

## **The Abstracts of the 13<sup>th</sup> Annual Conference of the APS College of Clinical Neuropsychologists**

**22 - 24 September 2007**

**Mantra Mooloolaba Beach Hotel, Sunshine Coast, QLD**

Abstracts Editor: Karen Sullivan  
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The proud CCN tradition of quality scientific meetings continued this year, with the APS, College of Clinical Neuropsychology Annual Conference held on the Sunshine Coast, Queensland at the Mantra Mooloolaba Beach Hotel, Saturday September 22 to Monday 24 2007. This year's conference showcased the diversity and strength of Clinical Neuropsychology in Australia. The program included presentations from neuropsychologists from most Australian States and Territories and addressed a range of issues of clinical significance across the lifespan. Presenters included leading academics, researchers, clinicians, and importantly, student presenters whose participation the CCN strongly encourages, consistent with our objectives of fostering the growth and development of future neuropsychologists. To enable us to offer a scientific program of the highest quality, before accepting submissions, we again undertook a process of blind peer review. To provide opportunities for scholarly and collegial interactions, we continued the practice of offering a vibrant and strong poster program, together with a host of interesting free paper sessions. Special forums included in the 2007 conference were 3 invited presentations including a medicare update for neuropsychologists, delivered by David L Stokes, Clinical Neuropsychologist and APS Manager Professional Issues, a presentation by Professor Simon Crowe on somatic stress disorders, and a presentation by Associate Professor Glynda Kinsella on neuropsychological interventions for dementia. We are pleased to acknowledge the generous support of Harcourt Assessment, in particular their generous donation of student prizes. In addition, Harcourt Assessment were proud sponsors of our keynote speaker, Professor Joseph J Ryan. Professor Joseph J. Ryan is currently Professor and Chair in the Department of Psychology at the University of Central Missouri, Warrensburg, Missouri. Professor Ryan spoke about assessment, and in particular, use of the Wechsler Scales. The organising committee would like to thank our keynote speaker, invited speakers, presenters, and delegates for their support of this year's CCN conference.

Karen Sullivan

### **ORGANISING COMMITTEE**

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Karen Sullivan (Scientific Program Chair)  
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### Exploring a model of neuropsychology within youth psychiatry

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Neuropsychology remains a relatively young discipline within psychiatry and more so in youth psychiatry. Onset of psychiatric illness peaks during adolescence/young adulthood, and is frequently associated with cognitive impairments. These 'impairments' may: 1) reflect pre-existing neurodevelopmental compromise or vulnerability markers; 2) may mediate the course of illness; and/or 3) may be clear sequelae of psychiatric illness, possibly resulting from neurodegeneration. From a research standpoint, application of neuropsychological practices to healthy and clinical adolescent samples can assist in disentangling these impairments, identifying 'endophenotypes', and refining knowledge regarding cognitive contributions to functional outcome. From a clinical perspective, neuropsychological formulations are useful in providing understanding of individual presentations during initial assessment and diagnostic phases, as well as over the course of psychiatric illness. Neuropsychological assessment and intervention during emerging severe mental illness is particularly useful for helping young people gain an understanding of self, with the aim of assisting them in managing their illness and recovering role functioning. The ORYGEN Neuropsychology Unit is embedded within a specialised youth mental health service, ORYGEN Youth Health. We aim to explore the utility of neuropsychology within this youth mental health setting both from a research and clinical standpoint.

### Inhalant abuse in adolescents: an initial study of cognitive functioning

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There has been little systematic study of the effects of chronic inhalant use. This paper reports a prospective study of the cognitive

functioning of inhalant using adolescents and young adults, contrasted with a comparable group not using inhalants in the 6 months prior to test, and non-clinical controls. Participants were 21 inhalant users (IU; mean age 17.2 years), 22 poly drug users (PDU; mean age 18.9 years), and 19 non-clinical controls (NCC; mean age 17.2 years). Areas assessed were: overall cognition (WISC-4), memory and learning (digit span, Corsi Block span, RAVLT), executive functioning (Controlled Animal Fluency Test, CAFT), and an olfactory test (University of Pennsylvania Smell Identification Test, UPSIT). Data analysis on raw scores from WISC-4 showed the 3 groups were statistically different for FSIQ and PRI where IU and PDU groups were both lower than NCC group. There were no significant differences for VCI, WMI and PSI. No memory and learning variables showed differences between groups however the executive functioning measure, Animals by Size, (CAFT) revealed that both IU and PDU groups were impaired compared to the NCC group. UPSIT data showed significant deficits for both IU and PDU groups. The implications of these findings are discussed.

### Cognitive deficits associated with prolonged seizures

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Study aims are to assess cognitive dysfunction in nine individuals with one or more episodes of status epilepticus (SE) and to compare performance against control patients with brief seizures (idiopathic generalised epilepsy IGE, temporal lobe epilepsy TLE), and against adult performance norms. Participants with SE (30-60 minutes seizure duration) were recruited from the Cairns Base Hospital's epilepsy clinic, and included non-convulsive SE (NCSE, N=3) and generalised convulsive SE (GCSE, N=6) patients. Neuropsychological tasks assessed cognitive domains of intelligence, attention, verbal and visual memory, and executive functions. The absence SE (ASE) patient functioned normally in all cognitive domains. The patient with left complex partial status (CPSE) was significantly worse in attention; while the right CPSE patient was weakest in verbal episodic memory. GCSE patients performed worse on Sustained Attention

tasks than control IGE and TLE patients with brief seizures. Verbal memory was preserved. Number of SE seizures correlated negatively with estimated I.Q., visual abilities and working memory. In the absence of localised neuropsychological deficits, the deficits in Sustained Attention and intellectual abilities of patients with GCSE suggest global cognitive dysfunction can result from relatively brief SE seizures. Generalisation of seizures cannot account for this, since the IGE performances were not affected.

