Brief executive function assessment tool (BEAT)

Record form

Drug and Alcohol Network

NSW GOVERNMENT

AGENCY FOR CLINICAL INNOVATION

9ANTS
ADVANCED NEUROPSYCHOLOGICAL TREATMENT SERVICES
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The BEAT was designed to increase the capacity of alcohol and other drug services to screen for cognitive impairment and to be administered by frontline alcohol and other drug service workers. As many BEAT users will not be psychologists, it is strongly recommended that they watch the training video prior to administering the tool. The need to enhance the capacity of alcohol and other drug services to screen for cognitive impairment has been balanced against the need to ensure psychological tests are not misused or cause harm. Therefore, it is strongly recommended that BEAT examiners who are not psychologists seek the supervision of a psychologist if and/or when interpretation anomalies arise.

Test details

Examinee details

Name _____

Date of birth _____

Examination details

Date of test _____

Facility _____

Examiner details

Name _____

Position _____

The test

Introduction

Say: We're about to have a look at your memory and thinking skills by asking you to do some mental tasks. You may find some tasks very easy and others a little challenging. It's normal to experience some difficulties, the main thing is for you to try your best.

Prompt 1. Prospective memory end setup

Say: At the end of this test I will say 'that's the end'. When I say that, I want you to remind me to ask about your schooling.

If you have already asked about the examinee's schooling, then replace the word schooling with some other relevant phrase such as hobbies, talents or interests.

Tick this box when you have said that.

Instruction given ☐

Item 1. Questionnaire

1. Present response form Item 1 Questionnaire to the examinee.

2. Say: To start with, I've got a brief questionnaire that asks on how many days out of the past seven days you experienced issues with your thinking or functioning. Would you like to complete it yourself, or would you prefer I read it to you?

3. Allow examinee to read and complete questionnaire.

4. If examinee has difficult reading, read the questions to them aloud and tick here: ☐

Scoring

Add the total number of days for all 10 questions to get the raw score.

Raw score = _____ /70

Raw score	0–9	10–18	19–29	30–70
Transformed score	3	2	1	0

Item 2. Trail making

1. Make sure you have a stopwatch to record the time. ⏱

2. Present response form Item 2 Trail making to the examinee.

3. *Say: I'd like you to start at number 1 and draw a line from 1 to A, A to 2, 2 to B and so on. Keep alternating between number and letter, as fast as you can until you reach the end here.*

4. Point to each number and letter as you explain.

5. Use a stopwatch to time how long the examinee takes to complete the trail.

6. If the examinee makes a mistake, **say 'that's not quite right, continue from here'.** Cross out the error with two lines and point to the last correct number or letter. Do not stop timing.

Scoring

Total time taken to complete the trail (in seconds).

Raw score = _____ seconds

Raw score	0–16	17–23	24–33	>33
Transformed score	3	2	1	0

Item 3. Clock drawing

1. Present response form Item 3 Clock drawing.

2. *Say: This circle represents a clock. Put in all the numbers so that it looks like a clock and then set the time to ten minutes past eleven.*

Scoring

The raw score is the first two numbers that are drawn.

Raw score = _____ , _____

| Raw score	Neither are 12, 9, 6 or 3	One is 12, 9, 6 or 3	Both are 12, 9, 6 or 3
Transformed score	0	1	3

Item 4. Figure copying

1. Present response form Item 4 Figure copying.

2. *Say: Copy this diagram as accurately as you can over here.*
   Point to the space below the design.

3. Remove the response form from the examinee when copy is complete.

4. *Say: I would like you to remember that last drawing you copied because I will ask you to draw it again later on.*

Prompt 2. Prospective memory bell setup

1. After you've given the instructions for Item 4 Figure copying, introduce this prompt

2. *Say: Also, if you see a bell, I want you to say to me, 'that rings a bell'.*

Tick this box when you have said that.

