

# The Fennell Phase Inventory in a Belgian Sample

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**ABSTRACT.** The present study is a follow-up of the research conducted by Jason, Fennell et al. (1995, 1999, 2000) on a multistage theory for chronic fatigue syndrome (CFS). This multistage model is a very promising method for the evaluation of patients suffering from CFS and could facilitate the appropriate selection of various psychosocial therapies that improve the patient's ability to cope with their illness. Four predictive factors emerged with moderate to excellent reliability. A Spearman's rank correlation revealed positive correlations between our four-factor model and the three-factor model identified by Jason et al. (1999). A correlation matrix between the dimensional psychological investigation and the Fennell Phases revealed characteristics as suggested by previous research. Biological parameters varied over the different phases suggesting an important interaction between body and psyche. *[Article copies available for a fee from The Haworth Document Delivery Service: 1-800-HAWORTH. E-mail address: <docdelivery@haworthpress.com> Website: <<http://www.HaworthPress.com>> © 2004 by The Haworth Press, Inc. All rights reserved.]*

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### **INTRODUCTION**

Chronic Fatigue Syndrome (CFS) is a severe disabling illness of unknown etiology, which had occurred in epidemic and endemic forms all over the world (1). The number of sufferers has dramatically increased as has the attention given to CFS by the professional and popular press. Regardless of its etiology or pathogenesis, the symptom complex labelled CFS is associated with prolonged moderate-to-severe disability (2-4).

The outcome of severely incapacitated patients with CFS is poor (5) because after a few years the condition is confounded by the effects of most chronic illnesses, such as deconditioning as well as loss of employment, relationships and income. The process thus becomes functionally disabling due to the multiplicity of symptoms and the profound inability to produce energy (3,5). Chronic conditions like CFS are imposed into the lives of the patients. Therefore, patients need to change in their physical, psychological, and social-interactive worlds.

A multistage management program for CFS (7) was developed by Fennell and Jason (7) that recognizes the influences of cultural, psychosocial and medical factors in CFS assessment and treatment (7). Patients may progress through the phases of the model as they learn to negotiate the illness experience (8). This model seems based on previously proposed stage theories that became a useful method or organized information in different fields into typologies, categories, or hierarchical constructs. Such frameworks have had a variety of applications such as to help understand how individuals use medical services, aid in the adoption of preventive behavior and suggest how to stop unhealthy behaviour (e.g., 9). These models may further assist researchers in evaluating the opinion-based research conclusions in the field of CFS (e.g., 6) and may help counsellors to better guide their patients.

According to Fennell, in *Phase 1*, the individual moves into a crisis mode with illness onset, wherein he/she experiences the traumatic aspects of a new illness. Factor and cluster analysis (6) characterize phase 1 with high CFS severity, fatigue severity and physical disability, as well as a short illness duration which can lead to denial of illness length, expectation of a cure, feelings of shock, and constant thoughts about the illness (6). With respect to coping styles, (10) patients in a crisis are nei-

ther engaged in information-seeking activities nor in accommodating to the illness.

In *Phase 2*, the person with CFS continues to experience chaos, followed by an eventual stabilization of the individual's symptoms. In practice, characteristics of Phase 2 are low CFS severity, fatigue severity and physical disability. Early in the process of learning how to cope, patients begin to accept the length of the illness and seek support and information (6) through life structuring. Accommodation to illness and information-seeking strategies are sporadically found (10) and patients start to improve their emotional stability.

In *Phase 3*, the person accepts the lengthiness and ambiguity of this chronic illness and creates meaning out of the illness experience through accommodation to the illness and information-seeking (10). According to Fennell, patients may experience a relapse in physical symptoms during Phase 3 (6).

Finally, in *Phase 4*, the person with CFS achieves integration, wherein he/she is able to integrate pre- and post-illness self-concepts (6,10), suggesting a state of psychological integration. Although CFS severity, fatigue severity, and physical disability could still be present, the patients report an understanding of the experience of relapse of their illness (6).

