban, suburban, and rural areas [19]. The first group ( $N = 450$ ; mean age = 47 yr) reported physical complaints of minor severity or no physical complaints at all. The second group ( $N = 144$ ; mean age = 49 yr) reported moderate to severe physical



complaints (gastrointestinal, back pain, arthralgia, and cardiovascular complaints).

In addition to the SIP, general questions regarding daily functioning were included: these assessed the patient's opinion concerning: (a) the extent to which their complaints interfered with daily activities (4-point scale); (b) problems in housekeeping activities and work (5-point scale); (c) satisfaction in housekeeping activities and work (5-point scale).

*Avoidance behaviour.* Avoidance of physical activity is thought to play a role in the perpetuation of the complaints in CFS [20, 21]. Therefore, four questions were asked with respect to avoidance of physical activity as a way of coping with complaints (e.g. 'avoiding complaints by nonactivity'). The level of physical activity is assessed by the CIS-Activity subscale (see the section *Fatigue questionnaire*).

*Cognitions and attributions.* Cognitions were assessed by: (a) a specific 3-point scale question concerning self-efficacy expectations ('do you think you can influence your complaints?'); (b) causal attributions: patients were asked to write down their opinions regarding the causes of the complaints. These responses were coded into the dichotomous variables 'physical causes' and 'non-physical causes'; (c) the Multi-dimensional Health Locus of Control questionnaire (MHLC) [22, 23] which measures control beliefs with respect to health in general. The MHLC contains three subscales: internal attributions (MHLC-I: health is determined by own behaviour/capacities); external attributions (MHLC-E: health is determined by fate/chance); and powerful others (MHLC-P: health is determined by partners/friends/doctors). MHLC-data of a comparison group of patients with FBD are available ( $N = 103$ ; mean age = 44 yr).

*Social interactions.* General questions were asked concerning: (a) satisfaction with social life (5-point scale); (b) problems in social relations (4-point scale); (c) the SIP contains a subscale assessing the effect of the complaints on social life (SIP-SI: see section *Daily functioning*).

*Sleep disturbances.* (a) A general sleep disturbances-question, which is coded 'yes' or 'no'; (b) a question with respect to the type of the sleep disturbance (problems falling asleep, restless sleep, and early awakening in the morning); (c) duration of sleep at night and during the day; (d) the SCL-90 contains a subscale on sleeping problems (SCL-SLP: see section *Psychological well-being*).

In addition to the above mentioned instruments information on age, sex, marital status, occupation, and education was obtained.

## STATISTICAL ANALYSES

Testing differences between groups was performed by analyses of variance (ANOVA). When appropriate, covariates were included in the ANOVA. The identification of dimensions of the CFS was a four-step procedure: (I) Principal components analyses on all subscales and the general questions. Variables that had low factor loadings or that loaded substantially on more than one factor were excluded; (II) Per factor the included variables were weighted in order to achieve approximately equal standard deviations; (III) Per factor reliability procedures were performed on the weighted variables (Cronbach's  $\alpha$ ). Variables that suppressed alpha were excluded. For each dimension a score was obtained by summing the scores of the variables belonging to the dimension; (IV) Stepwise multiple regression analyses were performed on the dimension scores in order to evaluate interrelations.

In analyses in which more than 5% of cases were excluded because of missing values, these values were replaced by means of the linear trend at point method, which is available in SPSS (release 6.0). For each variable, the existing series was regressed on an index variable, scaled 1 to  $n$ . Missing values were replaced with their predicted value.

## RESULTS

### *Descriptive*

*Biographical.* Mean age was 39 yr (range 18–73). There were 75 males and 223 females. Fifty-five per cent of patients were married or cohabiting, 34% were single, 8% were divorced, and 3% were widowed. Only 31% of patients reported being still at



work, whereas 58% worked before the onset of the complaints. Of the patients presently working, 80% worked part-time because of the complaints. All patients had visited at least one specialist for their complaints (internist: 81%; neurologist: 59%; psychologist: 35%; psychiatrist: 32%; rheumatologist: 19%).

