The Abstracts of the 17th Annual Conference of the Australian Psychological Society’s College of Clinical Neuropsychologists

“The Challenges of Evidence-Based Neuropsychology”

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Abstracts Editor:
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The NSW CCN Section was delighted to host the 17th Annual CCN conference in Sydney and to reflect on how our discipline has flourished since our humble first conference in 1993 at the Quarantine Station in Manly. The theme of our conference this year was “The Challenges of Evidence-Based Neuropsychology” as over the last 60 years we have seen rapid advances in neuroscience and neuroimaging; areas of science that are highly reliant on technology and strive to minimise human error in diagnosing diseases of the brain and mind. If neuropsychology is to continue its scientific contribution to this endeavour, it is crucial that it grounds its clinical application on evidence-based practice. Our conference aimed to provide a platform for clinicians and students to present submissions addressing evidence-based practice. We were very pleased to confirm the attendance of keynote presenters Professor Yaakov Stern and Professor Narinder Kapur, along with invited workshops on memory, paediatric neuropsychology, cognitive rehabilitation and neuroimaging. In addition we are delighted to host a pre-conference symposium on cutting edge research by internationally recognised neuroscientists on optimising healthy brain ageing. The lecture topics in the symposium will range from cognitive reserve and comparison of healthy and unhealthy brain ageing through to risk and protective factors for dementia and advances in treatment of neurodegenerative diseases. The speakers for the symposium, Professor Yaakov Stern, Professor Kaarin Anstey, Professor Nicola Teresa Lautenschlager, Professor Jonathan Foster, Associate Professor Michael Woodward and Dr Nicolas Cherbuin.

As Conference Chair I have been most fortunate to have had an enthusiastic and very resourceful and experienced conference organising team to assist in making our 17th national conference a great success. I would also like to acknowledge and thank all of our abstract reviewers whose efforts enabled us to achieve de-identified appraisal of all submissions by two independent evaluators. Lastly I would like to especially thank Dr. Sarah McRae for overseeing and collating all of the abstract submissions and reviewer comments and for all her work in editing the abstracts and structuring the conference scientific program.

Wayne Reid
Chair

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Introduction: Social cognition involves the perception, interpretation and processing of social information and underlies the ability to successfully navigate social situations. Significant deficits in social cognition are found in chronic schizophrenia, but are also evident in early psychosis and have a detrimental effect on social functioning and interpersonal skills. Social Cognition and Interaction Training (SCIT), developed by Penn and colleagues (2007), is a group-based intervention designed to remediate abilities in emotion perception, theory of mind, and attributional style and in turn, improve social functioning. SCIT has led to positive outcomes in chronic schizophrenia, but is yet to be trialled in first-episode psychosis (FEP), where benefits may be even greater due to the dynamic phase of development during this stage of life. Aim: The current study aimed to examine the feasibility and effectiveness of SCIT in a sample of young people with FEP.

Procedure: Twelve FEP participants (aged 16-26), forming two SCIT groups, were recruited from Orygen Youth Health, Melbourne. SCIT is a highly-structured manualised intervention with two 1-hour sessions delivered per week over 10 weeks. Social cognition and social functioning were assessed at baseline and post-intervention.

Results: Participants of the first group (n = 6) attended an average of 12 out of 18 sessions. They showed a significant improvement in overall social functioning (p < .05; SOFAS) and theory of mind (p < .01; Hinting Task) following SCIT. The second of the two groups (n = 6) was completed recently. Complete data from both groups, including self-reported satisfaction evaluations, will be presented. Discussion: This study extends SCIT by applying it early in the course of psychotic illness, with the rationale that there is greater brain plasticity in this developmental phase of life, and greater scope to reduce or prevent functional disability. The preliminary findings suggest that SCIT is acceptable to and helpful for young people with FEP. It is a relatively brief intervention that can be delivered within various clinical contexts by a range of mental health professionals. However, this is a small pilot study, thus we plan to test the efficacy of SCIT in a larger controlled trial.

Practice in child neuropsychology: What has child brain injury research taught us?
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Over the past two decades research into the mechanisms, consequences, assessment and treatment of childhood brain has made great gains. Neuroimaging work has also improved our understanding of brain development and its implications for neuropsychological functions. This presentation will discuss each of these areas and translation into child neuropsychology practice. Key topics to be covered include: 1) New developments in brain development and implications for children with brain insult; 2) Recovery after childhood brain insult, including potential for brain plasticity and functional re-organisation, brain-behaviour correlates; 3) Translation of research findings into practice: a. Advances in assessment, particularly in the domains of executive function, attention and social cognition; b. Outcomes from childhood brain insults and what predicts this, and c. Intervention approaches.

Evidence for risk and protective factors for Alzheimer’s disease
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This paper will critically evaluate the development of the evidence base for risk and protective factors for Alzheimer’s Disease (AD). Methodological factors that need to be considered when evaluating evidence will be described. These include study design, measurement of outcomes, understanding the difference between individual risk and population level risk of Alzheimer’s disease, the importance of age of exposure and non-linear relationships between risk factors and AD. The current evidence for demographic, medical, lifestyle, and genetic risk and protective factors for AD will be reviewed, with identification of risk factors for which there
is strong evidence. Population level implications of risk reduction will be discussed as a means of population level prevention of Alzheimer's disease.

**Prediction of Aβ deposition in persons with mild cognitive impairment with neuropsychological tests**

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Introduction and Aim: The presence of elevated cortical Aβ levels in persons with mild cognitive impairment (MCI) is a strong predictor of the development of dementia due to Alzheimer's disease (AD). In vivo imaging of Aβ is, however, an expensive procedure limited mainly to research settings. Reliable detection of Aβ using neuropsychological measures may identify individuals with MCI who should undergo Aβ imaging. Procedure: Forty five persons with MCI underwent MRI, in vivo Aβ imaging with 18F-Florbetaben PET and a comprehensive neuropsychological examination. Results: Elevated levels of Aβ were found in 24 participants (53.3%). Elevated Aβ levels were more strongly associated with the amnestic MCI subtype, and within this group, with persons in whom the cognitive impairment was restricted to the memory domain. Strong associations were observed between cortical Aβ and the delayed recall of a word list, a story and a figure. All three measures of episodic memory predicted Aβ levels after controlling for hippocampal volume, but only the delayed recall of a story was specifically associated with Aβ but not with hippocampal volume. Delayed story recall scores predicted Aβ levels as strongly as a composite memory score derived from all memory measures. Non-memory cognitive measures were not associated with Aβ. Conclusion: This cross-sectional study showed that in persons with MCI, measures of delayed recall can reliably predict the presence of AD pathology. Delayed recall of a story, however, may be the most robust and specific memory measure to predict Aβ and may therefore be a stronger predictor of future dementia than other memory measures.

**A case study of cognitive functioning pre and post onset of focal retrograde amnesia**

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Introduction: Focal retrograde amnesia (FRA) is a rare condition characterised by impaired retrograde memory in the context of relatively well preserved anterograde memory. Its aetiology is not well understood. The neuropsychological literature largely comprises single case studies in which cognitive functioning has been examined after FRA onset. We describe a patient, 'ES', who had undergone four neuropsychological assessments in the context of a mild to moderate head injury over a decade prior to the sudden onset of his FRA. Aim: Our aim was to compare his cognitive functioning pre and post FRA onset with particular attention to visual anterograde memory and executive functions given the proposed role of these cognitive domains in autobiographical memory retrieval (Greenberg et al., 2005; Kopelman, 2000). Procedure: ES underwent four neuropsychological assessments between 1996-1999 prior to the onset of his FRA in 2009. These findings were compared with his post FRA onset neuropsychological results obtained in August 2009 and November 2010. Results: Visual and verbal intellectual abilities remained within normal limits (low average to average range) and consistent with premorbid estimates. There were fluctuations in his anterograde memory, particularly in the visual domain, and executive test performances both pre and post FRA onset. Tests that may reflect effort were administered at two pre onset assessments and his performance was normal. Symptoms of depression were evident either qualitatively or on formal mood measures both pre and post FRA onset. It is noteworthy that there was a compensation claim following his motor vehicle accident that was ongoing during his 1996-1999 assessments but was resolved pre FRA onset. Conclusion: To the best of our knowledge this is the first case of FRA with preonset cognitive data. This complex case highlights the importance of interpreting multiple neuropsychological assessment findings within the overall psychosocial context rather than in isolation. Furthermore, we propose that measures of effort and mood are crucial in cases of FRA in which 'psychogenic' and 'organic' factors are enmeshed.
Retrograde amnesia
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Retrograde memory impairments have received considerably less attention in neuropsychological literature compared with anterograde memory disorders. Moreover, retrograde memory is rarely assessed during a clinical neuropsychological assessment, which typically involves an extensive evaluation of anterograde memory functions. As pointed out by Kapur (1999), this relative neglect of retrograde memory disorders may be due to (i) the infrequency of retrograde memory complaints by patients and carers, (ii) clinicians’ lack of awareness of retrograde memory problems, (iii) other cognitive or memory problems being more disabling, (iv) methodological difficulties associated with assessing retrograde memory (including a limited number of standardised tests being available), and (v) few cerebral pathologies presenting with focal or isolated symptoms of retrograde amnesia. Over the last two decades, however, scientific interest in retrograde memory function and its neural correlates has significantly increased. Retrograde amnesia has been most commonly reported after damage to temporal brain regions, but has also been documented after frontal, posterior cerebral and thalamic lesions. Nevertheless, focal retrograde amnesia is rare and its aetiological factors are not well understood. Many cases suggest a complex interaction between organic and psychogenic factors. In this symposium we will discuss factors underpinning retrograde memory deficits in the context of different neurological conditions, such as mild traumatic brain injury, semantic dementia and Wernicke Korsakoff’s encephalopathy. A set of individual case studies and a group study will be presented. All the studies include neuroimaging investigations and novel behavioural experimental measures to explore different aspects of retrograde memory and associated cognitive functions. Our aim is to highlight the need to consider retrograde memory impairments in individuals with various neurological conditions and to further our understanding of this uniquely human and fundamental cognitive function.

Correlates of whole figure rotations in the Rey Complex Figure: A retrospective analysis
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Aim: To investigate the neuroanatomical, cognitive and demographic correlates of gross rotation errors (a whole figure rotation ≥ 30°) when drawing the Rey Complex Figure (RCF). Procedure: Retrospective analyses of available cognitive, neuroanatomical and demographic data were conducted for all individuals who rotated their reproduction of the RCF (copy or recall) during the course of a neuropsychological assessment at Royal Prince Alfred Hospital between the years 1993 to 2010. These data were compared to that of a randomly selected clinical control group from the same population. Results: For the period in question, a total of 9 individuals rotated the RCF when copying it; 89 individuals produced a rotation on the recall trial; and 3 individuals rotated their reproduction on both their copy and recall of the figure. Given the limited sample size, only data for individuals producing rotation errors on recall were analysed. Patients producing spontaneous rotations were older, less educated and of lower estimated premorbid intelligence compared to the control patient group. An analysis covarying for these variables (namely age, years of education, and estimated premorbid intelligence) revealed that individuals who demonstrated a gross rotation error in their recall of the RCF scored lower on the Visual Reproduction II subtest, but higher on the Logical Memory I subtest compared to a clinical control group. More than the expected number of individuals producing rotation errors had sustained damage to sub-cortical structures. Additionally, a significantly higher incidence of rotated drawing was observed in individuals of culturally and linguistically diverse (CALD) backgrounds. Discussion: The higher incidence of spontaneous rotations in individuals of CALD backgrounds lends support to the notion that while non-verbal tasks may be language free, they may not be culture-free. Implications of the research findings for our current understanding of whole figure rotations will be discussed and recommendations for future research will be made.
Optimising healthy brain ageing
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The APS College of Clinical Neuropsychologists is pleased to present a one-day symposium on cutting edge research by internationally recognised neuroscientists on optimising healthy brain ageing; an area that has flourished with technological advances in neuroscience, neuroimaging and epidemiology. Lecture topics will range from cognitive reserve and comparison of healthy and unhealthy brain ageing through to risk and protective factors for dementia and advances in the treatment of neurodegenerative disease.