Instruction given ☐
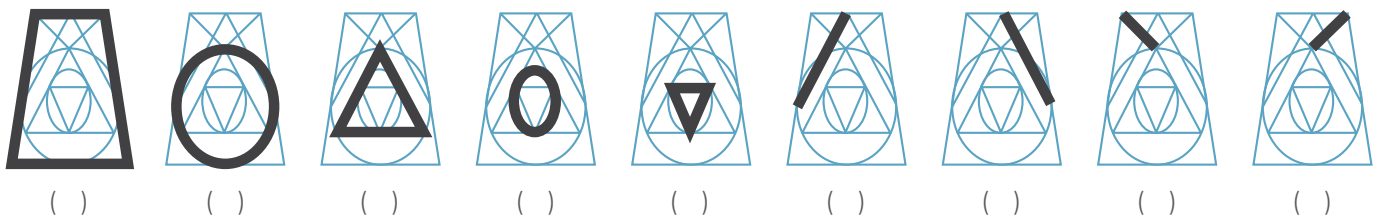
Scoring

- Give a point for each of the nine elements in Item 4 Figure copying that are drawn.

- An element must be clearly recognisable to attract a point, even if it is in the wrong location.

- Raw score is the total number of elements drawn.

Presented upside down below so scoring can be undertaken during drawing.

Raw score = _____ /9

Raw score	0–8	9
Transformed score	0	3

( )   ( )   ( )   ( )   ( )   ( )   ( )   ( )   ( )

Item 5. Word list learning

1. **Trial 1**: Say: *Now I'm going to say some words. Listen carefully, because after I've said them, I want you to tell me as many of them as you can remember, in any order you like. Ready?*

2. Read the words from left to right starting with 'violin' at a rate of one per second.

3. **Trial 2**: Say: *I'm going to say all the words again and when I stop, I want you to tell me all the words from the list, including the ones you've already told me. Ready?*

4. Read the words from left to right starting with 'violin' at a rate of one per second.

5. **Trial 3**: Say: *I'm going to say all the words one more time and when I stop, I want you to tell me all the words from the list, including the ones you've already told me. Ready?*

6. Read the words from left to right starting with 'violin' at a rate of one per second.

Scoring

- Mark the words for each trial in the table.
- Count the total for each trial.
- Add the totals for the raw score.

Raw score	0–16	17–18	19–20	21
Transformed score	0	1	2	3

Trial	VIOLIN	STOVE	FROG	LIP	SHIRT	LETTUCE	NURSE	Total
1st								
2nd								
3rd								
							Raw score	/21

Item 6. Attention span

1. *Say: I'll say some numbers and I want you to repeat them back to me in the same order. For example, if I say '3, 5', what would you say?*

2. Start with the sequence length of 5. Read the sequence at the rate of one number per second.

3. Go up if correct or down if incorrect. If going up, discontinue when the first error is made. If going down discontinue when the first correct response is made.

4. Write down the response provided in the table below.

Scoring

The raw score is the highest sequence length the examinee correctly repeats.

Sequence length	Stimuli	Response
7	3-1-9-7-5-8-4	
6	7-6-1-4-5-8	
5 Start Here ->	2-5-6-9-7	
4	5-1-8-4	
3	4-1-3	

Raw score = _____ /7

Raw score	0–4	5	6	7
Transformed score	0	1	2	3

Item 7. Working memory

1. *Say: I'll say some more numbers and this time I want you to say them in reverse order.*
    For example, if I say '7, 2', what would you say?
    They should say '2, 7'.
    If incorrect, explain again until the examinee understands the task.

2. Start with the sequence length of 3.
    Read the sequence at the rate of one number per second.

3. Go up if correct or down if incorrect. If going up, discontinue when the first error is made. If going down discontinue when the first correct response is made.

4. Write down the response provided in the table below.

Scoring

The raw score is the highest reverse sequence length the examinee achieves.

