

TICS-M (Australian version) Administration and Scoring Manual

Adam C Bentvelzen, and Nicole A Kochan, Sydney Memory and Ageing Study, Centre for Healthy Brain Ageing (CHeBA), University of New South Wales (UNSW), Sydney, Australia

This is the administration and scoring manual for the TICS-M, Australian version. This manual is based on the 13-item, 39-point version of the TICS-M (Brandt et al., 1993) used by the Sydney Memory & Ageing Study, CHeBA, UNSW (Sachdev et al., 2010). The administration and scoring procedure for TICS-M described in this manual correspond to that used by our group to produce the published validation and normative data (Bentvelzen et al., 2019). Due to the presence of two Australia-specific items we label it the "Australian version" of the TICS-M. To ensure the accurate use of the TICS-M and the normative data, please administer and score the TICS-M according to the guidelines included in this manual.

Background of the TICS-M (Australian version)

The original TICS was published by Brandt, Spencer and Folstein (1988). Currently the TICS remains the most thoroughly researched and validated telephone-based cognitive screen (see review by Castanho et al., 2014). This was followed by a modified version, often referred to as the "TICS-m", with an additional delayed recall component to increase the difficulty and hence the sensitivity of the screen to early dementia and mild cognitive impairment (Welsh et al., 1993).

A second modified TICS, the TICS-M was derived by Brandt and colleagues (1993) in the US after reducing the TICS-m to a briefer screen by removing items that did not add discriminative power in detecting dementia. This second modification of the TICS has been validated against the Mini Mental State Examination (MMSE) and other cognitive screens, has shown good sensitivity for detecting MCI in an older post-stroke sample, and demographic associations have been explored (de Jager et al., 2003; Pendlebury et al., 2013).

Please refer to our paper (Bentvelzen et al., 2019) for full details of validation and normative data for the TICS-M, Australian version. The paper includes validation against the MMSE, Addenbrooke's Cognitive Examination - Revised (ACE-R) and a battery of neuropsychological tests, and provides TICS-M score cut-offs for maximum diagnostic efficiency in detecting incident dementia and MCI, and associations of TICS-M scores with demographic factors (i.e., age, education, sex). The following types of comprehensive normative data were formulated:

- regular tabulated norms (stratified by age group, education, and their combination);
- regression-based norms using a range of demographic corrections;
- robust norms (i.e., subsequent incident dementia cases are excluded);
- combined regression based/robust norms;
- estimates of reliable change between administrations two years apart.

Please note that the norms in this paper were developed from the specific population of older persons included in the Sydney Memory and Ageing Study and will not necessarily be applicable to younger samples or older samples that differ greatly from the normative sample of native English speakers. Due to their lower representation in the normative sample, norms for persons at the extremes of demographic characteristics (i.e., aged well over 91 or with very low or high years of education) should be interpreted with care.

Administration and scoring

The TICS-M contains 13 items with a maximum score out of 39. The administrator is permitted to repeat any question ONCE only, except for the word list (Item 6) and the word repetition (Item 12).

Introduction:

- **Instructions:** *Now I'd like to ask you some questions for a memory exercise. I need you to answer these questions on your own, without getting any help from anyone else. Also please do not look anything up or write notes of any kind, as that would give us an incorrect measure. We also need you to try and prevent any interruptions, so perhaps you'd like to close the door to the room you're in and turn off radios or the TV. Please just answer the questions as best you can. Are you ready?*
- Allow the participant time to isolate themselves from other people or noise. Also use this time to establish that the participant can hear you properly over the phone and that the line is clear.

Item 1. Orientation to current day of the week.

- **Allow only one repetition of instructions.**
- **Instructions:** *What day of the week is it today?*
- **Scoring: 1 point for exactly correct.**
- If participant cannot decide and says something like "it's either Thursday or Friday", ask them to choose which day they think is the most correct and score appropriately.

