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**The Special Interest Group in Neuropsychological Rehabilitation
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SESSION 1: CHARTING NEW TERRITORY**Delusions Seen After Brain Injury: What Are They and Why Do We Need to Be Aware of Them?**

Barbara A. Wilson

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and The Oliver Zangwill Centre, Ely, United Kingdom*

This paper describes the most frequently reported delusions seen in people with neurological conditions and considers reasons why we need to be aware of such delusions in the assessment and rehabilitation of people with brain injury. In contrast to an hallucination (a false perception occurring without any identifiable external stimulus), a delusion is a belief that is clearly false and indicates an abnormality in the affected person's content of thought. A more detailed definition is that delusions are false beliefs which are held as absolute convictions, are not amenable to argument, are not culturally explicable, are typically bizarre, and are usually preoccupying. The most frequently reported delusions are: (1) the Capgras Syndrome (a belief that an acquaintance, usually a spouse or a close family member, has been replaced by an imposter); (2) Reduplicative paramnesia (a belief that a place or location has been duplicated); (3) Cotard's syndrome (a belief that one is dead or does not exist or is putrefying or has lost internal organs); and (4) the Fregoli delusion (a belief that several different unfamiliar people are really one person or that several different people are actually one person). Clinical examples are provided of patients with such delusions. The paper concludes with a discussion of possible misdiagnoses that may occur both in assessment and treatment of people with brain injury if neuropsychologists are unaware of these conditions.

Evaluation of an Autobiographical Memory Cueing Procedure in the Rehabilitation of Social Problem-Solving After Traumatic Brain InjuryMarie Holmes,¹ Jonathan J. Evans¹ and Barbara Dritschel²¹ *University of Glasgow, United Kingdom*² *University of St Andrews, United Kingdom*

Objective: Recollection from autobiographical episodic memory is an important process in problem-solving, but it has been shown that after traumatic brain injury (TBI) people are less likely to draw on such memories while solving problems. Hewitt et al. (2006) found that an autobiographical memory cueing procedure improved the effectiveness of practical problem solving (e.g., how to organise a holiday) in a group of participants with TBI. The present study aimed to examine whether a similar procedure would improve social (intrapersonal and interpersonal) problem solving after TBI. **Participants and methods:** Twenty three participants who had suffered a TBI were randomly allocated to either a control or intervention group. The primary outcome measure was performance on a Means-Ends Problem Solving test consisting of intrapersonal and interpersonal vignettes. The intervention group received a brief training on the use of autobiographical memories in problem-solving, while the control group had additional practice, but no specific training. **Results:** The intervention resulted in an increase in the number of specific memories produced and the number of steps in the plans compared to the control condition. The effectiveness ratings improved over time

for both groups, but there was no difference between them. *Conclusions:* While some measures of outcome improved as a result of the intervention, the critical measure of effectiveness did not benefit from the intervention. Anecdotal observations of participants' responses suggested that the intervention may increase emotion focused rumination, interfering with effective solution generation. Possible adaptations to the intervention are proposed.

An Investigation of the Effects of Nicotine on Executive Processes Using a Virtual Reality Environment

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Cholinergic decline has been linked to deficits in frontal lobe functioning in normal ageing and Alzheimer's disease (Hasher & Zacks, 1998; Parkin & Walter, 1992; West & Craik, 1999) while cholinergic dysfunction has been associated with cognitive sequelae following traumatic brain injury (Salmond et al., 2005). Nicotine, a cholinergic agonist, has been shown to improve aspects of cognition that require effortful processes, in healthy young smokers (Rusted et al., 1998; 2000), including increased attentional focus (Wesnes & Warburton, 1984), improved free recall (Philips & Fox, 1998; Warburton et al., 1986), and increased inhibition (Dawkins et al., 2007; Edginton & Rusted, 2003; Rodway et al., 2000). However, methodological issues associated with nicotine administration and withdrawal effects have implications for nicotine as a cognitive enhancer in a compromised system. Using a recently developed Virtual Reality environment (Jansari et al., 2004) that was designed to isolate the range of cognitive constructs that underlie executive functioning, we report two studies: first, an experimental group study, which investigated the effects of nicotine gum in healthy young 'never-smokers' and smokers using a double-blind placebo-controlled experimental design to address previous methodological criticisms; and second, a single case study, which explored the effects of nicotine gum in a patient with a posterior frontal lesion who has specific executive deficits. The differential effects of nicotine on specific executive constructs and the potential therapeutic effects of nicotine as a cholinergic enhancer on these constructs will be discussed in the context of recent theoretical models of executive functioning.

Sleep Difficulties and Sustained Attention Following Traumatic Brain Injury

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Objective: Sustained attention (SA) deficits are common following traumatic brain injury (TBI). SA is sensitive to sleep restriction. Sleep disorders are common, but under-diagnosed, after TBI. Thus, sleep disturbances may exacerbate SA deficits for some individuals who have sustained a TBI. If so, treatment of sleep disturbance may be an important factor in the rehabilitation of attention. In this prospective study we examined whether poor sleepers post-TBI had poorer SA ability than good sleepers post-TBI. *Participants and methods:* 44 people with TBI participated. Retrospective subjective measures (PSQI and ISI questionnaires), prospective subjective measures (sleep

diaries) and objective measures (Actigraphy) were used to assess participants' sleep. The Sustained Attention to Response Test (SART) and PASAT were used to measure attention. The Cognitive Failures Questionnaire measured everyday attention problems. *Results:* When good ($N = 21$) and poor ($N = 23$) sleep groups were categorised on the basis of self reports of sleep quality (PSQI) there were no differences on any measures of attention. However, when sleep groups were more conservatively defined on the basis of both subjective and objective data, using research diagnostic criteria for insomnia, the poor sleep group ($N = 11$) performed more poorly than the good sleep group ($N = 15$) on the SART, though not on other measures. *Conclusions:* Clinically significant sleep problems may exacerbate attentional deficits after TBI, highlighting the importance of addressing sleep problems in neuropsychological rehabilitation. Research on sleep and attention after TBI would benefit from use of both subjective and objective measures of sleep and sensitive measures of specific forms of attention.

The Role of Mimicry in Enhancing Emotion Perception Following Traumatic Brain Injury

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The ability to recognise emotional expressions in others is often impaired after traumatic brain injury (TBI) and is an important target for remediation. Normally, when a person processes emotional expressions there is excitation of the somatosensory cortices 'as if' s/he was actually displaying the expression. Consequently, we were interested to determine whether mimicking the expression would lead to improved recognition in people with TBI. 20 participants who had experienced a severe TBI (mean PTA = 45 days; mean time postinjury = 9.7 years) and 20 matched control participants were asked to label 3 sets of Ekman faces each containing 4 exemplars of the 6 basic expressions (happiness, surprise, fear, sadness, anger and disgust) under 3 conditions: (1) with no explicit instructions (control condition); (2) asked to focus on the face or; (3) asked to mimic the facial expression first. Condition 1 was always presented first but presentation order for Conditions 2 and 3 was counterbalanced across participants. Surprisingly, this group of people with TBI did not perform poorly on the base recognition rate of emotions (control condition). There was no effect of mimicry. Focusing upon expressions improved accuracy in the recognition of surprise in the control participants but had the reverse effect on people with TBI. It is possible that the effects of prior remediation on emotion recognition may have affected this particular group. Further data may help address this and clarify whether mimicry is likely to be a useful adjunct to the remediation of emotion recognition.

SESSION 2: RECOVERY AND OUTCOME**Outcomes after a Neuropsychological Rehabilitation Program for Brain-Injured Patients. The experience of the REAB in São Paulo, Brazil**

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The REAB is a center for people with cognitive or behavioral deficits after a brain injury. Our main goal is helping patients and families to cope better with deficits and changes, trying to reach the best level of functioning in real life. *Objective:* To present outcomes of a patient cohort after an individually designed rehabilitation program. *Method:* 37 brain-injured patients, aged from 17 to 62, in rehabilitation for at least 6 months. The program included neuropsychological and functional assessments, cognitive training, psychotherapy, group therapy, education on brain functioning, and family support. The program goals were set to meet particular needs of each patient, and there was no time limit for discharge. We retrospectively reviewed data from patients' files: professional notes of every session, direct behavioural observation, and family reports on patients' performance at home. We checked for outcomes that could be objectively observed: positive behavioural changes, improvement in task performance or participation in new activities. *Results:* Improvements were observed in the following areas: starting or going back to meaningful activities at home ($n = 14$); more independence in self-care ($n = 7$); cooperation in family/house chores ($n = 7$); being able to leave the house alone ($n = 2$); productive community activities, such as sheltered work ($n = 8$); school or independent courses ($n = 6$); competitive jobs ($n = 4$). *Discussion:* It is difficult to have a well-controlled study with groups of patients when working with an individual approach. Acknowledging the need for addressing methodological issues, we believe our results show that brain injured patients did benefit from the treatment provided.