Executive function in children and adolescents with Congenital Hemiplegia
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Background: Congenital hemiplegia is caused by damage to the foetal or infant brain resulting in motor and postural problems. Children with congenital hemiplegia also experience cognitive and psychological difficulties. Early injury to the brain can cause deficits in higher-order cognitive tasks, such as executive functions. Executive dysfunction can disrupt normal development by impeding the child’s ability to effectively interact with their environment and acquire new skills. Study Aims: To investigate executive function in children and adolescents with congenital hemiplegia. Also, to ascertain whether children and adolescents with left and right congenital hemiplegia exhibit the same executive function profile. The relationship between executive abilities and psychological functioning was also explored. Method: Forty-six children with congenital hemiplegia and 20 typically developing children were recruited. Executive function was operationalised according to P. Anderson’s (2002) developmental model of executive function that incorporates four components: attentional control; cognitive flexibility; goal setting; and information processing. Nine neuropsychological assessments assessed the executive function components—Digit Span Backwards, Symbol Search, and Cancellation, all from the Wechsler Intelligence Scale for Children—Fourth Edition; Trail Making Test, Verbal Fluency, Colour–Word Interference Test, and Tower Test, all from the Delis–Kaplan Executive Function System; Rey–Osterrieth Complex Figure Test; and Code Transmission Test from the Test of Everyday Attention for Children. Questionnaire data (i.e., Strengths and Difficulties Questionnaire and the Behavioural Rating Inventory of Executive Function) from the child’s parent and schoolteacher was also gained. Results: Children with congenital hemiplegia showed significantly more cognitive and behavioural executive function difficulties and psychological difficulties in comparison to typically developing children, $F(1,63) = 31.16, p < .001, \eta^2 = 0.33$. On all measures, there was no difference between children with left and right congenital hemiplegia, $F(1, 43) = 0.05, p = 0.819, \eta^2 < 0.001$, with the exception of Inhibition/Switching total errors, $F(1, 39) = 4.14, p = 0.049, \eta^2 = 0.1$. Children with higher (i.e., better performance) levels of executive function showed fewer psychological difficulties, $r = .34 – .54$, with the exception of the Emotion scale from the Strengths and Difficulties Questionnaire. Conclusions: Children and adolescents with congenital hemiplegia experience difficulties across multiple executive function domains. Also, a higher level of executive function was associated with fewer psychological difficulties.

Wernicke-Korsakoff syndrome and alcohol related dementia: a review of clinical evidence
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While Wernicke-Korsakoff Syndrome (WKS) has been the subject of innumerable neuropsychological studies, many aspects of this condition remain misunderstood. A variety of evidence has emerged over the last two decades to change our understanding of this condition, but much of this evidence is not well known, nor is it incorporated into clinical practice. This review will focus on some of the lesser known evidence about WKS. The review will show that the neurological definition of the disease has evolved to include a highly variable...
clinical presentation, but many neuropsychological accounts still place emphasis on identification of a severe, selective amnesia, or the so-called "IQ versus MQ" discrepancy. Instead, available evidence suggests that the IQ versus MQ discrepancy may have low diagnostic sensitivity. Other common misapprehensions about WKS include the belief that the pathological condition is rare, and once established WKS is a chronic, unremitting condition. Another source of misunderstanding relates to the idea that the Korsakoff amnesia phase of the condition is only seen in association with alcohol dependence. As well, the most common underlying cause of so-called alcohol-related dementia is unrecognised WKS. Identification of WKS remains a clinical diagnosis, at the present time. The most sensitive diagnostic signs of WKS may be cognitive impairment, of any degree, in association with a history of alcohol dependence or malnutrition. Treatment recommendations will be reviewed. Neuropsychologists will continue to play a key role in the identification of WKS through provision of cognitive assessments with optimal sensitivity.

Exploring age and sex effects on facets of topographical memory
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Topographical Memory (knowledge of familiar environments) is a multifaceted construct that has been researched less frequently than other domains of memory. While semantic memory is thought to remain stable and episodic memory is thought to decline with advanced age, the trajectory of topographical memory skills across the adult lifespan is unclear. By recruiting 63 normal adult participants familiar to the Sydney region, ranging between 20-79 years of age, the study investigated the influence of age and gender on facets of topographical memory (including, landmark recognition, knowledge of the spatial relationships between landmarks and way-finding) using the Sydney City Test of Topographical Memory (Hepner et al., 2007). The relationships between performance on tests of topographical memory and other cognitive skills (mental rotation, verbal fluency and object-naming) were also explored. The study controlled for recent depth of exposure of the target environment (number of different places visited in the Sydney central business district in the past 5 years). There were no significant sex or age effects on the ability to name famous Sydney landmarks from photographs, label the location of famous landmarks on a map of the Sydney central business district, or describe how to get from one famous landmark to another. When shown a photograph of a Sydney landmark and asked to give the cardinal direction (as if you were standing in the position of the photographer), a curvilinear relationship was found for males (i.e., improvement until middle age and then decline) while, for females, no relationship was found between this ability to give cardinal direction and age. A similar curvilinear relationship was found for males when they were asked to look at the picture of one Sydney landmark and point in the direction of a second one, whereas for women, this ability showed decline from middle age onwards. The results indicate that age and gender have an impact on memory for direction but not on other facets of topographical memory.

Neuropsychological changes following right temporal lobectomy in the context of bilateral lateralisation of memory and language function: A Case Study
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Functional MRI (fMRI) is routinely used to identify hemispheric lateralisation of memory and language function as part of the pre-surgical work-up in the context of medically refractory epilepsy. Bilateral distribution of these cognitive functions is rare in right-handed individuals. In conjunction with imaging data, neuropsychological input plays an important role both in terms of the identification of localising or lateralising features in the pre-surgical cognitive profile, as well as in the postsurgical management of cognitive changes. The case of a patient who underwent right temporal lobectomy at the Royal Melbourne Hospital is reported. Mrs. R is a 37-year-old right-handed woman with a 10-year history of medically refractory complex partial seizures. While EEG and ictal SPECT investigation were indicative of a right temporal lobe focus of seizure onset, there were no structural abnormalities noted on MRI. fMRI brain scans noted bilateral hippocampus activation for both verbal and non-verbal memory paradigms, bilateral activation of Wernicke’s area during verbal
comprehension tasks and right dominant Broca’s area activation during verbal expression tasks. Neuropsychological assessment was conducted pre-surgery and 11 months postsurgery. At follow-up, partial removal of the right temporal lobe resulted in complete seizure freedom. The results of the pre- and postsurgical neuropsychological assessment are described, with comparisons indicating a mild postsurgical decline in the domains of visuo-spatial learning and recall and attention. Verbal memory and language skills were unchanged. These results are discussed in the context of the bilateral activation of memory and language function identified on fMRI, surgical intervention and ongoing medical treatment. This case serves to assist in guiding the neuropsychological assessment and management of surgical candidates with bilateral language and memory activation noted on fMRI in the context of medically refractory right temporal lobe epilepsy.

Interpreting executive dysfunction in Parkinson’s disease: The relationship between cognitive flexibility and the basal ganglia
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Patients with Parkinson’s disease (PD) performance on tasks requiring cognitive flexibility is often impaired (Dubois & Pillon, 1997). The increased reaction time (RT) associated with switching tasks in PD is thought to represent this deficit. This research examined the basis of this increased RT using a combined Task Switching and Go/Nogo paradigm. Specifically, we investigated whether RT when switching tasks was influenced by the act of withholding a response. If increased basal ganglia inhibition is affecting task switching performance in PD, withholding a response on the current trial would augment inhibition on that response, which would spill over into subsequent trial and be manifest as slower responses in the subsequent trial. In particular this would slow task repetitions, and thus reduce the switching cost. Conversely, if impaired prefrontal functioning was causing the task switching deficit, then the elevated switching cost should remain despite this manipulation of response. Thus this research aimed to investigate whether the deficit is a result of impaired prefrontal functioning or impairment in the basal ganglia. Participants included 33 patients with PD as well as 30 age and IQ matched controls and their RTs were compared and assessed with a series of ANOVAs. Patients with PD did not demonstrate the previously published elevation of switching cost elicited by this paradigm. Instead, PD subjects performed a trial more slowly when their response was withheld in the previous trial. This slowing was attributed to greater basal ganglia related inhibition when withholding a response in PD patients, which persisted into the next trial to slow the response when the task is repeated. This lends support to our key hypothesis that it is greater inhibition in the basal ganglia that causes the impairment in this group. We suggest that previously reported elevations in the switching cost can also be interpreted as a basal ganglia deficit: a more parsimonious explanation given the pathology of the disease. These findings have important implications for interpretation of PD patients’ performance on tasks of executive function in the clinic.

Brain ageing in mid-life to early old-age: associations with risk factors for dementia and Mild Cognitive Impairment
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The nature, trajectory and timecourse of brain changes associated with typical brain ageing and the development of Alzheimer’s pathology will be reviewed. Particular attention will be given to early cerebral alterations which suggest that brain ageing and neurodegeneration are slow processes which commence early in adulthood and progress over decades. Risk factors associated with the development of AD and vascular neuropathology will be discussed and evidence demonstrating an association between risk reduction and improved brain health will be presented.
Healthy older adults show impaired recollection but intact novelty detection on associative memory tasks
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Introduction and Aim: Associative memory processes are crucial for optimal episodic memory function. Degradation of these processes appear to underlie age-related episodic memory changes. To investigate this issue, we compared the performance of 14 young (YA) and 8 older (OA) healthy adults on two associative memory tasks. Procedure: The first task assessed recognition of 60 compound words previously studied one at a time. At test, participants saw 20 words seen at study (familiar), 20 novel words (novel) and 20 words which recombined components of words seen at study and, as such, contained an element of familiarity (recombination). Participants were instructed to make a yes/no judgement to indicate whether each word had been seen at study or not. The second task assessed recognition of the spatial location of 60 words presented randomly in different quadrants of a computer monitor. At test, participants were instructed to make a yes/no judgement indicating whether the location of the word was identical to that seen at study. Results: Overall, performance on the compound word memory task was lower in OA than in YA. Whilst OA had greater difficulty identifying familiar items compared to YA, the two groups did not differ for the recombined or the novel items. On the spatial memory task, overall performance was equivalent between the groups. Interestingly, OA had significant difficulty identifying identical, but not different, spatial word positions compared to YA. Discussion/Conclusions: OA are impaired in correctly identifying previously seen words or spatial information but perform as well as YA when identifying novel words or novel spatial locations. This finding suggests that novelty detection may be spared at the expense of recollection in OA. These results can inform theoretical models of age-related changes in episodic memory.

Postconcussion symptom base rates: Does the method of assessment matter?
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Postconcussion syndrome (PCS) is an easily misdiagnosed disorder. Because of the high rates of PCS symptoms reported in the general population it is important that clinicians do not neglect base rate information during assessment. The aim of this study was to investigate whether the base rate of PCS symptoms varies depending on the method of assessment. A non-clinical sample comprised of 73 undergraduate students who reported no history of head trauma or neurological disease was used in this study. Participants reported their symptoms or problems experienced over a two week period in response to an open-ended question; a simulated (pen and paper) structured interview; and a checklist, the British Columbia Postconcussion Symptom Inventory (BC-PSI). Pairwise comparisons using a Bonferroni adjustment revealed that mean total of PCS symptoms reported for each method were all statistically significantly different from each other (all \( p < .001, \ d = 1.90-3.93, \) large effect sizes). The most PCS symptoms were elicited on the BC-PSI checklist (\( M = 9.45, \ SD = 2.52 \)) followed by the simulated structured interview (\( M = 5.58, \ SD = 2.02 \)). Participants reported the fewest PCS symptoms on the open-ended question (\( M = 1.86, \ SD = 1.00 \)). Additionally, 100%, 92.1% and 25.4% of participants met a caseness criterion (i.e., reporting three or more ICD-10 category C symptoms) on the BC-PSI, structured interview, and open-ended question, respectively. This study reveals that the method of assessment influences the base rate of PCS symptoms in a non-clinical sample. When symptoms are assessed using a checklist, the base rates of PCS symptoms are significantly higher than if other assessment methods are used (i.e., an open-ended question or structured interview). This effect may generalise to clinical populations. In itself, however, this finding is important because clinicians do not know in advance of completing their assessment to which group (clinical or non-clinical) their clients belong. This study clearly demonstrates the significant impact that assessment method may have on the number of reported PCS symptoms, and this finding has implications for base rate research and the use of such information clinically.
Accelerated long-term forgetting in epilepsy: Using ambulatory EEG monitoring to determine the pathophysiology

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Accelerated Long-Term Forgetting (ALF) is characterised by normal acquisition and initial retention over brief intervals (30 minutes), followed by an abnormally rapid rate of forgetting over days or weeks when compared to healthy controls. Evidence of ALF has been found in patients with transient epileptic amnesia and in some patients with temporal lobe epilepsy. ALF has a profound impact on the patients’ everyday lives, yet goes undetected by standard neuropsychological memory tests and the pathophysiological basis of ALF is poorly understood. The current study aimed to investigate ALF in epilepsy patients undergoing continuous ambulatory electroencephalography (EEG) monitoring to determine the relationship between EEG characteristics and the magnitude of consolidation failure. EEG, sleep, mood, IQ and memory data were collected from 41 patients who were diagnosed with epilepsy or probable epilepsy and who underwent 5 days of continuous ambulatory EEG monitoring. Fifteen healthy control subjects were assessed neuropsychologically but did not undergo EEG. Participants were taught a word-list and a design-list to criterion. Recall of both lists was tested at 30 minutes, 1 day and 4 days. Tests that measure estimated premorbid intellect and mood were also administered. Group analyses showed ALF for verbal and nonverbal material in patients who had generalised discharges and ALF for verbal information only in patients who had focal interictal discharges. Patients with normal EEG recordings over the study period did not demonstrate ALF on either task. Surprisingly, the occurrence of overt seizures showed no association with ALF. Furthermore, analyses of aspects of sleep architecture revealed no association with retention over the first 24 hour post-learning period and there was no relationship between the quantity of discharges during sleep and ALF. Daytime naps, however, were associated with better recall. Mood and IQ had some influence on longer-term recall, but these effects were independent of those related to discharges. Overall, the results indicate that ALF in epilepsy results mainly from subclinical discharges and disturbed mood rather than overt seizures or sleep disturbance. These findings have the potential to improve treatment strategies for patients who complain of ALF.