Item 2 (parts a, b and c). Orientation to current date.

- **Allow only one repetition of instructions.**
- **Instructions:** *What is today's date?*
- **Scoring: score out of 3 - 1 point each for correct date, month and year.**
- If they provide an incomplete date (for example missing the month), give one prompt for each missing part (for example, "*what is the month?*").
- If the participant has already completed the same items from similar screens such as the MMSE, ACE-III or MoCA during the same test session, score the participant's responses on those screens according to these TICS-M rules and refrain from repeating the question on the TICS-M to avoid potential practice effects.

Item 3. Orientation to current season.

- **Allow only one repetition of instructions.**
- **Instructions:** *What season are we currently in?*
- **Scoring: 1 point for correct.**
- Give ± 3 days from the actual date (for example, count "summer" correct on 3rd March).¹
- Australian/Southern hemisphere seasons (meteorological seasons)²:
 - Spring: 1 September to 30 November
 - Summer: 1 December to 28 February (29 in leap year)
 - Autumn: 1 March to 31 May

¹ Users in the Northern Hemisphere simply reverse the seasons (i.e., spring for autumn/fall, winter for summer etc. and vice versa).

² For people from the Northern Hemisphere (Europe and the USA) being tested in the Southern Hemisphere who indicate they only know the astronomical seasons definition (rather than the meteorological seasons as above), a point should be given if response was ± 3 days from the correct southern hemisphere astronomical season as follows (with seasons reversed correspondingly if tested in the Northern Hemisphere):

Spring: 21 September to 20 December

Summer: 21 December to 20 March

Autumn: 21 March to 20 June

Winter: 21 June to 20 September

- Winter: 1 June to 31 August
- If the participant has already completed the same items from similar screens such as the MMSE or ACE-III during the same test session, score the participant's responses on those screens according to these TICS-M rules and refrain from repeating the question on the TICS-M to avoid potential practice effects.

Item 4. Orientation – age.

- **Allow only one repetition of instructions.**
- **Instructions:** *Can you tell me your age?*
- **Scoring:** 1 point for exactly correct.
- If the participant says "I'm almost 86" then ask "what age are you right now?" to clarify that they know their exact current age.

Item 5. Orientation – phone number.

- **Allow only one repetition of instructions.**
- **Instructions:** *Do you know your telephone number?*
- **Scoring:** 1 point for exactly correct.
- The correct phone number is the number that the participant has supplied to do the TICS-M, or another verified phone number.

Item 6. Immediate recall of word list.

- **Repetition of the word list is NOT permitted.**
- **Instructions:** *Now I'm going to read you a list of ten words. Please listen carefully as I am going to ask you to try and remember them. You're not allowed to write the words down - so when I have finished reading the list, just tell me as many words as you can remember in any order. I can only say the words once, are you ready? The words are:*
- Read the words clearly & loudly at a rate of 1 word per second.
- Once you have finished say ***Can you remember any words in that list?***
- **Scoring:** 1 point for each correctly recalled word on the list (no penalty for repetitions or intrusions).
- Close approximations to the correct words are NOT permitted (for example, "cabinet" instead of "cabin" or "type" instead of "pipe" would each score 0).
- Do not say the words more slowly for participants whom you may expect to have greater difficulty with the task. Do not repeat any of the words even if the participant requests this or interrupts you for any other reason, simply say "I'm sorry I cannot repeat the words and will need to keep going, please do the best you can for the rest of the list"

Item 7. Serial 7s

- **Allow only one repetition of instructions.**
- **Instructions:** *Now can I ask you to take 7 away from 100 and continue to take 7 away from your answer until I ask you to stop?*
- **Scoring:** Score 5 points for exactly 5 correct responses (i.e., "93, 86, 79, 72, 65"). Stop after 5 subtractions, 1 point for each correct subtraction. Allow answers to carry forward, for example, if they say "93, 84, 77, 72, 65" they would score 4 as only the second answer was incorrect.
- If this item has been administered within another cognitive screen such as the MMSE, ACE-III or Montreal Cognitive Assessment (MoCA) during the same session, do not re-administer but score the responses according to TICS-M scoring rules.
- If the participant gives up part way through completing this item because it is clear they do not know the answers, record any responses and score those appropriately. If the

participant does not make a serious attempt at any answers before refusing, do not score this item, and refrain from using the normative data for the total TICS-M score.