The present study examined the structure of the Fennell phases as described by Jason and Fennell (6,10) in a Belgian sample. Our department included biological parameters to verify if these variables vary over the different phases. When entering another phase, patients should use better coping strategies and gain more control that should reduce stress and therefore influence bodily actions and subsequently biological parameters.

## ***PATIENTS AND METHODS***

### ***Patients***

All subjects came to our outpatient fatigue clinic (Brussels) to complete a medical examination to exclude other possible explanations for their fatigue in connection with the diagnosis of CFS (Spring 2002). All patients were seen between 8.30 and 11.30 a.m. to minimize the changes in parameters due to diurnal variation. Blood samples were transported to the laboratory and lymphocytes. Only confirmed CFS patients (11)

were included in the statistical analysis. All patients signed an informed consent. No control group was included as the particular phases and subsequently included CFS patients would be compared.

### ***Immunological Data (Immunophenotyping)***

Anticoagulated blood (EDTA) was collected between 9:00 and 11:00 a.m. and used for white blood cell enumeration, differential counts (Celldyn 4000, Abbott Laboratories, Abbott Park, IL 60064, USA) and flow cytometric studies. Lymphocyte populations were analyzed with dual color direct immunofluorescence on a EPICS<sup>®</sup> xl flow cytometer (Coulter, Miami, Florida, USA), with aid of the System I<sup>™</sup> computer software. One hundred  $\mu$ l of whole blood was incubated with the appropriate combination of monoclonal antibodies for 25 minutes at 4°C. Red blood cells were lysed using lysis buffer (Becton Dickinson, CA, USA) for 7 minutes, centrifuged and washed once with 2 ml phosphate buffered saline (PBS). Resuspension was immediately followed by cell analysis. Commercially available (Becton-Dickinson) phycoerythrin (PE) or fluorescein isothiocyanate (FITC) labelled monoclonal antibodies were used. Estimates of absolute numbers of lymphocyte subsets were determined by multiplying peripheral lymphocyte counts by the percentage of each surface marker.

### ***Peripheral Blood Mononuclear Cells (PBMC), Cell Extracts and Serum***

PBMC were separated from heparinized blood (30 ml) by Ficoll-Hypaque density gradient centrifugation within four hours of blood draw. The PBMC were then stored at  $-70^{\circ}\text{C}$  until cytoplasmic extracts could be made. Cytoplasmic extracts were prepared in the presence of the protease inhibitors aprotinin, leupeptin, pefabloc-SC and EDTA (Roche Biochemicals, Mannheim, Germany). Serum was separated from coagulated blood in the same timeframe according to standard laboratory procedures and stored at  $-70^{\circ}\text{C}$  until analyzed.

Quantification of total proteins in the patient cell extracts and serum was performed using a modified Bradford assay method (Bio-Rad Laboratories, Hercules, CA) according to the manufacturer's procedure.

### ***Quantification of 37-kDa 2-5A-BP in PBMC Extracts***

Analysis was performed by sodium dodecylsulfate polyacrylamide gel electrophoresis (SDS-PAGE), using a metaperiodate (10 mM final

concentration, pH 4.75) oxidized 2-5A trimer radiolabeled at the 3' end with  $^{32}\text{P}$ -pCp as the reporter ligand. Briefly, the radiolabeled 2-5A trimer was incubated with 200  $\mu\text{g}$  of cell extract at 2-4°C for 15 minutes to allow for interaction with any 2-5A-BP present and was then covalently attached to the binding proteins by the addition of cyanoborohydride (20 mM in 100 mM phosphate buffer, pH 8.0). The reduction reaction was allowed to proceed for 20 minutes at 2-4°C. SDS-PAGE buffer, including a tracking dye, was added to the samples which were incubated at 95°C for 5 minutes. The samples were then subjected to standard SDS-PAGE using a 4% stacking and a 10% separating gel. The gel was then dried and subjected to autoradiography (Bio-Rad Laboratories Molecular Imager<sup>®</sup> Fx, Hercules, CA). The autoradiographs were analyzed by densitometry, and quantification of any 2-5A-BP present was performed using specialized software (Quantity One<sup>®</sup> Software from Bio-Rad Laboratories, Hercules, CA). The results were expressed as the percentage of 80-kDa native RNase L present in the sample ( $80\text{-kDa}/[80\text{-kDa} + 37\text{-kDa}] \times 100$ ).

