# Critical Review of Cognitive Symptoms in Functional Neurologic Disorders (FND)

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## Introduction:

- Functional cognitive disorders (FCD)[1] are medically unexplained difficulties with concentration, attention, and memory, often occurring in patients with functional neurological disorders (FND).
- Though common, is inconclusive regarding etiology, mechanisms, or treatment.
- The present study seeks to assess the quality of studies on FCD collected by 3 recent reviews[1,2,3]

**Case example:**

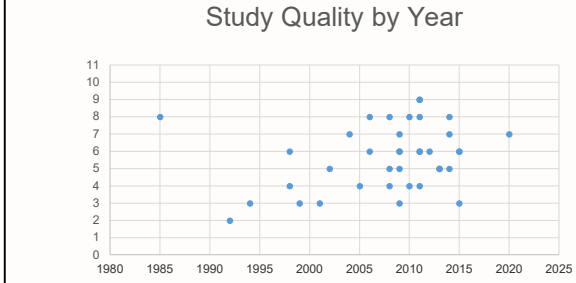
- 59 year old woman with symptoms including confusion, difficulty concentrating, cognitive fatigue, and gait and balance problems.
- Neurological and neuropsychological evaluations unremarkable. Patient diagnosed with FND.
- Risk factors included history of "action-oriented" coping and emotional minimization, symptom modeling in parent's illness, and onset tied to stressors (e.g. sibling's suicide, assuming parental caretaking responsibilities).
- Motor symptoms largely resolved with physical and occupational therapy, learning about FND. Cognitive symptoms persist, leading to marked social and emotional distress and impairment.

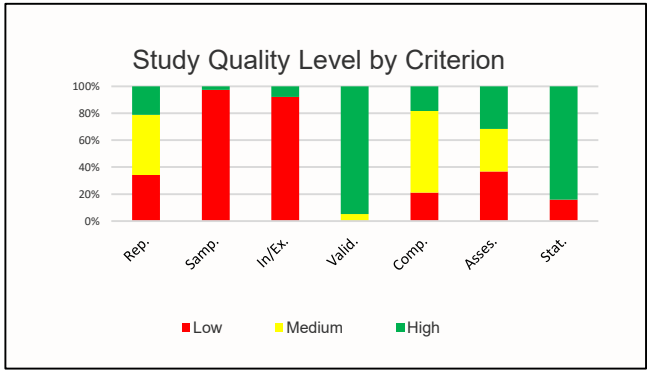
## Methods:

- Initial analysis of studies cited in three recent reviews of FCD,[1,2,3] pending remaining studies.
- Modified Newcastle Ottawa scale (NOS) rating system[4] for assessing quality of cross-sectional, observational studies.
- Consensus ratings by authors, discrepancies resolved by discussion.

## Results:

- 38 studies identified, one excluded for lack of original data, 37 studies rated.
- Mean quality rating = 5.66, Median = 6, Mode = 6, Range = 2 – 9
- Neuropsychological batteries: 25 (65.79%)
- Experimental tasks: 10 (26.32%)
- Self-Report measures: 22 (57.89%)
- Theory-driven hypotheses: 18 (47.37%)
- Included psychiatric control group: 2 (5.41%)




**Modified Newcastle-Ottawa Scale:**

Modified Newcastle-Ottawa Scale:
Rep. - Representativeness of sample (0-2)
Samp. - Sample size justified, power analysis (0-1)
In/Ex. - Assessed comparability of included and excluded eligible subjects (0-1)
Valid. – Validated assessments of independent and dependent constructs (0-2)
Comp. - Groups matched on relevant variables (disease, psych or cog function) (0-2)
Asses. – Controlled for experiment-wise error (0-2)
Stat. – Statistical tests described and justified (0-1)
Range = 0-11

## Discussion:

- In general, study quality improved over time (see scatterplot).
- With the exception of IV/DV validity and statistical justification, majority of studies did not meet full criteria (see bar graph).
- Strengths: wide range of neuropsychological batteries and frequent control for neurological disorders.
- Weaknesses: limited experimental design, few statistical power calculations or corrections for experiment-wise error, rare control for psychiatric symptoms.
- Few studies were theory driven.
- Results of neuropsychological battery studies were heterogeneous and inconsistent.

**Implications:**

- Study reliability is uncertain due to uncertain statistical power, inconsistent representativeness, and control for confounds (e.g IQ).
- Limited control for psychiatric symptoms (e.g. anxiety) limits ability to understand FCD as distinct from more general psychiatric symptomatology.
- Lack of experimental design makes it difficult to understand mechanisms, develop treatments.

## Conclusions:

- Preliminary findings, limited scope of current review.
- Research is still early in recognizing, classifying, and understanding FCD.
- More rigorous statistical and experimental designs that test theory-driven hypotheses and control for psychiatric symptoms could maximize applicability of findings, inform intervention.
- Under-explored constructs of interest include metacognition, social-cognition, and emotional processing.

## References:

[1]Alluri, P.R. et al. (2020) Cognitive Behavioral Neurol
[2]McWhirter, L. et al. (2020) Lancet Psychiatry
[3]Teodoro, T. et al. (2018) Cognitive Neurology
[4]Modesti, P.A. (2016) PLOS One