A Rehabilitation Program Suggestion in Multiple Sclerosis

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MS patients were examined on remote memory and mental imagery (MI). The present work stems from our clinical results together with recent theoretical evidence on core memory and MI processing. Our aim was to apply a MI rehabilitation program to improve related memory processing. *Method:* We examined 23 MS patients (McDonald et al., 2001; mean age of 43.9; $SD = 10.9$ years). The Expanded Disability Status Scale (EDSS) ranged from 0.5 to 5.5. We compared their scores to 20 normal controls. In addition to general ability, BC Cog Battery, anterograde and remote memory, 18 patients were tested in MI and compared to 10 normal controls. On those bases, a rehabilitation program using mental imagery to improve memory was constructed. Verbal and nonverbal material was used in the 1st (visualisation) and verbal material in the 2nd (construction) and 3rd (one self visualisation) parts of the program to be applied to a reduced group of patients from our sample. The program was planned to be single case-follow-up as alternative items are presented following partial results. *Results:* Statistical analysis, by means of one way ANOVA and Newman-Keuls test showed significant difference ($p < .001$) in the MS group relative

to normal controls in one remote memory test and in the MI tests. Results of the rehabilitation program will include pre- and post-MI and memory scores. *Discussion:* Theoretical interpretation is consistent with complex scene construction and self projection 'core' processes. Applied interpretation awaits the end of the rehabilitation program.

Role of Head Injury and Posttraumatic Stress in Violent Offending

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Forensic populations have been found to have high levels of head injury across all levels of severity. Posttraumatic stress disorders (PTSD) are also common. The interactions between head injury and PTSD are not well understood. Previous research has indicated that head injury is a risk factor for violent offending. Forensic rehabilitation of offenders typically does not address issues that arise from either head injury or PTSD. In this study we examined the factors which contribute levels of current stress in a category B, male prisoner population. Sixty prisoners were assessed via self-report scales for emotional distress, previous trauma and head injury status. A multiple regression model was used to identify factors that were predictive of elevated levels of traumatic stress. *T* tests were then used to investigate relationships between levels of traumatic stress, violent crime and recidivism. The results of the analysis and clinical implications for the treatment of traumatic stress and/or head injury in prison populations are discussed.

Why is Age Related to Employment Outcome After Traumatic Brain Injury? Interactions With Gender, Severity of Injury, and Premorbid Employment and Education

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The frequently established relationship between age and work integration after traumatic brain injury (TBI) may be caused by complex interactions between a range of biological and psychosocial factors. The aim of the current study was to investigate how the process of work integration after TBI is related to age at injury, and whether this relationship can be explained by patients' demographic and injury characteristics. *Method:* Length of PTA, type of accident, premorbid employment status and education of 346 individuals with moderate to severe TBI (69% males, 31% females, mean age at injury 34 years, *SD* = 17, range 14–79) was registered at the time of injury. Work integration was measured 1 and 5 years postinjury. *Results:* Nonparametric bivariate statistics and logistic regressions were computed. The pathway of work integration depended on patients' age, with patients aged 20 to 34 showing the best work integration. Both younger and older patients had poorer outcomes. The age group 20–34 had the second-shortest PTA, the highest level of education, the highest percentage of preinjury employment and the highest percentage of males, all of which were related to good work integration. *Discussion and Conclusion:* The findings suggest mediator relationships, so that age at injury is predictive of premorbid level of education and employment status as well as severity of injury, which again is predictive of employ-

ment status at follow-up. The effect of gender on employment outcome might partly be mediated by participants' age. Implications of the findings for clinical practice will be discussed at the conference.

Cognitive Follow-Up of a Patient With Posterior Cortical Atrophy

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Posterior cortical atrophy (PCA) is a rare early-onset dementing syndrome presenting with visuo-perceptual deficits, which clinicopathologically is most commonly considered a form of Alzheimer's disease. We present a case of a 64-year-old male who consulted for visuoperceptual difficulties and reading deficits characterised by letter-by-letter reading. Other symptoms included an aperceptive form of visual agnosia, right hemianopia and simultagnosia and optic ataxia as part of Balint's syndrome. After the cognitive assessment and MRI results the diagnosis of PCA was made. The patient was reassessed at 8 and 16 months with a complete cognitive battery showing a worsening of his visuoperceptual deficits. Language deficits followed next, showing anomias in spontaneous language and in the Boston Naming Test. Two years later, memory was still intact. This case illustrates the progression of PCA with difficulty in visuoperceptual abilities, then progressing to language and semantic problems. This cognitive evolution may reflect an extension of the pathophysiology of PCA from the visual cortex to its occipito-temporal connections. To our knowledge this is the first study to document a patient performance in a complete cognitive battery assessing all cognitive functions over time.

Neuropsychological and Psychosocial Functioning in Adult Brain Tumour Patients

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Background/Aim: Relative to other oncology populations, the brain tumour (BT) population is a unique group given that both benign and malignant BTs can be life-threatening and can cause severe morbidity including neurocognitive and psychosocial disturbances. Surprisingly however, the BT population is an understudied group compared to other oncology and neurological conditions. To address this void, the aim of the present study was to assess the effects of radiation treatment on memory, executive and psychosocial functioning. A secondary aim was to assess the effect that this experience has on BT patients' primary carers. **Method:** Using a longitudinal design, participants were assessed within 6-weeks prior to starting radiotherapy (T1), and reassessed at 3 months following completion of radiotherapy (T2), on a battery of psychosocial and neuropsychological tests measuring mood, quality of life, memory and executive functioning. **Results and Discussion:** To date, 41 patients have been assessed at T1, and 32 patients have been reassessed at T2. The sample experienced a significant improvement in memory at T2, whereas minimal (nonsignificant) changes were evident in psychosocial, and executive functioning overtime. However,

at T1, 18% of patients reported clinical or subclinical levels of posttraumatic stress symptoms (PTSS), and 14% reported PTSS at T2. PTSS at T1 were associated with more BT-related problems and a decline in memory and executive functioning. PTSS at T2 were associated with reduced quality of life. The findings will be discussed in context of developing and implementing appropriate counselling–rehabilitation services to address the unique needs of BT survivors.

SESSION 3: FAMILY ISSUES

‘Amidst the Joy There are Tears’: The Family’s Experience

Helen Harrington

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There is much written highlighting the fact the lives of family members can be significantly affected when one member suffers a traumatic brain injury (TBI). Research has identified family members often experience feelings of stress, burden, anxiety and depression. More recently a number of qualitative research studies describe the family member’s experience is more complex than previously identified. Family members experience joy in response to the survival and recovery of their family member. Yet amidst these experiences of joy family members also experience intense feelings of sadness. The family members feel the loss of the person they knew before the injury, and the loss of that person’s potential life. The loss is ambiguous and hidden to others, and is often not clear even to the family members themselves. In turn this leads to complicated and unresolved grief. This concept of complicated grief and joy is based upon a project of a number of steps. The project built upon 2 qualitative research studies completed exploring family experiences. This provided the data to develop a framework to describe the family’s reactions. The material was then presented to a group of 24 family members. Every group attendee provided positive feedback. Many described the material helped them understand their own emotional response and this in turn enabled them to feel better about themselves, their family, and to make positive changes. The paper aims to describe this understanding of the family’s emotional experience, and provide insightful reflections for clinicians to help family members achieve positive outcomes.

Alleviation of Caregiver Strain During the Use of a Paging Device by People With Acquired Brain Injury

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The efficacy of the Neuropage® as an automated prompting device for people with acquired brain injury has been well documented. It has been shown to considerably improve the performance of targeted daily life tasks. It more usually falls to close relatives and family members as caregivers to monitor that such tasks are performed. It could therefore be expected that the beneficial effect of the Neuropage® in increasing the independence of the

person with brain injury would also result in an experience of reduced strain for the caregiver. This hypothesis was tested in a cross-over design involving 99 persons with brain injury who used the Neuropage® for a 7-week period and their caregivers who completed a modified version of the Caregiver Strain Index questionnaire prior to, and towards the end of, this period. The results showed a clear and significant reduction in caregiver strain. Secondary analyses showed (a) that the degree of caregiver strain reduction was positively correlated to the degree to which the Neuropage® was successful in assisting the persons with brain injury to perform their targeted tasks, and (b) that the reduction in strain continued after the withdrawal of the Neuropage®.

The Courage to Care

Cheryl Koenig

Consumer Participant for NSW Health GMCT Brain Injury Rehabilitation Directorate, Sydney, Australia and Carer Representative for Carers NSW, Australia

My son sustained an extremely severe traumatic brain injury 10 years ago when he was hit by a car. He was a '3' on the Glasgow Coma Score, in a coma for 6 weeks, in PTA for over 10 months and was given a very poor prognosis. However, with the combination of good therapy, sheer determination and family support, he now not only walks well, but can run, snow-ski, play the piano, tennis, swim laps and is learning to drive — all this while working in 4 part-time jobs, 5 days a week. I became a consumer representative in 2004 for the Brain Injury Rehabilitation Directorate (NSW Greater Metropolitan Clinical Taskforce), hoping to be involved in the development of policy and the improvement of brain injury services. During this time I wrote 2 books for the NSW Health Department, which involved interviewing a diverse range of people with a brain injury, and their carers. From my experience in the extensive rehabilitation of my own son, along with meeting and interviewing many other consumers, I have collected a wide understanding of family and carer perspectives of those afflicted by brain injury. I will discuss what carers feel are the most helpful aspects of inpatient care, as well as the critical issue that arose in almost every interview for my books; and 'the transition period', that is, transition from the safe environment of the hospital to discharge into the often intimidating community environment.

