Dissociation and its biological and clinical correlates in functional neurological disorder: a systematic review and meta-analysis

Malcolm C Campbell[1], Abigail Smakowski[2], Maya Rojas-Aguiluz[1], Laura H Goldstein[1], Etzel Cardeña[3], Timothy R Nicholson[1], Antje A T S Reinders[1] & Susannah Pick[1]

[1] Institute of Psychiatry, Psychology & Neuroscience, King's College London, United Kingdom

[2] University Medical Center Hamburg-Eppendorf, Germany

[3] CERCAP, Department of Psychology, Lund University, Sweden

Introduction

Dissociation is frequently reported in Functional Neurological Disorder (FND). Dissociative symptoms include mental (psychoform) experiences such as depersonalisation or memory impairment, or sensory/motor experiences (somatoform) such as anaesthesia or weakness [1].

Dissociative symptoms contribute to morbidity in psychiatric populations as well as healthcare spending [2]. However, there has been no comprehensive review of dissociation in FND.

Table 1: Example dissociative symptom rating scales

Dissociative rating scale	Developed by	Scoring	Description
Somatoform Dissociation Questionnaire, SDQ-20	Nijenhuis et al., 1996 [3]	20 items 5-point Likert-like scale (1-5)	- Measures trait somatoform dissociative symptoms - Scores of 35 or more are suggestive of a dissociative disorder - Scores of 50 or more are consistent with DID
Dissociative Experiences Scale, DES	Bernstein & Putnam, 1986 [4]	28 items 0%-100% for each	- Measures trait psychoform dissociative symptoms - Scores of 30 or higher are suggestive of a dissociative disorder

Aims

Aim 1: To critically review rates of dissociative symptoms and disorders amongst people with FND.

Aim 2: To examine whether dissociation varies in severity in people with differing FND symptom types.

Aim 3: To summarise available data regarding biological and clinical correlates of elevated dissociation in FND.

Methods

Search Strategy: We searched Embase, PsycINFO, and Medline, up to June 2021, combining terms for FND and dissociation.

Inclusion Criteria: Studies were eligible if they reported dissociative symptom scores using validated scales, or rates of comorbid dissociative disorder in FND samples.

Quality Appraisal: Risk of bias was appraised using modified Newcastle-Ottawa criteria [6].

Synthesis Methods: The findings of the systematic review were synthesised qualitatively. Dissociative symptom scores were included in a meta-analysis.

Results

Study characteristics: Seventy-six studies were included (FND n=4076; control n=3073), mostly prospective case-control studies (k=55). The PRISMA diagram is displayed in Figure 1.

Dissociation in FND: Dissociative symptoms were elevated in FND. People with different FND symptom types endorsed varying degrees of dissociation. The prevalence of comorbid dissociative disorders in FND groups ranged between 8-80%.

Dissociative Symptom Scale Scores Meta-Analysis:

- Psychoform dissociation was higher in FND samples compared to healthy and neurological, but not psychiatric controls (Figure 2). Variance was significant (I_2 = 84%).
- Greater psychoform dissociation was observed in FND-seizures samples versus healthy controls, but not FND-motor samples (Figure 3)
- Somatoform dissociation was elevated in FND versus healthy controls (Figure 4). Variance was significant (I_2 = 85%) suggesting substantial heterogeneity between studies

Figure 1: PRISMA flowchart

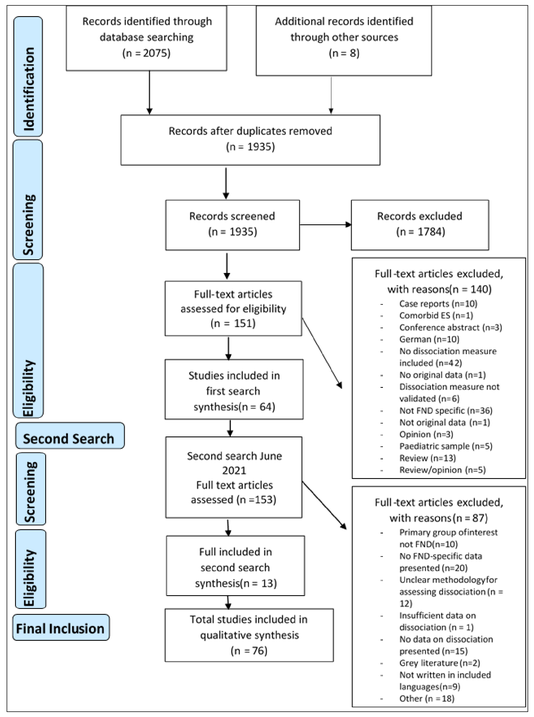


Figure 2: Psychoform dissociation scores in FND vs Healthy, Psychiatric and Neurological Controls

