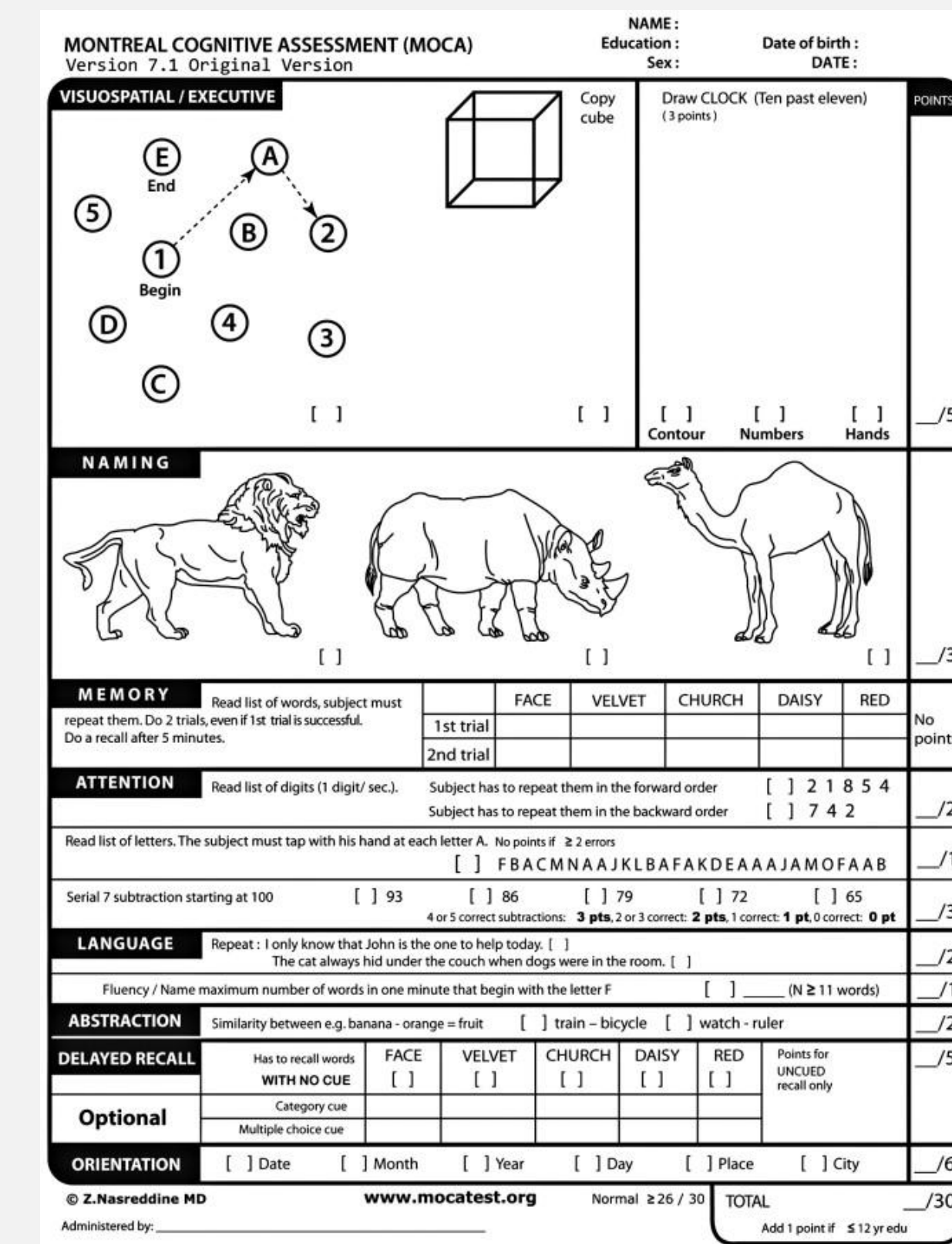


Background/Objectives

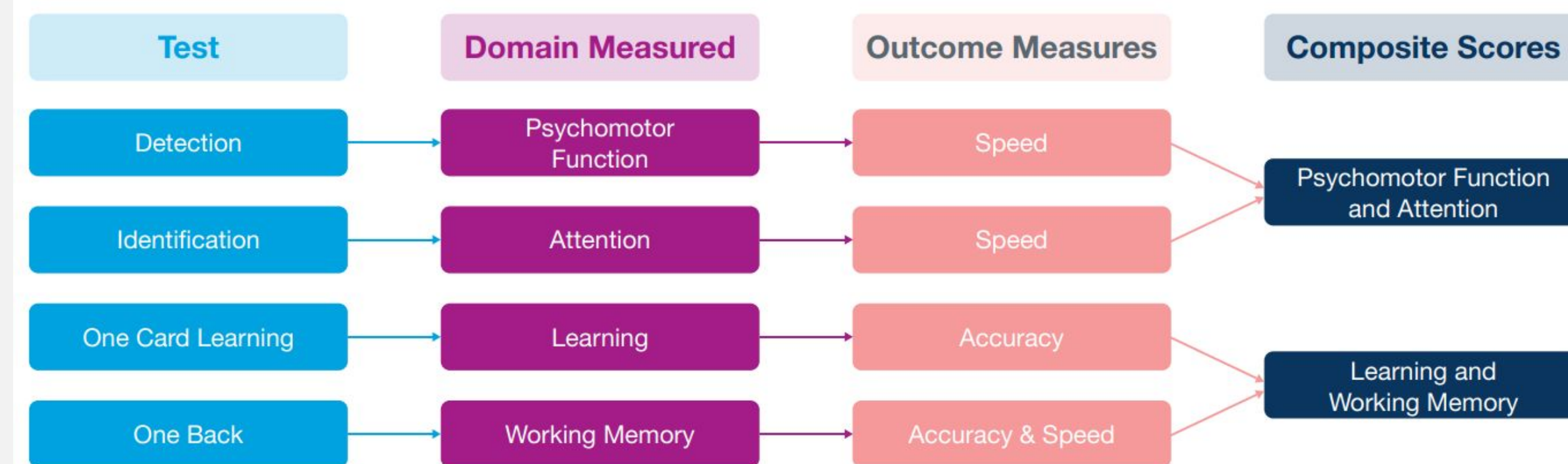
More than 30% of those infected with COVID-19 may experience Long COVID or Post Covid-19 Syndrome (PCS). It is defined as symptoms persisting for at least 12-weeks beyond the acute stage of the infection. Subjective cognitive symptoms (“brain fog”) occur in 5-22% of cases, and are unrelated to the severity of the initial COVID-19 infection. PCS brain fog has been reported to have a significant impact on quality of life. The cognitive symptoms reported are similar to those with mild cognitive impairment (MCI) – difficulty with attention, focus, multi-tasking, executive function, word-finding, and short-term memory. The Montreal Cognitive assessment (MoCA) has been validated to identify MCI in those with a score <26/30. The Cognigram® has been validated for MCI with scores normalised for age and reported as an absolute score and a percentile. The Cognigram® consists of two components: Part 1: psychomotor function/attention and Part 2: learning/working memory (normal ≥90, borderline 80-89, low ≤79). The objective of this study is to see whether two cognitive tools currently used to diagnose MCI are useful in evaluating cognitive symptoms related to PCS.



MoCA [1]

Cognigram [2]

