A Call to Explore the Etiology of Depression Underlying the Report of Cognitive Concerns in Patients with Multiple Sclerosis

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BACKGROUND

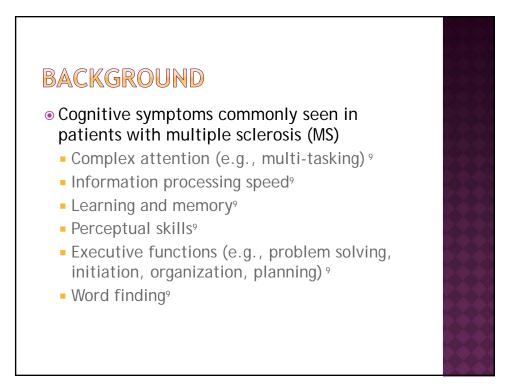
• The lifetime prevalence of depression in patients with MS is approximately¹

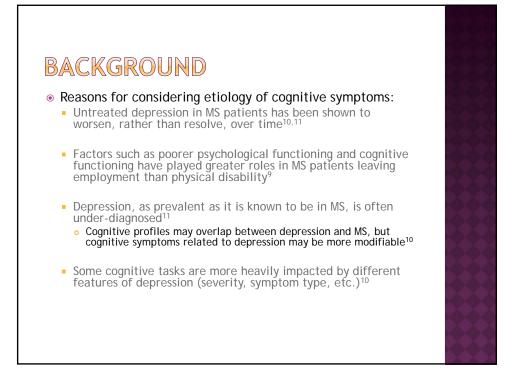
50%.

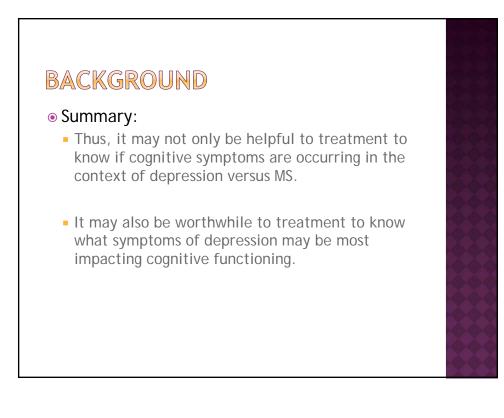
BACKGROUND

 Cognitive impairments seen in patients with depression:

- Learning²
- Verbal memory²
 - Recall but not recognition³
- Visual memory²
- Verbal fluency^{4,5}
- Executive set-shifting^{4,6,7}
- Motor speed⁸
- Spatial working memory⁵

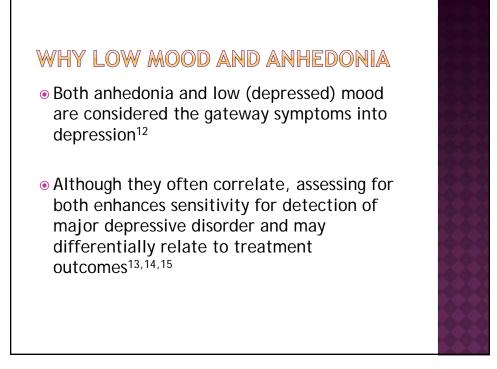






PROJECT OBJECTIVE

This study presents an initial attempt to examine whether anhedonia or low mood, two symptoms that are routinely screened for in identifying patients who might be experiencing depression, are more strongly associated with report of cognitive concerns.



WHY LOW MOOD AND ANHEDONIA

 Presence of anhedonia may signify a more severe depression, greater resistance to depression treatment, and be associated with greater cognitive impairment and involvement of particular neuroanatomical structures^{10,13}

METHODS

Participants

- 54.8% Caucasian;
- 44.0% African American;
- 79.2% female
- Age: 46.67 years (mean), 12.03 (SD), 20-81 (range)
 - 20-41 years (youngest third of the sample)
 - 52-81 years (oldest third of the sample)



