

What does neuropsychology have to offer to the world of stroke rehabilitation?

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Who am I?

- Clinical Neuropsychologist Registrar
- PhD Candidate
- Inaugural winner of the Brightwater Lyn Beazley Scholarship

ABI:RECOVER Project

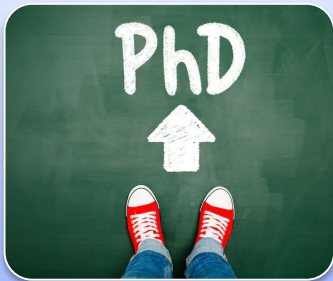


Designed to look at recovery following acquired brain injury



Aims to:

- Identify skills important for recovery
- Develop interventions targeting promising skills



Multi-student project

What is a clinical neuropsychologist?

*“Clinical neuropsychologists **assess and treat** people with **brain disorders** that affect memory, learning, attention, language, reading, problem solving, and decision making” (APS, 2019)*

Assessment:

- Assess the domain-specific impact of stroke
 - Take into account pre-morbid functioning and age
 - Modify test battery for particular presentations
 - Characterise what might be impacted, including neurobehavioural changes such as apathy
- Helps to predict functional outcome

Feedback and Intervention:

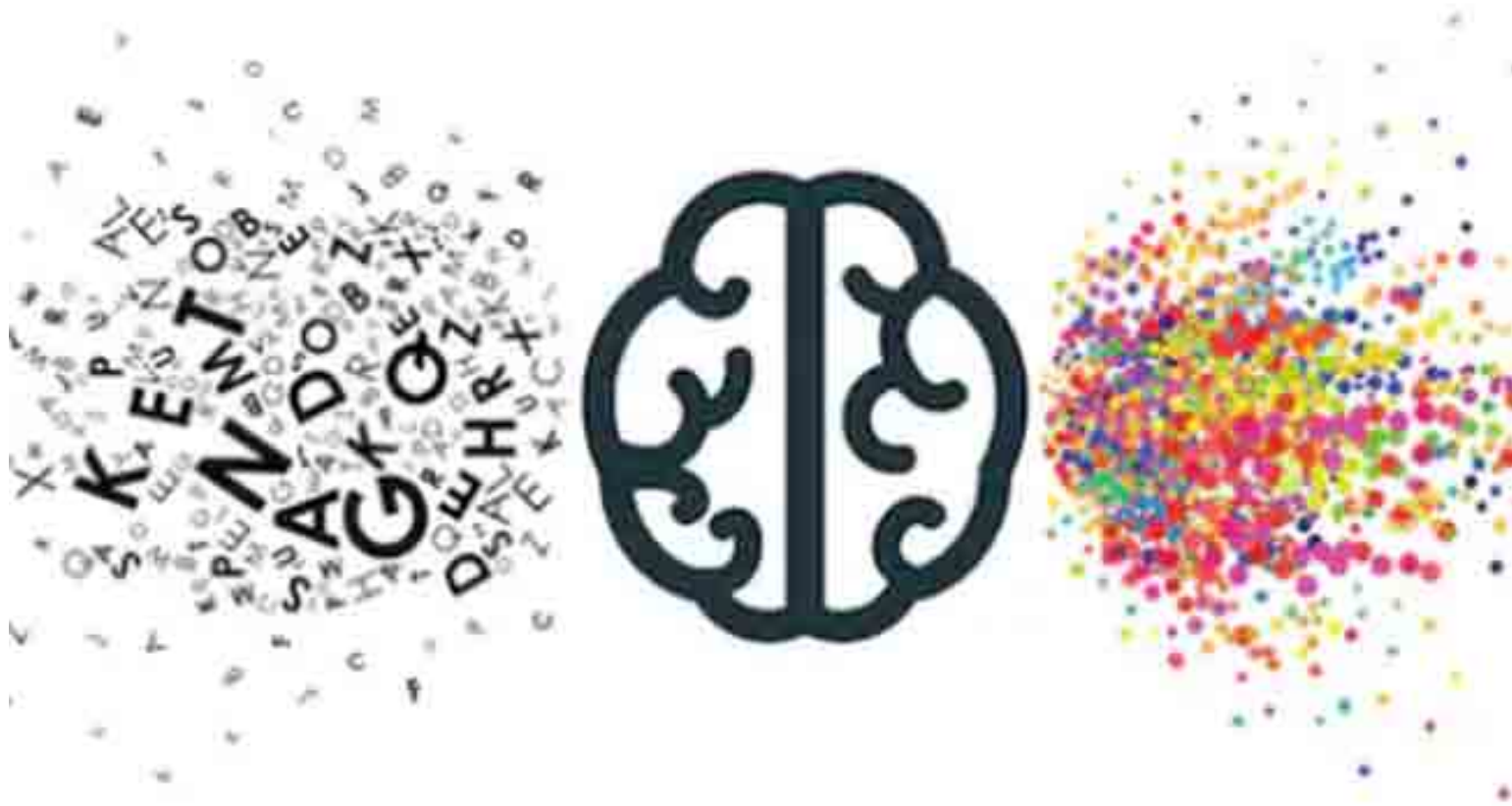
- Psycho-education
- Build self-awareness
- Rehabilitation approaches



