

Coping styles in people with chronic fatigue syndrome identified from the general population of Wichita, KS[☆]

Urs M. Nater^{a,b}, Dieter Wagner^a, Laura Solomon^{a,1}, James F. Jones^a, Elizabeth R. Unger^a,
Dimitris A. Papanicolaou^{c,2}, William C. Reeves^a, Christine Heim^{a,b,*}

^a*Viral Exanthems and Herpesvirus Branch, Division of Viral and Rickettsial Diseases, National Center for Infectious Diseases, Centers for Disease Control and Prevention, Atlanta, GA, USA*

^b*Department of Psychiatry and Behavioral Sciences, Emory University School of Medicine, Atlanta, GA, USA*

^c*Department of Medicine, Emory University School of Medicine, Atlanta, GA, USA*

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Abstract

Objective: Studies of primary and tertiary care patients suggest that maladaptive coping styles contribute to the pathogenesis and maintenance of chronic fatigue syndrome (CFS). We assessed coping styles in persons with unexplained fatigue and nonfatigued controls in a population-based study. **Methods:** We enrolled 43 subjects meeting the 1994 Research Case Definition of CFS, matching them with 61 subjects with chronic unexplained fatigue who did not meet criteria for CFS [we term them insufficient symptoms or fatigue (ISF)] and 60 non-ill (NI) controls. Coping styles and clinical features of CFS were assessed using standard

rating scales. **Results:** Subjects with CFS and ISF reported significantly more escape-avoiding behavior than NI controls. There were no differences between the CFS and ISF subjects. Among participants with CFS, escape-avoiding behavior was associated with fatigue severity, pain, and disability. **Conclusions:** We demonstrate significantly higher reporting of maladaptive coping in a population-based sample of people with CFS and other unexplained fatiguing illnesses defined by reproducible standardized clinical empirical means in comparison to NI controls.

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Introduction

Chronic fatigue syndrome (CFS) is an important public health problem that affects 400,000 to 900,000 adults in the United States [1,2]. Chronic fatigue syndrome is defined as

an unexplained persistent or relapsing fatigue of at least 6 months' duration, which is not relieved by rest, and causes substantial reduction in occupational, social, and personal activities. The fatigue must be accompanied by at least four of eight case-defining symptoms: unusual fatigue after exertion, impaired memory or concentration, unrefreshing sleep, headaches, muscle pain, joint pain, sore throat, and tender lymph nodes [3]. The etiology of CFS remains unknown but most likely involves contributions of multiple biological, psychological, social, and environmental factors. Cognitive-behavioral factors, such as maladaptive coping styles, may contribute to the pathogenesis and maintenance of CFS [4]. Identification and description of maladaptive coping styles associated with CFS might promote insight into the psychobiological mechanisms of the illness and provide targets for the development or improvement of

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* Corresponding author. Department of Psychiatry and Behavioral Sciences, Emory University School of Medicine, 101 Woodruff Circle, WMRB, Suite 4311, Atlanta, GA 30322, USA. Tel.: +1 404 727 5835; fax: +1 404 727 3233.

E-mail address: cmheim@emory.edu (C. Heim).

¹ Current Affiliation: Human Research Protection Office, Office of the Chief Science Officer, Centers for Disease Control and Prevention, Atlanta, GA, USA.

² Current Affiliation: Merck and Co., Rahway, NJ, USA.

intervention strategies that utilize cognitive-behavioral techniques [5,6].

Coping is a cognitive-behavioral process that unfolds in the context of a situation or condition perceived as personally relevant and challenging or that exceeds the individual's resources to handle the particular demand [7]. The coping process is initiated as a response to the individual's appraisal of the situation as harmful or threatening, and this appraisal often occurs in combination with intense negative emotions. Initial coping often focuses on down-regulating stressful emotional reactions that interfere with effective coping [8].

