PDCogniCare

The Stroop Test

Stroop

Copyright Status	Domain Assessed	Administration Time
PAR Inc.	Executive Function	5 Minutes

Description

The Stroop test is a neuropsychological test that is traditionally considered a measure of attention and executive function.[56] There are three trials in which clients: 1) read aloud a list of colours written in black text (word trial), 2) read aloud the colours of non-word items (colour trial), and 3) read aloud the text colour of a list of colour names printed in incongruent colours (colour-word or interference trial). The stoop test is recommended for use in both PD-MCI and PDD populations. [3,4]

Training and Administration

Administration of this test requires a bachelor's degree in psychology and either a master's degree, or certification that provides appropriate training and experience for psychological test administration.

The Stroop test occurs in three stages:

- Clients are shown a word page with the names of colours printed in black (word)
- Clients are shown a series of 'Xs' printed in colour (colour)
- Clients are shown the words from the first page printed in colours from the second page. The names of the colours are not printed in congruent colours; for example, the word 'yellow' is printed in the colour blue (interference)

The client has to read the colour (word) or name the colour (colour, interference) as quickly as possible. The time is recorded.

Validated in PD ✗

Validated for telehealth ✓

Alternative versions available ✓

Scoring

There are various administration and scoring systems.[57] The Victoria Stroop test is a timed version where clients read as quickly as possible, and the examiner can interrupt the client to correct an error. Only the Victoria Stroop has been validated in PD populations.[58] Scoring is determined by the time taken to complete each task, and errors are counted. The cutoff scores for PD-MCI are: ≥ 16 seconds on the word, ≥ 13 seconds on the colour, and ≥ 28 seconds on the interference.[58]

Alternative Versions

- The most common scoring system is the Golden Stroop: participants read as many items as possible within 45 seconds
- Coloured Numbers Test – used for illiterate populations. Participants name the colours of rectangles, read numbers, or name the colour of the presented numbers [59]

Telehealth

Stroop colour and colour-word subtests have demonstrated moderate reliability, for direct-to-home videoconference administration in a cohort of older adults with cognitive impairment or cognitive complaints.[46] The word subtest also demonstrated good reliability in this population,

PD Considerations

Poor performance on all three Stroop tests has been linked to motor slowness in PD.[60] To account for motor and memory impairments, test administrators should allow people with PD to point to items to mark their place.[45] Motor slowness and memory impairments may also be statistically controlled for when assessing performance.

Psychometric and Normative Data

Normative data (in seconds) for the Stroop test is shown in Table 10.[61]

Table 10 Normative Canadian Data for the Stroop Test

Age Group	n	Word Mean (SD)	Colour Mean (SD)	Interference Mean (SD)
50–64	62	15.4 (3.2)	12.0 (2.3)	28.5 (9.5)
60–69	55	15.9 (5.1)	12.1 (2.3)	29.4 (9.0)
65–74	60	16.9 (5.1)	13.3 (3.6)	32.6 (9.6)
70–79	61	18.6 (5.4)	14.2 (3.9)	37.1 (11.9)
75–84	53	20.7 (6.7)	15.1 (3.8)	43.3 (17.7)
80–94	38	22.1 (6.0)	15.1 (3.8)	50.4 (23.9)

Psychometric properties for the Stroop are shown in Table 11.[58]

Table 11 Psychometric data for the Stroop test in PD-MCI

	Cutoff score	Sensitivity	Specificity	PPV	NPV	AUC (95%CI)
Word	15	84	60	68	79	0.80
Colour	12	87	58	67	81	0.80
Interference	1.9/2.0	82	38	57	68	0.7 (0.55-0.77)