*Spontaneously reported complaints* are presented in Table I. Only complaints reported by at least 10% of patients are included in the table. The average number of complaints reported is 8 (SD = 3.8). Median duration for the complaints was 5 yr.

*Subjective feeling of fatigue (CIS-Subjective Fatigue)*. Data are presented in Table II. Overall analyses of variance revealed group differences on CIS-Subjective Fatigue ( $p < 0.001$ : age and sex were entered as covariates in the analyses). Patients with CFS reported more fatigue than healthy subjects and patients with FBD, FBD-patients reported more fatigue than healthy subjects.

TABLE I.—SPONTANEOUSLY REPORTED COMPLAINTS BY 298 CFS-PATIENTS

Complaint	%	(N)
Myalgia	71	(210)
Difficulty concentrating	51	(151)
Gastrointestinal complaints	49	(145)
Headache	46	(136)
Dizziness	43	(127)
Sleep disturbances	43	(122)
Memory problems	36	(106)
Muscle weakness	35	(103)
Recurrent infections	26	(77)
Irritability	24	(72)
Depression	22	(66)
Changes in body temperature	21	(63)
Speech disturbances	20	(59)
Visual disturbances	19	(57)
Arthralgia	17	(52)
Polyuria	16	(48)
Excessive transpiration	16	(48)
Coordination disturbances	15	(45)
Emotional lability	15	(44)
Sore throat	13	(39)
Allergies	12	(36)

TABLE II.—MEAN CIS SCORES (SD) OF 298 PATIENTS WITH CHRONIC FATIGUE SYNDROME (CFS), 61 PATIENTS WITH FUNCTIONAL BOWEL DISORDER (FBD), AND 60 HEALTHY SUBJECTS. HIGH SCORES INDICATE A HIGH LEVEL OF FATIGUE, A HIGH LEVEL OF CONCENTRATION PROBLEMS, LOW MOTIVATION, AND A LOW LEVEL OF PHYSICAL ACTIVITY

Subscales	CFS	FBD	Healthy
Subjective fatigue	6.1 (1.0)	4.4 (1.8)	2.4 (1.4)
Concentration	4.8 (1.8)	3.6 (1.7)	2.2 (1.2)
Motivation	4.0 (1.7)	3.4 (1.6)	2.0 (1.0)
Activity	5.0 (1.7)	3.3 (1.9)	2.0 (1.3)

On all subscales, CFS-patients scored significantly higher than FBD-patients and healthy controls ( $p < 0.001$ ), and FBD-patients scored significantly higher than healthy controls ( $p < 0.001$ ).



*Psychological well-being.* SCL-90 data of CFS-patients, psychiatric out-patients, FBD-patients, and healthy subjects are depicted in Table III. As sex is related to SCL-90 scores [17], this variable was entered as a covariate in analyses of variance. Overall analyses revealed group differences on all subscales ( $p < 0.001$ ). Significant differences between groups are displayed in Table 3. On the BDI, 32% of patients did not have depressed feelings at all. Using a score of 16 or more, 36% of patients could be considered as having a clinical depression.

*Daily functioning.* Ninety-three per cent of patients reported that they experienced severe impairment in daily life because of their complaints, 7% reported moderate impairment. Sixty-two per cent reported marked problems in activities at home or at work, and 70% reported not being satisfied with respect to daily functioning. Data on the SIP are presented in Table IV. Overall analyses of variance showed group differences on all subscales ( $p < 0.001$ ).

*Avoidance behaviour.* Only 4% of patients did not score on any of the four items measuring avoidance of physical activity, 11% scored on one item, 17% scored on

TABLE III.—MEAN SCL-90 SCORES (SD) OF 290 PATIENTS WITH CHRONIC FATIGUE SYNDROME (CFS), 103 PATIENTS WITH FUNCTIONAL BOWEL DISORDER (FBD), 1009 HEALTHY SUBJECTS, AND 2118 PSYCHIATRIC OUT-PATIENTS

