

Re:Cognition Health

COMPLETE COGNITIVE CARE

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Secondary Influences on Neuropsychological Performance

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Agenda

- : Brief Background
- : Case Study 1
- : Symptom Invalidity
- : Secondary Influences of TBI
- : Case Study 2

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: Quality

- Key to neuropsychological assessment in any context is the ability to have confidence in the quality of the data.
- It is key that users of test data are aware of the many factors that can influence the quality of the date. These include:
 - Psychometric properties of the test
 - Neuropsychologists experience
 - Secondary Influences
- Good practice in assessment requires that issues of data quality be addressed in any report on findings (BPS Guidelines).

: Definitions

- Primary Influences - are the direct result of the extent and location of the damage of the brain:
 - Typically what we are trying to measure with neuropsychological assessment.
- Secondary influences are the result of something associated with the brain injury or disease beside the specific area of the brain affected:
 - Can make it difficult to conclude what the affect of the brain injury is in a medico-legal context.

: Secondary Influences

Examples include:

Depression

Anxiety

Fatigue

Pain

Motivation/Malingering/Symptom Invalidity

Primary Motor Impairments

: Why are they important?

- Because they can explain a significant amount of variance in neuropsychological test performance. Particularly relevant when attempting to ‘partial’ out effect of brain injury from other factors.
- Because they can present an important treatment target – for example, treatment for anxiety or depression – and can help to tailor more relevant and specific treatment recommendations post assessment.

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: Case Study 2

- 70 year old female, developed a spinal injury following total knee replacement surgery.
- Referral question - query dementia.
- Initial neuropsychology assessment concluded that the scores on assessment indicate a significant under-functioning of cognitive abilities. Performance was significantly impaired for memory, attention and visuo-spatial function. In addition, some inconsistency in test performance was noted which was thought to be secondary to anxiety and emotional trauma.

- Repeat neuropsychological assessment results:
 - Impaired on tests of attention, borderline to low average on tests of memory, low average to average on tests of visuospatial function and borderline to average on language assessment.

- Symptom Validity Testing
 - Passed all tests.
- Relationship between test data and day to day functioning
 - No difficulties with ADLS reported, other than those affected by mobility.
 - Able to maintain a range of complex day to day activities such as repairing and restoring guns and fishing rods
 - Repeat testing showed some improvement over time.

What were the secondary influences?

Extreme pain

Pain medication

Fatigue – had not slept for 24 hours prior to assessment

Anxiety – very anxious about testing

- What can we conclude?
 - No evidence of dementia
 - No evidence of significant cognitive difficulties when secondary influences are accounted for
- Treatment Implications
 - Manage pain
 - Treatment for anxiety, emotional stress

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: Terminology

- Generally referred to in lay terms as ‘effort’ testing. Effort is often used a proxy for motivation and can be a misleading term. For example, it may take a large amount of effort to feign cognitive impairment. Terms used to describe performance in reports include:
- Malingering
- Feigned or exaggerated impairment
- Negative response bias
- Problematic effort
- Biased symptom reporting
- Non-credible neuro-cognitive dysfunction

: Why is measuring effort important

- If it not correctly identified can risk misinterpretation of data leading to inaccurate diagnosis, treatment recommendations and medical claims.
- Research suggests that negative response bias accounts for a large degree in variance in performance, perhaps even more so than even the brain injury itself. For example, in a study of litigants Greene et al (2001) reported that 53% of the variance in tests results was due to effort, with only 5% due to brain injury severity.

: How do we assess?

- Evidence from neuropsychological testing:
 - Below chance performance on symptom validity tests (SVTs)
 - Discrepancies between test data and observed behaviour
- Evidence from self report, questionnaires:
 - Self-reported history discrepant with documented history
 - Self-reported symptoms discrepant with known patterns of brain functioning
 - Behavioural observations
 - Information from collateral sources

: Symptom Validity Tests

- Basic rationale is that they appear to measure a particular ability, for example memory.
- However, in reality they are so simple that even a person with significant cognitive impairment should be able to perform well on them. Whilst typically called ‘effort tests’, the reality is they require little effort to achieve 100% performance.
- Two basic categories of SVT
 - Free standing
 - Embedded

: Symptom Validity Tests

- Free standing measures are additional measures specifically designed to test validity. Can be time consuming but have the best evidence base.
 - Forced choice – if perform below chance this suggests they knew the correct answer and deliberately chose incorrect answer.
 - Non forced choice – for example tapping speed, dot counting etc.
- Embedded measures are calculations derived from standard neuropsychological tests already included in the battery – for example reliable digit span.