Headstrong: A Multi-Family Group Intervention: Does It Promote Head Support or Head Change?

Grace Couchman

Monash University, Australia

Multi-family group (MFG) interventions promote bio-psycho-social knowledge of a specific illness area, problem-solving, social networking as well as improved family and social communication. The Monash University Headstrong project is currently evaluating MFG efficacy for people with TBI. This innovative project is an exciting extension of previous Victorian MFG research, and will produce an empirical basis for the effective treatment of socially vulnerable TBI-affected families. The current paper will look at 2 substantive Victorian clinical trials which reveal the successful impact of MFG intervention for serious mental illness and a current clinical trial at Monash University which is focused on the intervention for

TBI. The paper will present both quantitative findings and qualitative findings and discuss the sources of improved outcomes. It will pose the question of whether improvements in TBI will be due to a mere strengthening of the care team and social system or whether MFG interventions promote something more permanent for TBI-identified clients. Issues of self and social identity as well as personal skill development will be discussed.

SESSION 4: REHABILITATION MODELS AND SERVICE PROVISION

Which Psychological Models Influence Neuropsychological Rehabilitation?

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British clinical psychologists ($N = 54$) working in adult brain injury rehabilitation in the United Kingdom, were asked 'what psychological models most influence your clinical practice?' In total, 57 different models were reported. Because different terms were sometimes used to describe the same model (e.g., 'neuropsychology' and 'cognitive neuropsychology'), we grouped the models and theories into eight main categories. We used published literature and discussions with other psychologists to agree on the categories. The top models and theories reported as most influencing clinical practice show considerable overlap with those described as being most important by others (e.g., Prigatano 1986, Wilson 1987). Cognitive-behaviour therapy, endorsed more than any other single model, is one of the most influential theories of emotion. Systemic and family therapy models come under theories of emotion (Oddy and Herbert, 2003), as do a number of others (Williams et al., 2003). The frequency of references to emotion probably reflects the importance of these in the generic clinical psychology training completed by all participants. Cognitive and neuropsychological models come in second place, and in this category are more specific cognitive neuropsychological models such as The Working Memory Model, The Supervisory Attentional System Model and Warrington's Model of Language. Behavioural models and theories, including those of learning, come third. Again, this is likely to reflect the fact that clinicians use what they are comfortable with and apply this to the different fields in which they work. We discuss how these models relate to Wilson's 2002 synthesised model of rehabilitation.

Cases Illustrating a 'Y-Shaped' Model of Identity and Participation Change Processes in Holistic Rehabilitation of Brain Injury

Fergus Gracey,^{1,2} Siobhan Palmer,¹ Donna Malley,¹ Clare Keohane,¹ Jacqui Cooper,¹ Leyla Prince,¹ Susan Brentnall,¹ Fiona Ashworth,¹ Joanna Cope,¹ Juliette O'Dell,¹ Carlyne Threadgold,¹ Becky Rous,¹ Andrew Bateman,^{1,2} Jonathan Evans^{1,3} and Barbara A Wilson^{1,2}

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Models of change in rehabilitation are now moving beyond behavioural models of learning and integrating models of cognitive and affective changes developed in the understanding of emotional disorders and psychological therapies. Existing holistic, and emerging community-based

approaches to rehabilitation integrate such models and approaches. In this presentation, a brief summary of this literature is presented. An integrated provisional model aiming to describe in parallel both the client change process as well as the organisation of interdisciplinary rehabilitation efforts is described. The model highlights how notions of self and identity can be understood in terms of discrepancy (with old self, with peers, family, roles and society), and how rehabilitation efforts can usefully address such discrepancies through the systematic linking of 'doing' and 'meaning' in contexts that are safe and meaningful to the individual. The cases illustrate the process of rehabilitation organised in this way. Consistent with the model, outcome measures for these cases show attainment of social participation related goals through application of appropriate skills and strategies, and reduction in intra and interpersonal discrepancies. While encouraging, these clinical case descriptions do not offer sufficient evidence for the causal links between the intervention and changes reported. Recommendations for further research are proposed.

Establishing a Neuropsychological Rehabilitation Service for Children With Traumatic Brain Injury

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Pediatric traumatic brain injury (pTBI) is a serious and universal social concern. The appropriate health care response should include rehabilitation facilities designed to manage this epidemic. However, in contrast to developed countries, in South Africa there has been a striking lack of development of rehabilitation (especially neuropsychological rehabilitation) facilities for traumatically brain-injured children. In fact, there is a general dearth of research on pTBI in South Africa. This paper describes the first steps toward establishing a neuropsychological rehabilitation program at Red Cross War Memorial Children's Hospital (RXH) that focuses on pTBI, is empirically based, and is sensitive to issues unique to the local context. We first briefly describe three pilot studies that were conducted with the aim of improving the South African pTBI knowledge base. These studies have provided initial insights into (a) the demographic profile of pTBI admissions to RXH, (b) the neuropsychological profile of South African pTBI, and (c) the needs and stressors of South African families of children with TBI. Studies such as these provide a critical platform from which to introduce a neuropsychological rehabilitation service at RXH. We go on to describe how, in its early stage, this service will focus on remediation within the cognitive domain of attention, and how its efficacy will be evaluated through a controlled trial. We hope that favourable findings from this part of the research program will inform policy makers of the urgent need for neuropsychological rehabilitation services in South Africa.

Outcomes From an Holistic Rehabilitation Programme Generates Conceptual Model for Supporting Future RRPP Development

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A Rehabilitation/Reintegration Personalised Programme (RRPP) aims to return the individual 'from traumatic head injury to a productive life'. The process is not complete until the daunting divide from a shattered world

to a fulfilled life has been accomplished. In order to achieve a sustainable reintegration the process can be broadly divided into three universal stages: Assessment, Rehabilitation, Reintegration. Each stage focuses on specific objectives. This paper will focus on the Reintegration process. It will build upon an analysis of the multi-axial, long-term outcome data as revealed after their participation in our holistic rehabilitation head trauma program (7½+yrs: *Brain Impairment* 8(2), 2007, p. 227). By analysing the significant communalities between patients 'restored to a meaningful life', a model will be proposed to support the development of future Rehabilitation/Reintegration Personalised Programmes (RRPP). The conceptual framework cuts across sociocultural ecosystems and will be integrated with existing theories of 'executive' functioning; the functional organisation of the brain; socialisation and social structure.

Natural Recovery: An Ecological Approach to Neuropsychological Recuperation

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Community Based Rehabilitation (CBR) is an approach developed by the World Health Organization to make scarce rehabilitation resources more available, especially in the developing world. The natural recovery model of neuropsychological rehabilitation is proposed here as a model congruent with CBR, and appropriate for a wide variety of settings, most especially in the developing countries. It is culturally adapted to the social structures and economic realities of developing countries. The natural recovery model emphasises modifying everyday activities and the environment of recovery (usually the home) to facilitate recovery from brain dysfunction and adaptation to a target environment. It contrasts with professional service-oriented models which emphasise clinic-based and controlled, decontextualised training. It relies on community volunteers, peer support, natural helpers and family to carry out most rehabilitation activities under the guidance of rehabilitation professionals and paraprofessionals. Principles of the zone of recovery, goal-setting, activity analysis, cognitive and emotional strategies, evaluation of the environments and activities of recovery, and family/community training guide the natural recovery model. Supplementary professional services are introduced when needed. Advantages are felt to be enhanced motivation, cultural adaptation, direct application of results, reduced cost, and efficient use of scarce rehabilitation resources.

Ego-Identity: Can it be Restored if Impaired By Acquired Brain Injury?

Yehuda Ben-Yishay

NYU Medical School, Rusk Institute, United States of America

Optimising the cognitive, personal, social and vocational functions of traumatically brain-injured persons (TBI) are the major clinical objectives of the holistic approach to neuropsychological rehabilitation. The slide presentation will focus on: (a) articulating Kurt Goldstein's ideas concerning the amelioration of the interferences of the cognitive impairments with the functional lives of persons with TBI, fostering acceptance by the patient of his or her existential situation, and on the restoration of meaning in his or her life after neuropsychological rehabilitation; (b) explicating Erik Erikson's concept of Ego-Identity; and (c) on illustrating, by several clinical case studies, how fol-

lowing intensive, holistic, neuropsychological rehabilitation the impaired ego identity has been reconstituted. A brief discussion will follow the presentation.