ASSESSMENT



What is a neuropsychological assessment?



Neuropsychological Assessment

Intelligence

Memory and
Learning

Executive
Functioning

Language

Visuo-Spatial
Skills

Processing
Speed

Emotion/Mood

Adaptive
Functioning

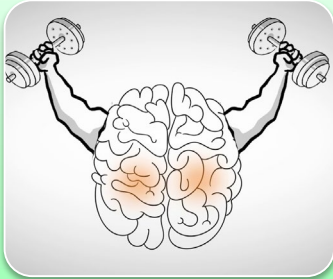
Social
Cognition

“Stroke survivors identified during screening as having cognitive deficits should be referred for comprehensive clinical neuropsychological investigations”

Cognitive impairment



Between 20 and 97% of people experience cognitive impairment following stroke (Chan et al., 2014; Sun et al., 2014)



Impairment is still seen in people with “good” recovery (Jokinen et al., 2015; Planton et al., 2012)



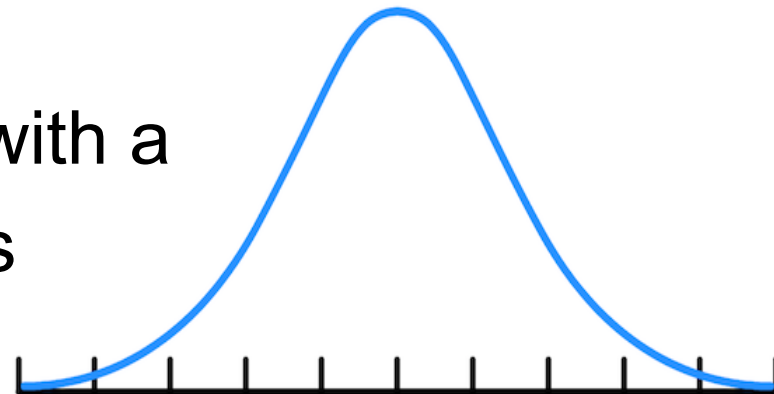
Most frequently, impairments are seen in memory, processing speed, visuo-spatial construction, executive functioning, and language (Jokinen et al. 2015; Planton et al., 2012)

Neuropsychology and stroke

Neuropsychologists also use *normative data* to characterise what is expected based on someone's age or gender.

Neuropsychological tests can estimate a *pre-morbid baseline* using tests of skills thought to be relatively resistant to neurological damage.