Several studies have documented dysfunctional or maladaptive coping styles in CFS [9]. Both primary and tertiary care patients with chronic fatigue were shown to use significantly more escape-avoidance strategies than healthy controls [10,11]. Escape-avoidance strategies involve disengaging or staying away from a stressful situation and its behavioral and cognitive/emotional consequences. Typical strategies in response to a stressful situation might encompass cognitive avoidance ("refused to believe that it had happened"), avoidant actions ("slept more than usual"), denial ("refused to believe that it had happened"), or wishful thinking ("wished that the situation would go away or somehow be over with it") (examples are items of the Ways of Coping Checklist, which was used in the current study [12]). In a study of twins, Afari et al. [13] observed that twins with CFS or other chronic fatigue utilized more avoidance strategies than their nonfatigued siblings. Finally, a recent study showed that CFS patients more frequently employed defensive coping styles than did healthy controls or patients with other chronic illness [14]. However, a recent community-based study of chronic fatigue showed that no differences existed with regard to coping styles between individuals with CFS and healthy controls [15]. Cognitive appraisals and maladaptive coping styles were also associated with clinical features of CFS (e.g., severity of fatigue, impairment, illness burden, psychosocial problems, and psychiatric comorbidity) [16].

Taken together, these studies indicate that CFS is associated with an escape-avoidance coping style. Such maladaptive coping may result in an inadequate regulatory adaptation to stress as well as in exaggerated or prolonged stress responses that are associated with increased neuroendocrine, autonomic, and immune activation [17]. This sort of maladaptive prolonged activation may lead to persistent fatigue and other related symptoms [18]. Cognitive-behavioral factors, such as coping styles, must be considered in studies of risk factors, clinical course, pathophysiology, and therapy of CFS.

Unfortunately, most of published studies of coping styles in CFS enrolled patients referred from primary or tertiary care clinics, from self-support groups, or from responses to advertisements. Their findings reflect inestimable recruitment bias. Clearly, individuals with CFS who see physicians represent a minority of those with the illness. For example, studies of CFS in the general population of Chicago have

found that only 66% of people with CFS have consulted a physician concerning their fatigue, and only 19% of them received a diagnosis of CFS [1], and studies in the general population of Wichita have similarly reported that only 16% of people with the illness have been diagnosed by or treated for CFS by a physician [2]. In addition to recruitment bias, virtually all published studies of coping styles of persons with CFS inadequately describe how CFS was diagnosed, and essentially, all of the studies lack information regarding the selection and characterization of nonfatigued controls. These deficiencies hamper the interpretation and comparison of the available information.

We conducted the present study to examine coping styles in persons with CFS, unexplained chronic fatigue that was not CFS [termed insufficient symptoms or fatigue (ISF)], and nonfatigued controls identified in a population-based survey of CFS and other fatiguing illnesses in Wichita, KS [2]. Our objective is to determine whether maladaptive coping styles were associated with CFS and whether coping styles were associated with CFS-specific symptoms.

Methods

Study participants

This study adhered to human experimentation guidelines of the U.S. Department of Health and Human Services and the Helsinki Declaration, and was approved by CDC and the Emory University Institutional Review Boards. All subjects were volunteers who gave written informed consent prior to study enrollment.

We enrolled subjects who were identified in the Wichita CFS Surveillance Study between 1997 and 2000 [2,19]. In brief, the surveillance study used a random-digit-dialing telephone survey to screen 56,146 adult residents, 18 to 69 years of age, in Wichita, Sedgwick County, KS. A surveillance cohort of 3528 adults who reported prolonged fatigue of at least 1-month duration and 3634 nonfatigued persons completed a detailed telephone interview. Eligible subjects were clinically evaluated, and a subset of the cohort was followed at 12, 24, and 36 months. All 70 people classified as CFS at least once during the surveillance study were invited to participate in the present in-hospital clinical study, and 58 (83%) agreed to participate. Subjects with chronic unexplained fatigue of at least 6 months' duration, who did not fulfill the criteria of the 1994 CFS Research Case Definition due to insufficient symptoms of fatigue severity (ISF group), were randomly selected from the surveillance population, and 59 were enrolled. Non-ill (NI) controls were selected from healthy subjects who never reported fatigue during surveillance to match CFS cases based on sex, race/ethnicity, age, and body mass index (NI group), and 55 participated. All subjects were admitted to a Wichita hospital research unit for 2 days. During the hospital stay, we reevaluated all subjects in terms of CFS symptoms as

well as exclusionary medical and psychiatric conditions. The 43 subjects meeting criteria for current CFS at the time of the clinic stay, 61 subjects with ISF, and 60 NI subjects were included in this report. Demographic features are summarized in Table 1.