Characterising differences between 'healthy' and 'unhealthy' brain aging: an experimental cognitive perspective

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Alzheimer’s disease (AD) is the most prevalent form of dementia. It is diagnosed based on somewhat fluid and debated criteria (cf. McKann et al. 1984; Dubois et al. 2007), yet over the decades cognitive impairment has been consistently specified as an essential feature of AD. Correspondingly, cognitive capacity is regarded as key outcome when evaluating interventions (pharmacological, dietary, lifestyle) which are designed to delay or prevent the onset of AD, or improve the functional status of individuals who have already been diagnosed with this dementia. But how should we characterise the cognitive profile in later onset ‘AD’ relative to ‘healthy aging’? Is there any evidence for qualitative cognitive shifts in AD? How should the answer to these questions inform our conceptualisation of the aging process, and influence the clinical advice which we may wish to offer concerning optimal cognitive capacity in the later decades of life? With reference to the experimental cognitive literature, I will attempt to address these issues in my paper; or, at least, I will raise some of what - I believe - are the most relevant questions.
A prospective study of structural abnormalities and neurocognitive deficits during a major depressive episode and following symptomatic recovery: An rTMS study
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Several lines of research suggest neuropsychological impairment and structural abnormalities in Major Depressive Disorder (MDD), yet their relationship to clinical state remains unclear. Understanding the relationship between these deficits and whether they resolve upon symptomatic remission may assist in the identification of potential neural markers of treatment response or aid in prediction of relapse. The aim of the present study was to investigate whether neurocognitive impairments and volumetric abnormalities of medial temporal lobe (MTL) structures improve or persist following a treatment course of repetitive Transcranial Magnetic Stimulation (rTMS) and whether differences exist between treatment responders and non-responders. rTMS is a new treatment developed for treatment-resistant depressed (TRD) patients.

Neuropsychological assessment and magnetic resonance imaging (MRI) were conducted on all patients prior to rTMS treatment (baseline) and at three months post baseline (endpoint; M=12.45 weeks, S.D.=2.66). MRI analysis was conducted using FreeSurfer 5.0. Of 29 patients with TRD, 15 were treatment responders and 14 non-responders following up to a 6-week course of daily rTMS treatments (M = 26.07 daily sessions, S.D.= 6.11). Treatment response was defined by 50% reduction in Hamilton Depression Rating Scale scores from baseline to endpoint. Mixed between-within subjects ANOVA's revealed significant improvements regardless of treatment response in the domains of attention, psychomotor processing speed, working memory, visual learning and memory, and aspects of executive functioning including verbal fluency and mental flexibility.

Significantly smaller left hippocampal volume was observed at endpoint in both treatment response groups [F(1,21) = 7.60, p < 0.01]. A significant interaction of time and responder group was found for left amygdala volume [F(1,21) = 5.37, p < 0.05], such that non-responders had larger left amygdala volumes overall at both time points, however, at endpoint only responders showed an increase in left amygdala volume. Ascertaining whether neurocognitive impairments and structural MTL abnormalities diminish or persist despite improvement of psychopathological symptoms of depressive illness is imperative for optimising treatment options. Our findings support past research of neurocognitive gains following a course of rTMS, with larger effect sizes observed in treatment responders. Although preliminary, our findings suggest that rTMS has similar therapeutic potential as antidepressant pharmacotherapy and electroconvulsive therapy in promoting neurogenesis. Moreover, abnormalities of the left amygdala may represent vulnerability to treatment resistance.

Melatonergic treatment for sleep disturbances in Traumatic Brain Injury: A randomised controlled trial
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Traumatic Brain Injury (TBI) is a leading cause of disability worldwide. Sleep disturbances post TBI are commonly reported, estimated to occur in 30% to 75% of individuals. Sleep disturbances lead to a myriad of problems which can impact rehabilitation, contribute to ongoing disability and impede quality of life. Sleep disturbances compound daytime fatigue and contribute to impaired cognitive functioning. TBI patients commonly experience poor sleep quality, increased sleep onset latency and wake after sleep onset. Despite the high prevalence of sleep disturbances post TBI, evidence-based treatments are lacking. Recent research, investigating the mechanistic processes underpinning sleep disturbances in TBI patients, has indicated that endogenous concentrations of melatonin were significantly lower as compared to normal controls. Furthermore, less melatonin was significantly associated with reduced rapid eye movement sleep and increased arousals. As melatonin is a naturally occurring hormone intricately involved in the circadian regulation of sleep/wake cycles it is plausible that melatonin may be associated with sleep difficulties commonly experienced by TBI patients. Recent work provides evidence that a prolonged release analogue
melatonin formulation (Circadin®) is efficacious in treating age-related insomnia in people who also have decreased endogenous concentrations of melatonin. In light of this research, the current study is the first randomised, placebo-controlled, crossover study to investigate the effects of melatonin on sleep in a TBI cohort. The aim of the current study is to examine the effects of melatoninergic supplementation in the treatment of sleep disturbance associated with TBI. The objective of this presentation is to outline a detailed study protocol. The study endeavours to recruit 80 participants who have sustained a mild to severe TBI. Each participant will be assessed over 10 weeks, with each intervention period running for 4 weeks. Sleep will be objectively assessed with the use of actigraphy. If melatonin therapy is successful in reducing latency to sleep and improving sleep quality, it could substantially improve the quality of life of individuals with TBI. As melatonin is a naturally occurring hormone with minimal side effects, its use to treat sleep disturbance could be implemented into clinical practice.

When beliefs become delusional: The clinical profiles of two psychiatric inpatients with persecutory delusional disorder
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Delusional Disorders (DD) are clinically rare syndromes characterised by nonbizarre false beliefs which are held with great conviction despite rational counterevidence. They are not due to any other mental disorder such as schizophrenia or mood disorder. Auditory or visual hallucinations, if present, are not prominent. The following delusional types are seen in DD: erotomanic, grandiose, jealous, persecutory, somatic, mixed and unspecified (American Psychiatric Association, 1994). Patient with DD are often treated with anti-psychotic medication but a positive response to treatment occurs in only 50% of cases (Manschrek & Khan, 2006). The neuropsychology of DDs is poorly understood and most research has been carried out in patients with paranoid schizophrenia rather than “pure” delusional disorder. According to the two-factor theory (Davies, Coltheart, Langdon & Breen, 2002) there must be two abnormalities present for such delusions to occur. The first is what initially prompts the delusional belief and is responsible for the content of that delusion. However, it is not sufficient to produce a delusional belief without the second abnormality, which is a cognitive deficit in evaluating beliefs. Delusional individuals tend to overconfidently arrive at a conclusion based on sparse evidence, a mechanism referred to as “jumping to conclusions” (Fear & Healy, 1997; Garrety & Freedman, 1999), which is supposed to be linked to a motivational need for closure. Moreover, they tend to show a bias against disconfirmatory evidence. Evidence for heightened vigilance towards threat was found by Fear, Sharp and Healy (1997) in a study using an emotional Stroop task, in which patients with delusional disorder were slower in reaction time to emotional words compared with neutral words. Patients with DD also demonstrate reduced cognitive flexibility with more errors and more perseverative errors on the Wisconsin Card Sorting Test compared to controls (Bömmer & Brüne, 2006). The aim of this case presentation is to give an overview of delusional disorder (persecutory type) including theoretical models, neuropsychological profile and current treatments. Two clinical cases will be presented to highlight the cognitive profile of patients with delusional disorder and how to differentiate delusional disorder from other mental disorders, such as schizophrenia.
Intra-individual variability in cognitive response time before and after CPAP treatment for obstructive sleep apnoea

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Introduction: Obstructive Sleep Apnoea (OSA) is a common disorder characterised by obstruction of the upper airway during sleep. Previous studies have found cognitive impairments in OSA, including reduced attention and memory deficits. However, findings are inconsistent and there is little consensus about whether worse OSA is associated with poorer cognitive abilities. Most studies have focused on the accuracy of responses to memory and attention tasks, rather than the speed with which responses are made. Participants may be slowing their responses to maintain accuracy. Alternatively, individuals may be slowing on some of their responses (e.g. fluctuating in their speed of responding trial-by-trial within each task: called intra-individual variability). Evidence from neurodegenerative disorders (e.g. Lewy body disease) shows greater trial-by-trial variability in cognitive performance than that shown by healthy age-matched controls. Such variability may also be a feature of memory and attention performance in OSA. Aim: The present study has three aims: (1) to characterise intra-individual variability in computerised memory and attention tasks in a sample of OSA patients; (2) to determine whether there is a relationship between such variability and disease severity; (3) to explore if intra-individual variability reduces with CPAP treatment. Procedure: Thus far, 138 OSA patients have been recruited for cognitive testing following diagnosis of OSA, aged 25 – 82 years (53.97±12.41), 53% male with AH1 ranging from 8.1 to 154.8 (41.5±25.8). Cognitive testing used a computerised battery (CDR) assessing attention, short-term working memory, verbal and visual memory. Forty-six have been retested after three months of CPAP treatment. Results: Data collection will be complete by end August 2011. Interim analysis, pre and post CPAP, reveals a strong trend for a reduction in variability in Vigilance (sustained attention), after controlling for age, OSA severity (AH1) and premorbid IQ, F (1,42) = 3.85, p = .057. Full results will describe memory and attention test accuracy, speed and intra-individual variability on the CDR measures by OSA severity, and will explore changes with CPAP treatment. Discussion: Characterisation of neuropsychological deficits in OSA has important implications for the assessment of individuals with this highly prevalent disorder.

When does anterograde memory become retrograde? Memory consolidation in semantic dementia

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Introduction: The laying down of new information into permanent memories is crucial for memory rehabilitation but the mechanisms of such memory consolidation are still very poorly understood. Aim: To understand explicit and implicit long-term consolidation of new information in semantic dementia. Procedure: Episodic memory consolidation was tested over a 2 month period in a semantic dementia patient as well as healthy controls with a novel task, which allows dissociating explicit and implicit retrieval of newly learnt information. Voxel-based morphometry was conducted to identify the extent of atrophy in the patient. Neuropsychological background data was collected in the patient and controls. Results: Voxel-based morphometry results show extensive atrophy in hippocampal and medial temporal lobe structures in semantic dementia patient. Neuropsychological examination shows profound semantic deficits in the semantic dementia patients, which contrasts with relatively intact anterograde episodic memory. The consolidation results reveal that despite an early good retention of information, the patient lost all explicit information of the newly learnt material between weeks 2 and 4. By contrast, he retained implicit word information even after 4
and 8 weeks delay. Conclusion: Our findings highlight the critical time window of 2 to 4 weeks in which newly learnt information should be re-encoded to allow the explicit retention of information over time. The results also indicate that some of the learnt information can be still accessed with implicit retrieval strategies when explicit retrieval fails, which suggests that storage of some memories remains intact. These findings will inform future rehabilitation studies.

