NZSIGN
NEW ZEALAND SPECIAL INTEREST GROUP IN NEUROPSYCHOLOGY

Newsletter **Edition 4.**
NOVEMBER 2016

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NZSIGN Upcoming NZ workshops - 2016

Current Practice Issues in Child Neuropsychology.

Christchurch, 12 December, 2016.

Professor Vicki Anderson will be presenting a workshop on the following key topics:

- *Why are children's social skills important? Theoretical, assessment and intervention issues.*
- *Recovery from child and youth concussion in 2016 - What's the evidence?*

To register, go to:
http://www.nzccp.co.nz/events/workshops-and-seminars/nz-sign-workshop/

NZSIGN Upcoming NZ workshops - 2017, Wellington
21st April, 2017

Topic - Emotion and Social Cognition in Traumatic Brain Injury.

Professor Skye McDonald will be presenting a one-day workshop on related research and the application of evidenced based practice.

For enquires about workshop, contact:
kay.cunningham@xtra.co.nz

Nau mai ki te tuawha o ngā tuhinga kawerongo a NZSIGN. Mō ngā tau e toru, he nui ngā whanaketanga ki te anga whakamua i te tirohanga tikanga mahi ki roto i te Neuropsychology ki Aotearoa. He wānanga ki waenga i te Poari Matai Hinengaro o Aotearoa me NZSIGN ki te waihanga huarahi hei tautuhi i ngā tikanga mō tenei kaupapa.

Tāpiri atu ko te kite o Neuropsychology he wahanga tuturu tenei, kia whai huarahi me te tautuhitanga mo te whanui o te kaupapa ki ngā ākonga me ngā rata hauora. He nanakia ngā papamahi i te whai ake mai i ngā whanaunga o te whenua Moemoea – Kahurangi Anderson raua ko Kahurangi McDonald. Kei mua tonu he papamahi aro atu ana ki te whanui o ngā pūkenga, mātanga o te hunga o Aotearoa nei me rātou o ngā whenua taketake hei whakanui i te rangahau me ngā mātauranga hauora kei konei puta atu ki ngā hononga o whenua ke.

Welcome to the 4th Edition of the NZSIGN Newsletter. Over the past year there have been significant developments towards creating a Scope of Practice in Neuropsychology in New Zealand. The New Zealand Psychologists Board, in consultation with NZSIGN, is in the process of formulating specific guidelines that will define competencies for this Scope. As well as further recognition of Neuropsychology as a specialist area, it will also provide formulation and definition of more explicit pathways in which Psychology students and new clinicians can clearly gain competencies in this field of work. We have some excellent workshops coming up, from our Australian counterparts - Professor Anderson and Professor McDonald. Future workshops will involve a diverse mix of New Zealand and International talent and expertise, to celebrate the rich research and clinical knowledge both within and beyond Aotearoa.

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Smartphones as prospective memory aids after traumatic brain injury

Dr Hannah Bos, Assoc. Prof. Duncan Babbage and Prof. Janet Leathem

Prospective memory is the ability to remember to perform a planned action at the intended time (Ellis & Kvavilashvili, 2000; Ellis & Milne, 1996) and is commonly impaired after Traumatic Brain Injury (TBI). Deficits in prospective memory have devastating effects on a person's ability to be independent, and increases caregiver burden (Sohlberg & Mateer, 2001).

Traditionally a memory notebook has been recommended as a compensatory memory aid, with demonstrated efficacy (e.g.; Ownsworth & McFarland, 1999). Electronic devices have the advantage of providing a cue at the appropriate time to remind participants to refer to the memory aid and complete tasks suggesting potential benefit in neurorehabilitation (e.g.; Kapur, Glisky, & Wilson, 2004; Mackie, 2008; Svoboda, Richards, Leach, & Mertens, 2012; McDonald et al., 2011). This study aimed to investigate the efficacy of a memory notebook and specifically a smartphone compensatory memory aid.

Single case study methods

A single case series design was used to assess seven participants who had suffered moderate to severe TBI's at least two years prior. A no-intervention baseline (3, 5 or 7 weeks randomly assigned) was followed by training (4-8 hours in two weeks) and intervention (further 6 weeks) with either the smartphone alone, or a memory notebook and later the smartphone. Where possible this was randomly assigned, however due to recruitment difficulties participants who previously had used a memory notebook were included into the study and assigned to the smartphone condition. The memory notebook was custom designed for this research and included sections for *Orientation*, *Schedule*, *To Do*, *People* and *Notes*. The key components being *Schedule* and *To Do* which were combined for greater effectiveness (McKerracher, Powell, & Oyebode, 2005). The smartphone was a mid range (at time of purchase) android smartphone. The primary applications were Google Calendar with GTasks (Dato, 2011) To Do list, Simple Calendar Widget (MYCOLOURSCREEN, 2011) as a display and CalendarSnooze (Bitfire-development, 2011) to repeat reminders. This provided participants with a calendar and task list which provided audible and visual reminders at set times (which would repeat and could be snoozed if needed) as well as a visual display of calendar and task items on their main screen.

Dr Bos completed her PhD in the use of smartphones after traumatic brain injury and is currently working in inpatient and outpatient neurorehabilitation. For questions relating to her research, she can be contacted on **Drhannahpsychology@gmail.com.**

Memory was assessed with weekly assigned memory tasks. The first was a *message task* and had two components: to place a text message or phone call at a randomly scheduled time (*message time*), addressing a particular question (*message content*). The second task was an unscheduled task, in which participants were provided with a postage-paid postcard (*postcard task*) and asked to return it via the post before their next weekly appointment. Qualitative data was compiled from clinical interview and observations.