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SAMP	LE CF	IARA	CTERIS	STICS		
		Anh	edonia		Low I	Mood
	<u>Yes (50%)</u> 1	<u>No (50%)</u> 1	<u>Yes (58.1%)16</u>	<u>No (41.9%)</u> 16	<u>Yes (50%)</u> ¹	<u>No (50%)</u> 1
Ethnicity						
Caucasian	37.3% ^b	62.7% ^b	37.3% ^b	62.7% ^b	43.3%	56.7%
African American	31.6% ^b	68.4% ^b	31.6% ^b	68.4% ^b	44.2%	55.8%
<u>Gender</u>						
Female	35.6% ^b	64.4% ^b	35.6% ^b	64.4% ^b	45.6%	54.4%
Male	32.1% ^b	67.9% ^b	32.1% ^b	67.9% ^b	36.5%	63.5%
Age Group						
Oldest Third	35.6% ^b	64.4% ^b	35.6% ^b	64.4% ^b	33.3% ^{b,c}	66.7% ^b
Youngest Third	37.9%ª	62.1% ^a	37.9% ^b	62.1% ^b	51.7% ^c	48.3%
Note: a: p < .05, b: p ·	< .01 for endorse	ement; c: p < .05	, d: p < .01 for dem	ographic		

SAMPLE CHARACTERISTICS

		Cognitive Concerns							
	Expecting 65% t	o Endorse ¹⁷	Expecting 43	3% to Endorse ¹⁷					
	<u>Yes (65%)</u>	<u>No (35%)</u>	<u>Yes (43%)</u>	<u>No (57%)</u>					
<u>Ethnicity</u>									
Caucasian	14.1% ^b	85.9% ^b	14.1% ^b	85.9% ^b					
African American	14.9% ^b	85.1% ^b	14.9% ^b	85.1% ^b					
<u>Gender</u>									
Female	14.6% ^b	85.4% ^b	14.6% ^b	85.4% ^b					
Male	13.2% ^b	86.8% ^b	13.2% ^b	86.8% ^b					
Age Group									
Oldest Third	12.6% ^b	87.4% ^b	12.6% ^b	87.4% ^b					
Youngest Third	17.2% ^b	82.8% ^b	17.2% ^b	82.8% ^b					

RESU Full Sample							
Predictor	R ²	χ²	Df	В	Wald	OR	OR 95% CI
Anhedonia	0.069	10.099**	2	-0.158	0.131	0.854	0.362-2.013
Low Mood				1.242	7.530**	3.462	1.426-8.405
<i>note:</i> CI = confide	ence interv	val. OR = odds ra	atio. <i>R</i> .	2 = Nagelker	ke <i>R2. *p</i> < .05	5. **p < .01	

RESU Caucasian							
Predictor	R ²	χ²	Df	В	Wald	OR	OR 95% CI
Anhedonia	0.104	8.449*	2	-0.815	1.663	0.443	0.128–1.528
Low Mood				1.839	7.711**	6.290	1.718–23.035
<i>note:</i> CI = confi	dence inte	rval. OR = odc	is ratio.	<i>R2</i> = Nagelk	erke <i>R2. *p</i> <	.05. ** p < .01	

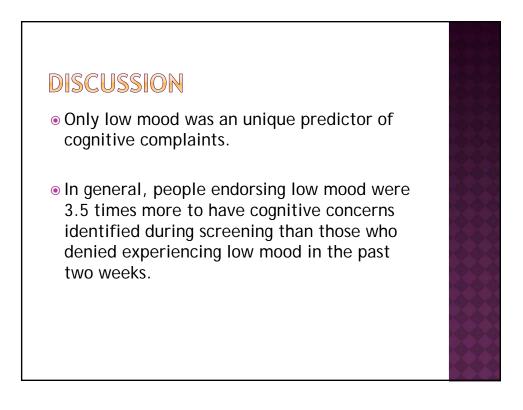
RES African A		Ŝ n Sample∶	n =	114			
Predictor	R ²	χ²	Df	В	Wald	OR	OR 95% CI
Anhedonia	0.059	3.904	2	0.438	0.517	1.550	0.469-5.115
Low Mood				0.784	1.599	2.190	0.650-7.383
<i>note:</i> CI = confid	dence inter	rval. OR = odds	ratio.	<i>R2</i> = Nagell	kerke <i>R2. *p</i> <	< .05. **p < .0	1

RESULTS Female Sample: n = 205					
Predictor R^2 χ^2	Df I	В	Wald	OR	OR 95% CI
Anhedonia 0.079 9.306*	2	-0.420	0.761	0.657	0.256-1.688
Low Mood		1.433	8.099**	4.190	1.562— 11.237
<i>note:</i> CI = confidence interval. OR = odds r	atio. <i>R2</i> =	= Nagelkerk	e <i>R2. *p</i> < .05.	** <i>p</i> < .01	