Neuropsychologists can work with a range of different presentations



Neuropsychological Assessment

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Neuropsychological Assessment

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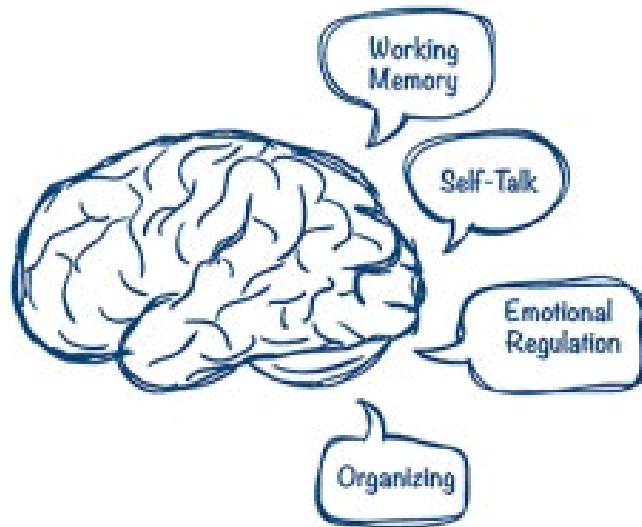
Processing
Speed

Emotion/Mood

Adaptive
Functioning

Social
Cognition

Executive Functioning



Broadly, there are three “prefrontal” syndromes:

- 1) Dorsolateral
- 2) Ventromedial/Orbitofrontal
- 3) Medial frontal

Executive Functioning

Cold

- Logical or rational higher order processes used in novel tasks
- Includes set shifting, working memory updating, response inhibition, and generativity