### **Assessments**

*Demographic Variables:* Socio-demographic information including age, gender race, education level, marital status, and number of children were requested from all study subjects.

*The Fennell Phase Inventory (FPI):* The construction of the FPI has been extensively described by Jason et al. (8). Twenty items were generated. Each item was rated on a 5-point scale with 1 being “definitely do not agree” and 5 being “very strongly agree.” The FPI items included in the Crisis Phase are 1, 5, 9 and 17; the Stabilization Phase consisted of 2, 3, 6, 7, 10, 11, 14, 15, 18 and 19; the Integration Phase included 4, 8, 16 and 20 (8). Criteria for the Crisis group were a crisis score of 3.00 or above and Stabilization and Integration scores of 3.30 or below. Criteria for the Integration group were a crisis score of 2.50 or below, a Stabilization score of 2.80 or below, and an Integration score of 4.25 or above. In this study, a Dutch translation of the FPI was used. This translation was reviewed by two independent mental health professionals in order to improve intelligibility.

*Medical Outcomes Study SF-36:* The SF-36 assesses functional status and well-being or quality of life. Its psychometric properties are well characterized; it has been documented to have good reliability and validity in a wide variety of patient populations (12-14).

The SF-36 contains 8 subscales: physical, emotional, social, and role functioning, body pain, mental health, vitality, and general health. Higher scores indicate better health and less body pain. Scoring of the SF-36-item was performed as described in the manual (15).

The *Symptom Checklist 90 (SCL-90)* measures psychological well-being. The scale consists of 90 items on a 5-point scale. The total score ranges from 0 to 450. A low total score reflects high psychological well-being. The scale is widely used, and the scores show good reliability and discriminating validity (16). The applied normscale included the general population (16).

The *Checklist Individual Strength (CIS-20r)* is a questionnaire designed to measure four aspects of fatigue, namely subjective experience of fatigue, concentration, motivation, and physical activity. Each subscale has a maximum score of 7. High scores indicate a high level of fatigue, a high level of concentration problems, low motivation, and a low level of physical activity. The scores show good reliability and discriminating validity (17,18).

The '*Utrechtse Copinglijst*' (*Coping-Questionnaire: UCL*) was constructed to measure coping-behavior in different populations. The scale consists of 47-items on a 4-Likert scale. The scores range from 0-188. The UCL consists of 7 subfactors: confronting, palliative behaviour, avoidance, social support, passive behaviour, expressing emotions and optimism. High scores indicate the presence of at least one of the subfactors. The scale is widely used and has good psychometric properties (19).

### ***Statistical Analysis***

Apart from the computation of essential descriptive statistics, a factor analysis was performed on the batch of the Fennell Phase Inventory. The factor analysis procedure was the same as used by Fennell (8), i.e., a principle components based factor extraction followed by a Varimax rotation. We decided not to include a cluster analysis in comparison to Fennell et al. (8). Using the rotated principle component factor seems cleaner than applying another procedure.

The number of factors was based on the criterion that the eigenvalues should be larger than 1 to deliver meaningful factors. A Scree plot was used to validate the selection of factors, A visual inspection of the factor plots indeed revealed that an orthogonal factor rotation such as the Varimax procedure is appropriate. Further Spearman rank correlations were computed for quantification of the strength of association between

the immunological variables and the factors; and also between the Fennell phases and the factors. All computations were performed using the statistical package SPSS (SPSS, 2000. SPSS Syntax Reference 10. SPSS Inc. Chicago, IL, USA). A Bonferroni correction was included to minimize Type I error.