Sequence length	Stimuli	(Expected response) Response
6	2-4-5-8-6-9	(9-6-8-5-4-2)
5	2-5-6-9-7	(7-9-6-5-2)
4	5-1-8-4	(4-8-1-5)
3 Start here ->	4-1-3	(3-1-4)
2	9-6	(6-9)

Raw score = _____ /6

Raw score	0–3	4	5	6
Transformed score	0	1	2	3

Item 8. Attention span minus working memory

This is not a question you have to ask the examinee. You calculate this item based on the raw scores of the previous two items.

Scoring

Raw score is the Item 6 Attention span raw score minus the Item 7 Working memory raw score.

Attention span raw score _____

minus

Working memory raw score _____

= Raw score _____

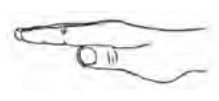| Raw score	<3	≥3
Transformed score	3	0

Item 9. Motor series

1. *Say: Look carefully at what I'm doing.*

2. Perform fist-edge-palm (but do not say this out loud) three times with your **left hand** on the table (hand should touch the table with each movement).

Fist   **Edge**   **Palm**

3. *Say: Now with your right hand, do the same series with me.*

4. Perform series three times with the examinee.

5. *Say: Now do it on your own.*

6. Allow examinee six attempts.

Scoring

Tick for each fist-edge-palm trial that is performed correctly.

With you

☐ 1st trial   ☐ 2nd trial   ☐ 3rd trial

On their own

☐ 1st trial   ☐ 2nd trial   ☐ 3rd trial

☐ 4th trial   ☐ 5th trial   ☐ 6th trial

The raw score is the total number of trials examinee could gesture fist-edge-palm (in that order) **on their own** correctly.

Raw score = _____ /6

Raw score	0–5	6
Transformed score	0	3

Image 'Fist-edge-palm' from Leonidovna SA, Sergeevna, SA. The use of 'The program of forming neuro-psychological space of junior schoolchildren' in teaching process. International Journal of Professional Science.2016;(1)

Item 10. Abstraction

1. *Say: In what way are a banana and orange alike?*

2. Note the response and if anything other than 'fruits(s)'. *Say: Yes, and they're both fruits.*

3. *Say: In what way are a table and chair alike?*

4. Repeat for the other items in the table below in a similar fashion.

5. Record responses verbatim.

Scoring

Record one point for each correct answer. See scoring key for examples.

1. Table – Chair _____ (   )

2. Wind – Rain _____ (   )

3. Salt – Pepper _____ (   )

4. Salt – Seaweed _____ (   )

The raw score is the total number of points across the four word pairs.

Raw score = _____ /4

Raw score	0–1	2	3	4
Transformed score	0	1	2	3

Scoring key							
Table – Chair		**Wind – Rain**		**Salt – Pepper**		**Salt – Seaweed**	
0 point examples	1 point examples	0 point examples	1 point examples	0 point examples	1 point examples	0 point examples	1 point examples
Matching For dining Made of wood Four legs Go together Eat at them Part of a set	Furniture	Elements Come from the sky or atmosphere Nature Environmental forces Seasons Precipitation When there's rain there's wind	Weather	Herbs or spices Additives Make food taste nice Add flavour Ingredients Granulated Comes from a shaker	Condiments Added to food, goes on food Seasoning	Start with S Salty or have salt Taste the same Saltwater Edible, eat them or food Beach Salt comes from the sea Marine	From the sea or ocean From water

Item 11. Letter fluency

1. Make sure you have a stopwatch to record the time. ⏱

2. *Say: I'd like you to tell me as many words as you can think of that begin with a particular letter of the alphabet. Only give me words that start with that letter. Don't tell me the names of people or places, and don't give me the same word with different endings, like eat, eating, eaten, etc. Tell me as many words as you can think of, as fast as you can, that start with S. Go ahead.*

3. Start the stopwatch.

4. Record responses verbatim.

5. *Say: Stop* after 60 seconds.

List S word responses here

Scoring

Count the total number of correct words for the raw score. Ensure you do not count words that are repetitions or rule breaks (e.g. names of people or places, or the same word with different endings).