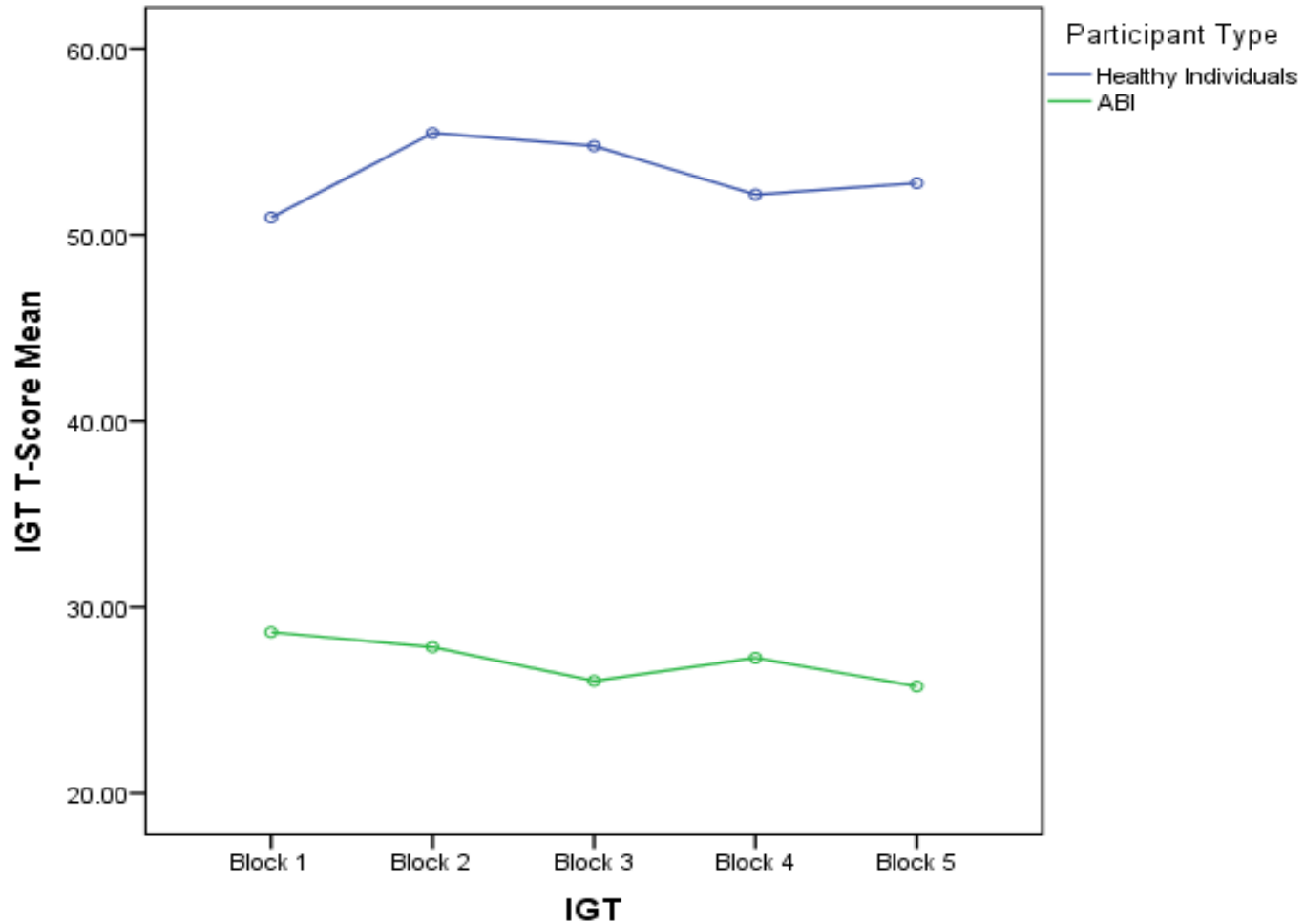
Hot

- Used in situations that require emotional or motivational processing
- Includes weighing up risk/reward, delaying gratification, following social norms, or regulating emotional responses

Phineas Gage



Hot Executive Functioning



Prospective memory

- Remembering to remember
 - E.g., passing on a message to a colleague when you next see them.
 - E.g., taking medication at 8am



Prospective Memory

- Shown to be a major issue in recovery following acquired brain injury
 - Impairments at least as common as retrospective memory impairments (41%)
 - Can interfere with engagement in rehabilitation
 - Important for adhering to sometimes life-saving medical treatments
 - Many family members find it incredibly frustrating

Emotion and Stroke



24-60% of people experience depression following a stroke



29% of people experience anxiety following a stroke



Mental health problems can be a barrier to rehab

1	I still enjoy the things I used to enjoy.	0	I get a sort of frightened feeling like butterflies in the stomach.
2	Definitely as much.	1	Not at all.
3	Not quite so much.	2	Occasionally.
4	Only a little.	3	Quite often.
5	Hardly at all.	4	Very often.
6	Not at all.	5	Very often.
7	I get a sort of frightened feeling as if something awful is about to happen.	0	I have lost interest in my appearance:
8	Very definitely and quite badly.	1	Definitely.
9	Yes, but not too badly.	2	I don't take as much care as I should.
10	A little, but it doesn't worry me.	3	I may not take quite as much care.
11	Not at all.	4	I take just as much care as ever.
12	I can laugh and see the funny side of things.	0	I feel restless as I have to be on the move.
13	As much as I always could.	1	Very much indeed.
14	Not quite so much now.	2	Quite a bit.
15	Definitely not so much now.	3	Not very much.
16	Not at all.	4	Not at all.
17	Worrying thoughts go through my mind.	0	I look forward with enjoyment to things.
18	A great deal of the time.	1	As much as I ever did.
19	A lot of the time.	2	Farther less than I used to.
20	From time to time, but not too often.	3	Definitely less than I used to.
21	Only occasionally.	4	Hardly at all.
22	I feel short-temper.	0	I get sudden feelings of panic:
23	Not at all.	1	Very often indeed.
24	Not often.	2	Quite often.
25	Sometimes.	3	Not very often.
26	Most of the time.	4	Not at all.
27	I can sit at ease and feel relaxed.	0	I can enjoy a good book or radio or TV program:
28	Definitely.	1	Often.
29	Usually.	2	Sometimes.