### **Improving supervision for clinical neuropsychology supervisors and trainees**

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This presentation is intended to help clinical neuropsychologists benefit from the extensive literature on supervision in professional psychology, including models of supervisor/supervisee development, and different methods of supervision. Models of supervisee and supervisor development will be presented to facilitate self-reflection and better supervision in both beginning and supervising neuropsychologists. In order to choose the most appropriate supervisory role, it helps if the supervisor considers not only the developmental level of the supervisee, but also their own level of development. Practical means to help improve the supervisory relationship for both supervisors and supervisees will be discussed. These will include guidelines for setting up supervision contracts, methods of supervision, feedback and evaluation, and responsibilities of supervisees and supervisors. The presentation will draw on the generic and specialist competencies involved in clinical neuropsychology.

### **10-year stability of olfactory identification deficits following psychosis onset**

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Previous investigation reveals stable olfactory identification deficits (OID) at 6 months following first onset of psychosis (Brewer et al, 2001), and more recently, in an ultra-high-risk group that later developed schizophrenia (Brewer et al, 2003). As a potential premorbid marker of transition to schizophrenia, the utility of OID in mapping development and compromise of limbic-prefrontal pathways, particularly in orbitofrontal regions (OFC), is important for tracking the relative integrity of circuitry implicated in the course of psychosis following onset. In this study we investigated longitudinal change in olfactory identification in first episode psychosis patients using the University of Pennsylvania Smell Identification Test (UPSIT). Preliminary data from 14 patients and 9 controls (mean follow-up = 73.4 months; range = 61.4 – 85.2 months) showed no change in performance over time. These data support our previous longitudinal study, suggesting that there is no change in olfactory identification with continued psychotic illness. Interaction between OFC and other neural networks implicated in the degenerative aspects of schizophrenia requires further exploration. The findings are discussed in the context of utilising olfactory models to track emerging onset of psychopathology.

### **Predicting outcomes of frail older inpatients referred to neuropsychology**

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A consecutive group of 60 older inpatients referred to general hospital neuropsychology was identified. The typical frail older patient with

suspected cognitive impairment, facing a problematic discharge, was found to be female, aged in the mid-70's, living alone, and with five comorbidities additional to the presenting diagnosis. Sensory and/ or motor disability was documented for about half the patients, as was cognitive impairment. Using regression, an attempt was made to predict these patients' health outcomes within 12 months from information available in their hospital charts, because neuropsychology referral often indicates concern about post-discharge outcome. Age and pre-admission ADL independence predicted placement and mortality, and hospital usage and placement also predicted mortality. However, not all variables had been systematically recorded for all patients, and for funding reasons, not all referred patients had received a neuropsychological assessment. The literature confirmed that despite being important determinants of older patients' outcomes, some variables with significant predictive power are not routinely measured by hospitals (Campbell, Seymour & Primrose, 2004). Formal and systematic recording, on admission, of older medical patients' cognition, mood, and pre-admission ADL and IADL functioning is recommended. Assessment instruments are reviewed, implications for practice discussed, and further research proposed.

#### **A critique of the reporting of psychological data in the literature on rare chromosome disorders**

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Genetic disorders research has the potential to make an important contribution to knowledge about gene, brain and behaviour relationships. The developmental profiles of individuals who have deletions, additions or rearrangements of varying amounts of chromosome material may be of particular value. Yet much of the published research on rare chromosome disorders comes from the areas of medicine and genetics, with little input from psychology. This paper reviews and critiques the reporting of psychological data, such as assessments of cognitive skills and behaviour, within the published literature on rare chromosome disorders. It is argued that

conclusions about developmental consequences such as intellectual disability are often vague, inappropriate or unsubstantiated by psychometric data. Considering the implications for research and practice, the author argues for more rigorous approaches to psychological assessment, reporting and interpretation of results, and stresses the valuable role of psychologists on interdisciplinary research teams.

#### **Preliminary evaluation of a new verbal memory measure for healthy older adults**

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Research has established that in studies of cognitive function where repeat testing is required, practice effects may hamper interpretation when identical tests are administered on each occasion. The aim of the current study was to conduct preliminary analyses on two alternate forms of a new paired associates measure, The Hohaus Alternate Forms Paired Associates Test (HAFPAT). The HAFPAT was designed to be brief, administered in a group format, and suitable for use with healthy elderly in a research setting such as in a memory clinic. The HAFPAT was piloted firstly with two tryout samples of undergraduate students. After revision of items, two alternate forms (List 1 and List 2) were administered to a sample of 24 healthy community-dwelling elderly. Preliminary evidence indicates good reliability for both List 1 and List 2. List 1 showed good convergent validity with the RMBT-E(Story) however List 2 did not correlate well. Theory-consistent validity was confirmed for both lists through expected differences in performance between young and old participants. In all, the preliminary investigations suggest the HAFPAT is a reliable and reasonably valid measure of verbal memory, and that both forms show an equivalent level of difficulty when used with healthy elderly.