Summary of Results

Two participants received a memory notebook, later followed by a smartphone, five participants received the smartphone alone. Overall, six of the seven participants (86%) showed improvements in their ability to perform assigned functional memory tasks using the smartphone. One participant showed improvement using the memory notebook and further improvements when provided a smartphone. Over 90% performance on both *message time* and *message content* was reached by three participants with a smartphone. Improvement on the *postcard task* was more variable with only three making small improvements (up to 33%) - and was influenced by participants finding this an irrelevant task and having difficulty finding post box's.

There were two participants who demonstrated reductions in performance, one whilst using the memory notebook and one using smartphone. In both cases the participant openly disliked their memory aid and therefore made limited use of it. In one case a young man felt it was embarrassing to have a memory aid and refused to carry or use a memory notebook, he rarely referred to it at home. In the other case an older man was opposed to the concept of a phone having functions beyond making calls and sending text messages.

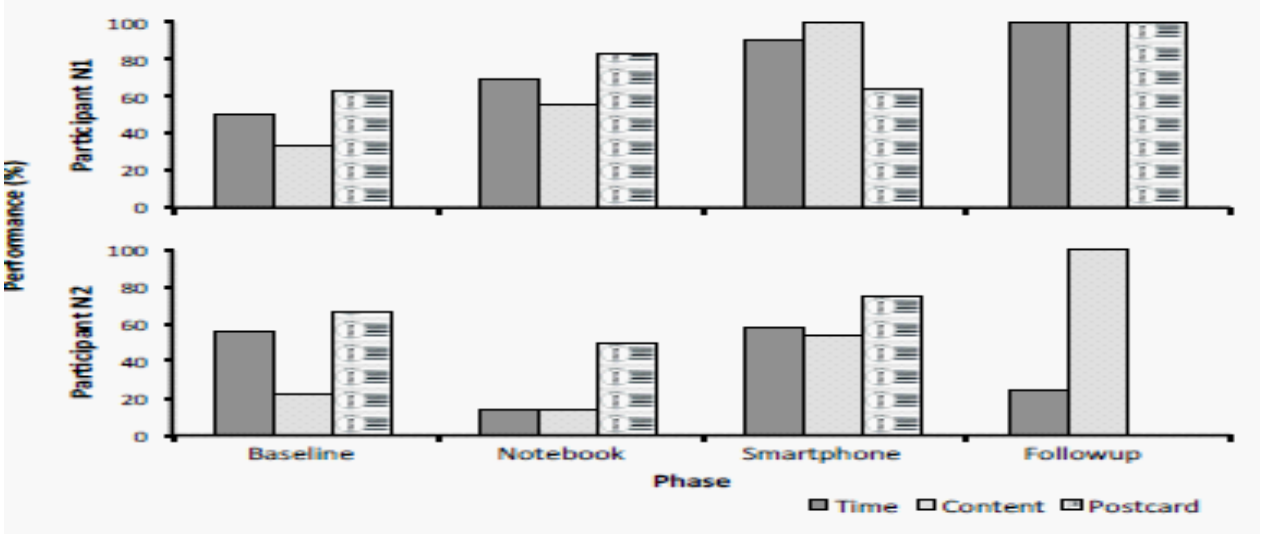

Figure 1. Memory performance of two participants who received a memory notebook followed by a smartphone.