## **RESULTS**

### ***Patients***

This consecutively randomized, cross-sectional study included forty-four subjects with a mean age of 34.64 years (SD = 9.71) and a mean onset of 7.30 years (SD = 7.28). Thirty-five were females (80%). Twenty-three (52%) subjects also fulfilled the CFS criteria of Holmes et al. (20) besides the 1994 criteria (10). The mean education was 8 years (high-school plus higher education) with standard education of 2.5 years; most study subjects (40%) had completed high school.

Most of the subjects were divorced (n = 18; 43%). A large proportion had no children (n = 25; 58%). Finally, a lot of the subjects were still working full-time (n = 19; 45%) (Table 1).

### ***Dimensional Assessment***

The scores on the CIS-20r revealed incapacitating subjective fatigue, physical activity, difficulty concentrating, and reduced motivation (Table 2) (17). Our sample also showed clinically significant psychological distress as measured by the SCL-90 (15: p. 39). All subscales were elevated except for the 'agoraphobia' subscale which presented a mean score. The SF-36 gives an indication of the physical disability. All scores showed incapacitated levels (14: p. 10:20) even compared with a clinically depressed population (14: p. 10:26). Our sample showed no avoidance behavior (Table 2) as measured by the UCL. All the other coping behavior strategies fell within the mean range except for the subscale 'palliative behavior' (17: 2c).

The mean scores of the immunological parameters are presented in Table 3. All RNase L levels were clinically elevated (> .5).

### ***Reliability***

The internal consistency of the entire questionnaire was calculated using Cronbach's alpha. This resulted in a  $\alpha$ -value of .69.

TABLE 1. Demographic variables

Variable		N	%
Marital status	Single	7	17
	Married	11	26
	Divorced	18	43
	Widowed	5	12
	Other	1	2
Children	0	25	58
	1	2	5
	2	12	28
	3	3	7
	Other	1	2
Work situation	Full-time	19	45
	Part-time	6	14
	Sick-leave	5	12
	Students	5	12
	Unemployed	7	17

### *Factor Analysis*

A principle component analysis with varimax rotation (limited to 4 factors) was conducted by analogy with Jason et al. (1999). The Bartlett's tests of sphericity was  $< .01$  (chi-quadrant-value = 423.6 (df = 190),  $P < .001$ ) and the Kaiser-Meyer-Olkin measure of sampling adequacy was .53. Four factors emerged (eigenvalues  $> 1.0$ ) and they explained 57.4% of the sample variance with factor 1: 20.7%, factor 2: 14.4%, factor 3: 11.3% and factor 4: 11% (see Table 3). Cronbach's alpha values for these factors were, respectively, .71, .71, .62 and .56. Leaving item 9 out of the first factor increases the reliability to .83. Items 10 and 13 did not load at the .45 level on this sample, and were eliminated from the analyses where factor scores were computed. An unlimited factor analysis was also performed explaining more variance but reporting low reliability scores. The same phenomena occurred when performing a limited three factor analysis. Therefore, the factor analysis limited to four factors was considered as most suitable (Tables 4 and 5).

TABLE 2. Mean variables of the different psychological questionnaires (N = 43-44)

Variable	Mean	Median	Standard Deviation
<b>Fennell Phase</b> Crisis	14.4	14.0	2.8
Stabilization	28.1	28.0	6.2
Integration	12.2	12.0	2.9
<b>CIS-20</b> Fatigue	50.1	52.5	8.5
Concentration	25.7	27.0	8.4
Motivation	12.2	18.0	6.7
Activity	14.6	16.0	5.9
<b>SCL-90</b> Agoraphobia	13.0	11.0	6.6
Anxiety	23.0	22.0	7.7
Depression	39.4	38.0	11.5
Hostility	10.5	10.0	3.6
Insufficiently	26.1	26.0	7.3
Sensitivity	37.4	36.0	13.1
Sleep problems	8.3	8.0	3.5
Somatisation	34.9	34.0	10.1
Psychological distress	208.4	198.0	55.3
<b>SF-36</b> Physical functioning	48.5	50.0	25.3
Emotional role	48.9	50.0	44.2
Social role	38.6	37.5	22.8
Role functioning	11.3	0.0	26.5
Bodily pain	41.3	41.0	26.3
Mental health	51.3	52.0	20.5
Vitality	30.9	30.0	18.5
General health perception	20.0	20.0	12.8
<b>UCL</b> Active behavior	16.7	17.0	3.5
Palliative behavior	24.7	24.0	4.2
Avoidance behavior	8.7	8.0	2.2
Socializing	13.8	14.0	3.4
Passive behavior	16.3	14.0	13.5
Expression	6.1	6.0	1.7
Reassurance	12.5	12.0	5.5