Raw score = _____

Raw score	0–14	15–17	18–20	>20
Transformed score	0	1	2	3

Item 12. Category fluency

1. Make sure you have a stopwatch to record the time. ⏱

2. *Say: Next I will ask you to tell me the names of things that belong to a particular category. They can start with any letter. As fast as you can, tell me as many different names of fruits as you can think of. Go ahead.*

3. *Start* the stopwatch.

4. Record responses verbatim.

5. *Say: Stop* after 60 seconds.

Scoring

Count the total number of correct words for the raw score.

Raw score = _____

Raw score	0–13	14–15	16–18	>18
Transformed score	0	1	2	3

List fruit responses here

Item 13. Letter fluency minus category fluency

This is not a question you have to ask the examinee. You calculate this item based on the raw scores of the previous two items.

Scoring

The raw score is the Item 11 Letter fluency raw score minus the Item 12 Category fluency raw score.

Letter fluency raw score _____

minus

Category fluency raw score _____

= Raw score _____

Raw score	<-2	-2–0	1–3	>3
Transformed score	0	1	2	3

Item 14. Word list recall

1. Say: *A little while ago I read you some words several times. I want you to tell me all the words again in any order.*

2. For words that are not freely recalled, provide a **category cue**. If the word is not recalled with a category cue, immediately provide the **multiple choice cue**. See scoring table for these cues.

Scoring

To calculate the raw score:

a. multiply the free recall score by 3

b. multiply the category cued recall score by 2

c. add these amounts to the multiple choice cued recall score.

Raw score	0–15	16–17	18–19	20–21
Transformed score	0	1	2	3

Free recall		Category cued recall 'One of the words was...'		Multiple choice cued recall 'Was it...'	
VIOLIN		a musical instrument		guitar, piano or violin?	
STOVE		something you find in a kitchen		sink, stove or fridge?	
FROG		an animal		frog, monkey or snake?	
LIP		part of a face		cheek, lip or nose?	
SHIRT		an item of clothing		shirt, jeans or singlet?	
LETTUCE		a vegetable		carrot, lettuce or cucumber?	
NURSE		a profession		lawyer, doctor or nurse?	
Total		Total		Total	
Total x 3		Total x 2		Total x 1	
Raw score: Add total multiplied scores from each column					

Item 15. Reading

1. Present the BEAT: stimulus card to the examinee.

2. *Say: Read these words for me out loud, starting at number one. Some of these are hard words that you may not have come across before. Just try your best to pronounce them correctly.*

Scoring

[ ] 1. Address   (pronounced like 'a-dress')
[ ] 2. Climb   (pronounced like 'clime')
[ ] 3. Equestrian (pronounced like 'e-quest-rian')
[ ] 4. Liaison   (pronounced like 'lee-ayze-on',
                     or 'lie-ayze-on')
[ ] 5. Ubiquitous (pronounced like 'you-bick-weh-tus')
[ ] 6. Anechoic   (pronounced like 'an-eck-oh-ick')
[ ] 7. Vivace   (pronounced like 'viv-arch-ie')

Add the total number of words pronounced correctly for the raw score.