Classification of CFS, ISF, and NI

Those who volunteered to participate in the study were admitted to a Wichita hospital research unit for 2 days at which time their illness classification was determined by standardized means. Neither hospital staff nor participants were aware of subjects' enrollment diagnosis.

The diagnosis of CFS requires exclusion of medical or psychiatric conditions that might cause the symptoms of CFS [3,20]. To identify exclusionary medical conditions, we performed a standardized past medical history, review of current medications, standardized physical examination as well as blood and urine routine analyses as recommended by the International CFS Study Group [20]. To identify exclu-

sionary psychiatric conditions, licensed and specifically trained psychiatric interviewers conducted the Diagnostic Interview Schedule (DIS) to diagnose current and lifetime Axis I psychiatric disorders [21]. Exclusionary psychiatric illnesses were melancholic depression in the past 5 years, current or lifetime bipolar disorder, psychosis, substance abuse within 2 years before onset of the fatiguing illness, and eating disorders within 5 years. Subjects with lifelong fatigue were excluded. For details regarding exclusionary diagnoses, the reader is referred to Refs. [19,20].

Following exclusion of certain medical and psychiatric conditions, we applied criteria of the 1994 CFS Case Definition [3] according to recommendations of the International CFS Study Group as to measurement of the major illness domains of CFS (i.e., impairment, fatigue, and accompanying symptoms) ([20], see also Ref. [19]). We measured each symptom domain using standardized psychometric rating scales, including the Short-Form Health Survey (SF-36) [22], the Multidimensional Fatigue Inventory (MFI) [23], and the CDC Symptom Inventory (SI) [24]

Table 1
Demographic and clinical features of cases with CFS, insufficient fatigue (ISF), and NI controls identified from the general population in Wichita, KS

	CFS (n=43)	ISF (n=61)	NI (n=60)	Statistics (df)	P
Mean age (95% CI)	50.6 (47.9–53.3)	50.5 (48.3–52.7)	49.5 (47.4–51.7)	$F(2/161)=0.27$	NS
Mean BMI (95% CI)	29.4 (28.0–30.7)	28.6 (27.3–29.9)	28.2 (26.8–29.5)	$F(2/161)=0.72$	NS
Sex (%)				$\chi^2(2)=0.71$	NS
Male	7 (16.3)	14 (23)	12 (20)		
Female	36 (83.7)	47 (77)	48 (80)		
Race (%)				$\chi^2(2)=0.01$	NS
White	40 (93)	57 (93.4)	56 (93.3)		
Nonwhite	3 (7)	4 (6.6)	4 (6.7)		
Mean SF-36 Scores (95% CI)					
General Health	51.2 (44.9–57.5)	70.1 (66.6–73.6)	85.2 (81.8–88.7)	$F(2/161)=59.97$	<.001 ^{a,b,c}
Physical Functioning	53.3 (46.6–59.9)	77.5 (72.6–82.3)	89.7 (86.2–93.1)	$F(2/161)=52.78$	<.001 ^{a,b,c}
Social Functioning	50.0 (43.0–57.0)	74.2 (69.2–79.2)	94.8 (92.0–97.5)	$F(2/161)=79.08$	<.001 ^{a,b,c}
Mental Health	66.4 (60.7–72.1)	74.6 (71.0–78.1)	87.5 (85.2–89.8)	$F(2/161)=30.8$	<.001 ^{b,c,d}
Role Physical	18.0 (9.3–26.8)	60.7 (51.1–70.2)	88.8 (82.3–95.2)	$F(2/161)=65.53$	<.001 ^{a,b,c}
Role Emotional	55.8 (42.8–68.8)	76.5 (67.9–85.1)	96.1 (92.5–99.7)	$F(2/161)=21.46$	<.001 ^{b,e,f}
Bodily Pain	41.7 (36.9–46.5)	59.7 (54.6–64.8)	77.9 (73.7–82.0)	$F(2/161)=53.86$	<.001 ^{a,b,c}
Vitality	18.6 (14.8–22.5)	37.3 (32.8–41.8)	72.3 (68.9–75.6)	$F(2/161)=180.64$	<.001 ^{a,b,c}
Mean MFI Scores (95% CI)					
General Fatigue	17.5 (16.8–18.1)	14.9 (14.2–15.6)	8 (7.4–8.7)	$F(2/161)=199.77$	<.001 ^{a,b,c}
Physical Fatigue	14.1 (13.2–15.1)	11.1 (10.2–11.9)	6.8 (6.2–7.3)	$F(2/161)=85.73$	<.001 ^{a,b,c}
Mental Fatigue	14.1 (12.8–15.4)	10.0 (8.9–11.1)	6.6 (5.9–7.3)	$F(2/161)=51.94$	<.001 ^{a,b,c}
Reduced Activity	14.7 (13.7–15.6)	11.5 (10.5–12.5)	5.6 (5.2–6.0)	$F(2/161)=116.09$	<.001 ^{a,b,c}
Reduced Motivation	12.2 (11.0–13.4)	10.1 (9.3–11.0)	6.1 (5.6–6.6)	$F(2/161)=54.55$	<.001 ^{b,c,d}
Mean SI Scores (95% CI)					
Number of Symptoms	11.8 (10.9–12.8)	7.0 (6.2–7.8)	3.9 (3.1–4.6)	$F(2/161)=84.86$	<.001 ^{a,b,c}
Intensity Score	27.9 (24.6–31.2)	13.5 (11.8–15.3)	6.3 (4.9–7.6)	$F(2/161)=102.91$	<.001 ^{a,b,c}
Frequency Score	29.5 (26.5–32.5)	15.2 (13.4–17.0)	6.5 (5.1–8.0)	$F(2/161)=122.2$	<.001 ^{a,b,c}
Total Score	76.5 (65.5–87.4)	31.9 (27.3–36.5)	11.8 (8.7–14.9)	$F(2/161)=106.73$	<.001 ^{a,b,c}
Case Definition Score	47.3 (40.6–54.1)	17.6 (14.5–20.7)	6.1 (4.3–8.0)	$F(2/161)=110.84$	<.001 ^{a,b,c}