Impact of pre-injury factors on neuropsychological outcome in adults with severe traumatic brain injury: A cognitive reserve perspective
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Cognitive reserve (CR) relates to the capacity to actively cope with and compensate following brain injury (Stern, 2002). Katzman and colleagues (1989) first proposed the idea of reserve to explain observed variability in the clinical manifestation of brain damage. The neuroprotective effects of CR in aging and dementia have been examined (Stern, 2009). However, there is little research applying the CR concept to traumatic brain injury (TBI). CR has been proposed to be of relevance in predicting outcome following severe TBI (Bigler, 2007). This may be particularly true, for those trauma groups for whom the recovery trajectories are relatively poorly understood. In applying the concept of CR to TBI, the present study analysed retrospective neuropsychological data from community clients of a TBI rehabilitation service (N = 150). Pre-injury variables proposed to enhance CR were higher education, complex occupation and mentally stimulating leisure activities, while variables hypothesised to diminish CR were substance abuse, psychiatric illness and learning difficulties. Neuropsychological outcome was assessed by scores on tests of speed of information processing, attention/concentration, learning and memory, and executive functioning. The relationship between pre-injury factors and neuropsychological outcome was examined at each level of TBI severity (i.e. severe, very severe and extremely severe) to better understand the nature and extent of CR’s influence on neuropsychological outcome at different severity levels. Factors that potentially moderate the effects of CR (e.g. age, gender, emotional and psychological distress) were controlled. Findings and implications are discussed.

Can memory profiling predict progression from Mild Cognitive Impairment to Alzheimer's disease?
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Introduction and Aim: When disease-modifying therapies for Alzheimer’s disease (AD) become available, they will be most efficacious when administered early in the disease course. Identifying indicators of incipient dementia has, therefore, become vital. Mild Cognitive Impairment (MCI)—measurable cognitive decline without major functional impairment—has become the focus of considerable research. Its amnestic subtype (aMCI) is often viewed as a transitional stage between healthy functioning and AD. Many cases, however, experience other outcomes, including stable MCI, reversion to normal functioning, progression to other dementias, or may have depression. Identifying reliable neuropsychological markers of progression from aMCI to AD would, therefore, be most worthwhile. Given medial temporal lobe pathology is likely in incipient AD, those aMCI with preclinical AD patients may be predicted to display an encoding/consolidation memory profile (i.e., impaired free recall and no significant improvement on recognition tasks). Retrieval profiles (i.e. markedly improved performance on recognition tasks) are thought to characterise other MCI aetiologies. The current research explores whether memory profiling can, therefore, identify aMCI patients most at risk of AD.
Procedure: The Australian Imaging Biomarkers and Lifestyle (AIBL) study is a prospective investigation into AD onset and course. Neuropsychological data have been collected at baseline and 18 month follow-up. Ninety-six participants classified as by an expert team as aMCI at baseline and who underwent follow-up were included in the analysis. Memory profiling was undertaken using CVLT-II protocols (i.e. retrieval and encoding profiles are indicated by impairment on long delay free recall, and improvement or no improvement, respectively, of ≥ 1 SD on recognition measures). Results and Discussion: At follow-up 34% of aMCI cases
The Abstracts of the 17th Clinical Neuropsychology Conference

had declared signs consistent with AD. Of these cases crossing the diagnostic boundary, 73% displayed an encoding profile, but so did an equivalent proportion (66%) of cases who remained aMCI, \( \chi^2 (1, N = 91) = 0.48, \text{ns} \). Moreover, post-hoc analyses revealed that for healthy controls (N = 768) a retrieval profile predicted cognitive decline at follow-up, Wald \( \chi^2 (1 \text{ df}) = 15.71, p < .001 \), and that retrieval profiles were common amongst baseline AD cases (33% of 169). These findings challenge current thinking regarding memory profiles and dementia.

On the pursuit of clinical excellence: ‘Smart Papers’ as clinical decision aids, and a conceptual framework
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This workshop addresses practical and conceptual issues relating to professional excellence in Neuropsychology. In particular, I will review ‘Smart Papers’, which represent evidence-based clinical guidelines that can serve as aide-memoires for Neuropsychologists in clinical settings. Six sets of Smart Paper are discussed – Clinical Interview, Distinguishing Neurological from Psychological Aetiologies, Movement Disorder Dementias, Alzheimer and related degenerative dementias, Transient Amnesia, and Epilepsy. In addition, a framework for clinical excellence is offered that may provide a conceptual scaffold which Neuropsychologists can use as part of their professional practice, appraisal and development.

The paradoxical brain and positive neuropsychology
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Disorders of the brain and its sensory organs have traditionally been associated with deficits in cognition, emotion and behaviour, but it is increasingly being recognised that positive phenomena may also occur with such conditions. This talk provides a selective review of such phenomena – enhanced function after brain lesions, recovery of function after a second brain lesion, and better-than-normal performance in people with sensory loss. I propose that, akin to the well-established field of positive psychology and the emerging field of positive clinical psychology, the nascent field of positive neuropsychology offers new avenues to understand brain-behaviour relationships, with both theoretical and therapeutic implications.

Memory strategy knowledge-transfer following cognitive intervention for amnestic mild cognitive impairment
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Many people in the early stages of a dementia are seeking guidance about how best to manage memory challenges in everyday life. In evaluating cognitive interventions for older adults with increasing memory difficulties there is a need to use outcome measures that index memory performance in everyday activities. We will report on our work in evaluating response to interventions for memory impairments in amnestic mild cognitive impairment, including preliminary findings from our recently completed randomised controlled trial of cognitive intervention (six-week memory group) for 92 older adults diagnosed with amnestic mild cognitive impairment (aMCI) and 92 age-matched healthy older adults (HOA), randomly allocated to early or late intervention. Following intervention, there was a large intervention effect (\( d = .58 \)) in increasing the knowledge-base of participants with aMCI and HOA on a task of memory strategy knowledge; a large intervention effect (\( d = .75 \)) in increasing self-reports of strategy-use in everyday life; and, a moderate intervention effect (\( d = .36 \)) in achievement of self-determined everyday memory goals following intervention. However, these significant changes in performance were not reflected in performance on standard
neuropsychological tests of memory. Reasons for this discrepancy between memory strategy knowledge, everyday memory goal achievement and standard neuropsychological test performance will be discussed.

Maximising the outcome of focal epilepsy surgery utilising electrical stimulation language mapping

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This case presentation includes brief review of the comprehensive investigations employed in the workup for epilepsy surgery, including advanced structural and functioning imaging techniques. The focus here is on maximising the chance of seizure-freedom whilst minimising cognitive deficits, which is especially difficult when the seizure focus is near language cortex. Electrical stimulation language mapping is an advanced technique that clinical neuropsychologists can use to identify precisely which parts of the cortex subserve specific language functions. One or two complex cases will be presented.

Challenges associated with diagnosing Mild Cognitive Impairment in older adults from non-English speaking backgrounds: Findings from the Sydney Memory and Ageing Study

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Introduction: Objective cognitive impairment determined by neuropsychological test performance is a core criterion for the diagnosis of Mild Cognitive Impairment (MCI). Cultural and linguistic minorities have been shown to perform more poorly on neuropsychological tests, thus MCI may be over-diagnosed in these groups. Aim: To examine prevalence of MCI diagnosis, cognitive profiles and neuropsychological predictors of dementia in a community-based sample of older adults from non-English speaking backgrounds (NESB).

Procedures: 827 persons from English-speaking backgrounds (ESB) and 160 persons from NESB, all initially without dementia, were recruited from the electoral roll to the Sydney Memory and Ageing Study. Fluent spoken English was required for inclusion in the study. Comprehensive clinical and neuropsychological assessments were administered by trained psychology graduates, at two year intervals. Five cognitive domains of attention/information processing speed, memory, language, visuospatial, and executive functions were evaluated. Standardised scores were derived from both published normative data and from the sample mean and standard deviation. Participants and informants completed questionnaires measuring functional activities and subjective cognitive complaints. Results: Using international consensus criteria, MCI prevalence was two to three fold higher in NESB participants than ESB participants. This difference was attributable to higher rates of cognitive impairment, evident across all cognitive domains, even when conservative impairment thresholds were used. Complaints and functional activities did not differ between the groups. Rates of conversion from MCI to dementia were the same for ESB and NESB groups, however predictive neuropsychological measures differed. Performance on Logical Memory delayed recall, Rey Auditory Verbal Learning Test (RAVLT) short-term and long-term delayed recall, and category fluency predicted dementia within two to four years in ESB participants. In NESB participants, only Digit Symbol was a significant predictor of dementia, together with a trend for RAVLT delayed recall. Discussion/Conclusion: “Impaired” performance in persons of NESB is difficult to interpret, even for non-verbal tests. These findings suggest NESB older adults are likely to be misdiagnosed if normative data derived from predominantly native English speakers is used to determine cognitive impairment. Moreover, the baseline neuropsychological profiles of NESB participants who convert to dementia are different from native English speakers.
Emotional enhancement of memory in frontotemporal dementia and Alzheimer’s disease
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Introduction: Emotionally relevant stimuli are usually more accurately remembered than non-emotional stimuli. This emotional enhancement effect is thought to depend on the integrity of structures within the medial temporal lobe (MTL). These structures are often affected in common progressive neurodegenerative disorders such as frontotemporal dementia (FTD) and Alzheimer’s disease (AD). To date, whether emotional enhancement of memory is compromised in these disorders remains unclear. Aim: This study aims to investigate recognition memory for emotional and neutral stimuli in the two language variants of FTD (semantic dementia (SD) and progressive nonfluent aphasia (PNFA)), and AD. Procedure: 7 SD, 4 PNFA and 3 AD participants were compared with 15 healthy controls. Participants studied 40 negative and 40 neutral images, and completed a forced-choice recognition test after a 1-hour delay. Analyses investigated correct responses (hits), incorrect responses (false alarms) and corrected hits (hits – false alarms). Results: A significant effect of diagnosis was present for corrected hits for negative and neutral items, with SDs performing worse than controls on both measures. When false alarms were examined, an effect of diagnosis was significant, with SDs showing more false alarms than controls, regardless of emotion. In contrast, controls were more likely to incorrectly endorse negative than neutral items. No significant effects of diagnosis were present for hits, however within-group analyses indicated that controls correctly identified more negative than neutral items, whereas for SD and PNFA, number of hits was not influenced by emotion. Conclusions: These preliminary results suggest that emotional enhancement of memory differs across these disorders. In SD, the emotional enhancement effect is dampened, with SDs showing more incorrect responses for both negative and neutral items. A similar pattern was observed in PNFA, although this did not reach statistical significance due to low power. Consistent with prior findings, the AD group showed a similar pattern of performance as controls, suggesting emotional enhancement of memory is intact in this group. These results suggest those MTL regions affected in FTD are likely important for emotional enhancement of memory. In addition the difference in performance on emotional memory tasks may be useful in differentiating between common neurodegenerative disorders.

Modern neuroimaging: The meaning behind the pictures
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Advances in physics and computing over the last decade have led to the development of astonishing brain imaging techniques that now allow clinicians to examine the complementary aspects of brain structure and function with excellent spatial resolution. The combination of magnetic resonance imaging (MRI) technology, sophisticated signal processing and advanced statistical and visualisation methodologies now make it possible to study aspects of the brain’s dynamic function, neurochemistry and the interconnections between different brain regions. This workshop program will focus on the description and critical evaluation of functional MRI, spectroscopy and diffusion tensor imaging modalities in clinical practice.

Double dissociation between verbal episodic and semantic memory in children: Is it possible, and does it have differential impact on the development of literacy skills?
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Introduction: A single dissociation between episodic and semantic memory (impaired episodic, but preserved semantic) has been established in children with temporal lobe lesions, but the opposite pattern of dissociation has not. Child and adult studies suggest that impaired episodic memory alone is not associated with reading or spelling deficits. In contrast, in adults (with semantic dementia), impaired semantic memory alone has been found to compromise reading and spelling skills. Aim: In this study we investigated relations between semantic and episodic memory, and the impact of the pattern of memory impairments on the development of
literacy skills in children with unilateral temporal lobe epilepsy, as they are known to be at risk of academic difficulties and memory impairments. **Procedure:** Sixty-six children and adolescents (38 with left- and 28 with right-sided seizure onset) were given tasks assessing verbal memory (semantic and episodic). Fifty-eight have concurrently completed tests of reading and spelling skills. **Results:** Impairments were found across memory and academic skills for children with temporal lobe epilepsy as a group. Interestingly, individual patient analyses revealed a double dissociation: while some children were impaired on episodic but not semantic, others showed intact episodic but impaired semantic memory. Nevertheless, semantic (but not episodic) memory was found to significantly contribute to reading accuracy and reading comprehension, but both contributed to spelling. Moreover, children with impaired semantic memory alone (but not episodic alone) performed significantly below the children with intact memory skills on tests of reading and spelling. **Conclusions:** This double dissociation suggests that semantic and episodic memory systems may develop independently in the context of temporal-lobe pathology, and that they have differential impact on the development of literacy skills.