Item 8. Counting backwards.

- **Allow only one repetition of instructions.**
- **Instructions: *Can I ask you now to count backwards from 20 to 1?***
- **Scoring: 1 point for exactly correct.**
- Do NOT allow corrections during the sequence, for example “16, 15, 13, no 14, 13” will score 0. This is meant to be a very basic task and is not timed.
- Participant must start by saying “20” and end by saying “1”, otherwise score 0. If the participant is correct then continues onto “0”, “minus 1”, “minus 2”, just stop them and award the point.

Item 9. Object naming (parts a and b)

- **Allow only one repetition of instructions.**
- **Item 9a. Naming 1.**
 - **Instructions: What do people normally use to cut paper?**
 - **Scoring: 1 point for “scissors” or “shears”.**
- **Item 9b. Naming 2.**
 - **Instructions: What is the name of the prickly green plant that grows in the desert?**
 - **Scoring: 1 point for “cactus” or “prickly pear”.**
- Do not use any prompts to help participants think of the answer but allow them some time to think before moving onto the next item.

Item 10. Naming current public figures (parts a and b).

- **Allow only one repetition of instructions.**
- **Item 10a. Prime Minister.**
 - **Instructions: *Who is Prime Minister of Australia now?***
 - **Scoring: 1 point** if the participant correctly names the last name of the current Prime Minister (PM). The last name only is required.
- **Item 10b. Premier.**
 - **Instructions for Australian states: *Do you know the name of the premier of (enter state here)?***
 - For participants living in the 2 Australian territories (ACT and NT) as there is no Premier the correct answer is the current Chief Minister for those territories.
 - **Instructions for ACT and NT: *Do you know the name of the Chief Minister of (enter territory here)?***
 - **Scoring: 1 point if the participant correctly names the last name of the current Premier/Chief Minister for the state/territory in which the participant lives.** The last name only is required and allow some leeway where the last name is difficult to pronounce (see example of this below).
- Item 10a and b – further comments.
 - Allow a *close* approximation to the correct pronunciation of the full last name (the first letter or first part of the name is not accepted)
 - If they say “unpronounceable” or a similar response encourage them to “take your best guess even if you are unsure or feel it is not exactly right”
 - Recent change in PM/Premier/Chief Minister – if less than 3 months has elapsed between a change of PM/Premier/Chief Minister score this item correct if the participant correctly provides the last name of *either* the new or the previous PM/Premier/Chief Minister.

Item 11. Word meaning.

- **Allow only one repetition of instructions.**
- **Instructions: *What is the opposite of “east”?***
- **Scoring: 1 point for “west”.**

Item 12. Word repetition

- **Repetition of the word list is NOT permitted.**
- **Instructions: *Can you say the words: “British constitution”?***
- **Scoring: 1 point if correctly pronounced on the first attempt**
- Ensure that the person is paying attention and you carefully pronounce the phrase.

Item 13. Delayed recall of Word List.

- **Allow only one repetition of instructions.**
- **Instructions: *Now can you remember any of the words from the list I read out earlier?***
- **Scoring: 1 point for each correctly recalled word.**
- This item can be administered immediately following Item 12 ("British constitution"), as no delay interval is specified.

Additional considerations.