Best practice guidelines recommend mood screening

Emotion and Stroke

- Mood disorders are often undiagnosed and untreated (Hackett et al., 2005)
- It can be hard to distinguish between mood symptoms and stroke-related impairments (Burton & Tyson, 2015; Hart & Morris, 2007)
- 56% of patients receive mood assessments following stroke (National Stroke Audit – Rehabilitation Services Report, 2018)
 - 1 in 3 do not have access to clinical or clinical neuropsychology

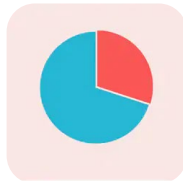


InformMe

Post-Stroke Mood Screening

- Many validated measures (Burton & Tyson, 2015):
 - Hospital Anxiety and Depression Scale (HADS), Patient Health Questionnaire (PHQ-9), Geriatric Depression Scale (GDS-15), Stroke Aphasic Depression Questionnaire–Hospital Version (SADQ-H)
 - Can differ based on age and communication needs
- International guidelines emphasise the importance of staff training and referral pathways (NHS, 2011)

Apathy is a disturbance of motivation, characterized by reduced goal-directed behaviour and cognition



Apathy is common following a stroke
(approximately 36%)



Associated with cognitive impairment



Most commonly associated with frontal and
subcortical lesions (Jorge et al. 2010)



Associated with poorer outcome and poorer
engagement in rehabilitation

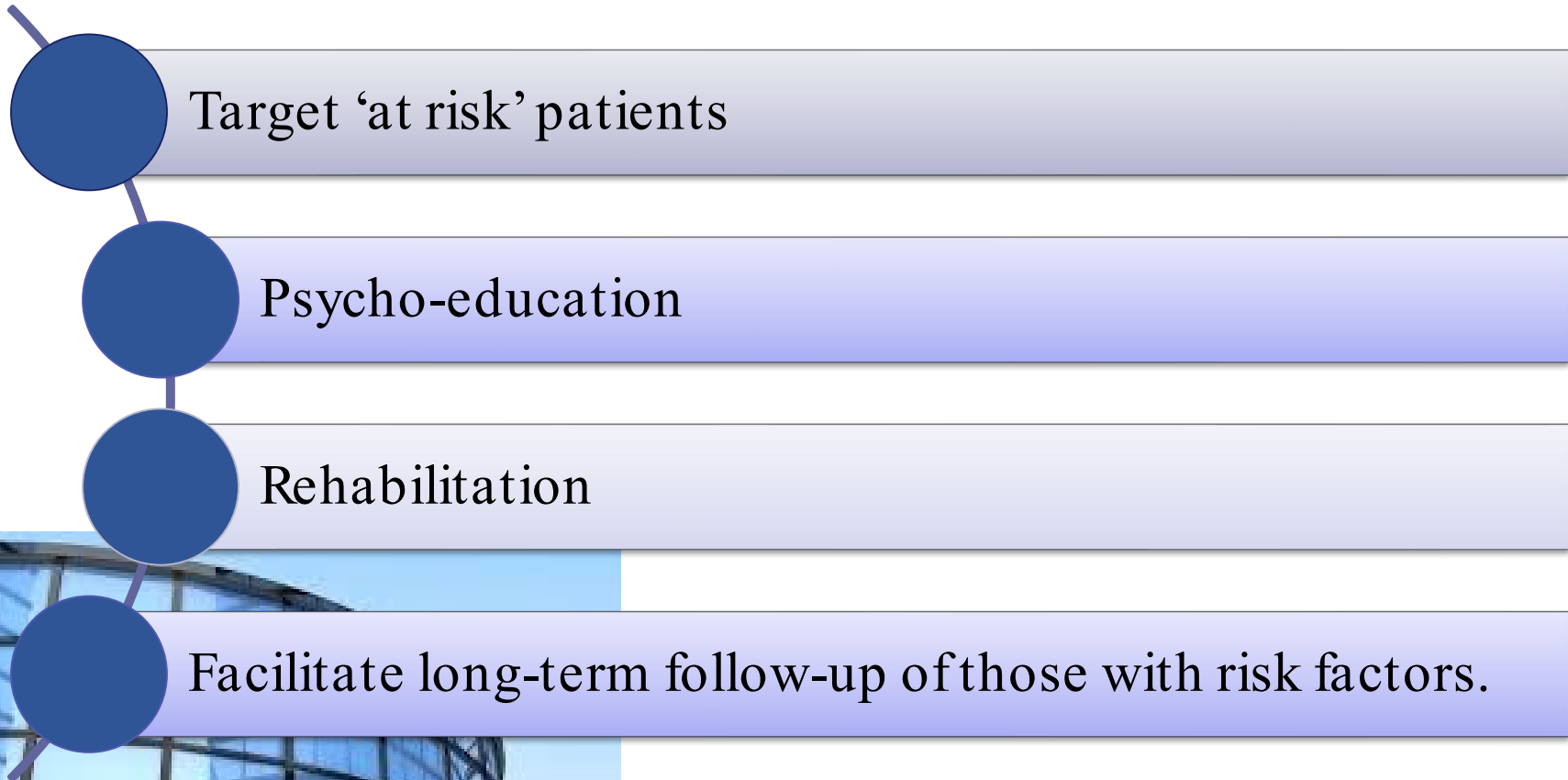
Why measure these skills?