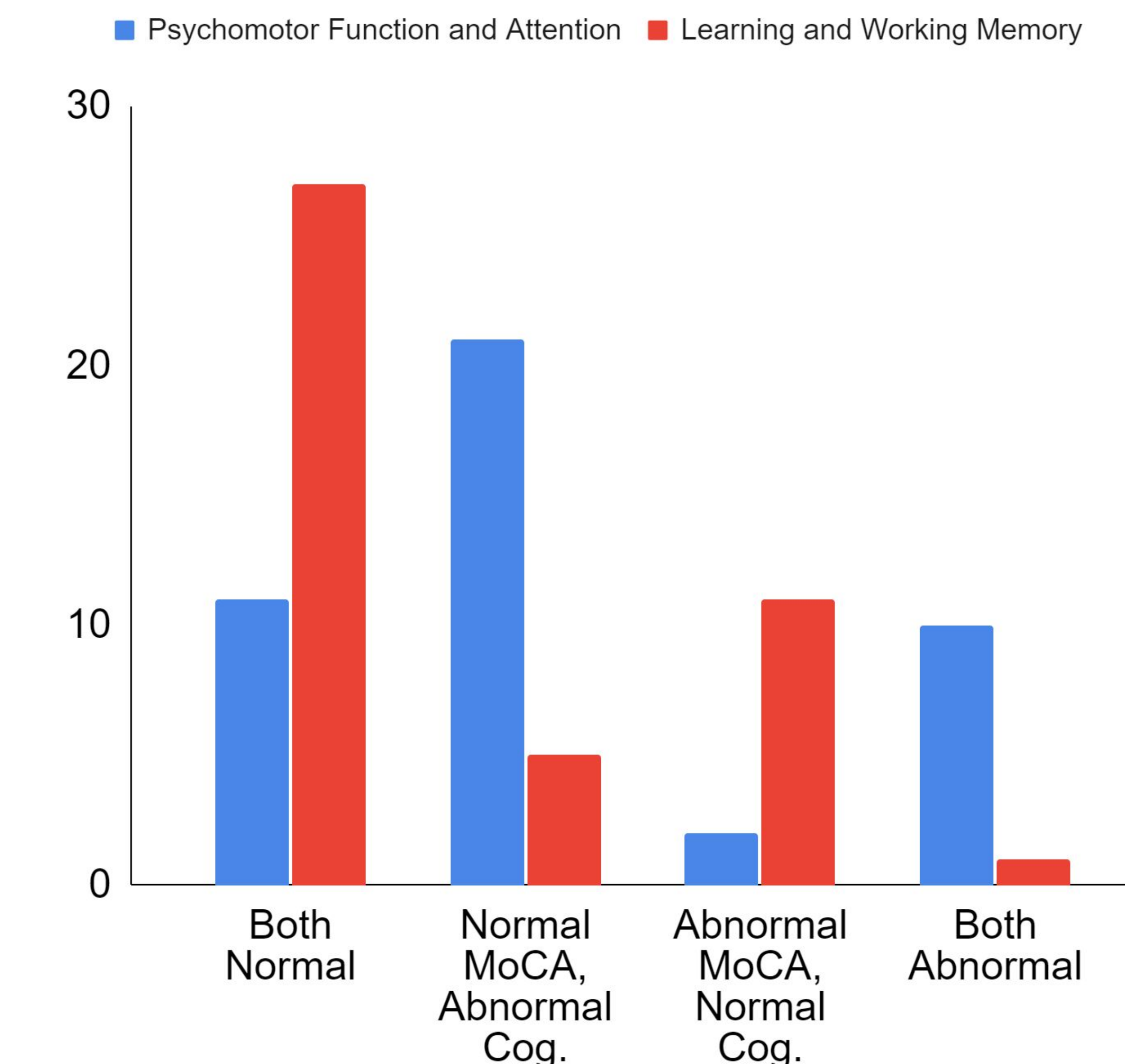
Test Name	Question	Main Domain Measured	Average Completion Time
Detection	Has the card turned over?	Psychomotor Function	1.5 minutes
Identification	Is the card red?	Attention	1 minute
One Card Learning	Have you seen this card before?	Learning	3.5 minutes
One Back	Is this card the same as the previous card?	Working Memory	1.5 minutes



MoCA scores relative to Cognigram

	Psychomotor Function and Attention	Learning and Working Memory
Both Normal	11	27
Normal MoCA, Abnormal Cog.	21	5
Abnormal MoCA, Normal Cog.	2	11
Both Abnormal	10	1