### **Can PET imaging predict decline in cognitively normal individuals?**

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In 1996, a number of relatively elderly participants underwent neurological screening and extensive neuropsychological assessment for a study of Positron Emission Tomography (PET) in normal ageing. Despite normal neurological and neuropsychological findings, a large proportion of the volunteers' PET scans were judged to be abnormal by a Nuclear Medicine physician. The present work examined the efficacy of PET in predicting cognitive outcome in individuals who were cognitively normal at the time the PET image was taken. In a 10 year longitudinal study, 12 individuals (mean age 78) underwent follow-up neuropsychological examination. No individual met criteria for the diagnosis of a neurodegenerative dementing process. Among the 5 participants who had been judged to have abnormal PET scans, none demonstrated significant cognitive decline relative to baseline. Based on the present study sample, the sensitivity and specificity rates for both the normal and abnormal PET status are zero in relation to clinical outcome. This study failed to find an effect of reported abnormalities on PET scanning on predicting subsequent cognitive decline in individuals who were asymptomatic at the time their PET scan was taken. These findings suggest that PET imaging demonstrates little clinical utility as a predictive instrument in cognitively normal older people.

### **Is testosterone associated with cognitive performance in healthy older men?**

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Testosterone, the gonadal sex steroid hormone, has various effects on numerous body tissues, including the brain. Older age is associated with functional declines throughout the body, including some aspects of cognitive performance. These functional declines are mirrored by decade-by-decade decline in testosterone levels in ageing

men. Testosterone influences brain function via androgen receptors, which are found in brain regions that are crucial for learning and memory. This provides a biologically plausible mechanism for testosterone to influence cognition. The impact of testosterone decline on brain function is unclear, with previous studies producing inconsistent findings. Using a population-based cross-sectional design, this research will examine the hypothesis that measures of testosterone will have a positive relationship with overall cognitive task performance in healthy older men (age range 70 to 97), while addressing a number of the methodological flaws of previous investigations. A comprehensive battery of standardised, commonly used neuropsychological tests will be employed, with particular emphasis on the visuospatial and memory domains. Positive findings may support future research into the viability of testosterone supplementation to protect against cognitive decline in older men. The methodology and preliminary findings of the current study will be presented.

### **Role of the Wada test in predicting cognitive outcome after temporal lobectomy**

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The Wada test and standardised neuropsychological measures are used to identify patients at risk of postoperative cognitive decline following temporal lobectomy. Given that the Wada test is an invasive procedure it is important to determine whether any information it provides is clinically unique. Data was considered from 54 patients who had undergone temporal lobectomy (TL) from either the language-dominant (n = 24) or non language-dominant (n = 30) hemisphere, and who had pre and postoperative neuropsychological assessment and magnetic resonance imaging (MRI). A subset of the sample also had a bilateral Wada test (n = 28). The results showed that baseline score was a significant predictor of postoperative naming and word pair recall for both TL groups, and recall of prose passages for the nondominant TL group. Side of resection predicted both verbal and visual memory outcome. Although Wada scores also predicted postoperative naming and verbal memory outcome, there were no



significant differences in the number of patients classified correctly when the Wada scores were removed from the regression equation. In conclusion, in this sample of patients it appears that the Wada test does not add unique predictive information to the pre-surgical investigations with respect to prediction of cognitive outcome.

#### **Eye-tunes: Memory for spatial and melodic form**

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Verbal learning tests, and paired associate paradigms in particular, reliably measure left medial temporal lobe (MTL) functioning. Attempts to measure right MTL functioning have been less successful, primarily because putative nonverbal stimuli often provide opportunity for verbal labelling during encoding. We developed a nonverbal memory task involving both visual (dot array) and auditory (novel melodic sequence) stimuli designed to tax right hemisphere processing while being very difficult to verbalise, thus minimising left hemisphere processing. The task involves list learning with recognition memory testing for dots and melodies individually, followed by paired associate learning of the materials. We present data from a series of experiments in normals which show no significant dependence on level of formal musical training when the lists are learned, but a training effect when dots and melodies are subsequently paired. We also present findings of a validation study of the list-learning phase of the task in patients with focal left or right temporal lobe lesions. When compared with performance on the verbal paired associates subtest of the WMS-R a double dissociation was observed between material type (verbal/nonverbal) and side of lesion, providing preliminary support for proceeding with the development of a clinically applicable version of the test.

