

A Case-Control Study of Aetiological Factors in Functional Seizures and Functional Motor Symptoms: Shared and Distinct Features

L. S. Merritt Millman¹, Snigdha Bhuma², Yasmine Basamh¹, Jemima Uloyok-Job¹, Jessica Davies¹, Lauren Blunstone¹, Akshaana Manoharan¹, Jan Coebergh³, Anthony S. David⁴, Mark J. Edwards^{1,2,5}, Laura H. Goldstein¹, John Hodsoll¹, Mitul A. Mehta¹, Timothy R. Nicholson^{1,2}, Biba Stanton^{1,2,5}, Joel S. Winston^{1,5}, Trudie Chalder^{1,2}, Matthew Hotopf^{1,2}, Susannah Pick^{1*}

*corresponding author

¹Institute of Psychiatry, Psychology & Neuroscience, King's College London, United Kingdom (UK)

²South London and Maudsley NHS Foundation Trust, UK

³Department of Neurology, St George's University Hospitals NHS Foundation Trust, UK

⁴Institute of Mental Health, University College London, UK

⁵King's College Hospitals NHS Foundation Trust, UK

SUPPORTED BY
NIHR National Institute for Health and Care Research

UKRI
Medical Research Council

Neurological Affective and Dissociative Symptoms (NEUROADS) Lab

Introduction

- Biopsychosocial factors are known to contribute to the aetiology of functional neurological disorder (FND).
- Two common FND subtypes = functional seizures (FS), functional motor symptoms (FMS)
 - May involve shared and distinct predisposing, precipitating, perpetuating, and triggering (PPPT) factors.
- Further research is required to understand patients' perspectives on independent and/or overlapping factors that may predispose, precipitate, maintain, or trigger symptoms.

Aims

- To directly compare a range of potential PPPT factors separately in patients with FS and FMS, compared to clinical (individuals with a diagnosis of anxiety and/or depression; CC) and healthy (HC) controls.

Methods

Participants

- 50 with FS, 50 with FMS
- 50 HC and 50 CC
- Groups matched in age ($p=.91$), sex ($p=.96$), and gender ($p=.81$)
- FS, FMS and CC matched for depression and anxiety; significantly elevated vs HC



Methods

Materials & measures

- Sociodemographic/medical history.
- Quick-SCID.
- Validated questionnaires:
 - Traumatic Experiences Checklist (TEC)
 - Toronto Alexithymia Scale-20
 - Multiscale Dissociation Inventory
 - Somatoform Dissociation Questionnaire-20
 - Autistic Spectrum Quotient
 - Patient Health Questionnaire-9
 - Patient Health Questionnaire-15
 - Generalised Anxiety Disorder-7
 - Brief Illness Perception Questionnaire
 - Cognitive Behavioural Response Questionnaire (CBRQ)
 - Short Form Survey-36 (SF-36)
 - Work & Social Adjustment Scale

Results

Most prominent perceived illness causes/precipitants

FS	FMS	CC
• Past traumatic events • Psychopathology	• Physical illness/injury • Other physical factors	• Genetics or psychological vulnerability • Childhood factors or neurodivergence

Higher number and impact of traumatic/adverse events reported in FS/FMS compared to HCs ($ps<.008$), not significantly different to CCs.

52% of the FS sample met diagnostic criteria for PTSD, scoring higher on the PDS-5 vs all other groups ($ps<.038$)

Results

Most prominent reported symptom triggers

FS	FMS	CC
• Sensory • Other physical • Physical activity	• Physical activity • Emotion • Other physical	• Social factors • Other psychological

Relative to HC and CC, FS/FMS reported elevated:

- **physical symptoms** ($ps<.001$)
- **somatoform dissociation** ($ps<.001$)
- aspects of **psychological dissociation**:
 - **disengagement** ($ps<.003$)
 - **depersonalisation** ($ps<.021$)
- Highest **derealisation, emotional constriction and memory disturbance** (dissociation) in FS vs all other groups ($ps<.037$); elevated in FMS/CC vs HC ($ps<.006$)
- Highest overall **alexithymia** (incl. **difficulty identifying emotions** and **externally oriented thinking**) in FMS, significantly different to CC/HC ($ps<.038$); elevated in FS/CC vs HC ($ps<.001$)
- **Autistic traits** elevated in FS/FMS/CC vs HC ($ps<.001$)
- Poorer health-related quality-of-life (HRQoL) and general functioning ($ps<.033$) in FS/FMS vs HC/CC

