

# The role of neuroticism, perfectionism and depression in chronic fatigue syndrome. A structural equation modeling approach

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## Abstract

**Objective:** Previous studies have reported consistent associations between Neuroticism, maladaptive perfectionism and depression with severity of fatigue in Chronic Fatigue Syndrome (CFS). Depression has been considered a mediator factor between maladaptive perfectionism and fatigue severity, but no studies have explored the role of neuroticism in a comparable theoretical framework. This study aims to examine for the first time, the role of neuroticism, maladaptive perfectionism and depression on the severity of CFS, analyzing several explanation models.

**Methods:** A sample of 229 CFS patients were studied comparing four structural equation models, testing the role of mediation effect of depression severity in the association of Neuroticism and/or Maladaptive perfectionism on fatigue severity.

**Results:** The model considering depression severity as mediator factor between Neuroticism and fatigue severity is the only one of the explored models where all the structural modeling indexes have fitted satisfactorily (Chi square = 27.01,  $p = 0.079$ ; RMSE = 0.047, CFI = 0.994; SRMR = 0.033). Neuroticism is associated with CFS by the mediation effect of depression severity. This personality variable constitutes a more consistent factor than maladaptive perfectionism in the conceptualization of CFS severity.

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## 1. Introduction

There is increasing evidence that Chronic Fatigue Syndrome (CFS) is probably not caused or maintained by single variables and is probably the result of the interplay of several factors [1]. The consideration of psychological variables as factors that constitute a part of the nature of

this illness is also convincing [2–5]. It has been argued that personality has been one of the most important psychological risk factors associated with this illness as a predisposing or perpetuating factor [2]. CFS patients have been frequently described as subjects with a high disposition to experience negative affect, emotional lability or feelings of worthlessness. According to this description, CFS patients obtain higher scores than unaffected subjects in neuroticism, becoming one of the most common personality traits observed within this disorder [6–9].

Another important psychological construct that has been regularly considered in CFS is perfectionism [1,10–12]. Many studies have found evidence that perfectionism is constituted by two factors: adaptive perfectionism, a positive striving for achievement and maladaptive perfectionism, a tendency to make overly critical self-evaluations [13–15]. Both factors may have differential effects on health [15,16]. In a recent study only maladaptive perfectionism, mediated by depression symptoms, has been consistently positively associated with CFS [17].

*Abbreviations:* CFS, Chronic fatigue syndrome; RMSE, Root Mean Squared Error; CFI, Confirmatory Fit Index; SRMR, Standardized Root Mean Residual; FIS, Fatigue Impact Scale; U-FIS, Unidimensional Fatigue Impact Scale; ZKPQ, Zuckerman–Kuhlman Personality Questionnaire; MPS-F, Frost Multidimensional Perfectionism Scale; HADS, Hospital Anxiety–Depression Scale.

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The association between maladaptive perfectionism and neuroticism has been examined in several studies, obtaining positive correlations between both factors [18–23]. As a consequence of the consistent association between these two variables, some authors have referred to maladaptive or negative perfectionism as neurotic perfectionism [13,24–26].

Despite the contrasted association between neuroticism or maladaptive perfectionism with CFS severity, the relevance of both variables in CFS has been frequently pointed out with caution as a consequence of their common association with depression symptoms or depression comorbidity [2,4,7,10,27]. Besides, depression is another factor commonly associated with CFS, although its role in the pathogenesis and perpetuation of CFS still remains unclear. It has been described that around one third of CFS patients are depressed [28,29] and some of the physical and psychological symptoms of CFS are similar to those of depression [2,30]. However, recent scientific advances have suggested that there are inflammatory and immunological differences between them, suggesting that CFS and depression are distinct yet interrelated conditions [31].

The role of neuroticism, maladaptive perfectionism, and depression in the severity of CFS has never been analyzed together before. The aim of this study, and in the context of a structural equation modeling, is to explore the fitness of different models testing different approximations with respect to CFS severity. As has been pointed out, the relevance of negative perfectionism on CFS seems to be mediated by severity of depression, but no information is available about the role of severity of depression on the association between Neuroticism and CFS severity. On the other hand, and according to the reported overlapping between neuroticism and negative perfectionism, it is examined, in a multivariate context of analysis, if both personality variables show an independent association or one of the two variables has a predominant or unique association with CFS severity.

## 2. Methods

### 2.1. Participants

The CFS group consisted of a sample of 229 consecutive CFS patients, 209 women (91.3%) and 20 men (8.7%) ( $M = 48.21$  years,  $SD = 8.93$ , range = 22–73). CFS diagnosis was established according to the Centers for Disease Control and Prevention criteria (CDC) [32]. Inclusion criteria were: being older than 18 years, having a CFS diagnosis according to the CDC criteria, completing clinical assessment, and signing an informed consent to participate. The exclusion criterion was the presence of severe unstable psychiatric disorders, such as psychotic episode, major depressive episode, manic episode, substance use disorders and anorexia nervosa. Comorbidity with other Axis I disorders was assessed by the Structured Clinical Interview for DSM-IV Axis I Disorders–Clinician Version (SCID I [33]).

### 2.2. Measurements

#### 2.2.1. Severity of fatigue

In this study, the Fatigue Impact Scale (FIS [34]) was used. This instrument is one of the most common measures of severity of CFS, which provides an approximation of how the disorder affects patients' every day functioning. The FIS was designed to assess three domains: physical, cognitive, and psychosocial functioning. Some authors have considered that, as a consequence of the combination of items from different domains, it is difficult to assume that a total score from the FIS provides a consistent unidimensional construct of fatigue [36]. In this study, in order to guarantee the simplicity and unidimensionality of the construct, an item reduction of the original 40 items of the scale was applied, obtaining a final scale of 22 items according to the international development of the Unidimensional Fatigue Impact Scale (U-FIS [35,36]). In the sample of this study the Cronbach alpha of the U-FIS was 0.91.

#### 2.2.2. Neuroticism

To assess the neuroticism construct, the Neuroticism dimension of the Zuckerman–Kuhlman Personality Questionnaire (ZKPQ) was used. The five dimensions of the instrument emerged from a series of factor analyses of scales believed to measure basic and normal dimensions of personality or temperament, particularly those used in psychobiological research [37,38]. The Neuroticism scale of the ZKPQ, unlike other neuroticism measures (i.e., Neuroticism from the NEO Personality Inventory [39]), is unidimensional, not constituted by facets or subscales [40]. The 19 items of the scale describe frequent emotional upset, tension, worry, fearfulness, indecision, lack of self-confidence, and sensitivity to criticism. The Cronbach alpha of this measure in the sample was 0.86.

#### 2.2.3. Perfectionism

To assess the perfectionism construct, the Frost Multidimensional Perfectionism Scale (MPS-F [14]) was used. It provides a measure of the self-imposed standards and the hard work to be performed to resolve them. The instrument has 35 self-report items distributed in 6 subscales, i.e. Personal Standards (PS), Concern over Mistakes (CM), Doubt about Actions (DA), Organization (O), Parental Expectations (PE), and Parental Criticism (PC). Factor-analytic studies have shown that items from the CM and DA subscales load together on a maladaptive perfectionism factor [17,41]. These two factors were selected in this study. In this sample, the internal consistency of CM and DA was 0.92 and 0.78, respectively.

#### 2.2.4. Severity of depression

Severity of depressive symptoms was assessed with the self-reported Hospital Anxiety–Depression Scale (HADS [42]), aimed at the evaluation of these symptoms in patients with a physical illness. In this study, the 7 items of the

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