PDCogniCare

Symbol Digit Modalities Test

SDMT

Copyright Status	Domain Assessed	Administration Time
WPS PAA	Attention	5 – 10 minutes

Description

The Symbol Digit Modalities Test (SDMT) is a measure of attention and processing speed.[49] The task involves matching numbers (1 – 9) to symbols of a cipher, within a limited timeframe of 90 seconds. An example of this test is shown in Figure 5.

Training and Administration

An instruction protocol is provided in the test manual. The SDMT is administered by presenting the client with a test sheet with a cipher at the top of the page showing pairs of numbers and symbols. An example faux cipher is shown in Figure 5.[1] On the bottom of the sheet is a series of symbols with blank spaces beneath. Clients are required to draw the correct number that matches the symbol in the blank space. There are 10 practice symbols to match. After the practice trial, clients have 90 seconds to draw as many number-matches as possible. Each symbol must be completed in order. For example, clients cannot find all the "≥" symbols and write "1" underneath.

Scoring

The test is scored based on the number of successfully matched items, with scores below 30 indicative of MCI in PD.[50] There is no upper limit for the number of matches made and thus the test is free from ceiling effects.

Validated in PD

Validated in telehealth

Alternative versions available

Figure 5 Faux Cipher representing cipher used during administration of SDMT[1]

≥	±	«	⊓	Ж	Ψ	Δ	o	↑
1	2	3	4	5	6	7	8	9

Ψ	±	⊓	Ψ	±	o	≥	Δ	↑	Ж	±	«	±	≥	Δ
6	2	4												

Ж	Δ	↑	o	⊓	«	Δ	↑	Ж	±	«	«	«	Ж	Ψ

o	±	«	⊓	Ж	Ψ	≥	o	±	≥	±	«	«	Ψ	o

≥	⊓	«	Ψ	Ж	±	Δ	o	↑	o	±	«	⊓	Ж	«

±	±	«	⊓	Ж	Ψ	o	±	o	≥	±	«	⊓	o	Ψ

«	⊓	«	Δ	«	⊓	Δ	o	↑	Δ	«	«	Δ	Ж	Ψ

≥	±	«	±	Ж	«	±	o	«	≥	±	±	⊓	Δ	Ψ

Alternative Versions

There are multiple SDMT versions, in written, verbal, and digital forms, with an alternative version where the symbols are matched to the numbers (Digit Symbol Substitution Test).[51] The Digit Symbol Substitution Test is an unlicensed alternative.

PD Considerations

Performance on the written and timed version of this test can be confounded by the motor symptoms and processing-speed impairments of PD.[52] To mitigate this, examinees can verbally state the corresponding number in the oral version of the test. The oral SDMT has not yet been validated in PD populations. However, it has demonstrated adequate validity in multiple sclerosis,[53] which has comparable motor features to PD such as tremor and parkinsonism.

Telehealth

The SDMT has demonstrated moderate reliability for direct-to-home videoconference administration in people living with PD.[33] Also, in a direct-to-home videoconference condition, the oral SDMT demonstrated good reliability within a cohort of older adults with intact cognition, MCI, or dementia.[54]

Psychometric and Normative Data

Australian normative data is shown in Table 8.[55]

Table 8 Normative Data for the SDMT

	Tertiary		Postsecondary, nontertiary		Completed high school		Year 11 or below	
Age Group	N	Mean (SD)	N	Mean (SD)	N	Mean (SD)	N	Mean (SD)
50–54	198	51.93 (7.74)	201	50.83 (9.08)	65	50.92 (13.00)	184	47.49 (11.78)
55–59	154	51.19 (9.66)	167	48.70 (9.53)	59	46.22 (10.09)	195	45.60 (10.58)
60–64	113	48.23 (10.89)	126	43.49 (9.62)	37	45.85 (12.39)	213	42.58 (12.25)
65–69	79	43.53 (10.98)	91	42.92 (10.01)	35	42.26 (8.14)	219	38.97 (10.59)
70–74	40	40.56 (8.22)	63	38.00 (10.18)	20	39.80 (11.36)	188	35.07 (11.59)
75–79					64	37.97 (9.65)	129	32.00 (10.89)
80–84					57	32.34 (11.53)	108	28.31 (10.09)
85+					24	27.37 (6.62)	88	22.62 (8.84)

Psychometric properties are provided in Table 9.[50]

Table 9 Psychometric Data for the SDMT in PD-MCI

	Cutoff	Sensitivity	Specificity	PPV	NPV	AUC
PD-MCI		60	81	29	94	76