TABLE 3. Mean scores of the immunological parameters (N = 44)

Variable	Mean	Median	Standard Deviation
CD3+	1475.8	1357.0	545.6
CD3%	76.0	80.0	9.2
CD4+	972.0	932.0	435.5
CD4%	49.1	49.0	9.6
CD8+	569.2	548.5	228.4
CD8%	30.5	31.0	9.1
CD4CD8	1.8	1.7	.9
CD19+	234.9	187.0	167.8
CD19%	11.6	11.0	4.9
NK	199.6	142.0	175.7
NK%	10.6	7.0	8.6
CD2+	1647.4	1468.0	535.2
CD2%	84.1	85.5	5.6
CD25+	186.4	152.0	98.1
CD25%	9.3	9.0	2.9
CD19CD5+	40.9	27.0	44.9
CD19CD5%	1.9	1.5	1.6
RNase L	7.2	3.1	11.3

TABLE 4. Unlimited factor analysis (cut-off on the items  $\geq .45$ )

Factors	Items	Variance	Cronbach's $\alpha$
Factor 1	20, 16, 9, 18, 15, 11	21%	.69
Factor 2	12, 7, 8	12%	.59
Factor 3	4, 3, 19	10.4%	.16
Factor 4	6, 14	9.8%	.70
Factor 5	17, 1	8.4%	.42
Factor 6	10, 5	8.2%	.43
Factor 7	13, 2	7.2%	.47
		77%	.70

TABLE 5. Factor analysis limited to three factors (cut-off on the items = &gt; .45)

Factors	Items	Variance	Cronbach's $\alpha$
Factor 1	20, 15, 9, 11, 16, 18, 7, 12, 3	25.6%	.78
Factor 2	5, 8, 14	11.3%	.49
Factor 3	1, 2, 4, 6, 17	11.1%	.53
		48%	

Factor 1 included characteristics of the Stabilization Phase, when looking at the content of the different factors. Factor 2 was called the Integration Phase, factor 3 was called the Resolution phase, and, finally, factor 4 was called the Crisis Phase (Table 6).

The aforementioned four-factor model presented the best psychometric capacities. In an unlimited factor analysis 77% of the variance could be explained but with low reliability scores. A limited three-factor model explained 44.6% of the variance and low reliability scores (Tables 4 and 5).

### Validity

A Spearman's rank correlation coefficient was calculated to compare relationships between our factors and the factors defined by Fennell and to investigate the internal validity. The results are presented in Table 7.

The Crisis factor defined by Fennell correlated negatively with the Stabilization Phase ( $P = .006$ ) and showed a positive and significant correlation with our Crisis Phase ( $P < .001$ ). The Stabilization factor defined by Fennell correlated positively and significantly with our Stabilization Phase ( $P < .001$ ), and also with our Integration Phase ( $P < .001$ ) and our Resolution Phase ( $P < .001$ ). Finally, factor 4, as defined by Fennell, showed a significant positive correlation with our Stabilization Phase.