MoCA Scores and Cognigram

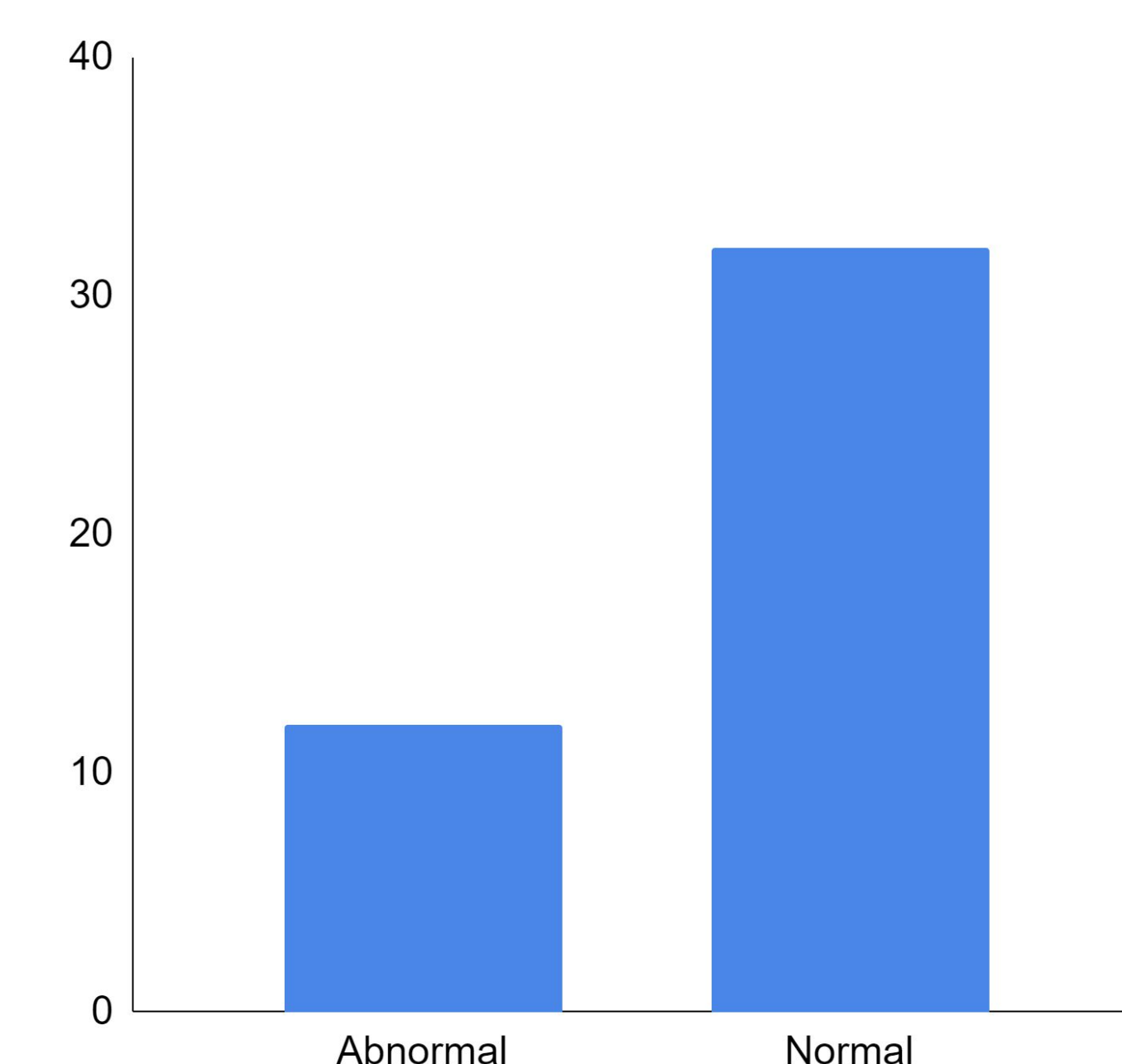


Scores were compared between MoCA and the subcomponents of Cognigram to explore any potential trends. The “Both Normal” and “Both Abnormal” represent agreement between the MoCA and Cognigram (both subcomponents) detection of potential impairment. Psychomotor function and attention subcomponent scores and MoCA scores detected similar findings with 21/44 (48%); contrasted with 28/44 (64%) for the working memory and learning subcomponent.

MoCA Results

MoCA scores were denoted “Abnormal” when participants scored <26/30. The average MoCA score was 27/30 (22-30). Only 12/44 participants (27%) scored abnormally on the MoCA, with the rest falling within a normal range.