SESSION 5: ASSESSMENT TOOLS

SYMPOSIUM: THE MAYO-PORTLAND ADAPTABILITY INVENTORY (MPAI-4) IN CLINICAL PRACTICE

Overview of Symposium

The Mayo-Portland Adaptability Inventory (MPAI) is a 29-item rating scale for evaluation and outcome measurement in postacute brain injury (BI) rehabilitation. Through a series of Rasch and traditional psychometric analyses spanning almost 20 years, the MPAI was refined into a current version (MPAI-4). The MPAI-4 may be completed by professional providers, by individuals with BI, and by their significant others. Three subscales measuring Ability, Adjustment/Activity, and Participation reflect the International Classification of Functioning, Disability and Health (ICF) and allow the identification of physical and cognitive impairments separately from restrictions in activity and adjustment and from societal participation. In this symposium, James Malec will review studies of validity, reliability, factor structure and item analysis and describe a developing web-based database system that offers feedback to providers about the effectiveness of their rehabilitation services relative to those of other providers serving similar individuals and using similar methods. Robyn Tate will describe the use of the MPAI-4 to evaluate rehabilitation outcomes in state centers in Australia. Helen Badge and colleagues will detail the use of key forms, a psychometric approach based on item response theory, to clearly describe individual MPAI-4 profiles for clinical evaluation and rehabilitation planning. Claudia Pott will describe the use of the MPAI-4 in translation in Germany. Translations to German, French, Spanish, and Danish as well as other information and a manual for the use of the MPAI-4 are available at the web site for the Center for Outcome Measurement in Brain Injury (www.tbims.org/combi/mpai).

MPAI-4: Development, Psychometric Properties and a Provider Database for Evaluating Rehabilitation Outcomes

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The current version of the Mayo-Portland Adaptability Inventory (MPAI-4) is a 29-item scale that provides a broadly based assessment of indicators of ability, activity, and participation. Rasch and factor analyses of MPAI-4 items identify correlated factors within a single dimension that represent ability, activity/adjustment, and community participation. A series of studies have shown good internal consistency/reliability for the MPAI-4 by Rasch (Person Reliability = .88; Item Reliability = .99) and traditional psychometric statistics (Cronbach's alpha = .89). The validity of the Provider MPAI has been demonstrated through correlations and agreement with other measures of BI outcome (Disability Rating Scale, Rancho scale, neuropsychometric measures) and with the Survivor and Significant Other forms of the MPAI. The predictive validity of the Provider MPAI relative to independent living and employment outcomes of postacute rehabilitation has been documented

in other studies. Development is underway of a provider database. This database will supply semi-annual feedback to participating providers about the effectiveness of their rehabilitation services, as represented by MPAI-4 assessments of persons served, relative to those of other providers serving similar individuals using similar methods. The database includes patient demographics, social and treatment environments, diagnosis/injury descriptors, in addition to change over the course of postacute rehabilitation and outcome as evaluated by the MPAI-4. Additional aims of the MPAI-4 database project are to offer: (a) a secure and user-friendly web interface for data acquisition, (b) data synthesis including background computations and data checks, (c) standardised biannual report format designed to meet provider and consumer needs.

Using the MPAI to Chart Recovery Over Time After Traumatic Brain Injury

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Our previous research examining MPAI data at the item level (Tate et al., 2006) has provided a clinically informative method to chart recovery patterns of specific functions over time. This paper reports 5-year data. Relatives of 132 people with severe traumatic brain injury recruited from 13 participating brain injury rehabilitation units in New South Wales, Australia, were administered the MPAI (and other instruments) at rehabilitation admission and three subsequent occasions. Using the International Classification of Functioning, Disability and Health as a framework, 10 variables were selected to represent impairments of Body Functions. Clinically significant impairments (MPAI responses indicating moderate or severe difficulty) were common at rehabilitation admission. A lag in the recovery of cognitive functions, relative to physical functions, occurred and persisted 5 years post-trauma (highest frequency was for memory, 65%). A series of regression analyses was conducted on the capacity of the 10 impairment variables to predict Activities/Participation at 5 years posttrauma. Each analysis was highly significant: impairment scores at rehabilitation admission predicted 20% of the variance in Participation scores at 5 years posttrauma, and scores at later time points accounted for 50% to 80% of the variance. Discussion of the results focuses on the different patterns of individual predictor variables at different stages in the recovery process. The capacity of the MPAI to furnish data at the item level, as well as the subscales, enhances its clinical utility and the following paper by Badge and colleagues describes refined procedures for item analysis of the MPAI in clinical practice.

Keyforms: Enhancing the Clinical Utility of the MPAI-4

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The NSW (Australia) statewide Brain Injury Rehabilitation Program (BIRP) uses the MPAI-4 to support the evaluation of transitional living and community-based rehabilitation services. Clinician feedback clearly indicates outcome measures need to be clinically useful as well as provide information about service effectiveness. A keyform chart can achieve this by providing a visual 'map' of an individual's scores that offers both quantita-

tive and qualitative data to support clinical reasoning. We will present the development and validation of a keyform chart to enhance the clinical utility of the MPAI-4, and demonstrate the chart using client case studies. *Methods:* An MPAI-4 keyform was produced using information from Rasch analysis of NSW BIRP data. We will describe initial validation and plans for further psychometric analysis. *Results:* We have produced a keyform chart that provides the clinician with both a total score and a profile of the client's scores on the MPAI-4, taking into account the relative difficulty of each item. The clinician enters the raw MPAI-4 scores into a Microsoft Excel spreadsheet and an individualised chart is instantly produced. Repeated assessments can be readily compared on a single chart, just one of the features we will demonstrate. *Discussion:* We will discuss the interpretation of keyform charts using examples. The visual medium of the keyform makes assessment results more meaningful for clinicians and clients and provides useful data to support intervention planning and goal setting. The keyform has enhanced the clinical utility of the MPAI-4 for use as an individual client and statewide outcome measure.

Use of the Mayo Portland Adaptability Index in Germany

Claudia Pott

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Notwithstanding the fact that even though social legislation demands 'participation in the community, in social roles and at work life' as a goal of every rehabilitation intervention, outcome measurements in Germany focus predominantly on the ICF components 'function' and 'activity'. In 2007 the Mayo Portland Adaptability Index (MPAI) was translated into German language but until now it is virtually unknown in our country. The interdisciplinary team for acquired brain injury of Praxis Prof Fries in Munich is the first team in Germany which has implemented the MPAI in its documentation system. The team applies a holistic, interdisciplinary and community-oriented therapy intervention, which is called 'Top Down Therapy' and will be briefly presented by video clips. Long experience with this approach shows that no other instrument is able to demonstrate the achievement of the individual patient's goals as well as the MPAI. A recent systematic review comparing the MPAI with other measurement techniques supports this observation. (Pott, C., & Mehrholz, J., Evaluation of participation in neurological rehabilitation. *Rehabilitation*, in press). This presentation summarises the results of data collection. It points out the importance of contextual factors, in particular, difficult to classify personal factors, in evaluating a patient's progress. The definition of 'participation' and its use in German rehabilitation settings will be described, and specific therapeutic, cultural, and linguistic considerations for the use of the MPAI in Germany will be summarised.

The Zoo Map Test: Equivalence of Two Alternate Forms

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The Zoo Map Test (ZOO) from the Behavioural Assessment of the Dysexecutive Syndrome provides a sensitive measure of planning capacity. One drawback is the unavailability of alternative forms, which is particularly problematic for executive measures where novelty is of paramount importance for valid evaluation. We report on two alternative forms of ZOO developed by our group; one setting is a shopping mall (SHOP) and the other a railway station (TRAIN). The places to visit and other instructions are equated to ZOO (but adapted as appropriate). Equivalence was tested in 47 people with severe traumatic brain injury who were randomly allocated to receive different versions (ZOO $n = 15$, SHOP $n = 17$, TRAIN $n = 15$). There were no group differences on demographic, injury or cognitive variables (including executive measures). Each form adopted the same scoring procedures as for ZOO. There were also no significant differences in profile scores between any of the ZOO, SHOP or TRAIN forms ($F_{(2,44)} = 0.58, p > .05$) and post-hoc t tests revealed no differences between any combination of two versions. A series of correlation coefficients between the three versions and a range of eight executive measures showed approximately the same pattern of correlations for each of the forms. There was the occasional exception, with SHOP or TRAIN showing substantially higher coefficients compared with ZOO. These results provide strong support for the equivalence of two alternate forms of the Zoo Map Test, and a basis for the further examination of their psychometric properties.

Swedish JAAM? Adaptation of a Virtual Reality Assessment of Dysexecutive Syndrome to a New Culture and Language

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The accurate assessment of individuals with dysexecutive syndrome (DS) is vital for effective rehabilitation. Although neuropsychological tests of executive function exist, they are not necessarily ecologically valid or predictive of real-world adjustment (Shallice & Burgess, 1991). The JAAM (Jansari, Agnew, Akesson, & Murphy) paradigm is an office-based role-playing task constructed to tap the major deficits seen in DS (Jansari et al., 2004). Using a nonimmersive virtual reality (VR) version of the task, fine-grained analysis of individual patients' performance on specific cognitive constructs reveals impairments which are often missed on formal clinical testing. Jansari et al. (2007) have shown that as well as being used as an assessment of executive abilities, the task can also be used to pick up gains following rehabilitation allowing for the possibility of assessing the effectiveness of new rehabilitation regimes. To test the cross-cultural utility of JAAM, the current study involved its translation into Swedish. Patients with executive dysfunction and matched controls were tested on this new version. Findings replicated earlier results showing that Swedish JAAM differentiated patients from matched controls. The findings are discussed with reference to ecological-validity and clinical

utility of JAAM, its potential for use in other cultures and its long-term prospects for use in both experimental and rehabilitation paradigms.