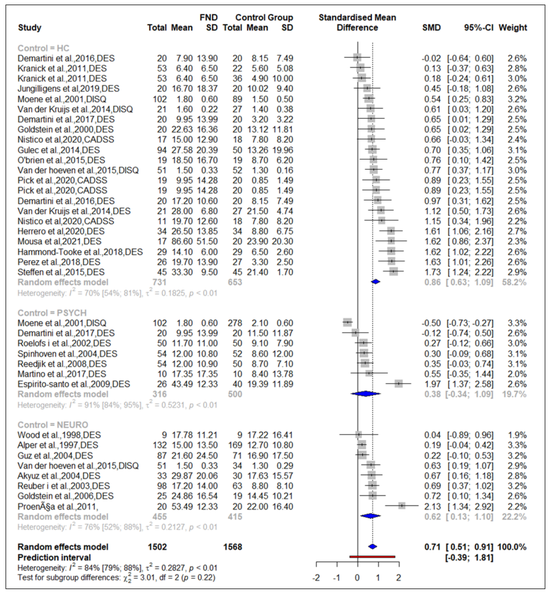


Figure 3: Psychoform dissociation scores – FND-seizures and FND-motor vs Healthy Controls

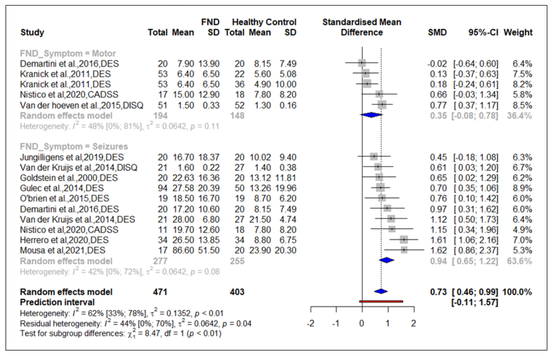
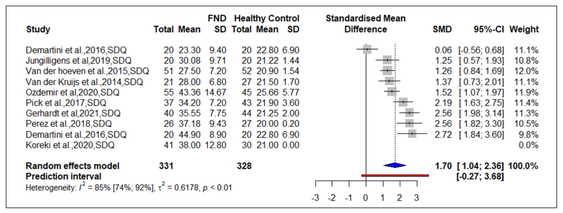


Figure 4: Somatoform dissociation scores – FND vs Healthy Controls

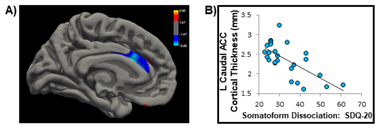


Clinical Impact of Dissociation in FND: Dissociative symptoms were associated with lower quality of life, greater FND symptom burden, and greater overall psychopathology.

Biological Markers of Dissociation in FND: Higher degrees of dissociation in FND were associated with volumetric and functional connectivity changes within several brain regions, including the anterior cingulate cortex (e.g., Figure 5).

Figure 5: Perez et al. 2018 [6]

Negative Correlations between Caudal ACC Cortical Thickness and Somatoform Dissociation in Functional Neurological Disorder



Conclusions

- FND is frequently comorbid with dissociative disorders.
- Psychoform and somatoform dissociative symptoms are omnipresent in FND, and vary with FND presentation.
- Structural and functional connectivity differences in various brain regions may underlie dissociation in FND and merit further investigation.
- Dissociation scales may provide a novel means of categorising FND severity, prognosis, and potentially guiding treatment.

References

1. van der Boom, K.J., et al., Psychoform and somatoform dissociation, traumatic experiences, and fantasy proneness in somatoform disorders. Personality and Individual Differences, 2010. 48(4): p.447-451.
2. Langeland, W., et al., The economic burden of dissociative disorders: A qualitative systematic review of empirical studies. Psychological Trauma: Theory, Research, Practice, and Policy, 2020. 12(7): p.73
3. Nijenhuis, E.R., et al., The development and psychometric characteristics of the Somatoform Dissociation Questionnaire (SDQ-20). Journal of Nervous and Mental Disease, 1996. 184(11): p. 688-694.
4. Bernstein, E.M., Putnam, F.W. Development, reliability, and validity of a dissociation scale. Journal of Nervous and Mental Disease, 1986174(12): p. 727-735.
5. Wells, G.A., et al., The Newcastle-Ottawa Scale (NOS) for assessing the quality of nonrandomised studies in meta-analyses. 2000, Oxford.
6. Perez, D.L., et al., Cortical thickness alterations linked to somatoform and psychological dissociation in functional neurological disorders. Human Brain Mapping, 2018. 39(1): p.428-439.