#### **Combining cognitive-behavioural, interpersonal, and pharmacotherapy in treating an adolescent with comorbid tuberous sclerosis and epilepsy following Neurosurgery**

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Tuberous Sclerosis (TSC) is a rare autosomal dominant genetic disease that causes benign tubers to grow in the brain (and/or other body parts). As they grow and calcify, they may press on surrounding tissue, triggering epileptic seizures. Traditionally, TSC was treated with antiepileptic drugs alongside behavioural treatments targeting specific symptoms. Presently, there exists no distinct model for the treatment of this disorder. The current case study attempted to integrate cognitive-behavioural, interpersonal and pharmacotherapy in the treatment of a 15.5 year old boy diagnosed with TSC, Epilepsy and Autism Spectrum Disorder. The client underwent tubectomy at age 15, where a large calcified epileptogenic tuber was removed from the right pre-central gyrus. No epileptic seizures were reported since then. Following neurosurgery the client exhibited severe behavioural problems, including unprecedented levels of aggression. Pre-treatment neuropsychological assessment identified a wide range of executive deficits and behavioural disinhibition. CBT treatment included self-monitoring, anger management, social skills training, relaxation techniques, problem solving and behavioural reinforcement. Interpersonal therapy aimed at assisting the client to adjust to life without seizures, while growing to become an adolescent needing to develop a coherent self-identity and personal autonomy. Post-treatment assessment showed a significant improvement in executive functioning and a significant reduction in problem behaviour, most importantly, aggressive outbursts and acts.

## **Self-awareness and theory of mind in acquired brain injury**

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**S**elf-awareness deficits are common sequelae of acquired brain injury (ABI) (i.e., stroke and traumatic brain injury). Currently there is converging evidence to suggest that the frontal lobes play an important part in mediating higher-level thinking skills, including self-awareness. It has also been suggested that the frontal lobes may play a critical role when making inferences about other people's mental states, known traditionally as Theory of Mind (ToM). While the relationship between self-awareness and ToM has been studied in the psychiatric literature, only one study (Bach & David, 2006) to date, has examined this relationship within a neurological population. The present study investigated the relationship between ToM and self-awareness deficits in an ABI population. Twenty-three participants (15 with stroke and 8 with traumatic brain injury) were administered verbal and nonverbal ToM tasks. Self-awareness was measured using discrepancy scores between patient and relative ratings on the Patient Competency Rating Scale (Prigatano et al, 1986). Preliminary results suggest that participants with self-awareness deficits after ABI perform more poorly on both verbal and non-verbal ToM measures; however, these greater difficulties most likely reflect more general difficulties.

## **Preinjury psychiatric disorder in the aetiology of acute postconcussion syndrome**

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**R**esearch suggests that individuals with psychiatric illness may be at an increased risk for traumatic brain injury (TBI) (Fann et al., 2002). Those who sustain mild TBI are at risk of persistent psychiatric disorder (Fann et al., 2004). Preinjury psychiatric illness has also been proposed as a predictor of persistent

postconcussion syndrome (PCS) following mild TBI (Carroll et al., 2004). Few studies, however, have investigated the relationship between preinjury psychiatric illness and the aetiology of PCS. The aim of the current study was to examine predictors of acute PCS (within the first 14 days after injury) in a prospective sample of consecutive trauma admissions to a Level 1, trauma hospital. The final sample comprised 90 mTBI and 85 non-brain injured trauma controls. Preinjury psychiatric disorder, demographic factors, injury-related characteristics, neuropsychological and psychological variables were examined as predictors of acute PCS. Multiple imputation of missing data in multivariable logistic regression was used to predict acute PCS, a mean 4.90 days postinjury. The strongest effect for acute PCS was at least one previous affective or anxiety disorder. Female gender was the next largest effect. Higher IQ, response speed, acute posttraumatic stress and pain were also significant predictors of acute PCS.

## **Cognitive function in haematology patients receiving chemotherapy**

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**C**hemotherapy effects on adult cognitive function are not well understood. Past research, most of which has been conducted on breast cancer patients, suggests a link between chemotherapy and impairments of memory, information processing and executive function. To investigate if these findings extend to haematological malignancy patients undergoing chemotherapy, we assessed cognitive function during treatment. All participants (12 females,  $n=27$ ) were English speaking, had at least an eighth grade education level, and were aged between 30 and 76 years. Cognitive function was assessed using the Dementia Rating Scale – 2 (DRS-2) before (T1) and after the first (T2) and third (T3) chemotherapy treatment cycles. The median DRS-2 total raw score at each time period

for the 22 participants who completed all assessments was: T1 139; T2 140; T3 141; a finding which suggests a statistically significant but small change over time T1 to T3 ( $p \leq 0.05$ ). There was no evidence to suggest cognitive function differed for men or women at any of the three time points. The percentage of participants showing mild/moderate impairment overall was T1=36%, T2=18%, T3=14%. Mild/moderate impairment was most common for memory (T1=32%, T2=36%, T3=18%), perseveration (T1=32%, T2=27%, T3=18%) and conceptualisation (T1=41%, T2=18%, T3=14%). Findings indicate cognitive impairment may be present prior to administration of chemotherapy.