	Healthy	FBD	CFS	Psychiatric
ANX	13.9 (5.2)**	17.0 (7.1)	17.9 (6.9)	26.0 (9.9)**
AGO	8.4 (2.9)**	9.3 (4.3)	9.7 (4.4)	13.9 (7.3)**
DEP	22.5 (7.9)**	26.9 (10.2)**	31.2 (11.3)	42.2 (15.0)**
SOM	17.8 (6.6)**	23.7 (9.4)**	30.6 (8.7)	26.6 (10.0)**
IN	13.7 (4.9)**	17.7 (6.5)**	23.0 (7.3)	21.7 (8.2)*
SEN	25.6 (8.0)**	27.2 (9.0)	27.9 (10.2)	39.1 (15.5)**
HOS	7.6 (2.4)**	8.2 (2.4)	8.7 (3.4)	11.6 (5.3)**
SLP	4.9 (2.7)**	6.5 (3.4)	7.5 (6.5)	7.8 (3.7)
PSN	123.9 (33.3)**	147.8 (45.2)**	167.8 (48.7)	206.0 (65.6)**

\*Significantly different from CFS:  $p < 0.05$ .

\*\*Significantly different from CFS:  $p < 0.001$ .

ANX = anxiety; AGO = agoraphobia; DEP = depression; SOM = somatization; IN = cognitive difficulties; SEN = interpersonal sensitivity; HOS = hostility; SLP = sleep; PSN = psychoneuroticism.

TABLE IV.—MEAN SIP-SCORES (SD) OF 296 PATIENTS WITH CFS, COMPARISON GROUP 1 (450 FAMILY PRACTICE PATIENTS WITH PHYSICAL COMPLAINTS OF MINOR SEVERITY OR NO PHYSICAL COMPLAINTS AT ALL) AND COMPARISON GROUP 2 (144 FAMILY PRACTICE PATIENTS WITH MODERATE TO SEVERE PHYSICAL COMPLAINTS)

	Comparison group 1	Comparison group 2	CFS
SR	2.8 (6.2)*	10.7 (10.7)*	16.6 (11.7)
HM	2.1 (8.4)*	13.4 (16.1)	15.7 (10.1)
MOB	1.2 (5.8)*	6.2 (10.8)*	9.5 (9.5)
SI	2.3 (6.3)*	9.2 (11.4)*	14.9 (10.4)
A	1.4 (5.2)*	8.0 (11.5)	7.8 (8.1)
AB	2.5 (9.0)*	11.1 (18.2)*	30.7 (20.6)
W	4.5 (15.0)*	16.1 (28.4)*	25.2 (16.9)
RP	4.3 (10.3)*	18.0 (18.5)	20.0 (10.1)

\*Significantly different from CFS:  $p < 0.001$ .

SR = sleep and rest; HM = activities at home; MOB = mobility; SI = social interaction; A = ambulation; AB = alertness behaviour; W = work; RP = recreation and pastimes.



two items, 26% scored on three items, and 43% scored on four items. Overall analyses of variance revealed group differences on CIS-Activity ( $p < 0.001$ ). Age and sex were entered as covariates in the analyses. See Table II for mean scores, standard deviations, and group differences.

*Cognitions.* Eighty-six per cent of patients reported a physical explanation for their complaints (predominantly viral infection), whereas only 7% reported a psychological explanation. Thirty-nine per cent of the patients believed that they could influence their complaints (positive self-efficacy), 27% did not know, and 35% believed that this would not be possible (negative self-efficacy). Compared to FBD-patients, CFS-patients showed less internal attributions regarding health in general (MHLC-I;  $p < 0.001$ ) and had less confidence in powerful others (MHLC-P;  $p < 0.001$ ). There was no significant difference between these two groups with respect to external attributions (MHLC-E).

*Social interactions.* Twenty-seven per cent of patients reported difficulties in social relations and 29% reported not being satisfied with social interactions. On the SIP-social functioning (SIP-SI) subscale, CFS-patients showed more problems in social interactions than patients with moderate to severe physical complaints (see Table IV).

*Sleep disturbances.* Although 43% of patients reported to have sleep disturbances spontaneously (see Table I), 61% of patients reported sleep disturbances when specifically asked (of those patients, 56% had problems falling asleep, 67% had restless sleep, and 27% woke up early in the morning). Average duration of sleep at night was 8 h (range 3–14) and during the day 2 h (range 1–11). For SCL-SLP results, see Table III.