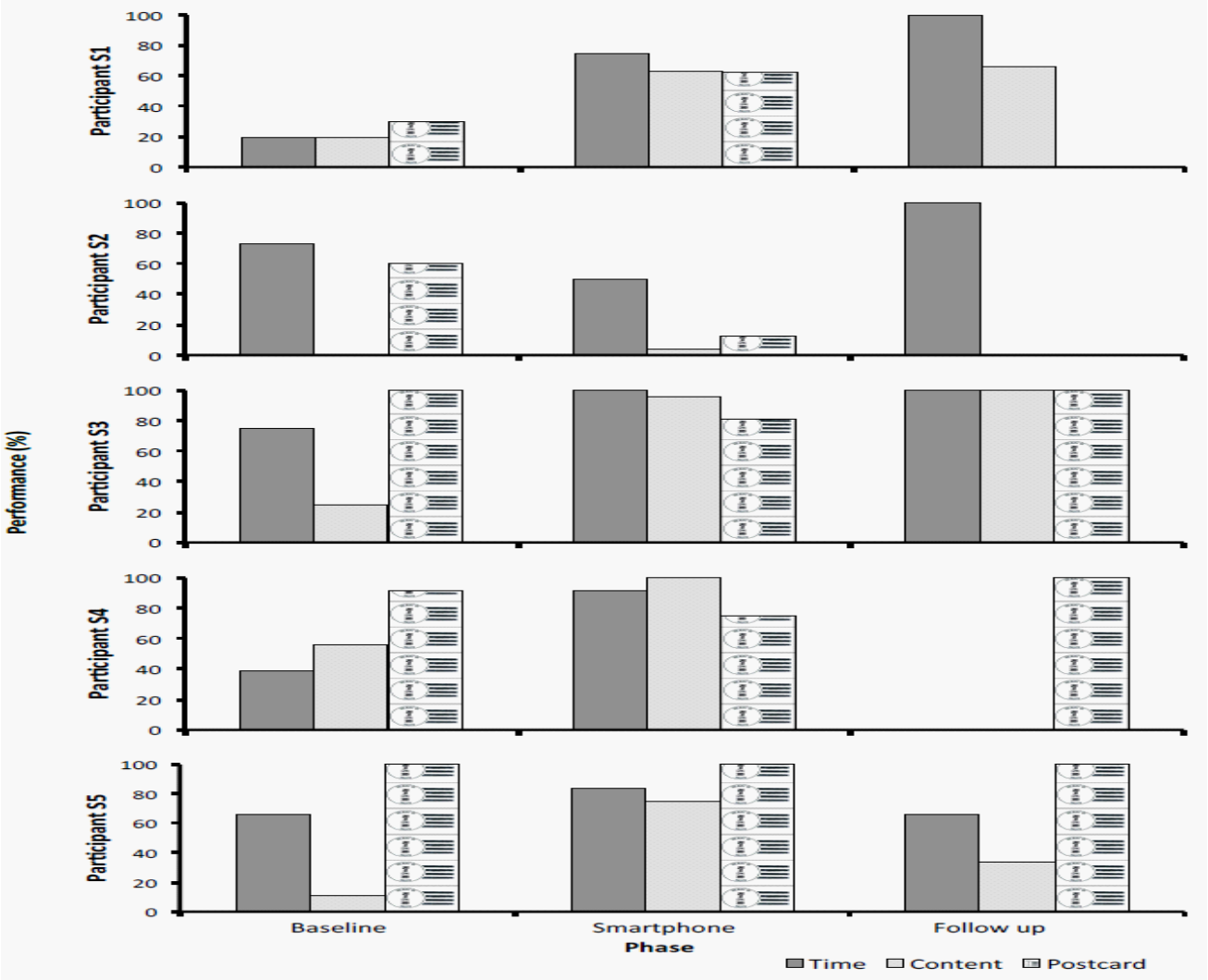

Figure 2. Memory performance of participants who received a smartphone

Conclusion

This study demonstrates that a smartphone can be effectively used by an individual with TBI to manage prospective memory difficulties. All participants were able to learn to use the smartphone, and six were willing to use it as a memory aid. Performance on the assigned memory tasks generally improved. In the scheduled *message task* participants were able to perform the task closer to the assigned *time* and the *content* was more likely to be relevant to the assigned question. This indicates a calendar on a smartphone with reminders and the ability to add notes to a task improves prospective memory performance.

Due to limitations in sample size the memory notebook and smartphone were not able to be directly compared. However, some tentative conclusions can be drawn based on the two participants who received both memory aids. One participant made a large improvement and found the memory notebook invaluable. This supports the idea that consistently using a structured memory notebook can compensate for prospective memory difficulties, as is the consensus in the literature.

The improvements using a smartphone over and above those already accrued with the memory notebook for this participant suggests that audible reminders as well as greater portability affords even greater benefit.

Considerations for implementing a memory aid

- Acceptability of the memory aid is an important contributor to effectiveness. Clinicians should assess the person's initial reaction to the proposed memory aid. In the current research one participant did not wish to be seen using a memory aid, they therefore refused to carry a memory notebook, but was able to use a smartphone as a memory aid as "people will think I'm texting" and was therefore not identified as having memory difficulties. Another was opposed to use of a phone beyond "phone functions". In both cases participants made minimal independent use of the memory aid.

- Insight into memory difficulties is important for sustained and independent use of memory aids. In the current study three participants who initially reported memory difficulties (therefore included in the study) reported minimal difficulties throughout the remaining study. Although improvements were seen through use of a memory aid, these improvements and independent use of the memory aid were not sustained at follow up as they did not consider themselves to have memory difficulties.

- Use meaningful activities to increase use of a memory aid. In the current study formal results did not necessarily reflect the use of memory aids with many participants having greater benefit in their own lives where activities were meaningful.

- Individuals may develop their own ways of using the memory aid that work for them. At follow up in the current study one participant used the calendar function only to respond to previously entered medication reminders. All new scheduled and unscheduled items were added to his to to do list. Another participant did not use his task list and utilised only the calendar, assigning times to unscheduled jobs. He additionally requested friends, family and support services send him a text message for all appointments so he could refer to this and copy it into his calendar.

- Training in the memory aid is important. This may require a significant time commitment and ideally should include errorless learning. Clinicians may consider training family members in appropriate training methods to assist at home as participants often found help well meaning help from family was both confusing, and delivered too quickly.

Considerations for implementing a smartphone as a memory aid

- Consider using a cloud based calendar and contacts account, while this requires access to internet/data there are a number of advantages of this system. Firstly, on more than one occasion participants inadvertently deleted local data on their smartphone. Having a cloud-based system set up on the smartphone meant all previous and upcoming events were able to be quickly restored and no contacts were lost. Additional benefits of this system included a participant providing the account details to family who then entered important events into his calendar allowing increased involvement with his family (e.g. attending grandchildren's sporting events). Whilst not specifically assessed in the current research it is plausible that individuals may have increased involvement in their family and community activities if family members provide assistance through remotely adding items to calendar and task lists.

- Set up the ability to repeat and snooze reminders. Calendar reminders were not necessarily responded to immediately, however the reminders continued regularly until responded to ensuring participants would respond to important reminders. In addition reminders did not always come at convenient times; therefore the ability to easily snooze the reminder was important to ensure participants could complete current tasks and not risk forgetting the upcoming task. Several participants reported this had previously been a problem.

- Small changes may be important changes. One participant reported even if he couldn't independently enter items on his smartphone use of the memory aid with repeating medication reminders entered with assistance was worth using the memory aid. He reported the risk of seizure was high previously due to forgotten medication; this was of great concern as he risked losing his driving licence and therefore independence. With the smartphone he reported remembering every dose over a one month period.

- Install a smartphone locating application. Some participants had considerable anxiety relating to the possibility of losing an expensive memory aid. This anxiety was reducing through addition of locating applications which could be remotely activated.

Future developments

The rapid increase in technology and application developments offer possibility and challenges for individuals living with traumatic brain injury.

