



## Resilience linked to personality dimensions, alexithymia and affective symptoms in motor functional neurological disorders

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### ABSTRACT

**Objective:** Reduced resilience, a construct associated with maladaptive stress coping and a predisposing vulnerability for Functional Neurological Disorders (FND), has been under-studied compared to other neuropsychiatric factors in FND. This prospective case-control study investigated self-reported resilience in patients with FND compared to controls and examined relationships between resilience and affective symptoms, personality traits, alexithymia, health status and adverse life event burden.

**Methods:** 50 individuals with motor FND and 47 healthy controls participated. A univariate test followed by a logistic regression analysis investigated group-level differences in Connor-Davidson Resilience Scale (CD-RISC) scores. For within-group analyses performed separately in patients with FND and controls, univariate screening tests followed by multivariate linear regression analyses examined factors associated with self-reported resilience.

**Results:** Adjusting for age, gender, education status, ethnicity and lifetime adverse event burden, patients with FND reported reduced resilience compared to controls. Within-group analyses in patients with FND showed that individual-differences in mental health, extraversion, conscientiousness, and openness positively correlated with CD-RISC scores; post-traumatic stress disorder symptom severity, depression, anxiety, alexithymia and neuroticism scores negatively correlated with CD-RISC scores. Extraversion independently predicted resilience scores in patients with FND. In control subjects, univariate associations were appreciated between CD-RISC scores and gender, personality traits, anxiety, alexithymia and physical health; conscientiousness independently predicted resilience in controls.

**Conclusion:** Patients with FND reported reduced resilience, and CD-RISC scores covaried with other important predisposing vulnerabilities for the development of FND. Future research should investigate if the CD-RISC is predictive of clinical outcomes in patients with FND.

### 1. Introduction

Functional Neurological Disorder (FND)/Conversion Disorder (CD), a common neuropsychiatric condition, is characterized by unexplained limb weakness, gait difficulties, non-epileptic seizures, abnormal movements and sensory deficits [1]. Despite its prevalence and

significant healthcare costs, many clinicians are uncomfortable treating FND [2]. Advancements in the assessment of FND emphasize the evaluation of predisposing vulnerabilities, acute precipitants and perpetuating factors [3]. Predisposing vulnerabilities, the focus of this article, include maladaptive stress coping strategies, personality traits, psychiatric co-morbidities, alexithymia, and adverse life events among

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other variables [4–7]. While studies have documented the importance of these factors, limited research to date has investigated relationships between resilience and other predisposing vulnerabilities associated with the development of FND.

Though initially conceptualized as an individual trait, resilience is recognized as a dynamic construct involving adaptability, sustainability, and recovery in the face of stress or trauma over the lifespan [8,9]. To date, few studies in FND have specifically investigated group-level differences in resilience. One study used the Connor-Davidson Resilience Scale (CD-RISC), a widely used and validated psychometric measure of stress coping abilities [10], to record that patients with psychogenic nonepileptic seizures (PNES) exhibiting altered ictal responsiveness reported lower resilience compared to individuals showing preserved ictal responsiveness [11]. Another study showed that patients with mixed FND compared to those with general medical conditions reported lower resilience [12]. Importantly, no studies to our knowledge have previously investigated within-group associations between self-reported resilience and other predisposing vulnerabilities across the spectrum of motor FND, which includes not only PNES but also functional movement disorders and functional limb weakness [13,14].

Studies in FND populations have demonstrated the importance of impaired stress coping using several distinct psychometric instruments [5,15–20]. Patients with PNES, for example, consistently report using emotion-focused coping strategies such as distancing or escape-avoidance, while relying less on active problem-solving approaches [5,15,16]. The use of emotion-focused coping strategies in patients with PNES correlates with depression, trauma-related intrusive experiences, alexithymia, and anger [17]. In FND, men may use avoidant coping more often than women, indicating potential gender differences in coping styles [18]. Patients with functional movement disorders and/or functional paralysis also report using active coping strategies less frequently than controls [19]. Similarly, individuals with other medically unexplained somatic symptoms report using maladaptive emotion-focused coping strategies at higher frequencies compared to healthy individuals [20].

Additional insights into neuropsychiatric and psychosocial factors associated with resilience may be gained through studies conducted in other clinical and healthy populations. Several studies have demonstrated that personality traits such as neuroticism are negatively associated with resilience, while extraversion and conscientiousness have been connected to enhanced resilience [21,22]. In individuals faced with adverse life events, reduced resilience is associated with increased rates of depression, post-traumatic stress disorder (PTSD), and poor prognosis [23,24]. Other factors commonly associated with resilience include attachment style, spirituality, the tendency to experience positive emotions, and family and social support structures [25,26].