- **Missing data. Exert caution in interpreting a total score if data are missing** due to refusal, hearing difficulties, speech difficulties, comprehension issues (particularly due to limited English comprehension), or any other reason, as our normative data were constructed using individuals who had complete data on the test.
- **Training in test administration.** Special qualifications are not required to administer the TICS-M, but knowledge of psychological test administration is preferable. We recommend practising the administration in person with a volunteer, then practice over the phone several times in order to become familiar with the administration. In particular, reading out the word list at an accurate rate of one word per second is important and can require some practice to master.

Dementia and MCI cut-offs.

Classification	Prediction range	TICS-M cut-off	Sensitivity (%)	Specificity (%)	AUC*	PPV^ (%)	NPV~ (%)
Dementia vs no dementia	1 year	≤ 21	77	88	0.87	14	99
	1 - 5 years	≤ 23	68	77	0.75	31	94
Dementia vs MCI	1 year	≤ 21	77	82	0.83	22	98
	1 - 5 years	≤ 23	68	71	0.71	32	91

* Area Under the Curve; ^ Positive Predictive Value; ~ Negative Predictive Value.

Please refer back to our paper (Bentvelzen et al., 2019) for more detail on validation of the TICS-M.

Acknowledgments

We thank Kate Maston (Black Dog Institute, Randwick, New South Wales, Australia) and Virginia Winter (Sydney Memory and Ageing Study, CHeBA, UNSW) for their valuable contributions to this manual.

References

- Bentvelzen, A. C., Crawford, J. D., Theobald, A., Maston, K., Slavin, M. J., Reppermund, S., ... Kochan, N. (2019). Validation and Normative Data for the Modified Telephone Interview for Cognitive Status: The Sydney Memory and Ageing Study. *Journal of the American Geriatrics Society*, 67(10), 2108–2115.
- Brandt, J., Spencer, M., & Folstein, M. (1988). The telephone interview for cognitive status. *Neuropsychiatry Neuropsychol Behav Neurol*, 1(2), 111–117.
- Brandt, J., Welsh, K. A., Breitner, J. C., Folstein, M. F., Helms, M., & Christian, J. C. (1993). Hereditary influences on cognitive functioning in older men. A study of 4000 twin pairs. *Archives of Neurology*, 50(6), 599–603. <https://doi.org/10.1001/archneur.1993.00540060039014>
- Castanho, T. C., Amorim, L., Zihl, J., Palha, J. A., Sousa, N., & Santos, N. C. (2014). Telephone-based screening tools for mild cognitive impairment and dementia in aging studies: A review of validated instruments. *Frontiers in Aging Neuroscience*, 6(FEB). <https://doi.org/10.3389/fnagi.2014.00016>
- de Jager, C. A., Budge, M., & Clarke, R. (2003). Utility of TICS-M for the assessment of cognitive function in older adults. *International Journal of Geriatric Psychiatry*, 18(4), 318–324.
- Pendlebury, S. T., Welch, S. J. V., Cuthbertson, F. C., Mariz, J., Mehta, Z., & Rothwell, P. M. (2013). Telephone assessment of cognition after transient ischemic attack and stroke: Modified Telephone interview of Cognitive Status and Telephone Montreal Cognitive Assessment versus face-to-face Montreal Cognitive Assessment and neuropsychological battery. *Stroke*, 44(1), 227–229. <https://doi.org/10.1161/STROKEAHA.112.673384>
- Sachdev, P. S., Brodaty, H., Reppermund, S., Kochan, N. A., Trollor, J. N., Draper, B., ... Lux, O. (2010). The Sydney Memory and Ageing Study (MAS): Methodology and baseline medical and neuropsychiatric characteristics of an elderly epidemiological non-demented cohort of Australians aged 70-90 years. *International Psychogeriatrics*, 22(8), 1248–1264. <https://doi.org/10.1017/S1041610210001067>
- Welsh, K. A., Breitner, J. C., & Magruder-Habib, K. M. (1993). Detection of dementia in the elderly using telephone screening of cognitive status. *Neuropsychiatry, Neuropsychology, & Behavioral Neurology*, 6(2), 103–110.