Raw score = _____ /7

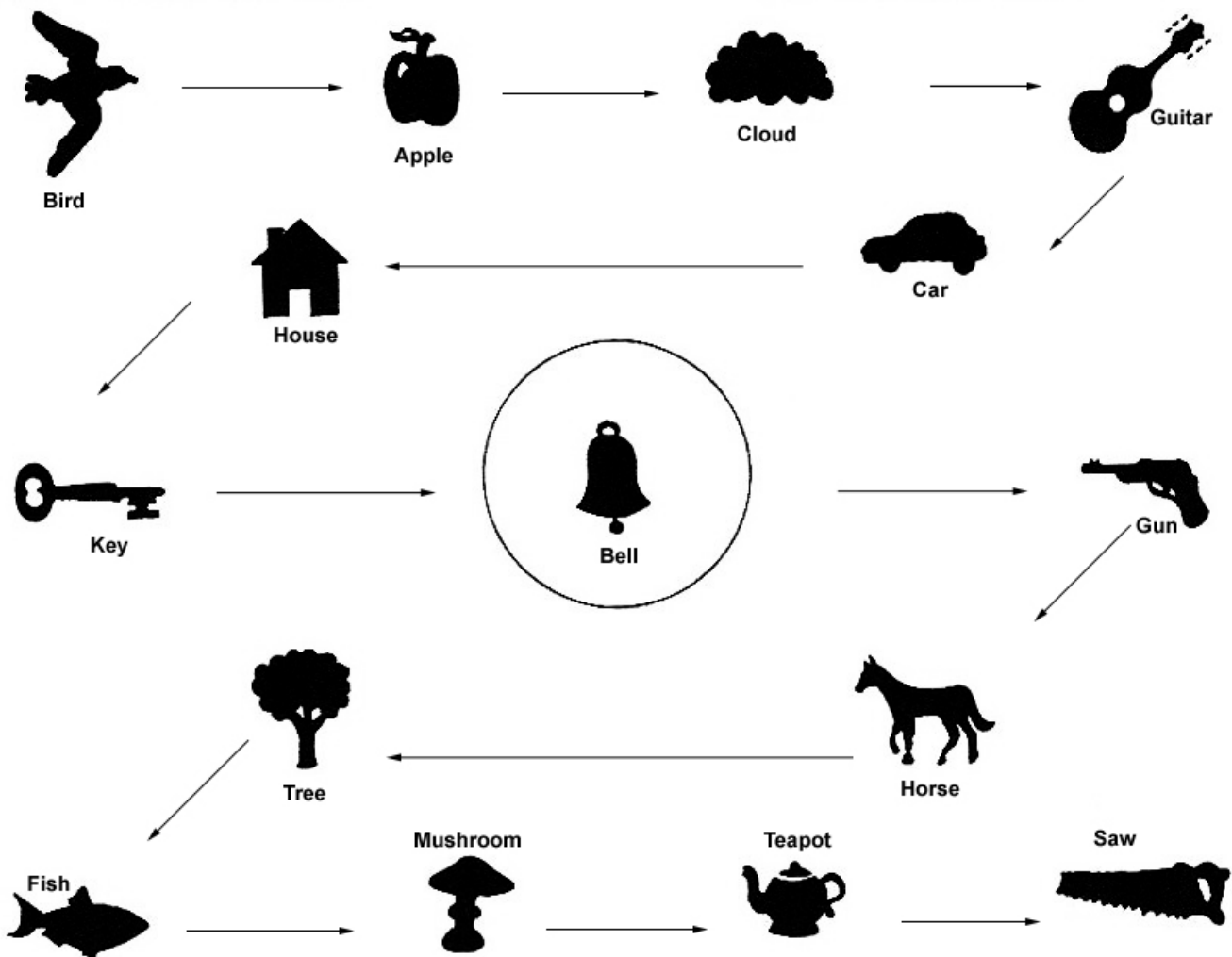| Raw score	0–3	4	5	6–7
Transformed score	0	1	2	3

Item 16. Naming

1. Present the BEAT: stimulus card to the examinee.

2. *Say: What's this a picture of?*
   Point at each of the silhouetted drawings on the stimulus card, in the order below.

Scoring

Add the total number of items named correctly for the raw score.