**Loss of memory for the past, but no problems in episodic future thinking in a patient with Korsakoff's disease**

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**Introduction:** Episodic future thinking, which is the unique ability of humans to mentally pre-experience personal future events has been linked to recall of personally experienced past events at both the behavioural and neurological level. Patients with bilateral hippocampal lesions and retrograde amnesia have also been found to be impaired at imagining future experiences. Nevertheless, a single dissociation: impaired ability to imagine future events, but preserved memory for the past events, has been documented in cases with bilateral damage to the thalamus (Weiler, Suchan, Koch, Schwarz, & Daum, 2011). The opposite type of dissociation, however, which would strengthen the argument that these two processes operate independently, has not been described in patients with thalamic lesions to date. **Aim:** To determine whether episodic future thinking is compromised in a 43 year old woman who developed amnesia suddenly as a result of Wernicke-Korsakoff's syndrome. **Procedure:** Patient SL and 11 age- and education-matched healthy controls (HC) completed a modified version of the Autobiographical Interview to elicit detailed descriptions of actual past and potential future events, as well as anterograde memory tests. Clinically obtained MRI scans were used in volumetric analyses of the thalamus and hippocampi. **Results:** SL demonstrated severe impairments in retrograde and anterograde memory compared to the HC participants. In contrast, she was able to generate future personal events, which were as richly described as the events generated by the HC subjects. Analyses of her MRI scans revealed significantly reduced thalamic volume bilaterally, but intact hippocampi. **Conclusions:** Taken together, studies of patients with thalamic lesions provide evidence of double dissociation between past and future episodic thinking, which raises a possibility that these two systems may be operating independently.

**Physical activity and the ageing brain**

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This paper will give an overview on the current evidence in the literature on physical activity as a potential protective factor for the ageing brain. Recently there has been an increased interest in the literature in physical activity as an environmental and modifiable factor and whether it has potential to delay the onset and progression of cognitive impairment in old age. Current hypotheses of the biological mechanisms which aim to explain the positive effects of physical activity on the brain will be discussed. Results of clinical studies with cognitively healthy older adults, participants with subjective memory complaints and mild cognitive impairment as well as with dementia will be critically reviewed. Several questions remain in the quest to develop an effective strategy for health promotion such as what the important exposure time window might be, what type of physical activity, duration and intensity is necessary, how older adults can be best motivated, how to avoid adverse events, how to design research trials and how to best translate findings into the community.

282
Subjective memory complaints and prospective memory performance in older adults: Multi-process theory
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This study investigated performance on a quasi-naturalistic prospective memory task in a sample of older adults reporting memory complaints. Using an adaption of McDaniel and Einstein’s (2000) Multi-Process Theory the objective was to determine if performance on the task differed based on memory complaint level (low and high) or cue condition (focal or non-focal). Fifty seven older adults completed the Memory Assessment Clinic-Questionnaire (MAC-Q; Crook, Feher, & Larrabee, 1992) and were divided into two memory complaint groups. The prospective memory task involved completing an ongoing foreground task with cues for remembering embedded either within the ongoing task or peripheral to it, representing the focal and non-focal cues respectively. The results indicated the high-level memory group was less accurate overall in both cue conditions. Focal cue condition performance was superior to non-focal however the high-level group were particularly impaired in the non-focal cue condition. The results were interpreted in the context of an emerging deficit in the cognitive processes of working memory and executive attention. These findings suggest that objective deficits in prospective memory performance may be apparent in older adults reporting memory complaints. Findings can be used to develop intervention programs to educate older adults regarding the nature of early prospective memory failure enabling alteration of daily routines leading to more accurate prospective memory and memory contentment.

Impaired consolidation of motor learning in Parkinson’s Disease
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Introduction: Motor adaptation consists of a fast process (fast-learning, fast-forgetting) and a slow process (slow-learning, slow-forgetting). The fast process is responsible for the rapid rate of error reduction early in adaptation, but results in a motor memory that decays quickly. The slow process learns slowly but results in a long-lasting motor memory. The consolidation of learning from the fast process to the slow process requires sufficient training and/or rest. Fast learning of visuomotor adaptation is intact in Parkinson’s Disease (PD). However, previous studies show impaired 24 hour recall of visuomotor adaptation, suggesting impaired consolidation of visuomotor adaptation. It is unknown if impaired consolidation deficits in the rest period after training, or consolidation deficits during training, or both. Aim: This study examined if PD patients show intact consolidation while continuously on-task to preclude the possible influence of consolidation deficits in the rest period after training. Method: Non-demented, medicated PD patients and age-matched controls participated in this study. An A1BA2 adaptation paradigm was used: A and B were opposing rotations: feedback was rotated by 30° counterclockwise during A, and 30° clockwise during B. Subjects completed either limited training (25 trials) or extended training (80 trials) on A. All subjects then completed 25 adaptation trials on B, followed by 15 washout trials with veridical feedback. Subjects then completed 25 adaptation trials on A (A2). Two indicators of consolidation were used: (1) Anterograde interference: slower rate of learning B as a result of interference from A and (2) Savings: faster re-learning of A at A2. Results: Despite extended training, PD patients showed less anterograde interference from A1 to B, and less savings from A1 to A2 than controls. Conclusions: Impaired corticostriatal pathways in PD play a role in deficient consolidation of motor learning from the fast to the slow state during training in PD. Impaired consolidation of motor learning may help explain the lack of long-term retention of benefits from motor rehabilitation in PD.
Memory profiling in Parkinson’s disease
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Introduction and Aim: Early detection and differential diagnosis of neurodegenerative diseases is often informed by examining memory profiles on neuropsychological testing. On memory testing, an encoding profile is typically taken to suggest possible Alzheimer’s disease (AD), with other differentials being associated with a retrieval profile (e.g., late-onset depression, vascular dementia). Recent findings, however, have suggested that a retrieval profile can be seen in AD using a novel paired associate learning (PAL) task (Pike, Rowe, Moss & Savage, 2008), with apparent further dependence on the mode of recognition testing employed. In order to understand the scope of such task dependence we examined memory profiles in Parkinson’s disease without dementia. Procedure: The study enlisted 25 cases with mild/moderate severity Parkinson’s disease and a control sample adequately matched in terms of age and education, and administered the CVLT-II and an experimental verbal paired associates test which included both Yes/No and 2AFC recognition measures. A brief neuropsychological battery was also administered. Results: We identified both encoding and retrieval profiles using list-learning, as well as a subgroup with no evident impairment. As in Pike et al., impaired profiles from the PAL testing contradicted the list-learning outcome: the list-learning encoding profile again reversed to one of retrieval, and the retrieval profile now reversed to encoding. Further complicating the pattern, 2AFC measures consistently suggested encoding difficulty. Discussion: We discuss the possible reasons that may result in the differences in memory profiles across tasks and the challenges to evidence-based practice in using memory profiles to inform differential diagnosis.

Screening and management of Acquired Brain Injury in mental health services: From evidence to policy
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Acquired brain injury (ABI) and psychiatric disorders are often linked, with the presence of an ABI increasing the likelihood of developing psychiatric symptoms, and having a mental illness increasing the risk of incurring ABI. According to the 2004 Victorian ABI-mental illness protocol (p.15), area mental health services “are responsible for providing clear, relevant information and advice to clients, carers and/or services requesting assistance in respect of ABI and mental illness issues”. However, anecdotally, ABI screening is below optimum in mental health services, and there are no clinical guidelines for screening and management of ABI. Against this background, this paper aims to evaluate the current status of ABI screening and management, first using evidence on ABI screening in an inpatient psychiatric setting, and second, examining the national policy framework on the issue. Evidence was gathered through a study on ABI screening in a Victorian inner-city area mental health service. The study involved retrospective file audit of randomly selected 100 psychiatric inpatients admitted during 2009 for duration of at least 3-days. The file audit included review of admission interviews, initial assessment and final discharge summary documents. Information was collected on patient demographics, psychiatric diagnosis, medical and substance use comorbidities, and ABI screening. The audit results revealed that the patients in general had chronic psychiatric conditions and a history of multiple inpatient admissions. The presentations were often complex, with a range of medical and polysubstance use comorbidities. With regard to screening, medical and substance use comorbidity information was regularly collected. On the other hand, the screening of ABI was non-systematic and poor, and there was limited evidence that patients were screened for ABI. Following from this evidence, the paper examines the existing national and Victorian state policy framework, and discusses the policy limitations. The paper concludes with recommendations on improving screening and management of ABI in mental health services, including development of clinical guidelines, and moving the ABI issue into the National Mental Health agenda.
Neuropsychological outcomes from a double-blind, sham-controlled trial investigating repeated sessions of transcranial direct current stimulation (tDCS) for the treatment of major depression.

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Introduction: Transcranial direct current stimulation (tDCS) has gained increased attention for its transient cognitive enhancing effects when administered during performance on cognitive tasks in a single session. It remains to be shown, however, whether tDCS has similar cognitive enhancing effects when administered alone without any task completion. We present the neuropsychological outcomes from a large sham-controlled study which investigated repeated administration of tDCS as a treatment for major depression. Acute and cumulative effects of repeated tDCS sessions on neuropsychological outcomes following up to 6 weeks of treatment are examined. Additional analyses examined the possibility for potential changes in neuropsychological functioning in participants who showed the poorest functioning in both the active and sham groups at baseline. Procedure: In a parallel group design, 64 depressed participants were randomised to receive active or sham tDCS every weekday across 15 treatment sessions, followed by an optional three-week open label active treatment phase. Anodal tDCS was administered to the left dorsal lateral prefrontal cortex at 2mA current strength with the cathode placed on the lateral aspect of the contralateral orbit. Acute effects on reaction time measures and processing speed were examined at treatment sessions 1, 15 and 30. Neuropsychological functioning was assessed at baseline, after the sham-controlled and open label phases with measures assessing learning and memory and fronto-executive functioning. Results: The active tDCS group significantly improved on a processing speed measure relative to the sham group immediately following tDCS session 1. This effect, however, was not replicated at tDCS session 15. No cumulative cognitive enhancing effects of active tDCS were found in the entire sample, or the poorest functioning participants, over the sham-controlled or after the open label trial phase. Conclusion: These findings suggest that a single active tDCS session alone, without performance of any task, has transient cognitive enhancing effects in patients with major depression. In contrast, multiple tDCS sessions do not appear to have any cumulative cognitive enhancing effects in this population independent of mood effects.

Contribution of biological and cognitive reserve to outcome after TBI: A meta-analysis

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Traumatic brain injuries (TBI) cause a range of long-term problems. Outcome after TBI is related to the severity of an injury and the amount of brain damage that is sustained but this relationship is far from perfect. While it is recognised that pre-morbid differences in reserve may affect outcome, the extent to which reserve contributes to the variability in outcome after TBI is not well understood. Brain reserve refers to the biological resources that an individual is endowed with and is assessed using a variety of measures, including intracranial volume and specific genetic markers. Cognitive reserve refers to the efficiency of the cognitive networks/processes available to an individual and is assessed using proxy measures, such as educational attainment and estimated pre-morbid IQ. The current study involved a meta-analysis of existing research that has examined the relationship between measures of brain and/or cognitive reserve and outcome following adult TBI. A comprehensive search of the PubMed and PsychInfo research data-bases between 1975 and 2010 was undertaken using 49 search terms and their derivatives. All studies were screened using detailed inclusion/exclusion criteria, with 93 studies being eligible for inclusion. Correlations were used to assess the extent to which the measures of biological (intracranial volume, APOE, age) and cognitive (premorbid IQ, education) reserve were related to outcome (cognitive and general/overall). Fail-safe N statistics were additionally calculated to address the bias caused by the tendency for journals to publish significant findings. The findings are discussed in terms of the pre-morbid variables that increase the risk of a poor outcome after TBI and the extent of their contribution to outcome.
Social perception deficits in mild cognitive impairment  
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Introduction: Social perception, the ability to recognise, perceive and evaluate emotional and contextual information, is essential for successful interaction in everyday social life. Research suggests that this ability is impaired in dementia and there is some evidence to date which indicates that deficits may be present even in individuals with Mild Cognitive Impairment (MCI), many of whom are ‘at risk’ of developing dementia. It is as yet unclear, however, whether social perception differs in MCI individuals presenting with predominantly impaired memory (i.e., amnestic MCI; aMCI) compared with individuals with deficits in cognitive domains other than memory (i.e., non-amnestic MCI; naMCI). Aims: To determine if facial emotional processing abilities differ in patients with aMCI, naMCI and controls. Procedure: Nineteen individuals with aMCI (7 males, 12 females; mean age 69.9 years), 19 individuals with naMCI (8 males, 11 females; mean age 63.5 years) and 17 healthy controls (9 males, 8 females; mean age 64.1 years) were assessed using tests of social perception, to assess emotion recognition and emotion identification. A novel eye-tracking paradigm was also used to investigate participant eye gaze and fixation whilst viewing images of faces on a computer screen.