SESSION 6: MEMORY

Effects of Emotion on Memory in Brain-Injured Patients

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Memory is enhanced in normal young individuals when study materials have emotional or arousing content. This emotion enhancement effect has also been shown in normally ageing older adults, and in some memory-impaired individuals with focal lesions. The purpose of the present study was to test whether this effect would be observed in patients with memory impairment as a result of traumatic brain injury and more diffuse brain damage. Twelve patients with memory deficits participated in an initial study along with a group of matched controls. Participants read sentences that were either neutral in content or emotionally arousing followed by a yes/no recognition test. Brain-injured individuals showed a substantial advantage in recognition for the emotional materials compared to the neutral. This advantage for emotional processing was unrelated to either memory or executive function, suggesting that it might provide a particularly useful rehabilitation method for patients with cognitive dysfunction. The emotion enhancement effect was also weakly correlated with the ability to benefit from self-referential processing, indicating that combined emotional and self-referential processing might provide still greater benefits.

Effect of Self- and Other-Referential Processing on Memory in Memory-Impaired Individuals

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Studies have found that referring information to the self or another person during encoding enhances memory in normal young and older adults. These have been called the self-reference effect (SRE) and other-reference effect (ORE), respectively. To the best of our knowledge, a previous study in our laboratory was the first one to explore the SRE in memory-impaired individuals. This prior study found that a group of patients showed improved recognition memory performance for personality trait adjectives after self-referential processing. The main goal of the present study was to replicate and extend these findings to materials and testing methods better suited for rehabilitation. We were also interested in investigating whether patients could show an ORE as a result of referring information to another person they knew well. Twelve memory-impaired individuals and 12 controls studied lists of verb-noun phrases depicting actions under three encoding conditions: (a) Shallow processing, 'Does this phrase have 4 syllables?'; (b) Other-referential processing, 'Is X the type of person who would do this?'; and (c) Self-referential processing, 'Are you the type of person who would do this?' Results from cued-recall and recognition memory testing indicated that memory-impaired individuals showed significant improvements in memory from self- and other-referential processing. Although both the SRE and ORE were related to memory and executive function, all patients

showed a SRE and only one did not show an ORE. Hence, although there may be some boundary conditions to benefits from referring information to the self or a well-known other, these types of processing might provide effective strategies for memory rehabilitation.

The Use of Mobile Phones to Compensate for Organisational and Memory Impairment in People With Acquired Brain Injury

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Objective: External aids are generally reported as more useful than internal aids for those who experience memory difficulty after TBI. Electronic aids such as NeuroPage® and palm-held electronic devices have received considerable scientific support. However, there has been limited evaluation as to the extent to which mobile phones are used by those with memory difficulties and little research on their efficacy as compensatory devices for memory impairment. *Method:* This paper will present the results of a study that investigated the efficacy of mobile phone use in compensating for memory impairment due to TBI. The study used a single-case ABAB design, and the result for 6 individuals will be presented. *Results and Conclusions:* All 6 participants showed statistically significant improvements in the number of tasks remembered while using the phone vs. not using any aids at all. When comparing the phone and the use of traditional aids, five participants showed statistically significant improvements and one performed worse. These results were maintained at 1-month follow-up. While the use of mobile phones to assist with remembering is efficacious in some cases, it is not suitable for use with all individuals. The results of the overall study will be presented with some discussion of the difficulties encountered during the research, and suggestions for maximising the potential of mobile phones in memory rehabilitation.

Is Memory Rehabilitation Possible in Older Densely Amnesic Adults? A Detailed Case Study of a Post-Encephalitic Patient Using Errorless Learning and a Personal Digital Computer

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Neuropsychological research has shown that both procedural (Corkin, 1968) and implicit memory remain intact in patients with amnesia (e.g., Graf et al., 1984; Schacter, 1987). Research has capitalised on this to develop rehabilitation paradigms for patients using a range of methods and devices such as NeuroPage (e.g., Wilson et al. 2001). In a single case study, Wilson et al. (1997) suggested that a younger age at the time of amnesic insult was a strong predictor of successful rehabilitation. Jansari, Gardner & Wilson (2006) used an errorless learning method (Baddeley & Wilson, 1994) in conjunction with an electronic personal digital computer (PalmTop) to teach a 62-year-old densely amnesic postencephalitic patient, NP to remember to perform a series of activities of daily living. Despite NP's age, the regime proved to be very successful with significant gains following training. A methodological concern with the study was that all effects of the 'treatment' were measured at the same time making it difficult to definitively state that improvement was driven by errorless learning rather than any

extraneous variables. An improved design using multiple baselines was implemented which brought in new target activities (e.g., asking for medication) in a stepwise fashion whilst holding other activities at baseline. The results confirmed that errorless learning results in significant gains in NP and can be used in successful rehabilitation in older amnesic patients. The bearings that this finding has on rehabilitation attempts with other groups of patients are discussed.

Long-Term Evaluation of Treatment Gains Following a Cognitive Rehabilitation of Amnesia: A Case Report

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Background: Several cognitive rehabilitation techniques have targeted people with different degrees of memory impairments. In this context, only a few studies have showed the contribution of preserved non-declarative memory capacity and errorless learning in the treatment of amnesic patients. **Objective:** The current study investigated the long-term follow up of the cognitive rehabilitation of a 44-year-old man with amnesia following viral encephalitis. **Methods:** Two memory techniques were applied, a procedural memory technique (motor imagery strategy to remember people's names) and a verbal learning technique (PQRST to recall new verbal information). These techniques were compared to two other control conditions (visual imagery and rehearsal, respectively). One baseline assessment and 2 follow ups, 1 year and 2 years later, were carried out. **Results:** There was some improvement in the patient's capacity to remember people's names and recall new verbal information after the main interventions. At follow up, one year and two years later, it was demonstrated that he maintained the treatment gains. **Conclusions:** These different memory rehabilitation techniques are discussed in terms of alternative possibilities in the rehabilitation of amnesic patients.

Group Reminiscence Enhances Memory But Not Wellbeing in Dementia: A Social Identity Perspective

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We report findings from an intervention study investigating the impact of group reminiscence (GR) and individual reminiscence (IR) on people suffering dementia living in residential care. Previous research has shown that these interventions can improve memory performance, but no studies have investigated the relative effectiveness of group and individual reminiscence. Social Identity Theory offers a novel perspective on the outcome of such treatment, predicting that GR would improve well-being because the experience of sharing memories from one's personal past with others creates a sense of shared social identification. Development of shared identity also has the potential to improve wellbeing and may motivate people to engage more in the cognitive tasks at hand. A total of 84 residents took part: 34 in GR, 24 in IR and 26 in a group control activity. The intervention took place over 6 weeks and cognitive screening and wellbeing measures

were taken both before and after the intervention. There were several important findings. First, improvement in memory was only found in the GR condition. Second, improvement in mood was only apparent for those in IR and control conditions and this might be explained by reduced awareness of one's condition and lack of nostalgia for the past. Discussion focuses on the theoretical and practical implications of these findings: suggesting (a) that cognition is facilitated by interactions that strengthen social identity, but (b) that this may also limit the benefits of therapy for wellbeing by providing insights into the way that one's own identity has changed.

SESSION 7: IDENTITY, ADJUSTMENT AND WELLBEING

Psychological Treatment for Anxiety in People With Traumatic Brain Injury: A Cochrane Systematic Review

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Aim: Anxiety is common in the general population and individuals with a traumatic brain injury (TBI) may even have increased risk of developing anxiety. Treatment options for anxiety include psychological therapies, however, there are currently no systematic reviews examining the evidence for these approaches for people with TBI. The aim of this systematic review was to determine the effectiveness of psychological treatments for anxiety in people with TBI. **Methods:** 11 electronic databases were searched, including Cochrane databases, MEDLINE and PsycINFO. Key journals were also hand-searched and reference lists of included trials were examined. Selection criteria for included trials comprised: (1) participants over 5 years old, (2) participants sustained a TBI, (3) used psychological treatment targeting anxiety (disorder and/or symptomatology), and (4) randomised controlled trial (RCT) design. Two reviewers independently inspected all citations identified and assessed method quality of included trials using PEDro scale. **Results:** Three RCTs were identified. Methodological quality of one trial was compromised and focus was placed on the other two trials. The first trial showed benefit of cognitive-behaviour therapy (CBT) in people with mild-TBI and acute stress disorder compared to supportive counselling. The second trial showed reduction of anxiety symptoms following combined CBT and neurorehabilitation in people with mild-moderate TBI compared to no intervention control group. **Conclusions:** Evidence was found for the effectiveness of psychological treatment of anxiety in people mild and moderate TBI, with CBT a feature of both included trials. More research using larger sample sizes as well as homogeneous samples and interventions, however, are needed to confirm these findings.

