Psychosocial Predictors of Metacognition in Multiple Sclerosis

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INTRODUCTION

Metacognition, or self-perceived cognitive functioning, has been studied in a variety populations (e.g., aging, cancer, TBI, and fibromyalgia). When compared to objective neuropsychological data, self-reported impairment is often associated with emotional distress. This is also true of multiple sclerosis (MS).

Depression is the most commonly studied psychological variable influencing metacognition in MS. Studies have reported that perceived neurocognitive functioning is indeed more strongly associated with depression than with objective neuropsychological findings. However, people with MS often report a large number of symptoms concurrently, some of the most common being: fatigue, pain, depression, anxiety, and sleep disturbance. Recent research suggests that depression might be only one of many confounding variables.

Measures such as the Multiple Sclerosis Neuropsychological Questionnaire (MSNQ) and the Perceived Deficits Questionnaire (PDQ) were developed as screening tools for MS-related cognitive change. These, like most subjective report, are highly correlated with emotional distress. Some suggest that new-generation self-report measures developed utilizing Item Response Theory may be a more suitable alternative.

The Applied Cognition–Executive Function–Short Form (Neuro-QOL-EF SF) and the Applied Cognition–General Concerns–Short Form (NeuroQOL-GC SF) are two such measures. The item banks and the short forms derived from them were developed to be precise self-report tools that can be used as primary or secondary outcomes measures in clinical research.

PURPOSE

Examine the demographic and psychosocial constructs that predict perceived cognitive impairment longitudinally.

HYPOTHESIS

Common MS symptoms (physical disability, fatigue, depression, perceived stress, anxiety, pain, wakefulness, and sleep disturbance) will be significantly correlated with and predict metacognition over time.

Table 1. Demographics at Baseline

	% (N) N = 407
Gender	
Female	83 (338)
Male	17 (69)
Education	
Some High School	0.5 (2)
High School Graduate/GED	13 (53)
Some College/Vocational or Technical School	39.1 (159)
College degree	28.7 (117)
Advanced degree	18.7 (76)
Race	
Non-Hispanic White	91.4 (372)
Non-Hispanic Black	2 (8)
Non-Hispanic American Indian/Alaska Native	.2 (1)
Non-Hispanic Asian	.5 (2)
Non-Hispanic Native Hawaiian/Pacific Islander	2.2 (9)
White Hispanic	.7 (3)
Hispanic and Other Race	2.5 (10)
More than One Race	.5 (2)
Marital Status	
Married/Living with a Partner	70.3 (286)
Divorced	14 (57)
Single	5.2 (21)
Never Married	4.9 (20)
Widowed	3.2 (13)
Separated	.5 (2)
Other	2 (8)
EDSS	
≤4.0	31.4 (127)
4.5 - 6.5	48. 6 (197)
≥7.0	20 (81)
MS Type	
Relapsing Remitting	57.2 (233)
Secondary Progressive	20.9 (85)
Primary Progressive	11.1 (45)
Progressive Relapsing	8.6 (35)
Paid Employment	
Yes	36.9 (150)
No	62.9 (256)
	M (SD) N = 407
Age	52.95 (10.67)
Duration of MS	14.62 (9.8)

METHODS

Adults with MS were recruited from the NMSS Greater Northwest chapter mailing list. A subset (N = 562) of participants in the baseline survey (N=1270) were randomly selected to continue in a longitudinal study. Data for this study was collected in 2008 and 2010, with an average of 22.7 months between time points (range: 18.7 – 26.1 months). The UW Human Subjects Division approved all study procedures, and participants were paid $25 for each time point.

STATISTICAL ANALYSIS

Person product-moment correlation coefficients examined the relationship of demographic and psychosocial variables with metacognition outcome measures. Univariate and multiple linear regression evaluated potential predictors of self-reported cognitive decline two years after baseline. Potential predictors:

- Demographics: MS type, MS duration, age, gender, education, race, and marital status
- Psychosocial: fatigue, depression, anxiety, pain, perceived stress, sleep disturbance, and daytime sleep-related impairment

RESULTS

Fatigue, not depression, was the strongest predictor of perceived cognitive impairment for both general cognitive concerns and perceived executive difficulties. General cognitive concerns were also predicted by anxiety. Perceived executive difficulty was also predicted by perceived stress.

CONCLUSIONS

In MS, metacognition is frequently linked to depression without consideration of other possible contributors. This study suggests MS fatigue is a stronger predictor of self-reported cognitive function.

Table 2. Correlates of Self-Reported Cognition

	1	2	3	4	5	6	7	8	9	10
1. General Cognition	-									
2. Executive Functioning	.74	-								
3. MFIS	-.63	-.59	-							
4. PHQ-9	-.51	-.54	.71	-						
5. PSS	-.46	-.49	.57	.69	-					
6. PROMIS Anxiety	-.5	-.47	.55	.64	69	-				
7. PROMIS Pain	-.44	-.37	.62	.52	.41	.43	-			
8. PROMIS Sleep-related Impairment	-.43	-.39	.53	.58	.46	.47	.42	-		
9.PROMIS Sleep Disturbance	-.29	-.27	.36	.54	.4	.45	.33	.65	-	
10.EDSS	-.17	-.21	.43	.19	.22	.1	.27	.06*	-.004*	-

*ns

Abbreviations: MFIS, Modified Fatigue Impact Scale; PHQ-9, Patient Health Questionnaire; PSS, Perceived Stress Scale

Table 3. Regression Analysis

General Cognitive Concerns				Executive Functioning			
	B	SE B	β		B	SE B	β
Intercept	58.24	2.88		Intercept	54.88	3.52	
EDSS	.91	.48	.08+	EDSS	.25	.58	.02
MFIS	**-.21**	**.03**	**-.52*** **	**MFIS**	**-.2**	**.03**	**-.4*** **
PHQ-9	.06	.1	.04	PHQ-9	-.24	.13	-.13+
PSS	-.13	.13	-.06	**PSS**	**-.3**	**.16**	**-.12***
PROMIS Anxiety	**-.14**	**.05**	**-.17****	PROMIS Anxiety	-.09	.06	-.09
PROMIS Pain	-.03	.04	-.04	PROMIS Pain	.05	.05	.05
PROMIS Sleep-related Impairment	-.09	.05	-.11+	PROMIS Sleep-related Impairment	-.07	.06	-.07
PROMIS Sleep Disturbance	.05	.04	.07	PROMIS Sleep Disturbance	.06	.05	.07
	R^2 = .45				R^2 = .41		

*p < .05; **p < .005; ***p < .0001
+ just missed significance (PHQ-9 p = .056, EDSS p = .056, wake p = .059)

Abbreviations: MFIS, Modified Fatigue Impact Scale; PHQ-9, Patient Health Questionnaire; PSS, Perceived Stress Scale; EDSS, Expanded Disability Status Scale

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