Results: Individuals with aMCI were significantly less accurate in recognising and identifying angry faces, compared with both naMCI participants and healthy controls. No significant differences were evident in emotion recognition and identification in individuals with naMCI, when compared with healthy controls. Individuals with naMCI did, however, fixate for a significantly greater period of time on the eye region of faces, compared with healthy controls. Conclusion: Early changes in emotion processing are evident in MCI with distinctly different social perception profiles demonstrated in naMCI and in aMCI. This suggests that in addition to cognitive deficits, social perception changes may be additional early illness markers in this subgroup. The basis of emotion processing deficits, and their significance for psychosocial functioning, are discussed.

Identifying acute cognitive impairment following mild traumatic brain injury: Validation of the Abbreviated-Westmead Post-Traumatic Amnesia Scale  
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Accurate identification of patients with mild Traumatic Brain Injury (mTBI) is crucial for optimal management. Prospective assessment of acute cognitive impairment (post-traumatic amnesia) provides a more precise diagnosis of mTBI. The aim of the study was to validate the use of the Abbreviated-Westmead Post-traumatic Amnesia Scale (A-WPTAS) in the assessment of acute cognitive impairment in mTBI. Data previously collected from 82 mTBI and 88 control participants using the Revised-Westmead Post-traumatic Amnesia Scale (R-WPTAS) was converted to A-WPTAS scores and pass/fail classifications were calculated for both scales. The proportion of failures on the R-WPTAS and the A-WPTAS did not differ and a similar number of mTBIs were classified on each. For mTBIs the relationship between the independent memory test and a pass/fail classification was the same for both scales. Bivariate logistic regressions revealed mTBIs, relative to controls, were around 8 times more likely to fail the assessment (R-WPTAS: 95% CI [3.70, 18.87]; A-WPTAS: 95% CI [3.70-20.14]). As verbal learning improved the likelihood of failure was reduced. Greater education was associated with a decreased likelihood of failure. The relationship between education and a fail performance was not sustained when education was adjusted for the effect of age, prior mTBI, blood alcohol level, injury status, verbal learning and morphine administration. The A-WPTAS is a valid measure. The A-WPTAS may reduce the risk of failing to classify patients with mTBI by identifying and documenting acute cognitive impairment.

Investigating the role of the right mesiodorsal thalamic nucleus in retrograde memory
Introduction: The anterior thalamic (AT) and the mesiodorsal (MD) thalamic nuclei receive projections from the hippocampus and the perirhinal region, respectively. Hence, much has been made about their role in anterograde memory. Ten years ago, we published a case of focal retrograde amnesia (Case JG), after a bilateral stroke affecting MD (Miller et al., 2001, 2003). Because the stroke affected JG’s right thalamus more than the left and in the context of the literature, we proposed that the right MD nucleus had a particularly important role to play in remembering autobiographical and other types of unique material (such as famous events and people). Aim: In the present study, we sought to investigate our hypothesis. Procedure: A prospective series of 16 English-speaking patients who presented with focal thalamic infarction and 10 matched control subjects were tested on measures of memory for famous faces, famous events and autobiographical material. Ten of the patients had left-sided lesions, five had right-sided lesions and one had bilateral damage. Structural imaging was used to determine whether (1) the lesion encroached on AT or its afferent fibre bundle (the mammillothalamic tract), (2) the lesion involved the MD or (3) both of these regions were spared. Results: We found that 2/2 patients with right-sided MD lesions (100%) demonstrated retrograde memory impairments and these were for multiple types of material and for much of their lifetimes. In contrast, a smaller percentage (43%) of patients with left-sided AT or MD lesions showed retrograde memory problems and these tended to be more circumscribed (both in terms of material and life period). However, the one case with bilateral MD damage showed the most pervasive retrograde amnesia. As expected, of the control patients who had a thalamic stroke sparing AT and MD, only 16% (i.e., 1/6) demonstrated any problem with retrograde memory. Conclusion: We found some further evidence that the right thalamus is more important than the left for retrograde memory, however, the number of cases remains small. The present results continue to indicate that for those who survive bilateral MD stroke, there are significant consequences in terms of loss of retrograde memories.

**Australian audit tool for neuropsychological capacity assessment reports**

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There has been a steady increase in the number of decision making capacity (DMC) referrals that neuropsychologists receive, and past research has suggested that neuropsychologists find these assessments challenging. New graduates often receive complex DMC referrals in the early stages of their careers. In 2007-8 a group of Victorian neuropsychologists collaborated with staff from the Office of the Public Advocate to develop guidelines for writing reports following such assessments. These were published in 2009 and are available on the Australian Psychological Society website. As a follow up, a small pilot study was organised as a joint project between Caulfield Hospital and La Trobe University to develop an audit tool for evaluating neuropsychological capacity assessment reports, using criteria from the published guidelines. The tool was based on a tool developed by the British Psychological Society for evaluating capacity assessments after the introduction of new legislation in the UK in 2007. The concept of the tool was to assist clinicians with achieving a ‘best practice’ approach and for training, quality improvement, and supervision purposes. The audit tool consists of five sections (preliminary information, assessment, results, summary and opinion) and each section was scored according to pre-determined criteria. Each student ($n = 10$) used the audit tool to assess a total of 13 reports. Results indicated that the audit tool produced a good range of data with no floor or ceiling effects, although further refinement of criteria or approach may be necessary in order to assign quantitative scores to a qualitative judgement or opinion. Nevertheless, the audit tool provides promise for use as a checklist (for self-audit or audit by supervisor) and with further refinement may yield reliable quantitative data for purposes such as quality improvement studies.
Longitudinal assessment of cognition and T2-hyperintensities in NF1: An 18 year study
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While many studies have documented an increased risk of academic and cognitive deficits in school-aged children with NF1, the developmental trajectory of these deficits is unclear. The aim of this study was to determine the natural history of cognitive functioning and MRI T2-hyperintesities (T2H) from childhood to adulthood and whether cognition is affected by the presence of T2H. We present data from a cohort of 17 patients with NF1 and sibling controls that were assessed at three time points across an 18 year period: 1992, 2000, and 2010. Cross-sectional analysis at time point 3 (mean age 29.4 years; SD 2.3) indicated that 95% of NF1 participants displayed impairment in at least one area of cognitive function. Cognitive domains particularly affected included visuospatial abilities, executive functioning and academic achievement. Longitudinal analyses revealed a positive linear trend for measures of FSIQ and visuospatial judgement. All other neurocognitive variables were stable across the 18 year period suggesting that children who display specific cognitive deficits will continue to experience impairment into adulthood. The number of discrete T2H decreased over time, with the majority of remaining lesions confined to the cerebral hemispheres. The presence of T2H in childhood did not predict intellectual functioning after 18 years. Given that cognitive impairments can impact employment status, quality of life and compliance with medical care, our results highlight the importance of continued clinical management as children transition into adult services.

Functional and predictive relationships between neuropsychological performance and decisional capacity
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Neuropsychological constructs assist in the understanding of capacity. Specifically, neuropsychological performance can predict and inform the assessment of capacity. In the absence of formal testing, neuropsychological constructs can assist in the interpretation of behavioural data and its significance for a determination of capacity, particularly in cases relying on analysis of retrospective evidence. Importantly, neuropsychological tests do not map directly on to legal constructs and any determination of capacity must integrate these with an assessment of functional abilities and the relevant legal tests. This paper will address the role of neuropsychological evaluation in translating the meaning of behaviour and performance for capacity assessments.

EEG analysis in clinical practice
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EEG is the end point of the chemical-electrical activity of the brain. Orderly rhythmic electrical activity allows accurate processing and transfer of information, and leads to a well-functioning brain. Disturbances in the EEG lead to subtle and not so subtle behavioural, emotional and cognitive manifestations. There is a strong correlation between disturbances in the EEG and many psychological disturbances. This is especially apparent in Acquired Brain Injury, Autistic Spectrum Disorders, perseverative disorders, such as OCD, eating disorders and addictions, and ADHD, to name a few. This presentation will review EEG and current thought on EEG and brain function including the literature as it pertains to EEG and psychotropic medication, and EEG as an adjunct to diagnostics.
Untangling the complexity, challenges and controversy of ADHD: Bridging the gap between neuropsychological theory and evidence based practice.

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The burgeoning literature addressing the neuropsychology of ADHD is complex, contradictory and confusing. Competing neuropsychological models have significantly influenced how we conceptualise this controversial disorder (e.g. Mirsky, 1995; Posner, 1992; Barkley, 2006; Brown, 2008). Nevertheless, there continues to be a gap between conventional diagnostic classification criteria and contemporary neuropsychological findings, which present a unique challenge for clinicians (Willcutt et al, 2005). This presentation will review the core neuropsychological features of ADHD and discuss the implications for evidence-based diagnosis, assessment, school-based interventions and treatment in both children and adults. The role of neuropsychological assessment in this complex condition will be explored, particularly in light of recent controversy. The most efficacious measures will also be highlighted, including the importance of assessing executive functioning (e.g. Aguiar, Eubig & Schantz, 2010; Holmes et al, 2010). Contemporary clinical and research developments will be reviewed, as well as how to avoid common pitfalls. Finally, key recommendations for clinical practice, in keeping with international guidelines, will be provided.

Older adults with memory complaints benefit less from elaborated encoding during paired associate learning: The role of processing speed

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Subjective memory complaints (SMCs) in older adults are suggested to represent a very early preclinical stage of dementia, with recent neuroimaging studies indicating medial temporal lobe involvement. Cognitive interventions are best targeted at preclinical stages, when there is minimal neurodegeneration and cognitive impairment. Elaborated encoding is a memory technique that has been shown to be effective in enhancing memory performance for healthy older adults (HOAs). Its application in older adults with SMCs has not yet been examined. The aim of the present study was to examine whether older adults with SMCs benefit from elaborated encoding to the same extent as HOAs. Participants were 33 HOAs and 24 people with SMCs, defined using the Memory Assessment Clinic Questionnaire (Crook, Feher, & Larrabee, 1992). Participants completed a verbal paired associate task under elaborated and non-elaborated encoding conditions. HOA and people with SMCs did not differ significantly in performance in the non-elaborated condition, F(1, 55) = 1.81, p =.18, whereas HOA learned more word pairs than people with SMC in the elaborated condition, F(1, 55) = 11.01, p <.01. Both HOA, t(32) = 6.64, p <.001, and participants with SMC, t(23) = 3.80, p <.01, were able to recall more in the elaborated than the non-elaborated condition. Individuals with SMCs, however, did not benefit as much from this elaboration as HOAs. Preliminary investigation indicates that this difficulty is related to slowing in speed of information processing, which suggests a focus for intervention with older people who are concerned about their memory performance.