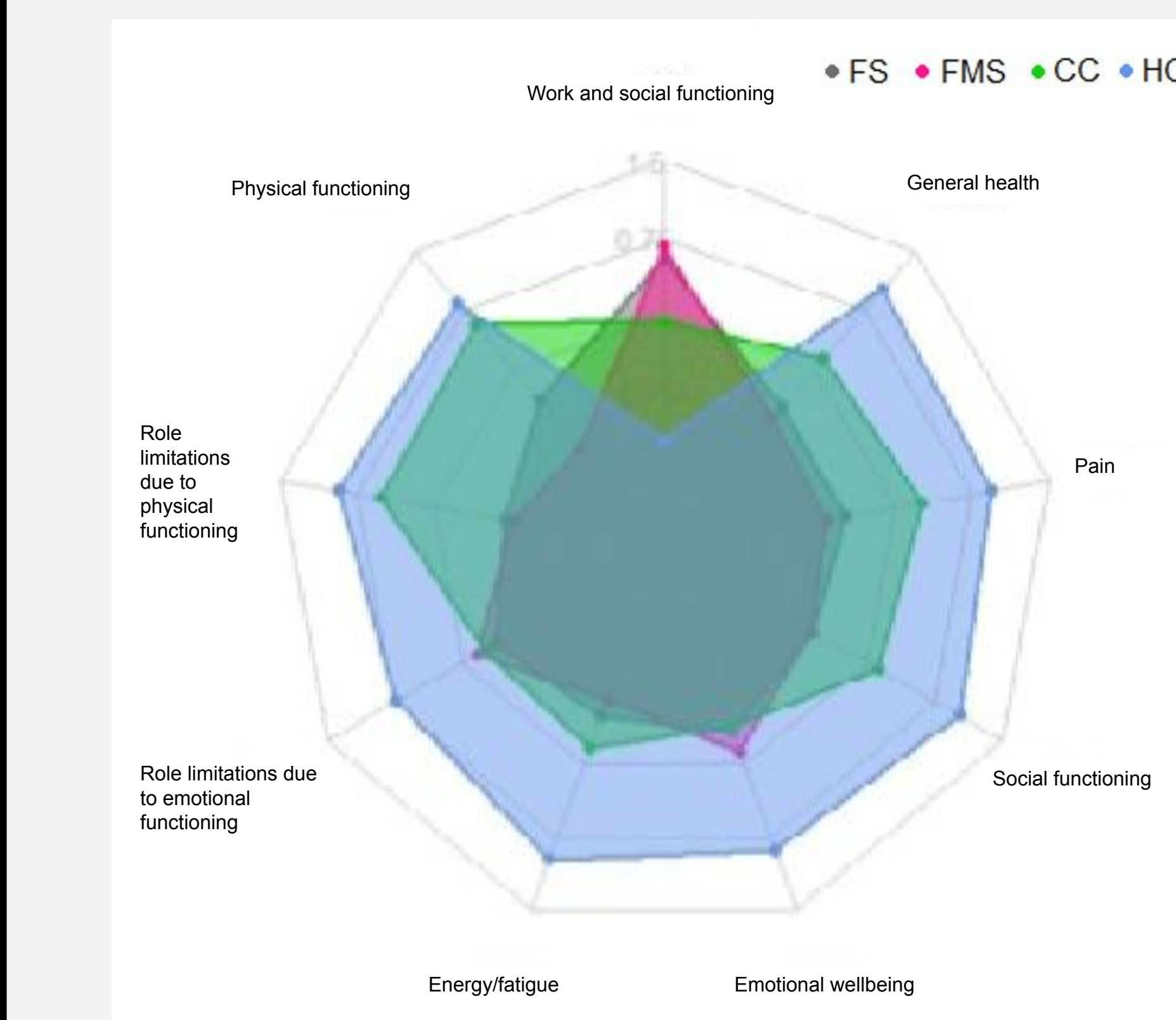


Figure 1. Measures of impact. Higher 'Work and social functioning' scores indicate poorer functioning. Lower scores on the other HRQoL measures depicted indicate poorer HRQoL.

Greater **current, threatening illness-related beliefs and cognitions** disclosed in FS/FMS vs CC ($ps<.017$)

Negative associations between HRQoL, cognitive-behavioural responses, and traumatic/adverse events in FS/FMS.