An Investigation Into Mood Induction and the Perception of Social Relationships in Stroke Patients With Depressed Mood: Laying the Foundations for Therapy

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Objective: The incidence of poststroke depression (PSD) is approximately 30% impacting on recovery, cognition and survival. Psychological therapy studies have produced largely negative results and

demonstrate the difficulty of working with patients with limited emotional and cognitive resources. This study assesses the influence of positive mood induction on mood and attitudes to interpersonal relationships, as a possible resource for therapeutic intervention. *Participants and Method:* Stroke patients ($n = 48$) and rheumatic/orthopaedic control patients ($n = 45$) with depressed mood were compared using positive and neutral filmed material on measures of mood (VAMS) and interpersonal attitudes (ATRQ). Patients were alternately assigned to either a positive or placebo/neutral mood induction condition. A further manipulation within each condition with alternating verbal and nonverbal formats to assess the influence of stroke laterality was included. Patients were also assessed for related cognitive and emotional processing deficits and on a series of cartoons and jokes as an independent measure of humour. *Results:* Positive mood induction significantly improved mood state and interpersonal attitudes compared to the neutral condition, irrespective of cognitive and emotional processing deficits. The non-verbal material was effective for all patients but the increase was more marked for the left hemisphere stroke group. The right hemisphere stroke group showed an increased humour rating of a test of verbal jokes but demonstrated the least understanding of them. *Conclusions:* These results demonstrate that positive mood induction is a means to enhance mood and interpersonal attitudes in patients with reduced cognitive and emotional resources. The implications for approaches to therapeutic intervention are discussed.

Social Experience and Wellbeing After Brain Injury: Is There a Fear of Not Fitting In?

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Traumatic brain injury (TBI) is the single most disabling condition in working age adults. Many of the individuals who have sustained these injuries have problems in sustaining work and family relationships, and mood disorders are very common (Ponsford & Fleminger, 2006). Key factors accounting for outcomes include degree of injury, neuropsychological dysfunction, premorbid history, presence of mood disorder and social support. Social groups (e.g., work, leisure) can have a protective effect upon wellbeing. However, people with TBI may make less use of such support due to perceived social discrimination. There have been few studies on such threats to social identity after brain injury. We devised a measure of adjustment, perceived discrimination and social support for survivors of brain injury — the TREAT (Trauma Recovery and Experiences Assessment Tool). This was administered by Headway UK in a national online and mail out survey to head-injured individuals. There were over 500 responses. Results provide insights into the role of social identity factors in mediating between the experience of trauma and recovery. These are pertinent to neuro-rehabilitation as survivors have key goals in the area of social roles.

Quality of Life and Wellbeing After Acquired Brain Injury: The Role of Cognitive Functioning, Use of Coping Strategies and Social Identity

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Background: The use of adaptive coping strategies (e.g. seeking social support) is known to influence outcome in terms of improved quality of life. However, it is not known whether neuropsychological variables, particularly executive functions, are more likely to result in the use of more maladaptive (e.g., escape/avoidance) coping strategies. Thus, our aim in this study was to examine the relationship between cognitive impairment, coping style, and quality of life in a group of people with head injury compared with a control group of patients with chronic pain. We also aimed to explore the protective effects of social identity on well-being using a measure currently being developed. *Participants:* In total, 60 participants were recruited from across Devon: 30 adults with acquired brain injuries were recruited from a community based charity and 30 adults with chronic pain difficulties from a NHS pain management service. *Results:* Analyses were conducted on differences in the coping strategies used by people with and without head injury (grouped as mild/moderate/severe). Multiple regression techniques were used to examine the relationship between executive function, coping style, social identity and wellbeing, on measures of quality of life, satisfaction with life, anxiety and depression. *Conclusions:* The role of adaptive coping strategies is associated with better emotional adjustment. Improving our understanding of how cognitive impairment influences the use of particular coping strategies should lead to improved interventions to increase the use of more adaptive coping strategies.

Exploring the Conceptualisation of Self in People With Severe Traumatic Brain Injury

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Background: Although conceptualisation of self has long been seen as an important regulator of behaviour, it has only recently received attention in the traumatic brain injury (TBI) research literature. The aim of this qualitative investigation was to gain some understanding of how adults who have sustained severe TBI view themselves several years after injury. *Method:* Participants were 16 men and 2 women (mean age 36.5 ± 8.4 years). They had sustained severe TBI (PTA > 4 weeks) a minimum of 5 years earlier. All were living in the community and were interviewed at home. Interview transcripts were coded using principles of grounded theory to identify emergent categories and themes. *Results:* Analysis revealed that participants' conceptualisation of self was characterised by two major themes: 'who I am' and 'how I feel about myself'. The first theme represented *knowledge components* of the self that emerged as *describing statements* depicting attributes and *striving statements* reflecting goals in four life areas (*physical, material, social-relational, activity*). The second major theme was conceptualised as *evaluative components* of the self and included *achievements* and *attitude to self*. *Discussion:* This conceptualisation of self has similarities with previous

work. Self-concept involves an organised knowledge structure that contains traits, values, episodic and semantic memories about the self. It also has a significant influence on processing self-relevant information, motivation and emotion. Attention, memory and executive function deficits and the rehabilitation process itself can have significant impacts upon dynamic conceptualisation of self after injury and these are highlighted in the discussion.

SESSION 8: INTERVENTION OUTCOMES

Neuropsychological Outcome After a Computerised Rehabilitation Program

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Cognitive deficits are a common consequence of brain injury. Structural and functional damage secondary to focal and/or diffuse brain injury could cause a complex combination of attention, memory and executive functions disorders. *Objective:* The aim of this study was to analyse the relation between the performance in treatment task and clinic outcome after the computerised cognitive rehabilitation program in acquired brain injury (ABI) patients. *Patients and Methods:* 90 patients with ABI who were receiving neurorehabilitation treatment at the Institut Guttmann-Hospital de Neurorehabilitació from October 2006 to May 2007 were included in the study. Mean age: 34.27 years ($SD = 11.67$); time since injury: 3.8 months ($SD = 1.7$). Participants received computer-assisted cognitive rehabilitation, based upon their individual clinical needs, directed towards improving their cognitive functioning. Cognitive rehabilitation took place during 8 weeks (5 sessions per week). Differences between pre- and posttreatment neuropsychological tests were used to measure improvements in attention, memory and executive functions. *Results:* 56 patients (62.2%) showed significant cognitive improvement after the computerised cognitive rehabilitation program. In this group, workload in the rehabilitation executive tasks showed a statistical relationship with performance in posttreatment executive function tests ($p = .027$). *Conclusions:* Findings of this study showed that the accuracy on task has a positive relationship with clinical outcome in the executive domain. This improvement could contribute to a decrease of the patient's disability and increment of quality of life. Future research on this topic is necessary.

Cognitive Stimulation Therapy (CST): Implications for Neuropsychological Interventions in Alzheimer's Disease

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CST is based on the theoretical concept of reality orientation with emphasis on explicit and implicit cognitive stimulation. It is part of the neuropsychological intervention techniques used in dementia patients. *Objective:* To verify the effects of CST in temporal orientation (TO) and autobiographic memory (AM) of demented patients. *Methods:* In this study 12 patients with Alzheimer's disease were involved (9 in the early stage and

3 moderate), mean age of 72.3 and 11.9 years of schooling. All patients were taking anticholinesterase and underwent neuropsychological assessment (NA). They then participated in a neuropsychological program (NP), where they were trained (12 months) in CST techniques, aiming to stimulate TO (through calendar weekly registration; e.g., year, month, day of month etc.) and AM through personal information registration techniques. (e.g., age, place and date of birth, name of relatives). *Results:* The comparative analysis of NA and observation logs, indicated stabilisation and improvement of TO and AM. When the initial evaluation of TO was performed patients remembered least the day of the month (16%), month (50%), with best results in time (75%), year and day of the week (58%). After treatment date recall improved: day of the month (41%), month (66%), year (83%) and time (91%). We also observed improvement in AM (birth date from 50% to 91%; age 66% to 75%), the remaining AM were stable. *Conclusion:* CST inserted in NP is an alternative to stabilisation of temporal orientation and autobiographic memory, indispensable to preserve personality and functionality of people with dementia. Other studies need to be conducted to understand the effects this techniques in the quality of life of people with dementia.