#### **The effect of age and mTBI on cognitive performance and learning strategies in adults**

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The effects of ageing and mild traumatic brain injury (mTBI) on cognitive performance and learning strategies were investigated. Participants who had sustained mTBI within the previous 24 hours (21 aged 16 to 29 years, 19 aged 35 to 65 years,) and matched controls (21 aged 35 to 65 years, 21 aged 16 to 29 years) were assessed on the Hopkins Verbal Learning Test-Revised (HVLTR), Digit Symbol Substitution Test (DSST), and the Speed of Comprehension Test. Overall, participants with mTBI demonstrated worse performance than controls, while the age groups did not differ significantly. Univariate tests showed that the mTBI group achieved significantly lower scores on the speed tests and delayed recall than the control group. Age had a negative effect on the DSST. Learning strategies (words added or omitted in trial two and three of the HVLTR and semantic clustering) were similar for both age and injury groups. The results indicate that mTBI has a negative effect on delayed verbal memory and speed of processing tests and that the negative effect of age was restricted to speed of transcribing symbols. The combined effects of ageing and mTBI were additive rather than interactive. Implications of this finding for the theory of Brain Reserve Capacity will be discussed.

#### **Psychological versus physiological correlates of sleep apnoea treatment adherence**

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Continuous Positive Airway Pressure (CPAP) is an effective therapy for Obstructive Sleep Apnoea (OSA), but adherence is poor. This study tested a motivational model of adherence at 3 months post-treatment initiation. 77 consecutive patients (61% male) newly diagnosed with OSA completed questionnaires assessing; outcome expectancy with treatment, self-efficacy, functional outcomes of sleepiness, and perceived risk of negative health outcomes. Physiological data from a standard clinical diagnostic sleep study were obtained. Average objective adherence to CPAP was 4.57 hours per night. Physiological indices correlated with adherence in the opposite direction to that expected. Fewer oxygen dips and fewer arousals before treatment were associated with greater adherence at 3 months. In a hierarchical regression, these physiological variables did not explain significant portions of the variance in CPAP adherence (10.4%,  $p > .05$ ), whilst treatment outcome expectancies and functional outcomes of sleep explained a unique proportion of the variance (15.3%,  $p < .05$ ), and in combination with physiological variables explained 32% of the total variance in CPAP adherence ( $p < .01$ ). The implications of the physiological findings in terms of hypoxic events, cognition and subsequent adherence will be discussed. An intervention for targeting functional outcomes of sleepiness and outcome expectancies to increase patients' adherence to treatment will be outlined.

#### **Effects of modulating distractor onset on distractor interference in the elderly**

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The phenomenon of distractor interference shows that information not relevant to a goal is processed and impacts on goal-directed actions. Typically, in visual distractor interference paradigms, distractors and targets have been



presented simultaneously. Recent work in young, healthy participants indicates that distractors presented 200ms prior to targets also have a significant, although attenuated, impact on responses. Beyond this interval, interference is not evident. Incongruent distractors presented 200 ms prior to targets are associated with greater interference than are neutral and congruent distractors. These findings imply that internal representations of irrelevant information are capable of affecting subsequent responses to goals. In the current study, elderly participants were compared with young participants to investigate age effects on temporal separation intervals greater than 200 ms. Overall reaction times were faster for younger participants, although there was no age effect on accuracy. The temporal separation interval was shown to have a differential effect on interference depending upon participant age. There was no effect of age of participant on distractor congruency effects. These findings are interpreted with reference to the impact of reduced speed of processing on the availability of attentional resources in the elderly.

#### Cognitive, MRI and neuroendocrine effects of rotating shift work in nurses

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Sleep disruption is a physiological stressor which causes a variety of adverse symptoms. Regardless of its source, stress provokes endocrine responses affecting the hypothalamic-pituitary-adrenal (HPA) axis. Whereas acute activation of the HPA-axis adaptively activates the body's stress response by increasing cortisol production, chronic activation is detrimental due to dysregulation of the HPA axis. The hippocampus has a high concentration of glucocorticoid receptors and plays a prominent role in HPA-axis down-regulation. Glucocorticoid receptor overstimulation can cause hippocampal atrophy and related cognitive deficits. Research has found that air crew with inadequate recovery time between long-haul flights showed reduced visual memory, reduced hippocampal volumes and increased cortisol. The current study investigated whether work-related sleep disruption caused

similar effects among rotating shift-workers from outside the flight industry. Twelve long-term female rotating shift-workers (nurses) and 17 day working controls (nurses and others) participated in the study. There were few differences between groups in cognitive performance, volumetric MRI or MRS. Shift workers reported less sleep, higher fatigue and lower vigor compared to controls. Cortisol rhythm phase shift and acrophase attenuation was apparent in shift workers. Results are interpreted in terms of age differences between groups and the existence of a "healthy worker" effect in shift workers.

#### $\beta$ -amyloid load and memory function correlate in MCI but not Alzheimer's disease

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Beta-amyloid ( $A\beta$ ) deposition is a ubiquitous feature of Alzheimer's disease (AD), which presents clinically with progressive impairment in memory and cognition.  $A\beta$  deposition can also occur in apparently healthy ageing (HA) and in mild cognitive impairment (MCI). The relationships between  $A\beta$  burden, episodic memory, and other cognitive functions are unclear in AD, MCI, and HA. We examined these relationships using  $^{11}C$ -PIB-PET to measure  $A\beta$  burden *in vivo*. Increased PIB binding was evident in almost all AD cases, two-thirds of MCI cases, and a quarter of HA participants. PIB-positive MCI cases had lower Mini- Mental State Examination scores, episodic memory scores, and were more likely to carry an apolipoprotein  $\epsilon 4$  allele than PIB-negative MCI. All non-amnesic MCI cases had a PIB-negative scan. There was a strong correlation between impaired episodic memory performance and PIB binding in MCI, a strong trend in HA, and no relationship in AD. Non-memory cognitive functions did not correlate with PIB binding in any group. The findings suggest that individuals with PIB-positive scans, irrespective of whether they fulfil diagnostic criteria for MCI, may in fact have preclinical AD. Anti- $A\beta$  therapy, when available, may be most beneficial before dementia develops.

