Subjective and Objective Cognitive Functioning Among Individuals With and Without Fibromyalgia

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Introduction

Background

- Fibromyalgia (FM): characterized by chronic widespread pain, fatigue, depression, anxiety, and cognitive symptoms (Wolfe et al., 2010).
- 54% of FM patients reported at least one cognitive complaint; most common: forgetfulness and attention (McCracken and Iverson, 2001).
- Chronic pain patients: more concentration and memory problems compared to healthy controls (Dick, Eccleston, and Grombez, 2002).
- Patients with FM motivated to perform well, but perform poorly on objective memory tests; perceived cognitive impairment related to actual cognitive performance; FM patients: poorer cognitive performance than age-matched controls, but performed similarly to people 20 years older, in working memory and verbal fluency (Glass and Park, 2001).
- Patients with FM: more poorly on tests of concentration, attention, and memory than did matched controls; greater perceived cognitive impairment (Grace, Nielson, Hopkins, and Berg, 1999).

Purpose

- To explore associations between objective cognitive impairment and subjective cognitive complaints in people with and without FM.

Method

Table 1. Demographic Characteristics of Participants by Group (FM & Non-FM)

	FM	Non-FM
N	68	73
Age Range (years)	50-85	50-87
M_{age} (*SD*)	59.54 (7.50)	67.58 (8.62)*
MMSE, *M* (*SD*)	28.84 (1.24)	28.86 (1.35)
Depression, *M* (*SD*)	16.97 (9.14)	4.18 (3.99)*

Note. MMSE = Mini Mental State Examination, five participants were excluded due to scores < 25; Depression = Beck Depression Inventory, lower mean scores indicate lower depression.
* FM vs. non-FM significantly different, $p < .05$

Method, continued

Procedure

- Questionnaires and assessments measuring physical and cognitive status (Jones, Rutledge, & Aquino, 2010).
- Secondary analysis of cross-sectional study conducted at California State University, Fullerton Fall 2008 (Fibromyalgia Research & Education Center). Initial study aim - to determine differences in cognitive and physical status between people with and without fibromyalgia (FM and Non-FM).

Objective cognitive assessments:

- Digit Span Forward and Backward (DSF & DSB; working memory)
- Trails A/B (sequencing)
- Animals (verbal fluency)
- Digit Symbol Substitution (DSS; processing speed)
- Stroop CW (interference/inhibition)
- Everyday Problems Test (EPT; problem-solving)
- CERAD composite score (10-item word list only) and total number of intrusions (episodic memory)

Subjective cognitive ratings:

- Health/Activity Information Questionnaire – experience during the last week, likert-type scale (0 = no problem to 10 = extreme problem)
  - Forgetfulness
  - Concentration Problems
  - Depression
  - Anxiety
- Approved by Institutional Review Board, California State University, Fullerton.

Examples of Objective Cognitive Testing Used (Figures 1-3)

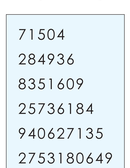

Figure 1. Digit Span (working memory)

Figure 2. Stroop CW (interference/inhibition)

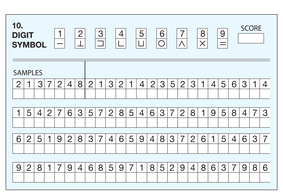

Figure 3. Digit Symbol Substitution (processing speed)

Analysis

Table 2. Correlations Between Objective and Subjective Cognitive Measures in FM and Non-FM Groups

	Mean (SD)	Forgetfulness	Concentration	Depression	Anxiety
FM					
Digit Span Forward	10.01 (2.20)	**- .28***	- .23	- .18	- .17
Digit Span Backward	6.34 (1.97)	- .15	- .15	- .10	- .02
CERAD (10 item)	20.74 (3.96)	**- .24***	**- .28***	.04	- .01
Total # Intrusions	0.91 (1.34)	**- .27***	- .18	- .10	**- .27***
Animals	19.35 (5.44)	- .19	- .16	- .06	- .19
Everyday Problems	14.90 (2.55)	- .01	. 02	.11	.15
Non-FM					
Digit Span Forward	9.88 (1.91)	- .02	.06	- .10	- .12
Digit Span Backward	7.10 (2.39)	.01	.00	.09	.09
CERAD (10 item)	19.68 (4.26)	.04	.12	**.24***	.20
Total # Intrusions	1.00 (1.50)	.12	- .01	- .01	.00
Animals	21.82 (5.40)	- .21	**- .26***	**- .28***	- .18
Everyday Problems	15.14 (2.24)	- .15	**- .25***	- .16	.09

*Note: *p < .05*

Results

Subjective vs. Objective Cognition

- Significant associations ($p < .05$) were found between subjective cognitive complaints and objective cognitive functioning measures.
- Higher ratings on subjective cognitive complaints were associated with poorer objective performance.

Associations by Group

FM group

- Significant negative correlations between: DSF score and Forgetfulness, CERAD and Forgetfulness, CERAD and Concentration, and Total number of Intrusions and Anxiety.

Non-FM group

- Significant negative correlations between: Animals and Concentration, Animals and Depression, and the EPT and Concentration.

Group Differences

- Significant group differences, age as a covariate: Stroop CW ($p < .04$), DSB ($p < .05$), Animals ($p = .005$), and DSS ($p = .001$)

Discussion

Subjective vs. Objective Cognition

- Significant associations suggest that people recognize real cognitive impairments.
- Digit Span Forward (working memory) - correlated with Forgetfulness (FM)
- CERAD/Intrusions (episodic memory) - correlated with Forgetfulness. CERAD - correlated with Concentration Problems. Episodic memory depends on attention-demanding encoding and retrieval. In this case, FM participants objective complaints of concentration and forgetfulness relate to the demands of episodic memory.
- Intrusions - correlated with Anxiety, has been shown to be associated with memory & concentration problems.
- Age included as a covariate, significant group differences: Stroop CW, DSB, Animals, and DSS, suggesting impairment in processing speed, verbal fluency, interference/inhibition, and working memory in the FM participants.

Implications and Future Directions

- Can lead to better testing and treatment plans for FM patients; treatment may include specific cognitive training to increase function and lifestyle strategies that can help with concentration and forgetfulness.
- Future research should further investigate the relationships between objective and subjective cognition in FM patients and other similar populations; compare different cognitive measures.
- Next step: to investigate mediating variables to further understand the correlations found here.

References

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