: AACN Consensus Statement

- In diagnosing poor effort need to consider overall presentation of client, background information, history taken during clinical interview, observations, neuropsychological performance and performance on SVTs.
- *Research has found that experienced experts are not accurate in identifying valid from invalid performances on the basis of behavioural observation and test scores alone.*

: AACN Consensus Statement

- In considering a diagnosis of malingering we are explicitly making a determination of intent.
- Consensus statement recommends:
 - the use of both stand alone and embedded measures in an assessment,
 - Should use multiple validity measures, covering multiple domains, across the assessment.

: BPS Guidance

- Effort testing should be routinely carried out except in exceptional circumstances (ie severe learning disability).
- A multi-method and multi-test approach is recommended.
- Careful interpretation of failure on effort testing is required.
- Knowledge of sensitivity and specificity of tests of effort is crucial.

: Example – Dot Counting



: Example – Dot Counting



: Example – Coin in the hand

: Example –15 Item Test

A	B	C
1	2	3
○	□	△
a	b	c
I	II	III

: Example –15 Item Test

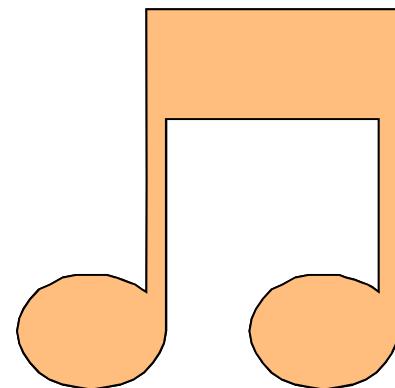
: Example – Forced Choice Test



: Example – Forced Choice Test



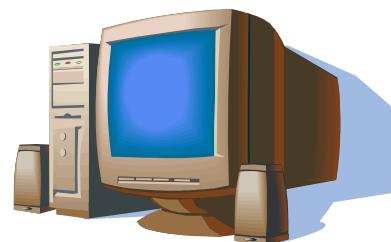
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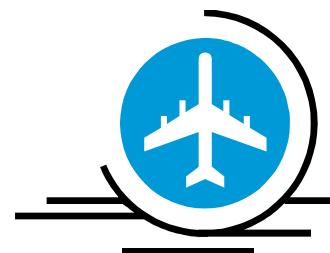
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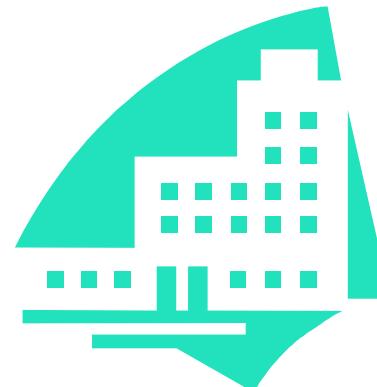
: Examples – Forced Choice Test



: Example – Forced Choice Test



: Example – Forced Choice Test



: How do we interpret findings?

- Poor performances on these tests can arise for a number of reasons including:
 - Mental health conditions
 - Neuropsychological conditions – ie dementia
 - Fatigue
 - Negative beliefs about competence
 - Poor understanding of requirements of testing
 - Prior tutoring
 - Deliberate non adherence
- To aid in interpretation of results it is important to understand the psychometric properties of the tests, and in particular their sensitivity and specificity.

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: Secondary Influences in TBI

- Neuropsychologists are often called upon to detect and partial out the effects that secondary influences may have on functioning in individuals who have sustained a TBI.
- In mild TBI the acute symptoms would generally be expected to have resolved within weeks following the injury. In the majority of cases where symptoms persist this is thought to be due to secondary factors.

: Depression

- Depression (and anxiety) are the most common psychiatric sequelae of TBI.
- Numerous studies have found that depressed patients perform worse on measures of executive functioning, memory, working memory and speed of information processing, with overall effect sizes moderately large.
- These effect sizes are mitigated by age, with individuals over 60 showing more impairment associated with depression, regardless of depression severity.