The relationship between alcohol and cognitive functioning following traumatic brain injury

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Introduction: Although it is widely assumed that pre- and post-injury alcohol use is deleterious to recovery following traumatic brain injury (TBI), the research underpinning this assumption has been very limited. Aim: The aim of the present study was to examine the association between frequency and quantity of alcohol consumption and cognitive functioning following traumatic brain injury (TBI). Procedures: Sixty moderately to severely injured individuals completed measures of pre-injury alcohol use soon after injury and were recruited and assessed 6-9 months post-injury. Fifty participants completed the follow-up assessment at 12 to 15 months post-injury. Frequency and quantity of alcohol consumption was measured at both time intervals, using the Time Line Follow-Back (TLFB) and Alcohol Use Disorders Identification Test (AUDIT), in addition to
measures of processing speed/attention (Symbol Digit Modalities Test), memory (California Verbal Learning Test), and executive function (Modified Six Elements Test). Multiple regression analyses were used to examine the relationships between alcohol use and cognition at each time point. Results: There was no significant relationship between pre-injury alcohol use and cognitive functioning 6 to 9 months post-injury. However, executive functioning, measured by the Modified Six Elements Test at 6 to 9 months post-injury, was found to be significantly poorer in participants who reported greater levels of concurrent alcohol use on the AUDIT. In addition, participants who recorded drinking more frequently in the month prior to follow-up assessment showed significantly less recovery of memory, as assessed on the California Verbal Learning Test (CVLT) over a 6-month period. Conclusions: The current study suggests that post-injury alcohol use impacts negatively on cognition and, in addition, heavier alcohol use may negatively impact cognitive recovery over time. In addition to providing some support for the provision of advice to abstain from alcohol after injury, it also suggests that interventions to reduce post-injury alcohol use may be useful.

Social perception and sarcasm in neurofibromatosis type 1 (not that you care)
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Individuals with neurofibromatosis type 1 (NF1) can experience significant social deficits including awkward peer interactions and delayed social skills. Although these poor social skills often present a major stumbling block to successful social relationships, the factors contributing to these social difficulties in NF1 are unclear. Social perception is the ability to interpret emotional expression, understand conversational inferences and determine the intentions and beliefs of others using cues such as voice tone, facial expression and gesture. This skill lies at the heart of social relations and impairment in this skill has been said to contribute to social dysfunction in a range of neurological and psychiatric disorders including autism, schizophrenia and traumatic brain injury. In this study, we aimed to determine if similar deficits in social perception exist in patients with NF1. Adults with NF1 were compared to a demographically matched healthy adult group on The Awareness of Social Inference Test (TASIT: a measure of social perception), as well as measures of intelligence, and executive function. Although there were no group differences in the ability to identify basic emotions, individuals with NF1 performed less accurately than controls when required to consider social situations from another person’s perspective (theory of mind judgements) (p < 0.05), including those involving sarcasm (p < 0.05). This study is the first of its kind to explore social perception/social cognition in NF1 and suggests that social difficulties in NF1 may be linked, in part, to deficits in inferring the attitudes, beliefs and intentions of others. Social skills programs will need to be developed with an awareness of the presence and nature of such difficulties.

Neuropsychological assessment and dementia in Aboriginal Australians
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It is becoming apparent that Aboriginal Australians are at greater risk for developing dementia. In remote Aboriginal populations, dementia is five times more prevalent than in the general Australian population and has been linked to lack of formal education, head injury, stroke and current smoking. Less is known about the nature and extent of dementia, and of its sub-type, in urban/rural Aboriginal people, who comprise the majority of Australia’s Indigenous population. The Koori Growing Well Study is currently investigating dementia and ageing across five Aboriginal communities in NSW. The methodological challenges of such research include engaging with and adapting to diverse communities, identifying an interspersed target group within the community and, notably, difficulties with the assessment of cognitive function and dementia in this population. Assessment tools developed for Aboriginal Australians are limited, the validity and cultural appropriateness of conventional neuropsychological tests is uncertain and interpretation is complicated by high rates of socioeconomic and educational disadvantage, comorbid physical and mental health problems,
and a lack of sound test norms. These issues are also relevant for clinical practice and need to be addressed in order to improve the assessment of cognitive function, diagnosis and management of dementia, and clinical outcomes for Aboriginal people and their families. The Koori Growing Old Well Study primarily aims: to determine the prevalence of dementia, dementia sub-types and cognitive impairment in urban/rural Aboriginal Australians aged 60 and over; to assess the relative performance of a number of standard as well as adapted instruments for the diagnosis of dementia and cognitive impairment in this population; and to examine risk factors for cognitive decline and dementia.

Cognitive and functional performance in a non-demented community sample and the relationship with depressive symptoms

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Introduction and Aim: Depressive symptoms that do not fulfill diagnostic criteria for major depression are common in the elderly. While cognitive and functional performance is often impaired during episodes of major depression, relatively little is known about the relationship between cognitive and functional performance in subclinical depression. The aim of this study was to examine whether current and past depression are associated with cognitive impairment and difficulties in instrumental activities of daily living (IADL) in a large sample of older community-dwelling individuals. Procedure: 800 non-demented participants aged 70 to 90 years from the Sydney Memory and Ageing Study were assessed with a comprehensive neuropsychological assessment, an interview about past psychiatric history and the 15-item Geriatric Depression Scale (GDS). The Bayer-Activities of Daily Living scale was completed by an informant to assess functional ability. In addition, we assessed symptoms of anxiety, psychological distress and satisfaction with life. Results: Depressive symptoms were present in 6.1 % of the sample and 16.6% reported a history of depression. Participants with clinically relevant symptoms of depression (GDS score > 5) performed worse on memory and executive function compared to participants without depression. In addition they had higher levels of psychological distress and anxiety, and lower satisfaction with life. A history of depression was associated with worse executive function. There was no association between current or past depression and IADL. Discussion: Both current depressive symptoms and past depression are associated with worse executive function, higher levels of psychological distress and anxiety, and lower satisfaction with life. Neither past nor current depression is associated with difficulties in performing IADL.

Cortical inhibition and working memory in schizophrenia: A preliminary TMS/EEG study

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A considerable amount of evidence has implicated impaired working memory (WM) as a key cognitive deficit associated with schizophrenia. Such deficits are associated with poor functional outcomes including difficulty living independently and maintaining work and social relationships. Understanding the pathophysiology of the WM impairments in schizophrenia may lead to the identification of neurobiological mechanism that could be targeted therapeutically to improve WM and therefore functional outcomes. Research has implicated deficient cortical inhibition (CI) in the dorsolateral prefrontal cortex (DLPFC) as a potential mechanism underlying the WM impairments observed in schizophrenia. The aim of this study was to investigate the relationship between CI in the DLPFC and WM performance in schizophrenia. CI was assessed in the left and right DLPFC of 11 patients with schizophrenia and 11 healthy participants using combined paired pulse Transcranial Magnetic Stimulation (ppTMS) and electroencephalography (EEG). The n-back task was used to assess WM capacity. Compared to controls, patients with schizophrenia demonstrated significant deficits in CI following ppTMS to the left DLPFC. Furthermore, this deficit was positively associated with impaired WM performance. Interestingly, CI in the right DLPFC did not differ between groups and was not associated with cognitive performance. The results suggest that inhibitory neurotransmission in the DLPFC may represent an important
neurophysiological process underlying the WM deficits observed in schizophrenia. As such, CI may represent a potential therapeutic target to improve the cognitive deficits associated with schizophrenia. Improving such impairments may lead to improved functional outcomes for individuals with this disorder.

A comparison of the cognitive functioning of cleft lip, cleft lip and palate and cleft palate: A meta-analysis
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A cleft lip and/or palate is one of the most common birth defects, affecting 1 in 750 children. Clefts may be related to compromised brain development, leading to cognitive impairments. Recent research suggests that cleft lip, cleft palate, and cleft lip and palate are etiologically distinct and, consequently, may differentially affect cognitive functioning. The current meta-analysis examined research that has compared the cognitive performance of children, and young adults with one or more of these three cleft types to healthy controls in order to determine whether they have different cognitive profiles. Comprehensive searches of the PubMed and PsycINFO databases (January 1960 to January 2011) yielded 19 relevant studies. Cognitive tests were grouped into a number of domains: processing speed, attention/executive function, language, memory (immediate and delayed), motor, visuospatial, academic and general cognitive ability. Cohen’s $d$ effect sizes were used to measure the extent to which the cognitive performance of the cleft groups differed from that of their peers. Confidence intervals were calculated to determine statistical significance. All effect sizes were negative, indicating that the cleft groups consistently performed more poorly that their peers. Children and young adults with a *cleft lip* showed moderate and statistically significant deficits in language and general cognitive ability. Those with a *cleft palate* showed significant moderate impairments in memory (immediate), and motor functions; all of which were significant. Finally, children and young adults with a *cleft lip and palate* showed significant minor deficits in general cognition, attention/executive functioning and language, and significant moderate impairments in memory (immediate). Thus cleft lip, cleft palate, and cleft lip and palate are all associated with cognitive impairments, although the profile of deficits appears to differ. Language and general cognitive ability appears to be affected by all three clefts. Children and adults with a cleft palate fare worst, having a broader range and more serious cognitive problems.

When upright, inverted and backwards look right: Disorientation, mirror reversals and pain
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Background and Aim: A man with persistent complex regional pain syndrome (CRPS) and an unusual cluster of cognitive deficits, including *object orientation agnosia*, is described. Following a myocardial infarct and coronary artery stenting procedure, pain was perceived in the right arm when the catheter was removed. The right arm was swollen and blue for 1 month whilst the perception of pain has persisted for several years. Method: Neuropsychological testing consisted of a baseline cognitive assessment and in-depth investigation focussed on reading, writing, drawing, orientation and object recognition abilities. Results: Object orientation knowledge was impaired despite good recognition and naming of objects in one of four orientations. Also observed were orientation errors when copying drawings of objects and features of mirror writing and reading for single words and letters. Analysis of the neuroimaging (clinical MRI) did not reveal any abnormalities. Conclusion: This is the first case report of features of disorientation and mirror reversal in a case of persistent CRPS. The neuroanatomical correlates of these cognitive deficits are discussed specifically in light of the possibility of cortical changes or reorganisation, which have recently been highlighted in the context of chronic pain and specifically CRPS.
The impact of mood, cognition and functional status on clients’ memory clinic experience and their capacity to benefit from information handouts

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We recently undertook a formal evaluation of 84 clients’ and carers’ experience of the Memory clinic service in the south-east of Melbourne. This study was undertaken as part of an evaluation of a new information resource that was developed for clients with MCI or early dementia and close family relatives. At their feedback session, clients and relatives rated the quality of life of the person with dementia using the DEMQOL (Smith et al., 2006), which includes items on mood, cognitive symptoms and functional status. Two to three weeks post feedback participants repeated the DEMQOL, were interviewed via telephone about their memory clinic experience, and were asked to rate and give feedback on the quality and usefulness of their experience. Overall both clients and relatives rated the memory clinic experience highly (a mean of 4.4 out of 5) and showed an improvement in quality of life as measured by the DEMQOL ($t(37) = -4.12, p < 0.001$). Clients and family members who had been given the new resource and had read it were more likely than other participants to say that they had learnt new information about thinking and memory ($t(17) = 2.20, p < .05$), and family members were also more likely to say that the service had impacted on everyday wellbeing ($t(16) = 2.32, p < .05$). Interestingly, clients’ mood did not appear to impact on the likelihood that they or their family member would read handouts provided. However, family members were less likely to read handouts when their relative scored relatively well on the MMSE ($t(17) = -2.28, p < 0.05$). This paper will present an overview of both the quantitative and qualitative results of the evaluation and discuss the implications for clinical practice.

Cognitive reserve and its implications for cognitive interventions in normal ageing

STERN, Y. (Columbia University College of Physicians and Surgeons)

The concept of reserve emerged from observations of a disjunction between the degree of brain damage or pathology and the clinical manifestation of that damage. For example, two individuals with the same amount of Alzheimer’s disease pathology can have widely divergent severity of clinical dementia. In addition, many studies indicate that a set of life experiences such as educational and occupational exposure and leisure activities are associated with reduced risk of developing dementia and with a slower rate of memory decline in normal aging. Two types of reserve are possible. Brain reserve applies to anatomic differences in the brain, such as more synapses, that may allow some individuals to cope better with AD pathology. Cognitive reserve postulates that individual differences in the cognitive processes or neural networks underlying task performance allow some people to cope better than others with brain damage. This talk will provide a theoretical account of reserve and review epidemiologic research that has lent support to the concept of cognitive reserve. Because epidemiologic evidence suggests that cognitive reserve can be enhanced through life experiences at any age, this concept supports the idea that nonpharmaceutical interventions might slow or prevent the cognitive effects of aging. Progress towards developing such interventions will be assessed.