Higher SF-36 scores reflect better functioning.

Post hoc tests, Bonferroni corrected.

^a CFS vs. ISF: $P<.001$.

^b CFS vs. NI: $P<.001$.

^c ISF vs. NI: $P<.001$.

^d CFS vs. ISF: $P<.01$.

^e CFS vs. NI: $P<.01$.

^f ISF vs. NI: $P<.01$.

(instruments are described in detail below). Classification as a current CFS case was based on cutoff scores derived from these rating scales with respect to each of the three dimensions of CFS. In brief, we defined substantial reduction in occupational, educational, social, or recreational activities as scores lower than the 25th percentile of published U.S. population [22] as a score ≤ 70 on the physical function, or ≤ 50 on the role physical, or ≤ 75 on the social function, or ≤ 66.7 on the role emotional subscales of the SF-36. We defined severe fatigue as a score ≥ 13 on the general fatigue or ≥ 10 on the reduced activity scales of the MFI. Finally, patients reporting ≥ 4 symptoms and scoring ≥ 25 on the CDC SI Case Definition Subscale were considered to have substantial accompanying symptoms. Forty-three study participants who met all three criteria (SF-36, MFI, and SI) when they entered the clinical study were classified as CFS; 61 who met some but not all three criteria were considered as ISF; and 60 who met none of the criteria were classified as NI.

Psychiatric assessment and psychometric instruments

We utilized the DIS [21] to diagnose lifetime and current both exclusionary and comorbid nonexclusionary psychiatric disorder. Disorders that are not considered exclusionary for a CFS diagnosis include nonmelancholic depression, anxiety disorders, somatoform disorders, and adjustment disorders.

The following instruments were used to measure the three major domains of CFS, that is, impairment, fatigue, and accompanying symptoms: To measure impairment, the Medical Outcomes Study 36-Item SF-36 [22] was used. The SF-36 measures general health status, that is, function and well-being. It assesses health-related quality of life in eight areas: (1) limitations in physical activities because of health problems, (2) limitations in social activities because of physical or emotional problems, (3) limitations in usual role activities because of physical health problems, (4) bodily pain, (5) general mental health, (6) limitations in usual role activities because of emotional problems, (7) vitality (energy and fatigue), and (8) general health perceptions. The SF-36 is a widely used, reliable, and valid instrument with population norms and normative data for medical conditions available.

