Comparative Analysis of Cognitive Function in Patients with Parkinson's Disease and Multiple Sclerosis

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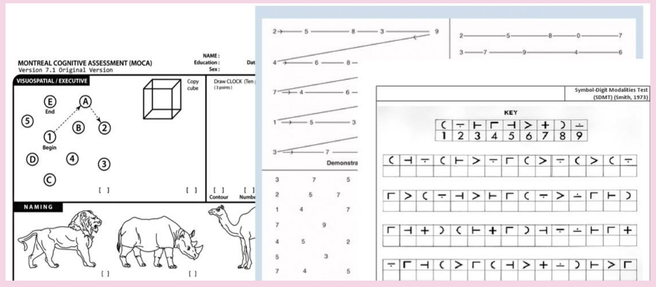
Introduction

Multiple Sclerosis (MS) is an autoimmune disorder where the immune system attacks the protective myelin sheath that covers nerve fibers, causing communication problems between the brain and the rest of the body. MS can cause permanent damage or deterioration of the neurons in the central nervous system. The exact cause of MS is unknown though symptoms can include pain, tremor, changes in vision, fatigue, difficulty moving, and cognitive decline though these symptoms can vary from one patient to another. Parkinson's disease (PD) is a neurological disorder that is caused by the death of cells in the substancia nigra that relay the neurotransmitter dopamine primarily to basal ganglia, a group of brain regions important for motor and other functions. Symptoms of PD include tremor, rigidity bradykinesia, and can include cognitive decline. PD treatment focuses on managing symptoms. MS and PD are neurological disorders characterized by progressive neurological decline which can then leads to cognitive impairment.

Methods

Patients with Parkinson's disease (PD) and multiple sclerosis (MS) were included in our study to evaluate their cognitive performance. They completed cognitive screenings using several neuropsychological assessments. The Montreal Cognitive Assessment (MoCA) examined language, memory, and attention. The Symbol Digit Modalities Test (SDMT) screens for information processing speed, attention and visual scanning. Lastly, the King-Devick Test evaluates eye movement and attention.



Demographics

	MS Group		PD Group		f	P-Value
	Mean	SD	Mean	SD		
Age	**45.9**	**12.9**	**66.8**	**9.1**	**87.8**	**<0.001**
Education	**14.4**	**2.8**	**14.9**	**2.4**	**1.1**	**0.293**

	MS Group		PD Group	
	Frequency	Percent	Frequency	Percent
Gender Male	**19**	**17.6**	**26**	**65.0**
Female	**89**	**82.4**	**14**	**35.0**
Race African. A	**48**	**44.7**	**2**	**5.0**
Caucasian	**58**	**53.7**	**38**	**95.0**
Ethnicity Hispanic	**1**	**0.9**	**1**	**2.5**
Non-Hispanic	**106**	**98.1**	**39**	**97.5**

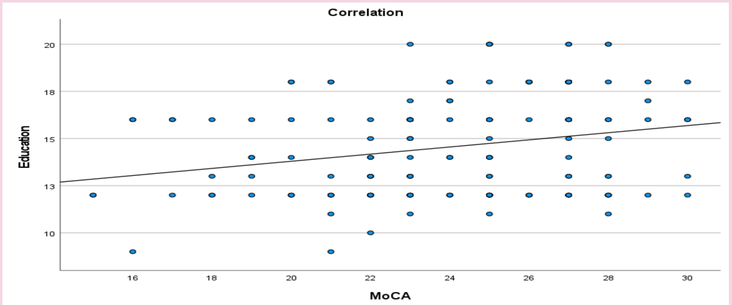
Comparison of MS & PD on Cognitive Assessments

		F	p
MoCA	**Between Groups**	**0.16**	**0.687**
SDMT	**Between Groups**	**15.95**	**< 0.001**
SDMT-T	**Between Groups**	**0.02**	**0.878**
KD	**Between Groups**	**0.05**	**0.824**
KD-T	**Between Groups**	**6.70**	**0.011**

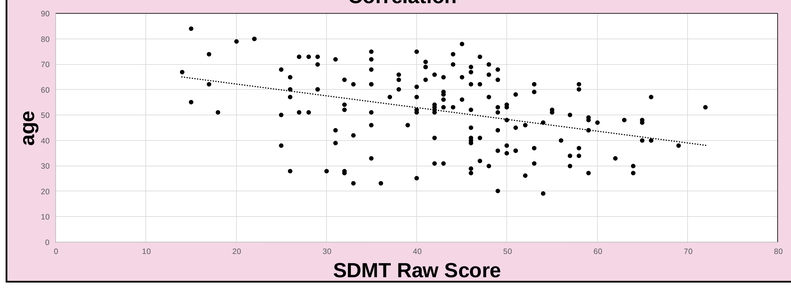
Correlations

		Age
MoCA	**Pearson r**	-0.07
	p	0.423
SDMT	**Pearson r**	**-.38****
	p	**<0.001**
KD	**Pearson r**	0.16
	p	0.05
SDMT T-score	**Pearson r**	0.031
	p	0.711

		Education
MoCA	**Pearson r**	**0.24**
	p	**0.003****
SDMT	**Pearson r**	0.16
	p	0.053
KD	**Pearson r**	-0.02
	p	0.793
SDMT-T	**Pearson r**	0.13
	p	0.126



Correlation



Conclusion & Future Directions

- **The groups differed by age (the PD group was older) but were well matched by level of education**
- **The groups did not differ on the MoCA**
- **The MS group performed better on the SDMT compared to the PD group, though this difference disappeared when raw scores were adjusted for age and education**
- **The groups did not differ on KD raw scores, however, when adjusted by age using normative data, the MS group performed significantly worse**
- **Further research and testing are needed to improve the KD test's assessment of cognitive impairment.**
- **Additionally, increasing the number of Male, Hispanic, and African American participants in our study could help reveal more differences between the MS and PD groups.**

This research project was supported by Award Number: DBI-2349224 through the National Science Foundation (NSF), Research Experiences for Undergraduates (REU) Program