Raw score = _____ /15

Raw score	0–14	15
Transformed score	0	3

Bird → Apple → Cloud → Guitar

Car → House

House → Key → Bell → Gun

Gun → Horse → Tree

Tree → Fish → Mushroom → Teapot → Saw

[ ] **1.** Bird   [ ] **2.** Apple   [ ] **3.** Cloud   [ ] **4.** Guitar   [ ] **5.** Car

[ ] **6.** House   [ ] **7.** Key   [ ] **8.** Bell   [ ] **9.** Gun   [ ] **10.** Horse

[ ] **11.** Tree   [ ] **12.** Fish   [ ] **13.** Mushroom   [ ] **14.** Teapot   [ ] **15.** Saw

Image 'Naming' source: © 2006 Oxford Publishing Limited. Strauss, Sherman and Spreen. A Compendium of Neuropsychological Tests. Reproduced with permission of the Licensor through PLSClear

Prompt 3. Prospective memory bell response

Scoring

- Give two points if the examinee responds to the bell cue by correctly stating the phrase 'that rings a bell'.

- Give one point if the examinee responds to the bell cue but cannot recall what they need to say.

- Give zero points if the examinee does not immediately respond to the bell cue (even though they might do so later).

Raw score = _____

Raw score	0	1	2
Transformed score	See Item 20 Prospective memory score		

Item 17. Delay discounting

1. *Say: In a hypothetical situation where someone is offering you money, would you prefer to receive…*
   [name each of the options in the table].

2. Circle the amount the examinee selects.

Scoring

Add the total number of delayed choices for the raw score.

Raw score = _____ /27

Raw score	0–10	11–15	16–21	22–27
Transformed score	0	1	2	3

1	$3 now or $10 in one week	**15**	$1 now or $10 in one week
2	$50 now or $100 in six months	**16**	$45 now or $50 in one month
3	$20 now or $100 in six months	**17**	$10 now or $100 in six months
4	$2 now or $10 in one week	**18**	$70 now or $100 in six months
5	$10 now or $50 in one month	**19**	$35 now or $50 in one month
6	$80 now or $100 in six months	**20**	$7 now or $10 in one week
7	$6 now or $10 in one week	**21**	$5 now or $10 in one week
8	$30 now or $100 in six months	**22**	$5 now or $50 in one month
9	$25 now or $50 in one month	**23**	$40 now or $100 in six months
10	$8 now or $10 in one week	**24**	$9 now or $10 in one week
11	$30 now or $50 in one month	**25**	$4 now or $10 in one week
12	$40 now or $50 in one month	**26**	$15 now or $50 in one month
13	$20 now or $50 in one month	**27**	$90 now or $100 in six months
14	$60 now or $100 in six months	**Total now =**	**Total delay =**

Item 18. Visual memory

1. Present response form Item 18 Visual memory to the examinee.

2. *Say: A little while ago, you copied a diagram. I want you to draw that diagram now as best as you can from memory.*
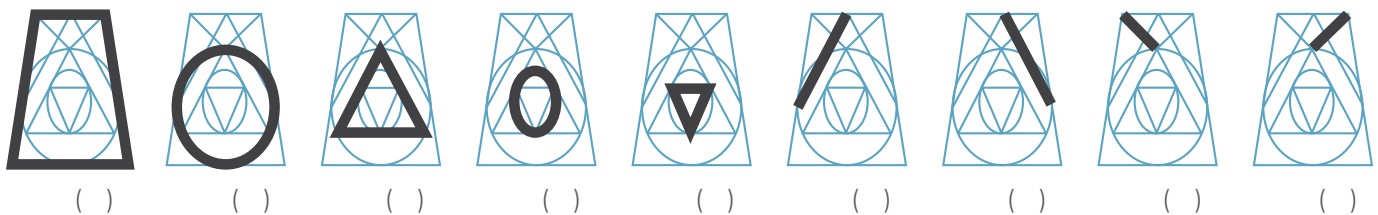
Scoring

The diagram is presented upside down below so scoring can be undertaken during drawing.

- Give a point for each of the nine elements that are recalled.

- An element must be clearly recognisable to attract a point, even if it is in the wrong location.

- Add the total number of elements drawn from memory for the raw score.