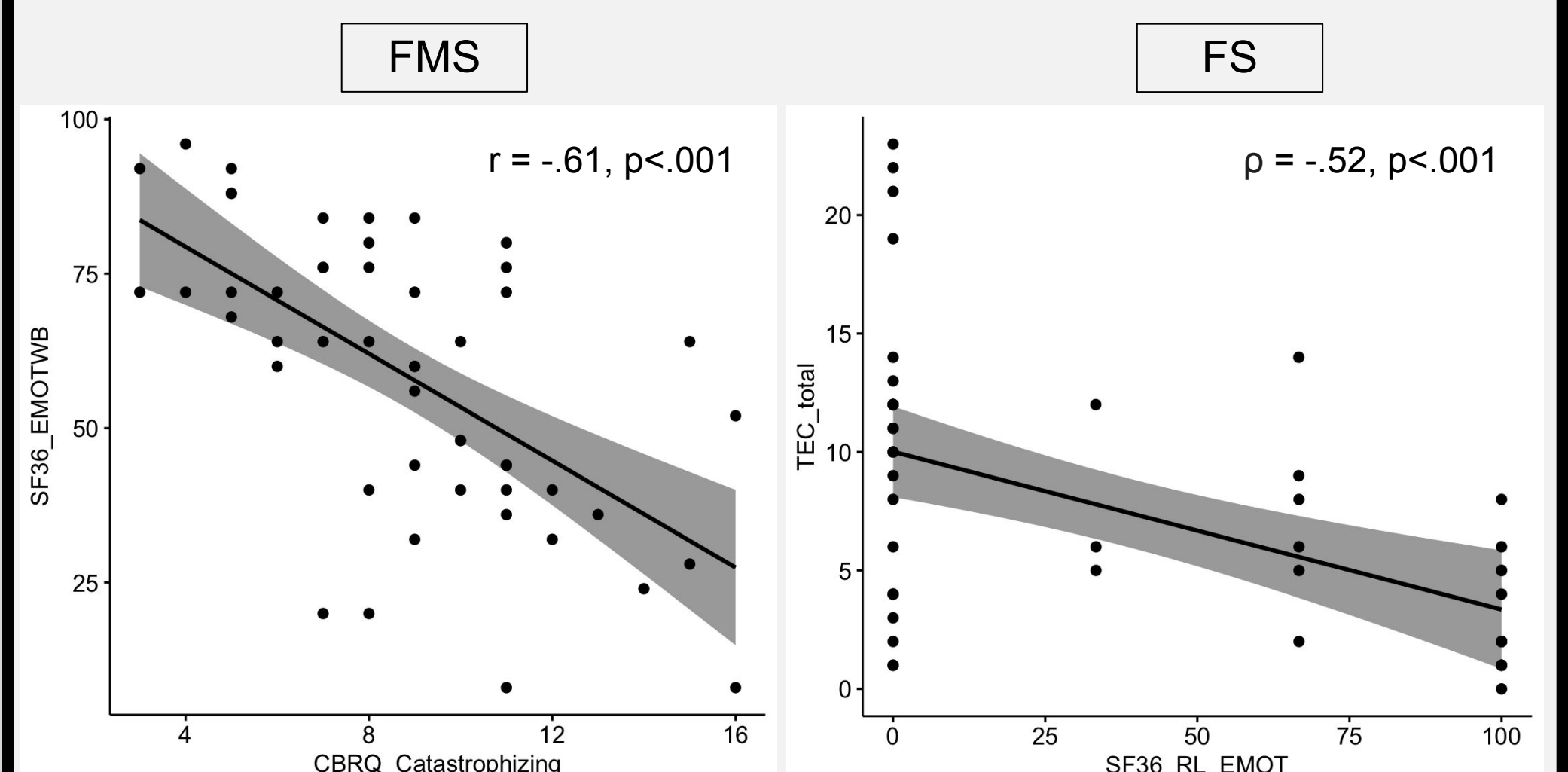


Figure 2. Correlation between catastrophizing and emotional wellbeing in FMS

Figure 3. Correlation between number of adverse events and role limitations due to emotional functioning in FS

Conclusions & future directions

- Distinct and shared biopsychosocial factors may influence the development and maintenance of FS and FMS.
- FS: traumatic events, psychopathology
- FMS: physical injury/illness, physical functioning, alexithymia
- Shared = specific illness-related beliefs and impacts on HRQoL and general functioning
- These results may facilitate development of individualised or subtype-specific treatment approaches/guide the optimisation of therapeutic environments.

Acknowledgements

The study was funded by the Medical Research Council, King's College London and the NIHR Maudsley Biomedical Research Centre. Thank you to our FND Patient and Carer Advisory Panel, all participants, FND Hope UK and FND Action for supporting the project.