### WAIS-R features of preclinical Huntington's disease

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Our research on Huntington's disease (HD) focuses on cognitive impairments related to the preclinical phases of HD. The main purpose of this study was to determine if neuropsychological deficits could be identified in carriers and to examine the potential selectivity of presymptomatic cognitive impairment in HD. A neuropsychological assessment battery was administered to a cohort of 65 persons at risk for Huntington's disease who were applying for genetic testing in Stockholm, Sweden. All subjects, 30 gene carriers and 35 non-carriers, displaying no neurological or psychiatric signs of HD, were tested individually with Wechsler Adult Intelligence Scale-Revised (WAIS-R). Crystallised and fluid intelligence revealed significant differences and the carriers evinced significantly lower performance in seven of the 11 subtests of WAIS-R. Cognitive testing revealed deficits in language abilities, reasoning and abstract thinking, attention and problem solving, and psychomotor speed. All the remaining subtests indicated a difference favouring the non-carriers. Deficits in executive functions, such as reasoning, attention, abstract thinking, and psychomotor speed are early preclinical signs of HD. These impairments, although not global, affect general intelligence and functioning of HD asymptomatic carriers. Fronto-striatal involvement is primarily affected in the preclinical stage and functional losses associated with executive abilities can cause cognitive, psychosocial, and psychiatric problems.

### Sex differences on the WAIS-R and WMS-R in Australia

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Although sex differences have been reported for many aspects of cognition, there is less available data on sex differences on the Wechsler tests of IQ and memory. We assessed sex differences on the WAIS-R and WMS-R in a young adult Australian standardisation sample and investigated the effects of verbal and performance IQ on memory scores. Participants were 399 adults (aged 18-34 years) recruited randomly from the Sydney area as part of the Macquarie University Neuropsychological Normative Study (MUNNS). The sample was representative in terms of important demographic characteristics. Significant sex differences were found on the WAIS-R Information and Arithmetic subtests in favour of males and Digit Symbol in favour of females, while there were no sex differences in IQ Index scores. The data indicate that Australian males do not have higher IQ scores than females. On the WMS-R there were significant sex differences in favour of females on several verbal and visual subtests, as well as all memory Indexes apart from the Attention/Concentration Index. Males performed significantly better on Mental Control only. These findings support the literature on sex differences in memory in general. Verbal ability, as measured by VIQ, could not account for the female advantage in memory scores.

### fMRI and neuropsychological investigation of language in patients with epilepsy.

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The anterior temporal pole (ATP) appears to be an important language area for patients

with temporal lobe epilepsy (TLE) who experience chronic language naming difficulties after undergoing anterior temporal lobectomy to remediate intractable seizures. The role of the ATP in language was investigated using neuropsychological testing and functional Magnetic Resonance Imaging (fMRI) with two new ATP activation tasks (sentence reading, and naming of famous faces). Cross-sectional neuropsychological testing was conducted on 42 TLE patients, who were compared on the basis of surgical status (pre-operative  $n=21$ , post-operative  $n=21$ ) and seizure lateralisation (21 left, 21 right). Neuropsychological testing identified a relationship between epilepsy lateralisation and naming difficulties in TLE patients. This relationship was demonstrated on both the Boston Naming Test (BNT,  $p<.05$ ) and the Category Specific Naming Test (CSNT,  $p<.05$ ). The fMRI component involved non-clinical ( $n=10$ ) and TLE groups ( $n=6$ ). Significant ATP activation was evident during the fMRI sentence reading task in both the control and TLE groups, and during the famous faces task for the control group only. Results suggest that the ATP is involved in language. Functional imaging of this region may identify those at risk of chronic language naming difficulties post-operatively.

#### **The cerebellum and executive functioning: Evidence for a dysmetria of thought?**

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Recent research into the cerebellum has suggested a role in executive functions, although the exact nature of this contribution remains unclear. Previous studies reporting reduced performances on executive measures have typically failed to identify the specific cognitive processes involved, or exclude the confounding effects of lower level skill impairments. This study presents a 34-year-old male who has documented executive impairments following the discovery of an arachnoid cyst overlaying his left cerebellum. Using the verbal fluency task as an exemplar, specific measures regarding level and maintenance of output across time, number of rule-breaking errors, degree of clustering and switching, and word retrieval efficiency were investigated across five different forms of verbal

fluency to examine executive functions. Contrary to expectation, little evidence of specific executive dysfunction was found. While some disorganisation in output could be inferred from his reduced phonemic clustering and cluster sizes, speed of word retrieval was an underlying factor across tasks. These results support Schmahmann's "dysmetria of thought" theory, which proposes that the cerebellum contributes to the conditions required for optimum performance, rather than executive functioning, per se. Future studies, using a similarly detailed approach, should be conducted to confirm this peripheral role of the cerebellum in executive functions.