Example possibilities:

- Recent advances have led to reminder applications which also include a location reminder, whereby when a user is near a particular location a reminder can be triggered (e.g. shopping list or task to be completed). This has clear potential uses for individuals with memory difficulties.

- In the current study a number of applications were used to add features to calendar application such as a widget (home screen display), ability to repeat and snooze reminders and separate tasks list. More recent calendar applications have these functions in a single application.

- There are a number of medication applications that specifically remind individuals to take medications at set times. This provides the added benefits of functions such as medication instructions with the reminder and can keep track of medication supply and alert the user when medication runs low.

- Location applications frequently come pre-installed on smartphones and require a user sign-in to use.

- There is a rise in applications for sharing and synchronising between users, this has potential uses for shared lists and notes.

Potential challenges:

- Individuals with memory difficulties may have difficulty learning to use applications. They may be particularly challenged if application automatically update and the appearance or use changes.

- There are an ever increasing number of possible useful applications for individuals living with brain injury, their family and supports to select from, this may be overwhelming.

- While there may be many beneficial applications available it may be difficult for a person with memory difficulties to learn to use all these applications.

- Some applications can be complex to set-up. A person with traumatic brain injury may need assistance from an experienced smartphone user for initial set up, help with learning to use the application, and trouble-shooting.

- Some applications lack the reliability that is necessary for individuals living with traumatic brain injury, who may be heavily relying on their smartphone as a memory aid. For instance, current developments in location reminders remain inconsistent and some applications including medication reminders may require resetting occasionally.

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Recognition of outstanding contribution to Neuropsychology profession.

We each contribute in our own way throughout our careers, not only to the individual clients that we see, but also to our profession. Some stand out as pioneers in their fields, and as recognition of our own New Zealand ‘gurus’ this Edition is dedicated to Dr Jenny Ogden. With a true kiwi spirit, Dr Ogden has been an inspiration to many. As well as providing exceptional teaching and mentoring to many New Zealand psychologists in the field of neuropsychology, she is also highly respected internationally for her work in this area. As an author of numerous research articles and several books, Dr Ogden shows her diversity of talents by winning the Silver Award for Women’s Fiction in the 2016 Readers’ Favourite International Book Awards for her fictional novel “A Drop in the Ocean”.

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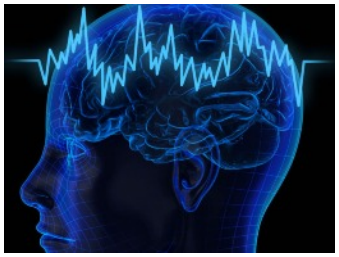

Cognitive Functioning following Electroconvulsive Therapy: Research Findings and Recommendations for Monitoring.

Dr Katie M. Douglas
Department of Psychological Medicine, University of Otago, Christchurch

Introduction

Electroconvulsive therapy (ECT) is an effective short-term treatment for severe depression. While it has evolved greatly in safety and efficacy since its introduction in the 1930s, ECT remains controversial to some due to concerning cognitive side-effects. This paper will outline the main cognitive effects of ECT, provide recommendations for assessing the cognitive impact of ECT, and guide differentiation of cognitive processes associated with depression and ECT. While ECT is used to treat a variety of severe mental illnesses in New Zealand, the focus of this review will be on major depressive disorder (referred to as 'depression' for the rest of this paper), as this is the most common indication for ECT in New Zealand.

What is Electroconvulsive Therapy?

Electroconvulsive therapy is a procedure, conducted under general anesthesia, which involves passing small electric currents through the brain (via electrodes) to trigger a seizure. It has well-established efficacy in treating severe forms of depression, such as depression with melancholic or psychotic features.[1] In clinical practice, it is often reserved for severely depressed individuals who have not responded to several trials of medication.

Reviews of studies examining the efficacy and side-effects of ECT often note the difficulty in drawing firm conclusions due to differences in ECT techniques between studies, including:

- *Electrode placement*: common electrode positions include bilateral, right unilateral and bifrontal.
- *Dose*: measured in millicoulombs of charge delivered, which is given at varying levels above the dose required to elicit a seizure (seizure threshold).
- *Waveform*: two main variations in the stimulus waveform used to induce seizure are sine-wave and brief-pulse. Stimulation with brief pulses can elicit a generalised seizure with about one third of the electricity required for sine-wave stimulation. Sine wave stimulation has now become obsolete in New Zealand.
- *Frequency and duration of treatment*: in New Zealand, ECT is often delivered 2 to 3 times weekly for 6 to 12 treatments, and maintenance ECT (usually monthly) is sometimes prescribed subsequently, however, this differs between treatment units.

Differences in technique can impact on the extent of cognitive impairment from ECT, as described next.

Cognitive Effects of ECT

Electroconvulsive therapy is more safely administered today than when it was first introduced in the 1930s. Much of the stigma associated with ECT relates to the first treatments involving high doses of electricity without anesthesia and without neuromuscular blocking agents, leading to fractured bones and serious cognitive impairment. Concerns about the cognitive side-effects of ECT still exist, and research is helping to determine the profile and persistence of cognitive impairment following ECT.