*Neuropsychological complaints.* A total of 59% reported memory and/or concentration problems (see also Table I). Neuropsychological problems are also expressed in high scores on CIS-Concentration (Table II) and SIP-alertness behaviour (SIP-AB: Table IV). Overall analyses of variance revealed group differences in CIS-Concentration ( $p < 0.001$ ) and SIP-AB ( $p < 0.001$ ). For significant differences between groups for CIS-concentration see Table II and for SIP-AB see Table IV.

### *Dimensions*

*Principal components* analysis yielded a 9-factor solution (see Table V). The first eight factors were easily interpreted and were named: psychological well-being, functional impairment in daily life, sleep disturbances, avoidance behaviour, concentration problems, causal attributions related to the complaints, social functioning, and self-efficacy expectations. The ninth factor was somewhat more difficult to interpret. It contains variables that would have been expected to be included in other dimensions. The general question 'problems in housekeeping/work', for example, would have been expected to be included in the dimension functional impairment. What the variables in this factor have in common, in contrast with variables that are included in the other eight dimensions, is that they represent highly subjective general interpretations of the personal situation. On the SIP, for example, respondents mark a list of specific situations as either present or absent. Hence, less subjective interpretation is required than is the case in evaluating the extent to which complaints interfere with daily functioning in general. The variables in this dimension tap another mode of responding. This dimension could be named 'subjective experience'.

*Reliability analyses* resulted in Cronbach's alphas varying from 0.62 to 0.91 (see



TABLE V.—DIMENSIONS OF CFS, COMPOSING VARIABLES, AND CRONBACH ALPHA RELIABILITY COEFFICIENTS OF THE DIMENSIONS

Dimension	Variables	Cronbach's alpha
Psychological well-being	SCL-ANX; SCL-AGO; SCL-DEP; SCL-SEN; SCL-IN; SCL-SOM; BDI	0.91
Functional impairment	SIP-HH; SIP-A; SIP-MOB	0.80
Sleep disturbances	Sleep disturbances; SCL-SLP	0.78
Avoidance physical activity	Avoidance of physical activity items	0.63
Neuropsychological functioning	SIP-AB; CIS-concentration	0.84
Social functioning	Problems relations; Satisfaction social life; SIP-SI	0.62
Causal attributions	Physical attributions; Non-physical attributions	0.71
Self-efficacy expectations	Self-efficacy expectations; MHLC-internal	0.77
Subjective experience	Problems in housekeeping/work; CIS-activity; Satisfaction in daily life; CIS-subjective fatigue	0.75

Table V for detailed information on variables finally included in each dimension and dimension reliability coefficients. Variables are ordered according to the magnitude of their primary factor loading).

*Stepwise multiple regression analyses* were performed to evaluate the interrelations between dimensions. Each of the nine dimensions served as the dependent variable consecutively with the remaining dimensions as the independent variables. As the subjective experience dimension represents another mode of responding, this dimension was excluded as an independent variable from all regression analyses. In these analyses the number of excluded cases exceeded 5%. Therefore, for all regression analyses missing values were replaced using the linear trend at point method. Results are displayed in Table VI (variables are ordered according to the step number they were entered into the model). The analyses show that, although the dimensions are interrelated, the combined effect of related dimensions can explain only a minor to moderate part of the variance. Also, regression analyses were performed with fatigue severity (CIS-subjective fatigue subscale), being the principal complaint in CFS, as the dependent variable. Fatigue severity was predicted by the dimensions psychological well-being, functional impairment, and self-efficacy expectations ( $R^2 = 0.51$ ; variance explained: 27%).

#### DISCUSSION

In the present study a multi-dimensional approach to the assessment of CFS was developed. This study identified nine dimensions, measuring emotional, behavioural, cognitive, and social functioning. Multiple regression analyses showed that, although interrelations between the dimensions exist, the combined effect of related dimensions explained only a minor to moderate part of variance. Hence, each dimension provides a unique contribution to the assessment of CFS. Comprehensive assessment of CFS then implies measurement of different dimensions simultaneously.