Raw score = _____ /9

Raw score	0–6	7	8	9
Transformed score	0	1	2	3

( )   ( )   ( )   ( )   ( )   ( )   ( )   ( )   ( )

Item 19. Incidental learning

1. *Say: Earlier, I showed you a page with 15 silhouette drawings and I asked you to name them. I want you to tell me as many of them as you can remember.*

Scoring

Tick the items recalled by the examinee on the record form (if they incorrectly named an item originally and used the same incorrect name in recalling it, give them a point).

Add the total number of correct items recalled for the raw score.

Raw score = _____ /15

Raw score	0–5	6–7	8	9–15
Transformed score	0	1	2	3

[ ] **1.** Bird   [ ] **2.** Apple   [ ] **3.** Cloud   [ ] **4.** Guitar   [ ] **5.** Car

[ ] **6.** House   [ ] **7.** Key   [ ] **8.** Bell   [ ] **9.** Gun   [ ] **10.** Horse

[ ] **11.** Tree   [ ] **12.** Fish   [ ] **13.** Mushroom   [ ] **14.** Teapot   [ ] **15.** Saw

Prompt 4. Prospective memory end response

1. *Say: That's the end.*

Scoring

- Give two points if the examinee responds to the cue by correctly asking the examiner to ask them about their schooling (or other topic mentioned in the setup).

- Give one point if the examinee responds to the cue but cannot recall what they need to say.

- Give zero points if the examinee does not immediately respond to the cue.

Raw score = _____

Raw score	0	1	2
Transformed score	See Item 20 Prospective memory score		

Item 20. Prospective memory score

Scoring

Add the raw score for Prompt 3 Prospective memory bell response and the Prompt 4 Prospective memory end response for the raw score.

Prospective memory bell response _____

plus

Prospective memory end response _____

= Raw score _____ /4

Raw score	0–1	2–3	4
Transformed score	0	1	3

Education

1. *Say: What is highest level of education you've completed?*
    TAFE Certificates are not counted.

2. Clarify whether a qualification was attempted but not completed, but count full years completed only (e.g. if someone completed their first year of a Bachelor Degree, then count that as 13 years).

Scoring

☐ Primary School (0-6 years)

☐ Year 7   (7 years)

☐ Year 8   (8 years)

☐ Year 9   (9 years)

☐ Year 10   (10 years)

☐ Year 11   (11 years)

☐ Year 12   (12 years)

☐ Diploma/Adv. Diploma (13 years)

☐ Associate Degree   (14 years)

☐ Bachelor Degree   (15 years)

☐ Honours Degree   (16 years)

☐ Masters Degree   (18 years)

☐ PhD (19 years)

Years of education = _____

Calculate the BEAT score

1. Circle the transformed scores for each item in the table below.

2. Add up the columns for 1, 2, and 3 scores.

3. Add up the totals of those columns to calculate the BEAT total score.

4. If the BEAT total score is 30 or less, this indicates the person has cognitive impairment.

Item	Transformed score			
Item 1. Questionnaire	0	1	2	3
Item 2. Trail making	0	1	2	3
Item 3. Clock drawing	0	1		3
Item 4. Figure copying	0			3
Item 5. Word list learning	0	1	2	3
Item 6. Attention span	0	1	2	3
Item 7. Working memory	0	1	2	3
Item 8. Attention span minus working memory	0			3
Item 9. Motor series	0			3
Item 10. Abstraction	0	1	2	3
Item 11. Letter fluency	0	1	2	3
Item 12. Category fluency	0	1	2	3
Item 13. Letter fluency minus category fluency	0	1	2	3
Item 14. Word list recall	0	1	2	3
Item 15. Reading	0	1	2	3
Item 16. Naming	0			3
Item 17. Delay discounting	0	1	2	3
Item 18. Visual memory	0	1	2	3
Item 19. Incidental learning	0	1	2	3
Item 20. Prospective memory score	0	1		3

Total score _____ + _____ + _____ = [ ] Cognitive impairment if BEAT score is 30 or less

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We bring consumers, clinicians and healthcare managers together to support the design, assessment and implementation of clinical innovations across the NSW public health system to change the way that care is delivered.

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