#### **Deficits to attention and working memory in MCI and Alzheimer's dementia**

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Mild Cognitive Impairment (MCI) appears to represent a transition between normal aging and early Alzheimer's disease (AD). Recent research suggests that attention and working memory deficits may appear much earlier in the progression of AD than traditionally conceptualised, and may emerge with the appearance of memory processing deficits. A total of 115 community based volunteers undertook baseline assessment on the: DRS-2, RAVLT, BNT, PAL, and two working memory tests and five attention tests from the CANTAB. Participants were allocated into one of three groups on the basis of specific selection criteria: control ( $n=40$ ); MCI ( $n=61$ ); and mild AD ( $n=14$ ). The results indicate that the AD group displayed significant deficits to verbal episodic memory, visual episodic memory, language function, visual STM span, visual working memory, selective attention, and sustained attention. The MCI group displayed significant deficits to verbal episodic memory, visual episodic memory, and visual working memory. The results indicate that attentional and working memory deficits are a prominent feature of mild AD, and that deficits to working memory but not attention are evident in MCI. Follow-up testing of this sample will identify which neuropsychological factors predict conversion from MCI to AD.

### Neuropsychological rehabilitation: How good is the evidence in dementia?

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There is a steadily growing body of research reporting on the efficacy of nonpharmacological rehabilitation for the neuropsychological consequences of ABI. Consequently evidence based clinical practice has increasingly gained currency but it relies upon the results of well-designed and conducted research studies such as randomised controlled trials (RCTs). Evidence from other disciplines has found that methodological rigour among RCTs is variable (Moseley et al., 2000). The PsycBITE™ database ([www.psycbite.com](http://www.psycbite.com)) lists all published, empirical reports on the effectiveness of non-pharmacological interventions for the psychological consequences of ABI. The aim of this paper is to present a survey of reports indexed on PsycBITE™ and to critically review their methodological quality. Whilst PsycBITE encompasses treatments for a broad range of psychological consequences of a range of neurological conditions, the main focus of this paper will be on treatments relating to dementia and core neuropsychological domains (executive, memory, behaviour, communication and attention). In summary, when the methodological quality of the RCTs on PsycBITE™ was examined, despite there being some high quality research within the literature, the standard of research in the field of ABI needs to be significantly improved. Methods for improving methodological rigour will be discussed.

### Executive functioning and attention deficit disorder in a sample of children with early and continuously treated phenylketonuria

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Phenylketonuria (PKU) is a genetically inherited inborn error of metabolism affecting approximately 1 in 11,000 live births in Australia. Treatment for PKU is via medically prescribed diet aimed at keeping blood levels of phenylalanine low enough to prevent brain damage. Treated appropriately, most people with PKU will currently develop an I.Q. within normal range however, PKU predisposes individuals to specific neuropsychological deficits. This study recruited a sample of twelve 10 – 17 year olds with early and continuously treated PKU and their siblings (controls) in order to examine the effects of metabolic markers (concurrent v lifetime phenylalanine levels, phenylalanine:tyrosine ratio) on executive functioning, as well as symptom expression of attention deficit hyperactivity disorder (ADHD). Assessments occurred in January (a difficult time of year for dietary compliance due to the preceding Christmas week) and March 2006. No time effects were found; however, higher phenylalanine:tyrosine ratios, especially those prior to age 12 years, were strongly correlated with poorer executive functioning measures, even in those children with well-controlled phenylalanine levels. Implications of this finding regarding the biochemical determinants of executive function impairment in this population are discussed, along with its contribution to the neurotransmitter model thought to underlie such impairments.



### **Which tests do neuropsychologists use? An preliminary update on a 10-year follow up.**

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**A**lmost 10 years ago a nationwide survey of test use by members of the Australian Psychological Society, College of Clinical Neuropsychologists (APS, CCN) was conducted. This survey showed that a majority of participants utilised the Wechsler Intelligence Scales, Rey's Complex Figure Test (RCFT), the Wechsler Memory Scales, The Verbal Fluency Test, the Trail Making Test (TMT) and the Rey Auditory Verbal Learning Test (RAVLT). In 2005/6 a follow up survey, conducted as part of a larger questionnaire, was conducted. 16 APS, CCN volunteered to participate in this study following recruitment via one of three methods (email list, conference, advertisement on APS website). The tests reported as "most commonly administered" by at least two thirds of the sample were: the Verbal Fluency Test, RCFT, TMT, RAVLT, and the Wechsler Scales (both Intelligence and Memory tests). These results are consistent with the previous findings, insofar as the most popular tests remain the same. Given that a major difference between these surveys was the response rate (48% in 1997 versus approximately 10% of the CCN membership), further efforts to recruit participants are needed to build up a more representative account of current practices in relation to test use.