: Depression

- Insufficient effort and poor motivation fails to account for the neuropsychological deficits associated with depression.
- Negative affect and TBI in combination can produce a 'double jeopardy' phenomena where disproportionately impairment monitoring and error processing is seen.
- Pre-injury psychiatric diagnosis often predicts post injury psychiatric status, and has been shown to directly predict persistence symptom reporting at 3 months.

: Anxiety

- Is thought to be one of the greatest and one of the most common non-neurological influences on test performance.
- Cognitive characteristics of anxiety do not involve a global deficits across all types of tasks.
- Anxiety may negatively impact on difficult tests of attention and executive control.
- Some degree of anxiety can also improve performance, particularly on easier tasks.

: Chronic Pain

- Medically explained and unexplained pain has been found to be associated with recovery and outcome following TBI.
- Relationship not well understood as higher rates of chronic pain are found in mild TBI rather than in severe TBI.
- Chronic headache has been found to persist in as many as 75% of cases and can impact on social and occupational function.

: Other Factors

- Sleep disturbance – sleep onset and maintenance difficulties are commonly associated with TBI.
 - Sleep disturbances associated with TBI can affect neuropsychological performance, mood, capacity, social functioning and work functioning.
 - In considering the impact of sleep, it is important to consider whether a sleep disturbance may be secondary to TBI or non-TBI factors such as anxiety.
- Fatigue – is one of the most commonly reported symptoms post TBI. Effects a wide range of areas of functioning similar to sleep disturbances.

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: Case Study 2

- 36 year old male with history of bomb blast injury in 2005, and reports of development of symptoms consistent with PTSD and major depression diagnosis.
- Treatment of PTSD symptoms not successful which led to referral for neuropsychological assessment to address the hypothesis that there may be an underlying brain injury impacting on presentation.
- Relevant background:
 - Deployed to Iraq between 2003 and 2010.
 - Constantly exposed to gun fire, ambush and death.

: Case Study 2

- 2005 – involved in bomb blast incident. No report of LOC but some injury to right side – reported right side weakness immediately after injury and then intermittently in weeks following. Injury to shoulder and neck. Reported memory and attention problems. 2 days later travelling in armoured car and involved in accident. Car flipped several times. Reported brief LOC MRI found no evidence of brain injury. Neurologist diagnosed PCS and PTSD.

: Case Study 2

- 2009 – involved in second bomb blast incident. Brief LOC. Injuries to neck, shoulders, knee, hips, spine. Eye and ear injuries. Report of memory difficulties. Medical and neurology reviews at the time did not find any evidence of head injury. Referred for neuropsychology assessment which found intact general intellectual functioning but some minor impairments in memory functioning. PTSD and major depression diagnosed. Seen for 18 sessions of CBT/EDMR.

- Current presentation –
 - reports significant day to day memory, behavioural and personality changes.
 - Examples include not remembering to eat, not remembering to take medication without prompts from phone (which his wife has to set up), not remembering to order medications.
 - Not working.
 - Still able to care for two young children.
 - Still able to drive and function independently.

- Current presentation –
 - Significant changes in behaviour – changed person.
 - Relationship with extended family broken down.
 - Less aware of social niceties, more likely to say what thinks and then not back down when realises caused offence.
 - Lost his sense of humour.
 - Verbally aggressive and at times physically aggressive.
 - Loss of interest in activities other than to do with the war.
 - Very focused on all things to do with war. Frequently reviews images of incidents on phone and video footage.
 - Difficulties with sleep.
 - Difficulties with pain.

- Assessment

- Presented as pleasant, relaxed, engaging.
- Clear that interested in talking above events in Iraq.
- Some very mild difficulties evident on assessment – mild difficulties in working memory, mental flexibility and processing speed.
- Significant mood and behavioural difficulties indentified.
- Passed all SVTs.
- Self report of mood difficulties on questionnaires do not appear to be an exaggeration.
- Reports of functioning consistent with wife reports of behaviour, with possibly some under-reporting by client.

- So what is going on? Is there any evidence of a head injury?
 - Negative MRI results, but query if these were 3T
 - Memory difficulties found in 2010
 - Some mild difficulties found in 2015 report
 - Significant day to day functioning deficits

- But –difficulties reported day to day are not consistent with research findings with regard to mild head injuries.
- What could be the secondary influences?
 - PTSD
 - Mood
 - Pain and Pain Management
 - Malingering?
 - Somatisation/Conversion Disorder?