To measure fatigue, we employed the MFI [23]. The MFI is a 20-item self-report questionnaire measuring several dimensions of fatigue, including general, physical, and mental fatigue as well as reduced motivation and activity. The MFI has good internal consistency (Cronbach's α , 0.53–0.93) and construct validity in samples with CFS.

To measure fatigue intensity, we employed the Chalder Fatigue Rating Scale (FRS) [25]. The FRS measures fatigue intensity and separates mental and physical fatigue, comprising 14 items. The FRS was found to be both reliable and valid.

To measure accompanying symptoms, we used the CDC SI [24] to measure occurrence, frequency, and severity of 19

symptoms common in CFS and other fatiguing illnesses. The CDC SI measures symptoms in four scores: Symptom Number, Intensity, Frequency, and a multiplied Total Symptom Score (sum of all 19 individual scores). An additional Case Definition Score considers the eight case-defining symptoms of CFS according to the Research Case Definition [3]. Reliability analyses revealed good to excellent reliability (Cronbach's α , 0.74–0.88) and good construct validity [24].

We used the Ways of Coping Questionnaire to measure coping styles [12]. This 66-item self-report questionnaire comprises a wide range of thoughts and acts that people use to deal with the internal or external demands of specific stressful encounters. Coping strategies are summarized on eight scales: (1) Escape-Avoidance, (2) Confrontive Coping, (3) Distancing, (4) Self-Controlling, (5) Seeking Social Support, (6) Accepting Responsibility, (7) Planful Problem Solving, and (8) Positive Reappraisal.

Statistical analyses

Data were tested for normal distribution by the Kolmogorov–Smirnov Test. For metric data, group differences between CFS, ISF, and control subjects were calculated with general linear models and Student's *t* tests. Homogeneity of variance was assessed using Levene's test. For multiple comparisons of means, Bonferroni-corrected results were used. For nonmetric data, differences between the three groups were analyzed using Kruskal–Wallis analysis of variance. Multivariate linear regression analyses were used to determine associations between illness-related variables and coping. Analyses were two tailed with the level of significance set at $P < .05$.

Results

Subjects characteristics and clinical features

Demographic and clinical features of the sample are summarized in Table 1. As expected, the three groups did not differ in demographic features. There were marked differences in clinical features between CFS and ISF, CFS and NI, and ISF and NI. The three groups significantly differed in all illness domains. Chronically fatigued subjects were ill for an average of 15 years with no differences between CFS and ISF groups (CFS 16.4 vs. ISF 14.1 years).

Coping styles

With the exception of escape-avoidance, no clinically or statistically significant group differences were apparent among the measured coping styles (Table 2). However, both persons with CFS and ISF had highly significant differences in the escape-avoidance coping style compared to NI controls ($P < .001$). Post hoc analyses demonstrated

Table 2

Ways of Coping Subscale Scores of cases with CFS, insufficient fatigue (ISF), and NI controls identified from the general population in Wichita, KS

	CFS (n=43)	ISF (n=61)	NI (n=60)	Statistics (df)	P
Coping styles					
Escape Avoidance	14.9 (13.5–16.3)	14.5 (13.6–15.4)	12.2 (11.2–13.1)	$F(2/161)=7.98$	<.001 ^{a,b,c}
Confrontive Coping	11.2 (10.4–12.1)	11.8 (11.1–12.4)	11.2 (10.5–11.8)	$F(2/161)=.98$	NS
Distancing	12.0 (11.1–12.9)	11.7 (10.0–12.4)	11.3 (10.6–12.0)	$F(2/161)=.79$	NS
Self-Controlling	17.0 (15.9–17.2)	16.6 (15.9–17.4)	16.4 (15.5–17.2)	$F(2/161)=.42$	NS
Seeking Social Support	13.8 (12.6–15.1)	14.1 (13.3–14.9)	13.7 (12.8–14.6)	$F(2/161)=.22$	NS
Accepting Responsibility	8.3 (7.5–9.1)	8.2 (7.6–8.8)	7.9 (7.3–8.6)	$F(2/161)=.33$	NS
Planful Problem Solving	15.2 (14.1–16.3)	14.9 (14.1–15.7)	15.4 (14.4–16.5)	$F(2/161)=.39$	NS
Positive Reappraisal	17.8 (16.3–19.4)	17.7 (16.7–18.7)	18.0 (16.9–19.1)	$F(2/161)=.07$	NS

Post hoc tests, Bonferroni corrected.