Table 8 shows the construct validity using the correlations between the psychosocial questionnaires and our four factors. The Crisis Phase correlates positively with subjective fatigue (CIS-20), motivation (CIS-20), somatic complaints (SCL-90), and sleep problems (SCL-90). A negative correlation exists between the crisis factor and social functioning (SF-36). The Stabilization Phase correlated positively with the Integration Phase and with coping behavior 'put into perspective.' There was

TABLE 6. Four-factor model for the Fennell Phase Inventory (cut-off score = .45)

Factor 1 <i>Stabilization</i>		Factor 2 <i>Integration</i>		Factor 3 <i>Resolution</i>		Factor 4 <i>Crisis</i>	
<i>Item</i>	<i>Loading</i>	<i>Item</i>	<i>Loading</i>	<i>Item</i>	<i>Loading</i>	<i>Item</i>	<i>Loading</i>
15	.86	19	.70	5	.72	1	.70
11	.83	12	.70	14	.70	17	.62
16	.71	7	.69	6	.52	4	.55
9	-.67			8	.48	2	.45
20	.63						
3	.58						
18	.54						

TABLE 7. Spearman's Rank Correlation Coefficient between the phases defined by Fennell and our four factors (N = 44)

Fennell factors	Stabilization		Integration		Resolution		Crisis	
	R	P	R	P	R	P	R	P
Crisis factor	-.41	<.006	-.17	.28	.38	<.01	.51*	<.001
Stabilization	.66*	<.001	.48*	<.001	.46*	<.001	-.27	.08
Integration	.63*	<.001	.19	.22	.38	<.01	.06	.71
Factor 4	.56*	<.001	.10	.54	.37	<.01	.34	<.03

\*Significant at the 0.1 level

also an inverse correlation with the 'Depression' subscale of the SCL-90. The Integration Phase correlated positively with the coping behavior 'seeking support.' The Resolution Phase correlated inversely with immune parameters (RNase L and CD8+).

## DISCUSSION

The present study supports a distinction between four factors (8) within the Dutch Fennell Phase Inventory as a model for evaluating CFS patients. Together, these four factors explained 57.4% of the variance although the cluster analysis was excluded in comparison with the statistical approach by Fennell et al. (8). All four factors presented with

TABLE 8. Spearman Correlation Coefficients (r; p)

Variable	Factor 1	Factor 2	Factor 3	Factor 4
	<i>Stabilization Phase</i>	<i>Integration Phase</i>	<i>Resolution Phase</i>	<i>Crisis Phase</i>
Factor 2: Integration Phase	.54** < .001			
Subjective fatigue				.39** < .008
Motivation				.42** < .005
Depression	-.39* < .01			
Somatic complaints				.33* < .03
Sleep problems				.37* < .02
Social functioning				-.39** < .009
Seeking support		.33* < .03		
Reassurance	.36* < .02			
RNase L			-.36* < .02	
CD8+ (#/mm <sup>3</sup> )			-.36* < .03	

\* Significant at the .01 level (two-tailed)

\*\* Significant at the .05 level (two-tailed)

moderate to excellent reliability, with the Stabilization Phase having the strongest statistical characteristics.

Table 9 presents the different items in the Fennell Phase Inventory comprising each factor. Several differences were evident in a comparison with Jason et al. (8), suggesting differences between the Belgian and the American CFS patients studied. One reason for the differences may be the self-reported diagnosis in the study by Jason et al. (8). In that study, individuals indicated whether a physician had diagnosed them with CFS, increasing the chance of cases of idiopathic chronic fatigue and not CFS. In our study, subjects were diagnosed according to the Fukuda et al. (11) CFS criteria by the physicians and an extensive medical examination in our department. Another possible explanation includes a difference in illness representation between Belgian and American chronic patients.

In the current study, the Crisis Phase consisted of items 1, 2, 4 and 17, whereas Jason et al. (8) included items 1, 5, 9, and 17. The Stabilization Phase in our study was created by items 3, 9, 11, 15, 16, 18, and 20, in comparison with items 2, 3, 6, 7, 10, 11, 14, 15, 18, and 19 by Jason et al. (8) (Table 9). Our Integration Phase included items 12 and 19 in comparison with 4, 8, 16, and 20 in the Jason et al. study (8). Finally, the