RES Male San							
Predictor	R ²	χ²	Df	В	Wald	OR	OR 95% CI
Anhedonia	0.086	2.154	2	1.111	1.059	3.037	0.366—25.194
Low Mood				0.295	0.074	1.343	0.161—11.169
<i>note:</i> CI = confid	dence inter	rval. OR = odds	ratio.	<i>R2</i> = Nagell	<erke <i="">R2. *p ∙</erke>	< .05. <i>**p</i> < .0	1

RESU			: n =	- 87			
Predictor	R ²	X ²	Df	В	Wald	OR	OR 95% CI
Anhedonia	0.053	2.433	2	-0.091	0.011	0.913	0.172-4.854
Low Mood				1.080	1.633	2.944	0.562-15.422
<i>note:</i> CI = confi	dence inte	rval. OR = odd	s ratio	. <i>R2</i> = Nage	lkerke <i>R2. *p</i>	o< .05. **p< .	.01

RES Youngest			mpl	e: n = 8	37			
Predictor	R ²	χ²	Df	В	Wald	OR	OR 95% CI	
Anhedonia	0.069	3.698	2	-0.294	0.183	0.745	0.194–2.867	
Low Mood				1.295	3.026	3.652	0.849—15.716	53
<i>note:</i> CI = confide	ence interva	I. OR = odd	ds rati	io. <i>R2</i> = Nag	jelkerke <i>R2</i>	P. *p < .05.	** <i>p</i> < .01	00000000



DISCUSSION

- The odds of cognitive complaints being identified varied a bit across subsamples from the overall figure of 3.5
 - Caucasians were 6.3 times more likely
 - Females were 4.2 times as likely
 - Interestingly, African American patients, male patients, the oldest patients, and the youngest patients who reported low mood were not significantly more likely to have cognitive concerns identified than those who denied low mood
 - In fact for many patients such as these, depression was not a factor in the report of cognitive symptoms and may have been absent in their clinical presentation



Limitations

- Program evaluation rather than research study
- Fatigue and anhedonia confounded
- Exploration limited to only two symptoms of depression
- Very low percentage of patients with cognitive concerns identified may have reduced power,
 - this issue may have been even more pronounced when dividing the sample into subsets to examine the relationship of depressive symptoms and cognitive concerns in a single demographic category (e.g., males)

DISCUSSION

• Possible implications of findings:

- Professionals may want to give greater consideration to interventions directly elevating mood, in the treatment of depression when cognition is also of concern, than to behavioral activation and stimulation.
- Although anhedonia was not significantly related to cognitive concerns in this limited exploration, teasing apart anhedonia from fatigue may be advisable to uncover masked effects of anhedonia versus fatigue



REFERENCES

¹²Sheeran, T., Reilly, C. F., Raue, P., Weinberger, M. I., Pomerantz, J., & Bruce, M. L. (2010). The PHQ-2 on OASIS-C: A new resource for identifying geriatric depression among home health patients. *Home Healthcare Nurse*, *28*(2), 92-104.

¹³Gorwood, P. (2008). Neurobiological mechanisms of anhedonia. *Dialogues in Clinical Neuroscience*, 10(3), 291-299.

¹⁴Kroenke, K., Spitzer, R. L., & Williams, J. B. (2003). The Patient Health Questionnaire-2: Validity of a two-item depression screener. *Medical Care*, 41(11), 1284-1292.

¹⁵Leventhal, A. M., Piper, M. E., Japuntich, S. J., Baker, T. B., & Cook, J. W. (2014). Anhedonia, depressed mood, and smoking cessation outcome. *Journal of Consulting and Clinical Psychology*, *82*(1), 122-129.

^{1e}Nagaraj, K., Taly, A. B., Gupta, A., Prasad, C., & Christopher, R. (2013). Prevalence of fatigue in patients with multiple sclerosis and its effect on the quality of life. *Journal of Neurosciences in Rural Practice*, 4(3), 278-282.

¹⁷Denney, D. R., Sworowski, L. A., & Lynch, S. G. (2005). Cognitive impairment in three subtypes of multiple sclerosis. Archives of Clinical Neuropsychology, 20(8), 967-981.