Overlooking impairment can lead to:

- Lack of access to services and rehabilitation
- Poorer quality of life
- Missing the opportunity for understanding problems

Neuropsychological assessment can also help predict functional outcome.

Why is it important to study predictors of outcome?



Functional Outcome

a persons' ability to live independently and engage in social relationships, leisure activities, study and/or employment

Predicting outcome



- Age
- Stroke severity
- Lesion location
- Medical comorbidities
- Pre-injury functioning
- Pre-injury substance use
- Social support
- Gender

Neuropsychological Predictors



Following TBI, NP tests predicted 31.3% of variance in global outcome:

- Verbal Memory
- Visuo-spatial Construction
- Set Shifting
- Verbal Fluency



Following non-traumatic ABI, NP tests predicted 20% of variance in ADLS and 13% of variance in quality of life

FEEDBACK



Psychoeducation

Refers to informing an individual (and their family, if relevant) about their specific condition, which can include strengths and weaknesses and how this relates to their stroke.

In people with traumatic brain injuries, giving people personalized information regarding their injury and rehabilitation lead to better outcomes (Pegg et al., 2005)



“Findings from neuropsychological testing should be discussed with the patient and family. Education and information should also be provided, verbally and in writing, about strategies which may help the person better engage in rehabilitation.”

The importance of awareness

- Impaired self-awareness and insight are common following stroke (up to 70%) (Hartman-Maier et al., 2003)
- A lack of insight can lead to disengagement in rehabilitation and unrealistic goal setting (Fleming & Strong, 1995)
- Higher levels of insight are associated with better outcomes following stroke (Ownsworth et al., 2006)



Compensatory Strategies

Using strategies based on assessment findings to help compensate for the relative weakness.

For example, in people with prospective memory problems you might use a range of different strategies such as environmental cues and alarms to prompt the behaviour.

Structured Rehabilitation

Using formal rehabilitation programs (e.g., groups or multiple individual sessions) to help the individual build more internal strategies.

Goal Management Training (GMT; Levine, 2000) is one such program. It encourages individuals to use a series of structured steps to improve executive functioning and prospective memory.

Referring to Neuropsychology



- Typically seen in the post-acute period following stroke (though there are always exceptions!)
- Public and private services are available in Perth

Neuropsychological assessment helps to:

- Characterise the impact of the stroke, including:
 - Novel skills such as hot executive functioning
 - Mood and emotion
- Identify targets for rehabilitation/intervention
- Predict functional outcome

Intervention can:

- Help individuals understand changes following their injury
- Improve self-awareness
- Provide targeted compensatory strategies or structured rehabilitation programs

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