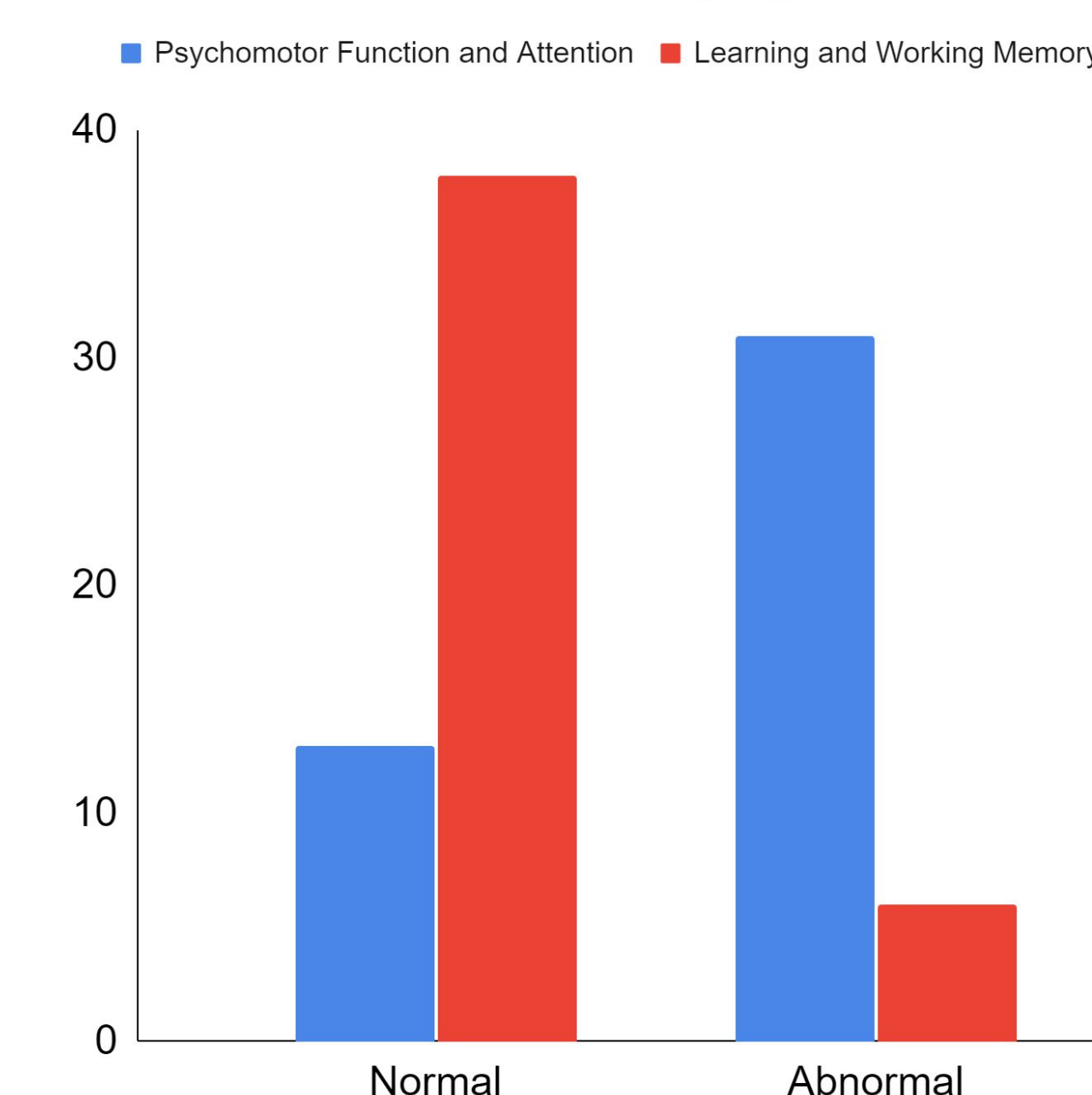
Abnormal and Normal MoCA Scores



Cognigram Results

Performance on the Cognigram was graded as “Abnormal” when participants’ composite scores were below 90, denoting borderline and low scores relative to age matched controls. 31/44 (70%) of participants scored abnormally on the psychomotor function composite, while only 6/44 (14%) performed abnormally on the working memory and learning component.

Abnormal and Normal Cognigram Scores



Conclusions

All participants reported subjective complaints associated with long covid brain fog. Of the 44 participants, 27% scored abnormally on the MoCA; 70% in psychomotor function and attention; 14% on working memory and learning. These results suggest that the psychomotor function and attention subcomponent of the Cognigram was most sensitive in the detection of long covid brain fog. This finding coincides with anecdotal subject reported feelings of lethargy and mental slowness. This may potentially preempt more significant difficulties with memory and learning, partially explaining normality in the MoCA and working memory and learning Cognigram scores.

References

1. Nasreddine, Ziad S., et al. "The Montreal Cognitive Assessment, MoCA: a brief screening tool for mild cognitive impairment." *Journal of the American Geriatrics Society* 53.4 (2005): 695-699.
2. *Cognigram Clinician User Manual V7.0*

Acknowledgements

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