Cognitive effects of ECT can be divided into short-term and long-term effects. Postictal disorientation and difficulty learning new information are often present immediately following an ECT procedure, but typically resolve within one hour [1]. Patient reports and clinical studies suggest loss of autobiographical memory (often referred to as retrograde amnesia) to be the most serious and persistent longer-term cognitive side effect of ECT.[2, 3]

Autobiographical memory is a memory system consisting of episodes recollected from an individual's life based on a combination of personal experiences (personal or episodic memory) and general knowledge about facts and the world (impersonal or semantic memory). The terms personal memory and impersonal memory will be used in this paper when discussing the two main types of autobiographical memory. It is generally considered that personal memory is likely to be more deeply encoded and therefore likely to be less affected by brain changes. Consistently, Lisanby et al. (2000) found that autobiographical memory, and particularly impersonal memory, was impaired immediately after a course of ECT in their group of depressed individuals and remained impaired at two months follow-up.[4] Of importance, however, is that loss of *personal* memory is considered to be the most distressing and concerning cognitive side-effect from patients' perspectives.[2]

Evidence is mixed as to whether or not loss of autobiographical memory persists in the longer-term following ECT. In a small, one-year follow-up study, Meeter et al. (2011) found that loss of impersonal memory in the previous year had returned to pre-ECT level in their depressed sample.[5] In a 24-week follow-up study comparing continuation pharmacotherapy with continuation ECT, Smith et al. (2010) reported no between-group differences in new learning or autobiographical memory measures pre-treatment to 24-week follow up.[6] In contrast, Sackeim and colleagues have conducted a number of larger-scale studies using variants of the Colombia University Autobiographical Memory Interview (AMI) to show that depressed individuals receiving longer courses of ECT, especially with bilateral electrode placement, display greater autobiographical memory loss at 2-months and 6-months follow-up.[3] Thus, while some research suggests that autobiographical memory remains impaired at study endpoints, others report normalisation of autobiographical memory. Additionally, as newer forms of

ECT emerge that require less electricity to induce seizure (e.g., ultrabrief pulse unilateral ECT), autobiographical memory becomes less impaired.[7] One issue in investigating memory functioning in individuals receiving ECT is that many studies do not conduct follow-up assessment of memory functioning past six months post-treatment. This is, in part, due to the issue of high attrition rates in studies of severely depressed individuals.

Particular patient or treatment characteristics may also help to explain variability in findings from studies examining the time course of memory memory impairment following ECT. Sobin et al. (1995) found strong linear relationships between pre-existing global cognitive impairment (measured using the Modified Mini Mental State Examination; 3MSE) and duration of postictal reorientation in predicting the extent of autobiographical memory loss in the week after ECT and at two-months follow-up.[8] Related to preexisting global cognitive functioning is the concept of 'cognitive reserve'. Higher levels of educational and occupational attainment (thought to contribute to cognitive reserve) have been related to better verbal learning and memory performance after three bilateral treatments than low educational and occupational attainment, implying that greater cognitive reserve may be a protective factor.[9]

In relation to other cognitive domains affected by ECT, research suggests more minimal impact. Meta-analysis of 84 studies examining short- and long-term effects of ECT on cognitive functioning in depression reported significant worsening in performance of medium to large effect in measures of verbal memory and executive functioning (planning and set-shifting) up to three days after finishing an ECT course.[10] In relation to verbal memory, learning and retrieval of unstructured information (e.g., word list tests) showed greater impairment than ability to learn organised, contextualised information (e.g., short story tests). From 4 to 15 days following an ECT course, only one verbal memory variable remained impaired (Verbal Paired Associates), with all other previously impaired variables having recovered to baseline level. No persisting cognitive deficit was observed beyond 15 days after ECT.

In summary, verbal learning and memory appears to be impaired immediately following a course of ECT but returns to baseline levels within a few weeks. The most prominent and persisting cognitive side-effect of ECT is autobiographical memory loss. While many individuals appear to have a complete recovery of autobiographical memory functions following ECT, not all individuals appear to, which may be related to treatment techniques (e.g., electrode placement) or pre-existing personal characteristics (e.g., baseline cognitive functioning).

For a more detailed description of the moderating and mediating factors believed to underlie cognitive effects of ECT, see McClintock et al. (2014).[11] This paper also provides a tentative model to help explain why cognitive function is impaired following ECT, which is beyond the scope of the current review. In short, however, the mechanisms of action for the cognitive effects of ECT remain largely unknown.

Monitoring the Cognitive Effects of ECT

I contributed to a paper focusing on recommendations for monitoring cognitive effects of ECT,[12] and I guide readers to this article if more information on this topic is required. However, in this section, a summary of the rationale for monitoring cognitive effects of ECT is provided, along with specific recommendations as to the tests that could be included in cognitive testing batteries.

There are various reasons why cognitive functioning could be monitored either during or after a course of ECT:[13]

- To guide clinical care: If cognitive functioning is assessed *during* a course of ECT, modifications to treatment, or even halting treatment for a period in a case of severe impairment, can occur.
- To advise on activities of daily living: Cognitive testing may be used to provide individuals with practical information about daily activities they may find more challenging and therefore, may need to recruit support for.
- As a therapeutic tool: Cognitive testing during or after ECT may be used therapeutically to encourage individuals to think about their memory and practice using it. It may also provide reassurance that their memory performance is improving or has returned to normal. This is of use given that individuals' subjective view of their cognitive function may not always correlate closely with actual cognitive ability.

To plan cognitive remediation activities: While Cognitive Remediation (practicing tasks that improve aspects of cognitive function) is an uncommon treatment option for individuals with mood disorders currently in New Zealand, there is emerging evidence showing beneficial effects on cognitive and functional outcomes in mood disorder samples [14]. In the future, it - may be that in cases of severe cognitive impairment following ECT, referral for cognitive remediation is made to improve particularly impaired cognitive domains.

Selection of Suitable Cognitive Tests

As noted in Rasmussen's (2016)[13] review, many publications have recommended cognitive testing to be conducted during and after an ECT course. It is, however, uncommon for specific tests to be suggested. The ideal tests to use would be short, reliable and sensitive to detecting changes in cognitive function secondary to ECT. The following section will provide specific recommendations for tests that could be included in a cognitive assessment battery for a depressed individual undergoing ECT, under headings corresponding to the domains of cognitive function found to be most affected by ECT (see Table 1).