### **Effect of occupational exposure to manganese on neuropsychological function**

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**R**esearch has established a relationship between acute high level exposure to manganese (Mn) and the development of manganism, a condition with symptoms similar to Parkinson's disease. Recent studies have suggested a possible link between low level chronic Mn exposure and neuropsychological deficits, however, a number of studies dispute such a link. The present study was designed to

systematically examine the effect of chronic low level exposure to inhalable and respirable Mn particulate on neuropsychological functioning. A total of 133 employees of the TEMCO Bell Bay Mn smelter completed a comprehensive battery of neuropsychological tests selected for their sensitivity to the subcortical deficits associated with Parkinson's disease. In addition, for each employee a cumulative exposure index to Mn (inhalable and respirable) was calculated based on employment history data from HR records and airsampling data collected at TEMCO (1995-2006). Multiple regression analyses indicated no effect of low level chronic Mn particulate exposure (inhalable or respirable) on neuropsychological function when covariates (age, education, IQ) are controlled for. The results of this study provide important information regarding safe levels of exposure to Mn and raise issues relating to the appropriate use of neuropsychological testing in the field of occupational toxicity.

### **Childhood indicators of later onset psychosis: Planning for a prospective study**

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**T**he identification of precursors to earlier onset psychiatric disorders is controversial, primarily due to the subtle nature of prodromal signs, as well as consideration to the developmental trajectory, including age appropriate features. Further confounding diagnostic issues are several neurodevelopmental disorders including Autism, Asperger's Syndrome and Pervasive Developmental Disorders – Not Otherwise Specified, which can present with similar clinical and neuropsychological features. This paper will discuss several case histories of children aged four to nine years of age who presented at a Learning Difficulties Clinic in Melbourne with usual features in their clinical presentation and particularly their ideas or patterns of thought. Some commonalities in the neuropsychological profile are also discussed, including deficits in language, higher-level attention (particularly visual-spatial), executive skills (significant disorganisation), and conceptual reasoning. In addition striking social and emotional impairments have been noted. A prospective study will be undertaken in order to



better document the presentation of these children, and also monitor and follow-up on their progress in regards to cognition and possible psychiatric presentations. This has implications for the early intervention and the treatment of these children, and also for understanding more broadly the cognitive development and aberrations taking place in possibly early and adult onset schizophrenia-spectrum disorders. Suggestions will be welcomed for the planned study.

#### **Multiple Sclerosis - related dementia: relatively rare and often misunderstood**

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**M**ultiple Sclerosis (MS) - related dementia is a poorly recognised and often misunderstood aspect of MS. It is relatively rare, occurring in approximately 10% of people with MS, while cognitive impairment in general occurs in 43% or more. It is hard to detect on the basis of short social interactions or clinical interview alone. While the mild end of the cognitive impairment spectrum of MS has become generally well-accepted within the health system over the last decade, the severe end has received almost no attention. There are currently no clinically relevant scientific articles on this topic to help guide the early detection, case conceptualisation, or support needs of this subgroup of people with younger-onset MS-related dementia. As a consequence, this subgroup is poorly understood, and frequently does not receive the support required to prevent unnecessary activity and participation restrictions. This poster utilises a dementia-based conceptual framework, and integrates the limited available scientific literature, to describe the clinical characteristics of MS-related dementia, to introduce some of the screening approaches available for early detection, and to outline the education and support needs of this misunderstood subgroup of people with MS. It also alerts health professionals to the sensitivities surrounding the use of dementia terminology within the MS community.

#### **Effects of cultural background on test scores in severe traumatic brain injury**

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**T**he relationship between cultural and linguistic background and neuropsychological test performances was examined in a convenience sample of people sustaining severe to extremely severe traumatic brain injury (TBI). Three groups were compared: (1) monolingual English speaking (N=152), (2) culturally and linguistically diverse background (CALD) educated in Australia (N=35) and (3) CALD and educated in a non-English speaking country (N=37). Those still in posttraumatic amnesia (PTA), more than 2 years post-injury, with prior TBI, or showing insufficient effort were excluded. Groups were not different in years of education, PTA duration or compensation status. On most tests the monolingual English speaking group performed highest and CALD educated in a non-English speaking country lowest, with CALD educated in Australia in between. After adjusting p-value for multiple comparisons, people educated in a non-English speaking country performed at a significantly lower level on WAIS-III indices (PIQ, POI), some WAIS-III subtests and Wisconsin Card Sorting Test (perseverative errors). Effects of cultural background were less prominent on tests of new learning and memory. The results are discussed with respect to the effects of acculturation including context of education on test scores and implications for clinical neuropsychological practice.

#### **Is the Conductor out of sync or still just learning the beat?**

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**T**his study explored the development of, and interaction between, intellect and executive functioning as well as behavioural observations in 8 and 12 year olds. Inclusion criteria was irrespective of behavioural conduct, having average academic achievement or higher, and no learning difficulties. The resultant sample of 68 children (42 8yo and 26 12yo) completed an

abbreviated IQ test and tasks that comprised eight clinical areas of Executive Functioning (EF). Parents and teachers also completed behavioural checklists. Results suggested that the developmental trajectory of EF does not necessarily happen in concert with the development of intellect. In addition, having a superior intellect did not necessarily relate to an absence of behavioural difficulties. Indeed, 8 yo participants who had a superior Verbal IQ and a well developed ability to selectively sustain attention were more likely to be rated as being oppositional. Having a significant difference between the development of intellect and impulse control in either direction led to parents perceiving these children as having academic difficulties as well as being more disorganised and distractible. Irrespective of IQ, both parents and teachers rated children with an overall lower EF score as having significantly more behavioural problems than children with an overall higher EF score.