TABLE 9. The Fennell Phase Inventory

Item	I	II
1. I feel like I am falling apart.	A	A
2. I am just beginning to recognize when and how my symptoms occur.	B	A
3. I am beginning to accept the fact that I will never be completely like I was before the illness and that I will need to become a new person.	B	B
4. I now have learned that living with the illness involves getting sicker, at times, and improving, at times.	C	A
5. The primary way for me to improve is if my physician finds me the right treatment.	A	D
6. I am beginning to seek support and information from others who have or who know about the illness.	B	D
7. I am in the early process of creating meaning about my illness experience.	B	C
8. I have gained a sense of myself that is blended—a combination of my life before and after I first got sick.	C	D
9. I need to know with certainty when and if I am going to get better.	A	X
10. I just want to feel like I have some control over my life.	B	X
11. I am beginning to learn how to live with the unknown or chronic nature of my illness.	B	B
12. I have better and more satisfying relationships with people I care about since I first became sick.	D	C
13. It is my fault I got sick.	D	X
14. I am just starting to realize that there may be things I can do to help myself feel better.	B	D
15. I am starting to see my illness experience as having some value.	B	B
16. I am proud of myself for living with this illness.	C	B
17. I think about my illness all of the time.	A	A
18. I am just beginning to stabilize (i.e., feeling a bit less confused and a bit more ordered).	B	B
19. For the first time, I am beginning to have compassion and love for myself and for what I have endured.	B	C
20. I am a better and wiser person since I first got sick.	C	B

I: Factor scores found by Jason et al. (1999)

II: Factor scores of our population

A: Crisis Phase

B: Stabilization Phase

C: Integration Phase

Resolution Phase in our study presented with items 5, 6, 8, and 14. The correlation scores suggested a good resemblance with the factors of Jason et al. (8), although both the Integration and Resolution Phases correlated better with the Stabilization Phase.

The Spearman's rank correlations indicate relationships between our factors and the dimensional psychological variables. The Crisis Phase was related to more somatic problems, more sleep problems, more subjective fatigue, reduced motivation to perform activities, and more social functioning possibly due to increased attention by friends and family members in order to support a sick person.

Second, the Stabilization Phase seemed to incorporate better coping strategies. In seeking order in chaos, subjects appear to seek out information. Third, the Integration Phase was positively correlated with seeking support (UCL: coping strategy), indicating the willingness to become active in their disease process.

Finally, the Resolution Phase seems negatively correlated with RNase L and CD8+, suggesting an improvement in the immune defense of the CFS patient. Better biological parameters in this phase could indicate the interaction between psyche and body. In the first two phases, people experience more stress according to the theoretical construct. Extensive research already pointed out the importance of stress factors on the immunity and subsequently bodily functions.

Our statistical results, thus, indicated a good validity but also a good reliability of this translated questionnaire (Dutch version).

Several limitations, however, should be taken into consideration. First, these findings are based on small sample sizes and caution needs to be exercised until they are replicated with larger samples. Second, because all the included patients came from an outpatient clinic, our subjects could not be seen as a community sample. These results, influenced by a selection bias, should be interpreted with caution although they support findings from previous research. Third, the data is cross-sectional, therefore no statements on causality can be made. Finally, a large number of comparisons were performed. This makes it more likely that differences emerge by chance on at least some of the tests, thereby increasing the risk of Type I error. However, it is important to realize that decreasing Type I error by a Bonferonni adjustment automatically increases Type II error.

When validated by larger samples, this Phase Inventory shows promising characteristics for clinical use in CFS. Through an understanding of stage paradigms, patients, families and caregivers may have a better understanding of what is transpiring for patients with CFS. As a result,

they would then have a method for validating their feelings, stabilizing and structuring their responses, developing meaning for their experiences, and possibly transcending them.

### CONCLUSIONS

The Fennell Phase Inventory (Dutch version) seems a promising tool for clinical use in CFS patients. The questionnaire presents with scores suggesting good reliability and validity. Our department further examines this approach in a larger sample and in control populations.