^a CFS vs. NI: $P<.01$.^b ISF vs. NI: $P<.01$.^c CFS vs. ISF: NS.

that CFS and ISF cases did not differ in escape-avoidance; however, both CFS and ISF groups had significantly higher scores than the NI group ($P=.001$).

Associations between escape-avoidance and clinical features

Finally, we focused on associations between the emerging coping style “escape-avoidance” and illness-related variables as measured by the aforementioned instruments (SF-36, MFI, CDC SI, and FRS). Multivariate regression analyses were run separately for each instrument, including sum scores as independent variables and escape-avoidance as dependent variable. For all models, variance inflation factors were ranging from 1.0 to 2.7, indicating no collinearity for the entered variables. The following significant variables were found from these analyses: bodily pain (SF-36) ($\beta=-.63$, $P=.01$), reduced activity (MFI) ($\beta=-.39$, $P=.047$), low energy (FRS) ($\beta=.39$, $P=.014$), and muscle fatigue (FRS) ($\beta=.39$, $P=.013$). No significant associations were shown for the CDC SI. The significant variables were then included in a final model. Linear regression analysis of this model suggests that bodily pain (SF-36, $\beta=-.36$, $P=.022$), reduced activity (MFI, $\beta=-.31$, $P=.023$), and low energy (FRS, $\beta=.52$, $P<.001$), but not muscle fatigue (FRS, $\beta=.16$, $P=.28$), are significantly associated with escape-avoidance in CFS cases. The same model has also been run for ISF and NI cases. However, none of the variables entered were significant for these two other groups.

Discussion

In the present report, we focused on coping strategies in CFS cases in a population-based sample compared to subjects with unexplained fatigue not meeting the CFS Case Definition (ISF) and NI controls (NI). We found that both fatigue groups (CFS and ISF) used escape-avoidance coping strategies significantly more frequently than NI controls, although these two groups did not differ. Interest-

ingly, escape-avoidance was related to fatigue severity, pain, and disability in CFS cases, but not in the other two groups. Our main finding is in remarkable concordance with previous studies on coping in CFS (for a review, see Ref. [9]). Other studies have also found CFS patients to use significantly more escape-avoidance strategies compared to healthy controls [10,11,13,14,26–28]. Thus, CFS appears to be particularly associated with escape-avoidance and similar coping styles.

This study extends the previous literature on coping styles in CFS. We found significantly different coping strategies in groups of individuals with CFS, ISF, and NI in a population-based sample. Findings in samples derived from other samples, such as tertiary referral centers [14], patient registries [29], and patients groups [30], might not be transferable to the general population. One notable exception is the population-based study of CFS in Chicago [15]. This study included CFS, cases with idiopathic chronic fatigue, a fatigue group due to medical illness, and well controls, but no differences in coping styles were found between CFS and the other three groups. Further analyses of this study showed that coping strategies in CFS and cases with idiopathic chronic fatigue differed between ethnicities [31], and that in the CFS group, women were significantly more likely than men to turn to religion as a coping method [32]. However, measurement of coping differed from our study, rendering it difficult to compare findings between the Chicago and the Wichita studies. More important, because we diagnosed CFS based on scores from standardized and validated instruments, it is possible to replicate our results. Previous studies relied on a variety of approaches for the diagnosis of CFS, some using self-reported health information only [13], others using published criteria for the CFS Case Definition [3], but not specifying details of application that can lead to ambiguity [20]. In the present study, we incorporate empirically derived diagnostic methods, combined with a variety of health-related examinations [19], thus, allowing us to thoroughly define CFS cases. Furthermore, in the current study, a group not fulfilling the full CDC symptom criteria for CFS was included. In that

context, it is interesting that although CFS and ISF subjects were similar in their coping styles and duration of illness, we observed a correlation between escape-avoidance and illness-related variables, such as general health, pain, and fatigue only for CFS cases, but not for ISF and NI controls. Thus, we were able to distinguish groups with a varying degree of illness severity (NI, ISF, and CFS). An interesting question might be whether maladaptive coping styles are a risk factor for illness severity. Other studies indicate that maladaptive coping strategies might play a causal role in negative health outcome, for example, disabling pain [33]. However, longitudinal designs are needed to adequately answer this question.