Orientation

Although postictal disorientation is temporary (i.e., typically resolves within hours following a treatment), research suggests that it's duration correlates with autobiographical memory loss.[8] Thus, this easily assessed dimension of cognition may yield predictive information. Measurement of orientation can take the form of time since seizure endpoint until a specified criterion of "oriented" is reached or degree of orientation at a specified time-point (e.g., 20 minutes post-seizure). It should be noted here, however, that bilateral ECT results in longer periods of disorientation. In New Zealand, unilateral ECT is the electrode placement of choice, and thus, nearly all individuals receiving ECT are oriented within 15 minutes of ECT which may reduce the predictive power of duration of orientation.

Global Cognitive Function

As has been discussed previously, baseline scores on the Mini-Mental State Examination (MMSE)[15] or 3MSE[16] have been shown to correlate with later autobiographical memory loss secondary to ECT with some predictive value. These scales are the global cognitive function tests that have been used most commonly in ECT research and have been shown to be sensitive to differential effects of electrode placement.[8, 17] Both the MMSE and 3MSE take 5 to 10 minutes to administer, and thus, are worthwhile including in a cognitive monitoring battery.

New Learning

Tests of learning examine an individual's ability to learn new information presented to them by the tester. Verbal learning and memory tests appear to be more sensitive to cognitive effects of ECT than non-verbal learning and memory tests,[12] and the latter also tend to be more difficult to score or code accurately. Verbal learning and memory tests, particularly word list tests which involve retrieval of unstructured information, have generally shown a decrease in immediate and delayed recall immediately after a course of ECT. At the Acute Inpatient Service at Hillmorton Hospital (Christchurch), a previous trial used the Rey Auditory-Verbal Learning Test (RAVLT), which showed significantly declined recall after three ECT treatments. However, study participants (severely depressed inpatients) had difficulty tolerating this test due to its length and difficulty. Thus, the Hopkins Verbal Learning Test - Revised (which involves three repetitions of a list of 12 words)[18] is the current recommended verbal learning measure due to it being shorter than the RAVLT and having six alternative forms.

Autobiographical Memory

While measures of personal and impersonal memory have been shown to be sensitive to the effects of ECT, some research shows impersonal memory tests to have greater sensitivity. However impersonal memory tests are more difficult to construct due to lack of control over acquisition of memories tested and they may need to be adapted for use in different cultures and countries, making comparison of results challenging. For these reasons, the Columbia University Autobiographical Memory Interview – Short Form (AMI-S)[19], which assesses personal memory, is the author's recommended test for monitoring autobiographical memory. The original, longer version is the most extensively used autobiographical memory measure in ECT research, although the extended time taken to complete the longer version (1 to 3.5 hours) often makes it unfeasible to use in clinical settings. The AMI-S takes 20 minutes to administer, and it can be shortened further to focus only on those aspects of most relevance, such as personal events in the last two years. At the Acute Inpatient Service at Hillmorton Hospital in Christchurch (Canterbury District Health Board), the AMI-S is used as part of routine cognitive testing and has been found to be well tolerated by inpatients and sensitive to treatment effects.[20] The major disadvantages of interview-based measures is that they are difficult to score objectively, and the accuracy of the memories produced is hard to verify.[12]

Processing Speed

Tests of processing speed, such as trail making tests and digit-symbol coding tests, are particularly sensitive to changes in cognition as a result of brain injury or psychopathology. Minimal evidence exists for the sensitivity of processing speed tests to the effects of ECT, although it may be that processing speed becomes more greatly affected with more dramatic differences in ECT techniques, such as using sine-wave versus brief-pulse ECT.[19] Thus, including a test of processing speed in a battery of tests to assess the cognitive effects of ECT may be warranted if particularly severe cognitive impairment seems apparent.

Table 1. Summary of Useful Tests to Include when Assessing the Cognitive Impact of ECT.

Test	Domain	Test Duration
Reorientation	Postictal disorientation	< 1 minute
MMSE[15] or 3MSE[16]	Global Cognitive Function	10 minutes
AMI-S[19]	Autobiographical memory	20 minutes
Hopkins Verbal Learning Test – Revised[18]	Verbal learning and memory	10 minutes
Trail Making Test Part A[21] *OR* Digit Symbol Coding[22]	Processing speed	< 5 minutes

Abbreviations: 3MSE = Modified Mini-Mental State Examination, MMSE = Mini-Mental State Examination, AMI-S = Columbia University Autobiographical Memory Interview – Short Form

It would be too challenging to infer causes of cognitive dysfunction in individuals who are acutely depressed and in the midst of ECT treatment. However, if assessing an individual at least one month post-ECT, who is not severely depressed, the following points may help to differentiate the cognitive impact of ECT from impaired cognitive functioning associated with depression:

- Persisting deficits in executive functioning and new learning (verbal or non-verbal learning memory) are more likely to be related to cognitive processes involved in depression .
- Persisting autobiographical memory loss is more likely to be related to the cognitive effects of ECT.

Timing of Cognitive Testing

Timing of cognitive testing is an important factor to consider for individuals receiving ECT. American Psychiatric Association guidelines[23] recommend a review of cognitive function on a weekly basis for individuals receiving ECT, however, it is important to consider patient load, resource availability, and problems with the validity of repeated testing. There is little firm evidence for the timing of testing at this point, however, as a guideline, the following time-points are recommended:

1. Baseline (pre-ECT)
2. After three ECT treatments - early reassessment to detect any serious cognitive change and modify treatment accordingly
3. After six ECT treatments – many studies have tested cognitive function at this time and shown changes. This is also a time when decisions are made about possible termination of ECT.
4. Two to six months post-ECT – in terms of ease of following up, two months is probably a more feasible follow-up period which would allow for testing of any persisting cognitive effects of ECT.