### REFERENCES

1. Ax S, Gregg VH, Jones D. Coping and illness cognitions: Chronic fatigue syndrome. *Clin Psychol Rev* 2001; 21(2): 161-182.
2. Barrows DM. Functional Capacity Evaluations of persons with chronic fatigue syndrome. *Am J Occupation Therapy* 1995; 49(4): 327-337.
3. Peterson D. Chronic fatigue syndrome and disability. *J Chronic Fatigue Syndr* 1997; 3(4): 5-7.
4. De Becker P, Roeykens J, Reynders M, McGregor N, De Meirleir K. Exercise capacity in chronic fatigue syndrome. *Arch Intern Med* 2000; 160: 3270-3277.
5. Hamilton WT, Hall GH, Round AP. Frequency of attendance in general practice and symptoms before development of chronic fatigue syndrome: A case-control study. *Brit J Gen Practice* 2001; 51: 553-558.
6. Jason LA, Fennell PA, Taylor RR, Fricano G, Halpert PA. An empirical verification of the Fennell Phases of the CFS illness. *J Chronic Fatigue Syndr* 2000A; 6(1): 47-56.
7. Fennell PA. The four progressive stages of the CFS experience: A coping tool for patients. *J Chronic Fatigue Syndr* 1995; 1(3/4): 69-79.
8. Jason LA, Fennell PA, Klein S, Fricano G, Halpert, J. An investigation of the different phases of the CFS illness. *J Chronic Fatigue Syndr* 1999; 5(3/4): 35-54.
9. Fennell PA. A Four-Phase Approach to Understanding Chronic Fatigue Syndrome. In: Jason LA, Fennell PA, Taylor RR. (eds.) *The Handbook of Chronic Fatigue Syndrome*. John Wiley & Sons, Inc., New Jersey: 155-175.
10. Jason LA, Fricano G, Taylor RR, Halpert J, Fennell PA, Klein S, Levine S. Chronic fatigue syndrome: An examination of the phases. *J Clin Psychol* 2000B; 56(12): 1497-1508.
11. Fukuda K, Strauss SE, Hickie I, Sharpe MC, Dobbins JG, Komaroff A and the International Chronic Fatigue Syndrome Study Group. The chronic fatigue syndrome, a comprehensive approach to its definition and study. *Ann Intern Med* 1994; 121: 953-959.
12. Wells KB, Stewart A, Hays R, Camp P. The course of depression in adult outpatients. Results from the Medical Outcomes Study. *Arch Gen Psychiatry* 1992; 49(10): 788-994.

13. McHorney CA, Ware JE, Lu JFR, Sherbourn CD. The MOS 36-item Short Form Health Survey (SF-36): III. Tests of data quality, scaling assumptions, and reliability across diverse patients groups. *Med Care* 1994; 32: 40-66.
14. Stewart AL, Greenfield S, Hays RD, Wells K, Rogers WH, Berry SD et al. Functional Status and well-being of patients with chronic conditions. Results from the Medical Outcomes Study. *JAMA* 1989; 262: 907-913.
15. Ware JE, Snow KK, Kosinski M, Gandek B. *SF-36 Health Survey Manual and Interpretation Guide*. Boston: The Health Institute, 1993.
16. Arrindell WA, Ettema JHM. *SCL-90: Handleiding bij een multidimensionale psychopathologie-indicator* (Guide on a multidimensional psychopathology-indicator). Lisse: Swets & Zeitlinger BV, The Netherlands, 1986.
17. Vercoulen JHMM, Swanink CMA, Fennis JFM, Galama JMD, van der Meer JWM, Bleijenberg G. Dimensional assessment of chronic fatigue syndrome. *J Psychosom Res* 1994; 38: 383-392.
18. Vercoulen JHMM, Alberts M, Bleijenberg G. De Checklist Individual Strength. *Gedragstherapie* 1999; 32(2): 131-136.
19. Schreurs PJG, Van De Willige G, Brosschot JF, Tellegen B, Graus GMH. *De Utrechtse Copinglijst: UCL, Omgaan met problemen en gebeurtenissen*. Lisse, Swets & Zeitlinger, 1993.
20. Holmes GP, Kaplan JA, Gantz NM, Komaroff AL, Schonberger LB, Straus SE et al. Chronic fatigue syndrome, a working case definition. *Ann Intern Med* 1988; 108: 387-389.

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