The Effects of Social Skills Training on Social Behaviour for People With Severe, Chronic Traumatic Brain Injury: A Multi-Centre Trial

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This study was a randomised controlled trial to assess an integrated social skills treatment for people with severe, chronic brain injury. In this paper we focus upon ratings of social behaviour before and after treatment. 51 participants (age = 35 years) with severe, chronic brain injury were assessed and randomly allocated to treatment ($N = 18$), social placebo ($N = 17$) or waitlist ($N = 16$). 12 dropouts left 13 in each condition. Prior to treatment participants were videotaped during conversation with a confederate on 3 occasions. The treatment group then attended 12 weeks of group work to improve social skills and social perception and individual sessions to address self-esteem, anxiety, depression etc. At the end of treatment all participants were again videotaped conversing with a confederate on 3 occasions. Videotapes were randomised and rated by 2 raters blind to group membership using the BRISS-R scales — Partner Directed Behaviour Scale (PDBS) and Personal Conversational Style Scale (PCSS). Interrater reliability (ICCs) for 5 of the 6 subscales of the PDBS and PCCS were acceptable (ranging from fair to excellent). Significantly improved social behaviour on the PDBS was seen for the treatment group relative to the control groups. Changes were most apparent on two subscales: Self-Centred Behaviour and Partner Involvement Behavior Scale. No change was seen on the PCCS. In conclusion, this study, as with others before it, documented differential improvements in social behaviour as a result of treatment in a group with very severe and very chronic injuries although additional factors may need to be addressed.

POSTERS (IN ALPHABETICAL ORDER BY FIRST AUTHOR)**'Ecological' Neuropsychological Evaluations in the Work Rehabilitation Setting: A Case-Study of Traumatic Brain Injury**

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Objective: Work rehabilitation programs are an essential part of interdisciplinary therapeutic intervention programs designed to maximise patients' premorbid functional capacity. Assessment of the patient's ability to perform the tasks demanded by his or her working environment can prove quite challenging, especially because of the lack of tools available to quantify impairment in the work setting. *Participants and Methods:* D.R. was a 47-year-old sales manager who suffered a traumatic brain injury in a car accident on July 2007. Initial neuropsychological assessment revealed executive and attention deficits. Following a 1-month intensive behavioural, cognitive, and language therapeutic program, improvements were observed across all cognitive domains. However, tests designed to measure executive functioning in more 'ecological' domains proved significantly challenging for the patient. For this reason, an assessment of working abilities, and an occupational analysis of the tasks demanded by his original position was conducted. D.R. completed an intensive 1-month work rehabilitation program, and was reassessed in his real working environment. *Results:* The initial impairment on the executive tasks correlated with the qualitative assessment of his working capacity. Following occupational training, D.R. significantly improved his performance on tasks demanded by his job. This improvement was also observed on the neuropsychological follow-up assessment. *Conclusions:* This case study demonstrates the importance of a working capacities training, supported by an initial occupational evaluation, and follow-up assessment, all in their real working environment. The supplementary neuropsychological evaluation proved essential in understanding the impairments experienced by D.R., revealing the need to develop a comprehensive neuropsychological and occupational assessment tool.

Switching Handedness: fMRI Study of Motor Control in Right-Handers, Left-Handers and Converted Left-Handers

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The aim of this study was to investigate whether early changes of hand preference behaviors lead to changes in neural organisation of motor function. We report fMRI study of hemispheric activation patterns during simple and complex movements performed with either the dominant or non-dominant hand. Consistent right-handers, consistent left-handers, and subjects who, in their childhood, had been forced to switch their left-hand preferences toward the right side participated in the study. In right-handers there was a general predominance of the left-hemisphere activation relative to right hemisphere activation. In left-handers this pattern was reversed. The

switched subjects showed no such volumetric asymmetry. In both right- and left-handers, movements of the preferred hand activated mainly the contralateral hemisphere, whereas movements of the nonpreferred hand resulted in a more balanced pattern of activation in the two hemispheres, indicating higher involvement of the ipsilateral activations. These results show that the preferred hand is controlled mainly by the hemisphere contralateral to that hand, whereas the nonpreferred hand is controlled by both hemispheres. The switched individuals share features of both left-handers and right-handers. The view that in right-handers the left hemisphere supports the execution of complex movements of the nondominant left hand is consistent with clinical evidence demonstrating that damage to the left hemisphere leads to apraxia (Heilman 2000) and disrupts motor skills even when the left, ipsilesional hand is used (Haaland and Harrington 1996). Our data provide evidence that similar ipsilateral mechanism is present also in left-handers. These data bear value for rehabilitation of motor function.

Errorless Learning of Novel Routes Through a Virtual Town in People With Acquired Brain Injury

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Impaired route learning is a common consequence of acquired brain injury (ABI) but has received little attention in the research literature. Errorless learning may be a method of facilitating the learning of routes but this is unclear as previous studies have focused mainly on verbal skills and the only previous study involving route learning was based upon a pencil and paper task. Here we report two studies using virtual reality to explore the benefits of errorless learning and other way finding strategies in an ecologically valid task. In the first study 20 people with ABI learned two routes, of equivalent difficulty, around a virtual town based upon the city of Nice. For one route an errorless learning paradigm was used and for the other a trial and error approach was used. Route recall following the errorless learning condition was significantly more accurate than recall in the errorful condition. It is possible that the relatively procedural nature of realistic route learning rendered our task particularly amenable to rapid implicit learning. In a second study we taught participants one route under simple errorless conditions, and two equivalent routes under an errorless condition plus one of two additional strategies (landmark memorisation or cognitive mapping). Results failed to demonstrate any benefit of the additional strategies over errorless learning alone. In summary, errorless learning appears to be superior to trial and error learning for route acquisition in ABI but learning was not further augmented by the addition of naturalistic landmark and mental mapping strategies.

The Relevance of an Interdisciplinary Program of Neuropsychological Rehabilitation Applied to Patients With Mild Cognitive Impairment

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Mild cognitive impairment (MCI) represents the interface between pathological and normal ageing, and is considered a predictor for the development of dementia. Neuropsychological rehabilitation has been shown to be

beneficial in maintaining cognitive and psychosocial abilities in these patients. *Objective:* To determine if neuropsychological rehabilitation affects the progression of cognitive, functional, behavioral and psychosocial impairment in MCI. *Methodology:* The subjects were three patients with MCI undergoing a program of interdisciplinary neuropsychological rehabilitation in a private clinic in the city of Maceio for a period of 1 year. The program consisted of weekly sessions of 90 minutes duration. Neuropsychological evaluation was performed before and after treatment (the mini-mental state examination, Clock drawing test, verbal fluency, Pfeffer e GDS). The activities started with the report of socialisation through the experience of life, then temporospatial orientation activities and finally training of cognitive functions. The activities that were developed stimulated cognitive functions such as temporal and spatial orientation, memory of items, semantics, recognition, contextual and classification into categories from the manipulation of multisensory information. *Results:* In the psychosocial and functional aspects maintenance of independence in activities of daily living was observed, as well as reduction of negative emotions, improved communication and maintenance of social activities. As for cognitive function, a general decline of these functions occurred. *Conclusion:* Neuropsychological rehabilitation was beneficial in terms of psychosocial aspects, but cognitive functions declined after 1 year.

Neuropsychological Intervention in a Case of Korsakoff Amnesia

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The Wernicke-Korsakov syndrome is caused by diencephalic neuropathology associated with lack of B1 (thiamine), and is frequently associated with alcohol abuse. In some cases, there may also be generalised cortical atrophy, particularly in the frontal lobes, giving rise to significant behavioural and cognitive impairment. *Case Report:* A.C. is a right-handed, 42-year-old female music teacher, who completed high school education. She had a 15-year history of alcohol and tobacco abuse. In January of 2007 she was hospitalised with nystagmus, gait ataxia, mental confusion, delirium and hallucinations. Cerebral MRI showed bilateral alterations in the medial portions of the thalamus. Neuropsychological assessment in July of 2007 showed impairment of attention, executive control and significant impairment of new learning and short-term memory. The results suggested a multidisciplinary approach to rehabilitation involving neurologists, psychiatrists and neuropsychologists, in order to address the different symptoms that the patient showed, such as auditory hallucinations, depression and suicidal thoughts. *Results:* Stabilisation of the psychotic symptoms allowed the implementation of a cognitive rehabilitation plan, aimed at increasing the patient's initiative and use of external compensatory strategies, as well as the psychoeducational orientation of the family and carers.

Application of the Spaced Retrieval Technique in Two Cases of Severe Memory Impairment With Different Attention and Working Memory Abilities

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Objective: The aim of the study was to investigate the effectiveness of a memory rehabilitation program based on the spaced retrieval technique. **Design:** Multiple baseline single case experimental design. Implicit and explicit memory tests were employed to test the effectiveness of the program. Generalisation and activities of daily living measures were also used. **Methods and procedure:** Two patients with severe memory impairment recruited via neurorehabilitation clinic. These stroke patients differed in their attentional and working memory capacities. ABA analysis was conducted using number of items recalled as an index of improvement. **Experimental interventions:** Subjects were exposed to relevant pieces of information about significant persons (i.e., name, years, profession of therapists) trying to create new associations. A computer program was designed. The information was presented in the computer screen. Visual and verbal modalities of stimuli were employed. Learning and remembering of information were tested with spaced retrievals of seconds, minutes, hours and days. **Main outcomes, results and conclusions:** The study is continuing. Preliminary data show the influence of attention and working memory abilities in the success of this memory rehabilitation technique.