Differentiating between Impaired Cognition Associated with Depression and ECT

The assessment of cognitive impairment secondary to ECT is complicated by several issues related to the disorder it is used to treat. Depression is often associated with significant cognitive impairment in a range of cognitive domains. This is the case even in unmedicated, moderately depressed samples,[24] and is even more prevalent in groups of individuals more likely to receive ECT, such as inpatients with depression and in individuals who have depression with psychotic features.[25, 26] While cognitive function improves as depression eases, for many individuals, residual cognitive impairment remains after recovery.[27] This is particularly the case for depression in the elderly, in whom there is consistent evidence of continued executive and psychomotor impairment.[28-30]

Summary

Electroconvulsive therapy is a commonly used treatment option for individuals hospitalized in New Zealand with severe and treatment resistant depression. The most concerning side-effect of ECT is loss of autobiographical memory, and debate continues regarding the persistence of this side-effect. Monitoring cognitive effects of ECT is beneficial for a number of reasons, and a tentative recommended battery of tests has been provided in this paper. Cognitive remediation for processes affected by ECT would be a useful avenue for further research in order to determine whether autobiographical memory loss can be ameliorated with training.

Useful Resources

Ministry of Health, NZ (2004). *Use of Electroconvulsive Therapy (ECT) in New Zealand: A Review of Efficacy, Safety, and Regulatory Controls*. PDF available from: www.supportingfamilies.org.nz/Libraries/Documents/Use_of_Electroconvulsive_Therapy_ECT_in_New_Zealand.sflb.ashx

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Dr Katie Douglas works as a Clinical Psychologist and Research Fellow at the Department of Psychological Medicine, University of Otago, Christchurch, New Zealand. Her research interests include neurobiological, neurocognitive and psychological underpinnings and treatment predictors of mood and anxiety disorders.

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Cognitive Reserve

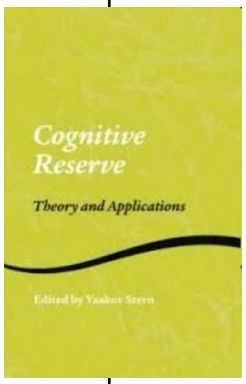
K.Cunningham

The prediction of positive or negative outcome from a significant insult on the brain is multifactorial. Every clinician working with brain injury can provide examples of seemingly miraculous recoveries from what initially appears as an unrecoverable injury state. Conversely, some individuals have milder traumas or conditions but have poorer recoveries that expected.

A number of models have been provided as explanations as to why some people recover better than others, or why some individudals have a lower threshold for optimal recovery. The Cognitive Reserve (CR) Model suggests there are a number of underlying physiological 'reserve' processes. Neural reserve is the brain networks and the efficacy and capacity they hold. Neural compensation refers to how individuals with brain pathology ultilise brain networks that are not normally used by non-injured individuals, as a means of compensating for the effects of brain damage on functioning. Individul factors such as prior intelligence, genetics, lifestyle, life-time experience, coping/personality and so forth are part of this cognitive reserve. Thus, there is an interaction between physiological factors (neural reserve) and other forms of development (neural compensation) that provide an overall CR threshold. Cognitive Reserve is not fixed, but rather can change over time, in either postiive or negative directions. As outlined in Stern (2007, below), CR can be a malleable entity, and "Thus an individual's level of function at any point in time is a function of the underlying brain substrate and their ability to make use of this substrate, with the latter influenced by the level of cognitive reserve" (p. 2).

There has been considerable research over recent years into this topic, with the effects of CR considered in all types of brain related conditions, as well as normal aging. Of particular relevance to clinicians is the application of CR models to clinical interventions. For example, the reader is referred to articles such as Mondini et. Al., (2016). Cognitive Reserve in Dementia: Implications for Cognitive Training. Front. Aging Neurosci., Vol: 8(84). *https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4844602/pdf/fnagi-08-00084.pdf*

BOOK REVIEW by Kay Cunningham - Stern, Y. (Ed.) (2007) ***COGNITIVE RESERVE: THEORY AND APPLICATIONS.*** Psychology Press: NY.



This book provides a comprehensive review of Cognitive Reserve theories, from a wide range of perspectives, including genetics; childhood development and brain injury; implications for recovery from traumatic brain injury; passive and active forms of cognitive reserve, functional imaging and epidemiological studies; adult neurogenesis, and related potential for compensatory mechanisms from brain damage. An important book and field of research for both students and experienced clinicians, as a starting point to understanding this very relevant topic.

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Neuropsychology and Cardiovascular Disorder

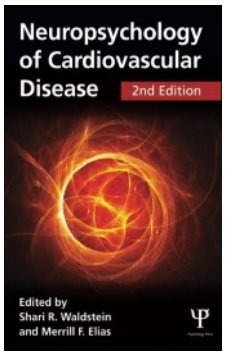
K.Cunningham

Cardiovascular (CVD) disease and stroke are the leading cause of death in New Zealand (i.e. about 40% of deaths annually - *http://www.bpac.org.nz/BPJ/2010/December/cvra.aspx)*. However many more suffer from varying levels of severity related disbillity from CVD, with 1 in 20 adults in New Zealand diagnosed with CVD. Based on the New Zealand MInistry of Health statistics, in 2010-12, the total cardiovascular disease mortality rate was twice as high for Maori as for non-Maori, and in 2012-2014 Maori were more than 1.5 times as likely as non-Maori to be hospitalised for CVD. For further statistics go to: *http://www.health.govt.nz/our-work/populations/maori-health/tatau-kahukura-maori-health-statistics/nga-mana-hauora-tutohu-health-status-indicators/cardiovascular-disease.* Other Pacific peoples also have higher risk, and whereas CVD has more prominently been in males, across cultures women are increasingly in numbers of being diagnosed with, and dying from, CVD related conditions.