Cognitive reserve: From theory to intervention

STERN, Y. (Columbia University)

The concept of reserve emerged from observations of a disjunction between the degree of brain damage or pathology and the clinical manifestation of that damage. For example, two individuals with the same amount of Alzheimer’s disease pathology can have widely divergent severity of clinical dementia. In addition, many studies indicate that a set of life experiences such as educational and occupational exposure and leisure activities are associated with reduced risk of developing dementia and with a slower rate of memory decline in normal aging. Two types of reserve are possible. Brain reserve applies to anatomic differences in the brain, such as more synapses, that may allow some individuals to cope better with AD pathology. Cognitive reserve
postulates that individual differences in the cognitive processes or neural networks underlying task performance allow some people to cope better than others with brain damage. This talk will provide a theoretical account of reserve. It will review epidemiologic research that has lent support to the concept of cognitive reserve. The logic behind the design of imaging studies intended to elucidate the neural underpinnings of cognitive reserve will be presented, and the implications of cognitive reserve for clinical practice will be explored. Finally, because epidemiologic evidence suggests that cognitive reserve can be enhanced through life experiences at any age, this concept supports the idea that nonpharmaceutical interventions might slow or prevent the cognitive effects of aging and dementia. Progress towards developing such interventions will be assessed.

Evidence of bias in expert opinion......What lies beneath

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In both criminal and civil court proceedings, the recourse to expert opinion in general and neuropsychological opinion in particular has increased dramatically over the past three decades. At the same time however, there is increasing concern as to the objectivity and impartiality of this evidence. As a result, expert witnesses in NSW are required to state in their reports that they have read and undertake to comply with a Code of Conduct. This Code stresses the obligation of the expert witness to provide objective, scientifically verifiable and impartial evidence to the Court. However, the expert witness is retained by lawyers driven by a different code: that of advocacy for their client, be it the defendant or plaintiff. As a result, there can be pressure on the expert witness to present an opinion advantageous to their referrer. In neuropsychology, as in other branches of medicine, the evidence or data is frequently less than definitive and bias can colour the interpretation of data. This paper will identify some of the causes and manifestations of bias, using case examples, and how to avoid bias in both compiling a written report and giving evidence.

De-differentiation of executive function in older adults: Implications for older driver research

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Executive function is a higher order cognitive ability that is relevant to operating a motor vehicle. Recent research suggests that executive function may have a structure that is delineable into relatively unique components onto which individual tests of executive function may load in approaches using factor analysis. Indeed, evidence for the existence of three underlying components consistent with the abilities to (1) inhibit prepotent responses, (2) shift between different task sets, and (3) update information, has emerged from factor analytic studies in healthy young and older adult samples. This component structure of executive function has been useful in the examination of de-differentiation, an increase in the correlation between, and subsequent reduction in the number of, unique executive function components. De-differentiation has been demonstrated in non-pathological aging and is thought to be consistent with normal cognitive aging processes for many older adults. Using a cross sectional design, 94 young (< 55) and 38 older adults (aged > 55) were administered a battery of 6 executive function tests. Results were analysed using principal components analysis. In the older adult sample, a single factor model of executive function emerged; whereas in the younger adult sample, a two factor model was identified. These results are consistent with previous research suggesting that healthy older adults experience de-differentiation of executive function. Implications for these findings in relation to driving ability and self-reported driving ability are discussed before a hypothesis for future research is presented. It may be the case that the age related de-differentiation that appears to occur in executive function for some older adults is consistent with reduction in the accuracy of self-judgments about individual abilities or the likelihood of a particular outcome that is consistent with the optimism bias. A goal of research investigating this relationship would be to identify potential mechanisms that explain the hypothesised connection between de-differentiated executive function and optimism bias related to the expectation of driving outcomes.
Older adult drivers and the self-enhancement bias: Implications for driving self-regulation strategies
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Older drivers may regulate their driving behaviour in response to perceived age-related decreases in driving ability. This driving self-regulation strategy is endorsed by authorities; however, it relies on older adults being able to accurately self-assess their ability so that they know when to regulate their driving. Ninety-eight healthy older adults (aged 65 years and above) all of whom had current drivers licenses and substantial driving experience completed an objective test of driving ability (hazard perception) and several subjective measures of driving ability. All participants scored 27 or above on the standardised MMSE. Using regression analyses, no significant relationships emerged between objective and subjective ratings of driving ability. Self-enhancement biases were identified on all subjective driving measures relative to objective driving performance. This finding is consistent with previous literature that has demonstrated that such biases are present in younger driver samples. For older adults, however, this relationship is particularly significant in the context of driving self-regulation.

Postconcussion syndrome and the expectation-as-aetiology hypothesis: Is it time for a new vignette?
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The expectation-as-aetiology hypothesis has been examined by a number of research groups as a possible explanation for the development of Post Concussion Syndrome (PCS). However, the main vignette used to test this hypothesis, developed over 20 years ago by Mittenberg et al. (1992), may no longer reflect our understanding of what constitutes a mild head injury as outlined by the World Health Organization's (2004) consensus definition of a mild Traumatic Brain Injury (mTBI). The aim of this study was to assess the relevance of five previously used vignettes (including Mittenberg et al.'s original vignette), and three newly developed vignettes. The new vignettes varied in terms of key injury severity descriptors so that two of the vignettes were not expected to meet the WHO definitional requirements (because they were “too mild” or “too severe”), and the other vignette was predicted to accurately meet the definitional requirements. Participants were PCS experts drawn from a reference group of 27 leading Australian and international researchers who have published in the mTBI or PCS literature. Participants were exposed in random order to the eight vignettes and then indicated the extent to which the vignettes reflected the WHO mTBI definition. The results revealed that the previously used vignettes (with the exception of that developed by Mackenzie and McMillan (2005)) did “not at all well” or only “somewhat well” fit the mTBI criteria. As expected, two of the newly developed vignettes were rated as a relatively poor fit against the criteria (the “too mild” vignette and “too severe” vignette), while the new “mTBI” vignette was rated as fitting the criteria “moderately” or “very well”. Expert comment was also collected during the review process to obtain suggested improvements for the newly developed vignettes. These vignettes may prove useful to those interested in further study of the PCS expectation-as-aetiology hypothesis.

Rehabilitation interventions for the psychological consequences of traumatic brain injury: What do we know and how good is the evidence?
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One problem confronted by both clinicians and researchers is keeping up-to-date with the literature. This applies to many areas of clinical practice, including rehabilitation. This workshop provides the latest findings regarding rehabilitation interventions to treat cognitive, mood and behavioural dysfunction after traumatic brain injury. A synthesis of the results of more than 50 systematic reviews published since 2000 which report on the efficacy of a range of psychological and pharmacological therapies is presented. Information is integrated into practical and easily used evidence tables, and illustrated with clinical case examples of
specific interventions. Reviews and the primary studies are critically appraised and the strength of the evidence evaluated.

Diagnostic classification systems are poor predictors of cognitive recovery following Traumatic Brain Injury (TBI): An argument for early neuropsychological assessment
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Introduction and Aim: Diagnostic classifications of severe, moderate or mild TBI are based on depth of coma and the duration of the patient's unconsciousness and post-traumatic amnesia. These measures are often used to formulate prognoses for the recovery of cognitive functioning. This study aimed to quantify the prognostic accuracy for classification systems following TBI, and to investigate the sensitivity and specificity of these systems to identify future cognitive impairment. Additionally, the study aimed to investigate the potential for early neuropsychological assessment to improve prognostic accuracy, and strengthen sensitivity and specificity in identifying future cognitive impairment. Procedure: 414 participants (Male 65.2%, M Age = 35.9, SD = 16.15) who had experienced a TBI participated in this longitudinal study. Diagnostic and demographic factors were collected following their admission to the Royal Hobart Hospital, and all participants underwent a neuropsychological assessment within 14 days following their injury. Cognitive assessments of verbal fluency, working memory, and processing speed were then undertaken at three and six months following injury. Scores on all measures were then converted to the Standard Score rubric of M = 100, SD = 15. Results: Regression analyses consistently illustrated that diagnostic classification systems are very poor predictors of cognitive outcome, with prognostic accuracy of only 30.8%, and a clinically unacceptable 95% confidence interval of +/-23.3. However, prognostic accuracy was significantly improved by incorporating early neuropsychological assessment data. The inclusion of this data improved prognostic accuracy to 56.9%, with a clinically acceptable 95% confidence interval of +/- 13.1. Individual performance deficit, defined as predicted performance versus actual performance, was found to account for the most variance in outcome. Subsequently, by adopting a deficit cutoff of 15, future cognitive impairment was identified with 100.0% sensitivity and 98.75% specificity. Discussion/Conclusion: Diagnostic classification systems are insufficient to provide accurate prognoses of cognitive recovery following TBI. However, prognostic accuracy can be significantly improved if the patient receives brief neuropsychological assessment shortly following their injury. The adoption of routine cognitive evaluation for all TBI patients would lead to more accurate prognoses of recovery, and assist in identifying those patients who will require ongoing review and rehabilitation.

The relationship between driving self-regulation and cognitive ability: Findings from the older population and implications for older driver safety
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Recent older driver literature has identified self-monitoring to be a key determinant of older people’s driving behaviour. While cognitive, sensory and other physical functions predict older drivers’ capacity to drive, accurate self-monitoring of these functions is crucial for the safe driving of older drivers. Previous studies have reported that a significant number of older drivers commonly compensate for the strain they experience while driving by adopting coping strategies such as avoiding high-demand driving conditions. However self-regulation is dependent upon older adults’ levels of insight and the cognitive ability to make accurate judgments in regards to their own driving ability. The aim of this study was to investigate the relationship between older drivers’ levels of cognitive ability and their use of driving self-regulation. One hundred and fifty current drivers (aged 65 years and over) completed a self-reported questionnaire about their driving. They also completed an untimed clock-drawing task. While all participants indicated a high degree of confidence about their driving ability, a significant percentage performed poorly on the clock drawing test. Compared to participants who successfully completed the clock drawing task, those who failed this test were more confident of their driving, less likely to report driving self-regulation, and showed less interest in being involved in targeted driving inventions for older drivers. This study may inform the design of interventions that promote
older driver self-regulation. Since such interventions are generally targeted at cognitively impaired drivers who, as this study shows, are the ones who are most likely to be resistant to such strategies, new approaches may be needed.

**Interactive care-giving behaviours following paediatric acquired brain injury**

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**Purpose:** This study describes the disciplinary practices of parents following acquired brain injury (ABI) of their child, and examines the relationship between disciplinary use, family-parental adversities, and children's behavioural sequelae. Method: Participants were 48 parent respondents of children between 3 and 12 years with mild, moderate, and severe ABI. Parents provided demographic information and completed questionnaires investigating disciplinary strategy use, parental-family functioning, and child behaviour. Results: Overreactive and lax disciplinary strategies were endorsed most by parents. Dysfunctional levels of disciplinary use were associated with children who displayed more behaviour problems, parents with elevated distress and families experiencing more dysfunction and social adversity. Conclusions: Dysfunctional parenting practices, if not ameliorated, could exacerbate problematic child behaviour following ABI, as well as parent and family difficulties. Parental assessment may be useful as a method of screening for parental factors that put children at risk for ongoing behaviour problems and families for ongoing stress.

**Diagnosis and Treatment of the Dementias**

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As we are better characterising the phenotypes of the various dementias, diagnosis is moving more to "rule in" rather than "rule out". No longer is Alzheimer's disease diagnosed only by excluding other causes of neurodegeneration- it can be ruled in by the typical clinical features as well as hippocampal atrophy on MRI and the pattern of hypometabolism on FDG-PET or levels of biomarkers in CSF. Similarly, as we better understand the correlation between clinical presentation, pathology and genetics of the FTLD spectrum, we are now able to rule in this diagnosis. Overlap syndromes are also being better characterised- eg. AD/ DLB and AD with vascular cognitive impairment. Atypical presentations of the more common dementias continue to pose difficulty, but are also being better diagnosed – these include frontal variant AD (FvAD) and logopenic aphasia, a language-onset AD. It is disappointing that a quarter of a century after the first publication on effective AD therapy we still only have four marketed drugs for all the dementias, but there is a huge pipeline of new therapies being developed, targeting the various pathological and genetic processes we are increasingly identifying in the dementias. As with any other major clinical area (eg. cancer), it may take decades but it is likely that therapies that target the disease process itself will soon be developed and marketed. Whilst most research activity is directed towards AD, there is increasing research into therapies for FTLD and the other more common dementias. Therapies are likely to be more effective if used earlier, and new diagnostic criteria for prodromal AD facilitate the identification of these early stages, underlying the close relationship between advances in diagnosis and therapies for the dementias.