It should be noted that, according to Lazarus [34], coping strategies are not inherently adaptive or maladaptive, but their effectiveness depends on individuals' personal circumstances, goals, and expectations. According to Lazarus' framework [34], peoples' perceptions or appraisals of the situation (as challenge, harm, or threat, defined as primary appraisal) lead to the evaluation of available resources and the usefulness of coping strategies (secondary appraisal), and ultimately, to the choice of particular strategies. Coping styles should therefore be considered in the context of stress-related cognitions and their consequences in everyday life. It would therefore be an important extension of our findings to study coping styles in a stress context.

A broad literature exists with regard to coping *with* CFS. A prior study comparing subjects ill for less than 3 years vs. subjects ill for 4–7 years showed that denial coping strategies were more likely in those participants with the shorter illness duration [30]. Another study found a specific cognitive profile (coping with illness, measured by three items) in subjects with CFS compared to those with depression. Chronic fatigue syndrome patients were also more likely than depressed patients to cope with their illness by limiting stress and activity levels [27]. Chronic fatigue syndrome subjects may also be characterized by high levels of generalized illness worry and particular styles of coping with illness and disability, as a study in children recently found [35]. It would be interesting to compare these data and our findings with results obtained from a coping questionnaire specifically tailored for the needs of CFS patients (e.g., Illness Management Questionnaire [36]).

Some limitations of the current study have to be pointed out. We used the Ways of Coping Checklist, which is the best-evaluated and most used coping instrument in the literature [12]. Therefore, our results are not perfectly comparable to those of other studies because different coping questionnaires were used. This has been recognized as a general problem in the coping literature [37]. Furthermore, our study is only cross-sectional, giving rise to the idea that cognitive processes involved in coping might be adversely affected by the illness. It has been suggested that ineffective coping with stress before the illness might be associated with illness onset, and that ineffective coping with the physical and emotional consequences of the illness

might be associated with chronicity [4,10,38,39]. Clearly, long-term changes in coping styles have to be examined using longitudinal studies. A recent analysis showed that coping varies among different ethnic groups [31]. The sample of the current study consisted of predominantly whites ($n=40$). Thus, no further conclusions can be drawn from our findings whether these hold true for other ethnic groups. Finally, it has been repeatedly criticized that the checklist approach, as chosen in this study, is prone to retrospective report bias and inaccuracy of recall (see Ref. [8]). An alternative might involve the measurement of "real-time" coping behavior in the participants' home environment. This strategy would allow for the examination of the association between more proximal coping behavior and symptom manifestation. However, this strategy would warrant a different study design than the population-based questionnaire approach we chose in the current study.

The findings on escape-avoidance coping styles in CFS have important clinical implications. Intervention strategies specifically targeting coping behavior might be developed on the basis of our findings. Our results show that reduced activity is associated with escape-avoidance in CFS cases. Although we have no information on the actual activities that might be reduced in CFS cases, interventions should discourage avoiding activity. Furthermore, social-support seeking should be enhanced, and the venting of emotions should be advocated. Recent intervention trials have indeed focused on changing illness beliefs and coping behavior in CFS, finding positive effects on these factors by using cognitive-behavioral therapy [40].

Taken together, we were able to describe specific coping styles in cases with fatiguing illness and to differentiate groups of cases with differing symptomatology with regard to clinical variables and the use of escape-avoidance coping styles. The emerging style of escape-avoidance in CFS is related to a variety of illness-specific variables, suggesting an important role in the persistence of CFS symptoms. As a next step, health outcome variables, such as cytokines, hormones, and stress-related variables such as perceived stress levels, should be related to coping styles in cases with CFS.

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