The number of individuals with CVD may well be rising, given the concerns about increased CVD risk factors in children, teenagers and young adults, and more rapid aging effects in our young people - see the following excellent article related to the Dunedin study: *http://www.pnas.org/content/112/30/E4104.full.pdf*. Other sources further describe modern children living in what has been termed an 'obesogenic' environment, whereby diet and inactivity are part of significant enviornmental factors in the development of increased risk for CVD and other conditions such as diabetes. For a useful review, see *www.health.govt.nz/system/files/documents/publications/influencesinchildhood.pdf*

CVD conditions may have subtle or profound effects on cognitive functioning. Potential subltle effects on cognition can present as Mild Cognitive Impairment, which can impact on vocational or acdemic achievement, and daily living. A knowledge of CVD and potential effects on cognition across the continuum of severity is therefore an important part of neuropsychological clinical practice.

BOOK REVIEW by Kay Cunningham - Waldstein, S.R. & Elias, M.F. (2nd Edition). (Eds.) (2015). *NEUROPSYCHOLOGY OF CARDIOVASCULAR DISEASE* . Psychology Press: NY.



This is a great reference for the effects of cardiovascular disease (CVD) and related lifestyle risk factors on cognitive functioning. Topics include the effects of smoking, alcohol, levels of activity in older adults, hypertension, cholesterol, vitamin deficiencies, stress, pre-diabetic and diabetic states. In following sections, CVD is considered in the context of specific types pf cardiovascular disease, and dementia and stroke. A must read for any clinician working in the field of neuropsychology, and psychology in general.

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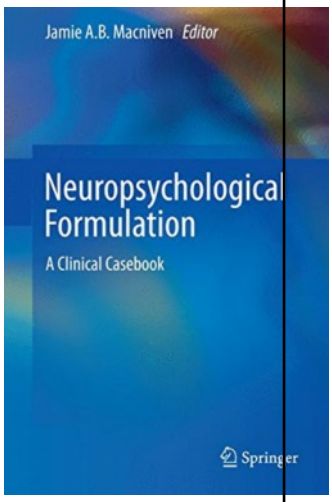
BOOK REVIEW by Dr Dryden Badenoch

Macniven, J.A.B. (Ed.) (2016). ***NEUROPSYCHOLOGICAL FORMULATION: A Clinical Casebook.*** Springer: New York.



My supervisor fell ill for several weeks of my first training placement.. I was sent each day to observe one of the other clinical psychologists in the local area. I quickly began to appreciate the similarities and differences in their practice, and to see all the ways I might improve my work.

This book affords us all the opportunity to 'sit in the corner' and observe 13 neuropsychologists in six different countries (including New Zealand) do their thing across 16 cases, including: dyslexia, epilepsy, traumatic brain injury, stroke and dementia; with children, adolescents, adults and older adults; via one-off and repeat assessments with, amongst others, an Australian "East European", a British Asian, an American Vietnamese and an American Indian (yes, that's currently their preferred term). Individually, each case is interesting. But taken together, the differences and similarities in the way each clinician approaches their case(s) illuminate the processes of formulation in neuropsychology. If you're a student or trainee, this is an invaluable introduction. If you're working in isolation, this might help fill the gap in your peer support. And if you're lucky enough to be part of a regular support group, I imagine working through the book, one chapter per month, would be a fascinating way to improve your practice.

Mental Capacity - updating New Zealand's Law and Practice

Alison Douglass is a New Zealand Barrister who has recently completed a legal research project of New Zealand medico-legal capacity laws. An excellent overview can be found on ***http://www.alisondouglass.co.nz/*** Alison's review also includes how capacity is defined as well as the challenges in making correct clinical decisions within the expectations of legal criteria.

In conjunction with this review, and in a collaboration with Dr Greg Young (Psychiatrist) and Professor John McMillan (Director of the Bioethics Centre, University of Otago) "A Toolkit for Assessing Capacity" has been developed.

See: A Douglass, G Young and J McMillan A Toolkit for Assessing Capacity in A Douglass "Mental Capacity: updating New Zealand's Law and Practice" (Report for the New Zealand Law Foundation, July 2016) *www.lawfoundation.org.nz/*

Future Newsletters

If you have a great article, book or test review, case study; evaluation of any conferences/workshops you have attended; research projects you are doing, an article that you can provide, or requests for past editions, please email to:

kay.cunningham@xtra.co.nz (Newsletter Editor).

Thanks to Dr Margaret Dudley for her translation on p.1 from English to Maori.

NZSIGN Mandate

To provide the following opportunities for group members to:

- **Meet** others with an interest /expertise in neuropsychology and to increase knowledge and support via discussion of cases, topic areas, and issues relevant to the practice of neuropsychology in Aotearoa/New Zealand;
- **Share** ideas and information via NZSIGN email membership server;
- **Share** information regarding upcoming training events relevant to neuropsychology;
- **Provide** workshops and other events related to neuropsychology to contribute to the continuing professional development of group members;
- **Align** with international standard of practice as a long term aim through continuous improvement of the practice of neuropsychology in New Zealand.

If you want to know more about NZSIGN, email Dr Nic Ward (Co-coordinator of NZSIGN) at **Nic@insightteam.co.nz**

NZSIGN has an email list for announcements and discussion. To subscribe, send an email with brief information on your background in neuropsychology to: **nzsign-subscribe@synapseproject.org**