Neuropsychological Approach in Psychotherapy With an Aphasic Patient

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Aphasia is a language disorder commonly observed after an injury in the dominant hemisphere of the brain. Besides the language deficits, other cognitive deficits may be seen, such as impairment of memory, attention and executive functions. Emotional instability and social withdrawal are also associated with aphasia and cause great impact in patient's life. **Objective:** We will describe the therapeutic process of an aphasic patient, emphasising the need for a neuropsychological approach to psychotherapy. **Case Report:** M.A.C., a 49-year-old female, suffered a brain injury in 2001. Neuropsychological assessment in 2005 revealed a motor aphasia diagnosis. She entered a neuropsychology rehabilitation program early in 2006, with the aim of improving her comprehension deficits. She cried frequently, had a constant desire to end her life, and persisted in wanting to leave home in order to find other people than her family. **Results:** After 1 year, the patient's mood was not depressed and she ceased to demonstrate her constant feelings of sadness. Prior to rehabilitation, she was not motivated to engage in social activities. Nowadays she goes to parties, family events and community projects, such as a theater group. These activities have improved the quality of her social participation. **Conclusion:** The improvement in emotional adaptation, ameliorated the patient's symptoms and also had positive consequences for her social participation. This case illustrates that treatment aimed at cognitive and emotional deficits significantly contributes to the achievement of rehabilitation goals.

Addenbrooke's Cognitive Examination: A Useful Screening Test for Mild Cognitive Impairment

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Aim: The detection of mild cognitive impairment (MCI) cases depends on the sensitivity of memory tests within the standard neuropsychological assessment battery. Current research in the field highlights the need for an early identification of MCI, in order to design better treatments and therapeutic interventions. Previous studies have shown that the Mini-Mental State Examination has low sensitivity for cases of MCI, revealing the need for a brief yet reliable instrument to detect possible MCI patients. This study sought to determine the Addenbrooke's Cognitive Examination's (ACE) utility as a screening test to discriminate between normal aging and MCI. With this objective in mind we analyzed which ACE items were useful for that purpose and its correlation with an extensive neuropsychological assessment. **Methods:** Patients with MCI diagnosis ($n = 21$) and paired controls ($n = 19$) were assessed with the ACE and an extensive neuropsychological assessment. Correlations between ACE scores and neuropsychological variables were conducted. **Results:** The ACE total score differed significantly between normal controls and MCI ($p < .001$). Specific particular items of the ACE also differed between the groups, including the three words recall task ($p < .01$), the number of intrusion in the episodic memory task ($p < .05$), and semantic verbal fluency ($p < .05$). These ACE subtest scores significantly correlated with specialised tests of the neuropsychological assessment. **Conclusions:** The ACE is a sensitive screening test for cases of MCI, and some of its subtests reliably correlate with performance on tests of an extensive neuropsychological assessment.

Association Between Frontal Lobe Cognitive and Executive Functions and Domains of Depressive Symptoms in Early Poststroke Patients

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Objective: The aim of this study was to investigate the relationship between frontal lobe functions and domains of depressive symptoms in first ever ischemic stroke patients. **Methods:** We assessed 72 consecutive males and females patients of the neuro-clinic unit of the HCFMUSP-SP with diagnosis of first ischemic stroke. Patients were 18 years or older and had no history of depressive disorder. They were evaluated 12 (mean, $SD \pm 3.8$) days after the stroke. Seven domains of depressive symptomatology (cognitive symptoms, accessory symptoms, retardation, fatigue and interest, eating and weight, insomnia, anxiety) as reported by Jamerson et al. (2003) were assessed by a psychiatrist using the HAM-D-31. A neuropsychologist assessed frontal lobe functions using the Digit Span Test (WAIS-R), the Verbal Fluency words/min (FAS) and the Stroop Test. **Results:** An inverse correlation was found between scores in the retardation domain and FAS ($t = -2.97$; $p = .004$; 95%CI: -5.20 to -1.02); and a positive correlation was found between scores in the retardation domain and Stroop-D ($t = 3.11$; $p = .005$; 95%CI: 1.41 to 6.93), Stroop-W ($t = 2.70$; $p = .012$; 95%CI: 1.57 to 11.54), and Stroop-C ($t = 2.41$; $p = .023$; 95%CI: 1.53 to 19.70). Scores in the

domain of cognitive depressive symptoms were positively correlated with Stroop-D ($t = 2.36$; $p = .026$; 95%CI: 0.47 to 6.77) and Stroop-C ($t = 2.15$; $p = .041$; 95%CI: 0.43 to 20.28). *Conclusion:* The results suggest that scores in the domains of retardation and cognitive symptoms of the HAM-D-31 in early poststroke patients are related to impairment in working memory and executive functions as assessed with the Stroop, Digit Span and FAS tests.

Investigation of Cognitive Functions in Elderly People Before and After Digital Inclusion Training

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There has been some evidence of cognitive improvement after digital inclusion in elderly people. Different studies have been carried out in order to identify the efficacy of computer training in elderly people. However, there is a lack of a detailed investigation of the cognitive functions in this population after a longer period of digital inclusion training. *Objective:* The aim of the current study was to investigate the cognitive functions of six healthy elderly people of average age 72.33 ($SD = 3.99$) and education of 8.3 ($SD = 1.80$) before and after a 6-month course on digital inclusion using a detailed protocol of neuropsychological tests in order to identify changes in their cognitive abilities. *Method:* Two sessions of neuropsychological evaluation were carried out, one before and one after the six-month course, each lasting 2 hours. The cognitive functions investigated included executive functions, short-term and long-term memory, praxis, attention, language, activities of daily living (ADL), behavioural and psychological aspects. *Results:* Some executive functions ($N = 5$) and ADL ($N = 3$) tended to improve after training. Other measures showed no change before and after the training. *Conclusion:* This study showed the potential for improvement, particularly in ADL, after digital inclusion in the elderly population. Due to the small number of the present sample, further research is necessary in order to replicate these findings.

Performance on a Sample of Normal People Between 45 and 89 Years Old Resident in the State of Sao Paulo Through the Raven Progressive Matrix Test

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This article aims to investigate the performance of healthy people between 45 and 89 years old with an education between 0 and 8 years, who were residents in the State of São Paulo, using the Raven's Progressive Matrices Test. In this study the sample was divided in two groups (group 1: 45–59 years and group 2: 60–89 years). The results demonstrate an increase of the number of correct answers in group 1 compared to group 2. We concluded that the group 2 showed a decrease in performance compared to group 1, consistent with the literature. These findings suggest the hypothesis that decline occurs because of the normal physiological process of ageing. This suggests that neuropsychological evaluation has a decisive role in differential diagnosis.

Neuropsychological Rehabilitation Program (NRP) in Alzheimer's Disease (AD) Patients

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Available treatments for cognitive and behaviour rehabilitation in AD patients are primarily pharmacological. Evidence for the efficacy of non-pharmacological interventions is scant. *Objectives:* To evaluate the effects of NRP in addition to pharmacological management in patients with mild AD. *Methods:* We studied 6 patients (3 women) with mean age of 73.2 (\pm 4.6) years, and 7.8 (\pm 5.1) years of schooling. All of them fulfilled NINCDS/ADRDA criteria, and were on maximum doses of anticholinesterase agents. A cognitive evaluation was performed using the MMSE, ADAS-Cog, and NEUROPSI. Caregivers were administered the NPI and Functional Activities Questionnaire (FAQ). Three evaluations were performed: initial (T1), after 8 months without rehabilitation (T2), and after 8 months of rehabilitation (T3). The rehabilitation program consisted of twice weekly sessions as well as a family orientation session every 15 days. *Results:* MMSE (T1: 23.3 (1.0)/ T2: 23.2/ T3: 24 (3.0)); ADAS-Cog (T1: 14.0(2.6)/ T2: 23.3(5.1)/ T3: 19.1 (7.7)); NEUROPSI (T1: 77.9(8.5)/ T2: 72.0(8.0)/ T3: 74.7(7.3)); NPI (T1: 29.3(33.5)/ T2: 33.8(30.9)/ T3:14.6(16.3); FAQ (T1: 11(7.0)/ T2: 9(7.9)/ T3: 14.1(7.6)). *Conclusions:* Improvement in cognitive and behavioural measures was observed after the NRP. Nonetheless, patients showed functional decline in the context of a neurodegenerative process, as reflected by observations reported by caregivers.

Neuropsychological Rehabilitation in Post-Apartheid South Africa: Developments and Challenges

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The focus of the post-apartheid reconstruction project in South Africa is on equity, access, redress and social justice. This is particularly important for mental health service delivery in South Africa which has historically neglected the problems of poverty and been characterised by inequitable access to services. Accordingly, this paper will consider recent developments in and existing challenges facing neuropsychological rehabilitation as these relate to the provision of services within the context of diversity and disadvantage. Based on this discussion, the paper reviews current neuropsychological rehabilitation programs that are being developed in South Africa, with an emphasis on those that are community based. The paper concludes with a vision for neuropsychological rehabilitation in South Africa that addresses the needs and demands of the nation.