This prospective case-control study investigated group-level differences in resilience in 50 patients with motor FND compared to 47 control subjects. Thereafter, univariate tests followed by multivariate linear regression analyses examined relationships between CD-RISC scores and self-reported mood/anxiety, PTSD symptoms, personality traits, alexithymia, adverse life event burden and health status in patients with FND. Within-group analyses were also performed separately in healthy subjects to determine which factors represented markers of perceived resilience across populations and which variables were specifically linked to resilience in patients with FND. We hypothesized that patients with FND would report decreased resilience compared to controls, and that maladaptive personality traits, increased affective and trauma-related symptoms, and impaired health status would be associated with reduced resilience in patients with FND.

## 2. Methods

### 2.1. Subjects

50 patients with motor FND (mean age =  $40.8 \pm 12.5$ ; 37 women, 13 men; illness duration =  $3.4 \pm 3.8$ ) were prospectively recruited from the Massachusetts General Hospital FND Clinic [13]. Patients met criteria for clinically-established functional movement disorder ( $n = 26$ ) [27], PNES (18 documented; 1 clinically-established; 2 probable) [28], and/or functional limb weakness ( $n = 18$  with positive exam findings, 1 with probable paroxysmal functional weakness based on history and longitudinal follow-up) (Supplemental Table 1). 16 of 50 had mixed-motor FND; 15 also showed functional speech symptoms and 12 exhibited splitting of the midline sensory deficits. To be representative of the FND population, patients with major neurologic comorbidities ( $n = 6$ ) and/or co-morbid epileptic seizures ( $n = 4$ ) were also included (Supplemental Table 2). Exclusion criteria included illiteracy, history of mania or psychosis, active suicidality, current illicit drug abuse or alcohol dependence. 47 control subjects (mean age =  $37.7 \pm 11.8$ ; 34 women, 13 men) were also recruited by internet advertisements from the greater Boston metropolitan area. All subjects provided written informed consent as approved by the Institutional Review Board of Partners HealthCare.

### 2.2. Psychometric measures

As the primary study measure, subjects completed the CD-RISC [10]. As part of a detailed psychometric battery, all subjects also completed the following self-report measures: Patient Health Questionnaire-15 (PHQ-15) [29], Screening for Somatoform Symptoms Conversion Disorder Subscale (SOMS:CD) [30], Dissociative Experiences Scale (DES) [31], Somatoform Dissociation Questionnaire-20 (SDQ) [32], Short Form Health Survey (SF-36) [33], Beck Depression Inventory-II (BDI) [34], Spielberger State-Trait Anxiety Inventory (STAI-T) [35], NEO Five-Factor Inventory-3 (NEO) [36], Toronto Alexithymia Scale (TAS) [37], Childhood Trauma Questionnaire (CTQ) [38], Life Events Checklist-5 (LEC) [39] and PTSD Checklist-5 (PCL) [40].

The CD-RISC is a widely used and validated measure of adaptive stress coping consisting of 25-items scored on a 5-point Likert scale ranging from “not true at all” (0) to “true nearly all the time” [4]. Higher scores reflect greater levels of perceived resilience. The PHQ-15 is a 15-item measure of somatic symptoms within the past 4 weeks, while the SOMS:CD is a measure of functional neurological symptom severity within the past 7 days. The DES and SDQ are measures of psychological and somatoform dissociation respectively. The SF-36 is a 36-item index of health status, which consists of two summary composite domains: mental health and physical health. The STAI-T is a 40-item questionnaire of trait and state anxiety, and the BDI is a 21-item self-report measure for depression. The TAS is a measure of difficulty identifying and describing feelings (alexithymia) consisting of 20 items rated on a 5-point scale. The NEO consists of 60 items assessing 5 personality domains including neuroticism, extraversion, openness, agreeableness, and conscientiousness. To assess childhood/adolescent trauma and lifetime adverse event burden, the CTQ and LEC-5 “happened to me” indices were used. In addition, patients and controls participated in a Structured Clinical Interview for DSM-IV-TR Axis I Disorders (SCID). See Supplemental Table 1 for psychiatric diagnoses in FND patients. All control subjects denied a clinical history of psychiatric diagnoses on telephone screens, however, 6 met SCID criteria for mild lifetime psychiatric co-morbidities (2 with current anxiety not otherwise specified) (Supplemental Table 3).

### 2.3. Statistical analyses

Since CD-RISC scores were not normally distributed in controls

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