TABLE VI.—STEPWISE MULTIPLE REGRESSION ANALYSES WITH DIMENSIONS AND FATIGUE SEVERITY

Dependent variable	Independent	Variables
	Dimensions in model	$R^2$ (% variance explained)
Psychological well-being	Concentration Sleep disturbances Social functioning Causal attributions Functional impairment	0.69 (47%)
Functional impairment	Social functioning Avoidance physical activity Psychological well-being	0.46 (22%)
Sleep disturbances	Psychological well-being	0.45 (20%)
Avoidance physical activity	Functional impairment	0.29 (8%)
Concentration	Psychological well-being Social functioning Functional impairment Causal attributions	0.61 (38%)
Social functioning	Concentration Psychological well-being Functional impairment	0.57 (33%)
Self-efficacy	Psychological well-being	0.13 (2%)
Causal attributions	Psychological well-being Concentration	0.19 (3%)
Subjective experience	Functional impairment Concentration Self-efficacy Social functioning Psychological well-being	0.62 (39%)
Fatigue severity (CIS subscale subjective fatigue)	Psychological well-being Functional impairment Self-efficacy	0.53 (28%)

A recently developed multi-dimensional questionnaire is the Profile of Fatigue-Related Symptoms (PFRS) [24, 25], which has four subscales: emotional distress, cognitive difficulty, fatigue and somatic symptoms. The PFRS was developed to provide a measure of severity and pattern of illness. The PFRS resembles the CIS used in this study, although the former only gives information on symptoms whereas the CIS also provides data on behaviour. The PFRS may be a suitable instrument for the assessment of symptoms, but comprehensive assessment of CFS goes further than just symptoms.

Eifert and Wilson [26] cautioned for methodological pitfalls in multi-dimensional assessment. Studies on the relationships between different dimensions can be confounded by the use of different methods of assessment across the dimensions. The surfacing of a set of variables that requires a higher degree of subjective interpretation as a separate dimension (subjective experience), in contrast to the standardized psychological instruments measuring the same concept, supports this notion. Since different modes of assessment may yield different results, it is appropriate to measure every dimension by different methods. We are currently carrying out studies in which, apart from self-report, other modes of assessment are also being used. These include standardized neuropsychological laboratory tests, the actometer (an apparatus to



measure the level of physical activity), and self-monitoring. The use of multiple measures increases the complexity of the method, and results in rather a vast package of instruments. This is clearly a disadvantage in clinical practice. In research settings, however, multi-dimensional assessment in CFS has many advantages. This method provides a comprehensive assessment of patients with CFS. Clinical status, disability, and other relevant processes are measured. Multi-dimensional assessment may fill the void that exists in methods to identify homogeneous (sub)groups in patients with unexplained chronic fatigue. Studies that evaluate the effects of therapeutic interventions should concentrate not only on a possible reduction in fatigue severity or other symptoms, but also on the effects of treatment on other aspects of the patients' functioning. Also, a multi-dimensional assessment might be useful in tailoring therapy to the individual patient.

Some critical remarks with respect to the present study have to be made. The sample was self-referred. Generalizing results to other cohorts of patients with CFS might then be difficult. To test generalizability, the present study sample was compared with a recently tested group of 68 patients with unexplained fatigue who were referred to the General Internal Medicine out-patient clinic of our hospital by their family doctor or a specialist. There were no differences between groups with respect to socio-demographic data or any other measure we used, except that self-referred patients reported more complaints and had a longer duration of complaints.

Information on physical abnormalities and treatment relied on self-report. This made the exclusion of patients with a medical condition known to produce fatigue difficult. To overcome this problem as far as possible, complaints had to have been present for more than 1 year. This minimized the risk of including patients with delayed convalescence of a viral infection. Moreover, we excluded all patients who had not been investigated by at least one specialist.

The dimensions we have found should not be considered as exhaustive in measuring all relevant aspects of CFS, nor is it said that the identified dimensions should be measured by the instruments used in the present study. But the main theme here is that, to get a comprehensive picture of CFS, a multi-dimensional approach should be applied.

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