

# Cognitive Processing Speed Predicts Disability Milestones in Multiple Sclerosis

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## INTRODUCTION AND OBJECTIVE

Previous studies have shown a correlation between cognitive processing speed (CPS) and certain outcome measures in multiple sclerosis like disability progression by Expanded Disability Status Scale (EDSS), time to secondary progression in relapsing remitting (RRMS) patients, disease duration, and emotional and quality-of-life measures.

Our aim was to clarify the predictive value of CPS via the Symbol Digit Modalities Test (SDMT) on time to disability progression to EDSS landmarks 3.0, 4.0, 6.0, and 7.0 in people living with multiple sclerosis.

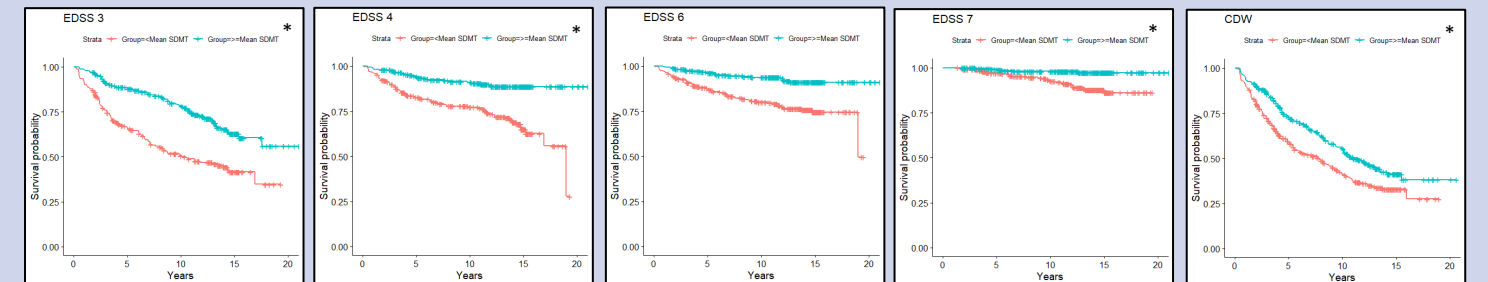
## MATERIALS AND METHODS

We retrospectively reviewed people living with multiple sclerosis (PlwMS) enrolled in the Comprehensive Longitudinal Investigation of Multiple Sclerosis at the Brigham (CLIMB) study who had CPS evaluated by SDMT at two time points at least two years apart. The association between baseline SDMT scores and time to EDSS values of 3.0, 4.0, 6.0 and 7.0 was estimated using Cox proportional hazards models.

## RESULTS

- A total of 624 PlwMS were included
- A lower baseline SDMT value was found to be predictive of time to EDSS 3.0, 4.0, and 7.0
- Lower baseline SDMT scores were also found to be predictive of shorter times to confirmed disability worsening (CDW)
- When adjusted for age, sex, EDSS, fatigue and depression, lower baseline CPS was predictive of time to EDSS 3.0 and CDW

<b>N</b>	<b>624</b>
Age at baseline SDMT (mean (SD) years)	42.3 (10.8)
Female (N (%))	469 (75.2)
Baseline SDMT score (mean (SD))	53.1 (10.7)
Baseline EDSS score	1.7 (1.6)
<b>Treatment at baseline SDMT</b>	
Untreated	177 (28.4)
First line (interferon, glatiramer acetate)	379 (60.7)
Second line (all other DMTs)	65 (10.4)
Unknown	3 (0.5)
<b>Disease category at baseline SDMT</b>	
Relapsing-Remitting	485 (78.1)
Secondary Progressive	48 (7.7)
Primary Progressive/Progressive Relapsing	27 (4.3)
CIS/RIS/ Suspected MS	60 (9.6)
Unknown	4 (0.6)
Year 2 SDMT	55.9 (12.4)



	SDMT	MFIS	CESD	Three coefficients
EDSS3	0.781 (0.666, 0.914); p=0.002	1.249 (1.113, 1.403); p=0	0.891 (0.71, 1.118); p=0.32	<b>p &lt; 0.001</b>
EDSS4	0.811 (0.648, 1.013); p=0.065	1.019 (0.865, 1.201); p=0.822	0.906 (0.673, 1.219); p=0.514	p = 0.270
EDSS6	0.898 (0.706, 1.143); p=0.383	1.193 (0.993, 1.434); p=0.059	0.908 (0.647, 1.275); p=0.579	p = 0.127
EDSS7	0.72 (0.526, 0.986); p=0.041	1.196 (0.928, 1.541); p=0.168	0.865 (0.539, 1.386); p=0.546	p = 0.068
CDW	0.826 (0.732, 0.931); p=0.002	1.142 (1.044, 1.249); p=0.004	0.933 (0.787, 1.107); p=0.43	<b>p &lt; 0.001</b>

## CONCLUSIONS

- Baseline CPS was found to be directly correlated with time to physical disability landmark of EDSS 3.0 and time to CDW even when controlled for baseline fatigue and depression
- CPS measured by the SDMT can be used to help MS providers better prognosticate patient outcomes, and may allow for triaging of treatment to high-risk patients

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