brainwaves

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South African Clinical Neuropsychological Association

From The Editor

Dear SACNA Member

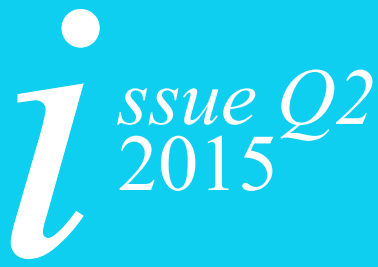
As we head into the last quarter of the year, we are pleased to bring you another edition of Brainwaves. This issue reminds us of the many aspects and applications of neuropsychological practice in the South African context. With neuropsychology being practiced across cultures, ages, clinical disciplines, and social environments the field is growing faster than ever. SACNA intends to be at the forefront of this upward trajectory, in educating psychologists and other health professionals about the myriad of brain-behaviour relationships that affect our lives and our world.

This Brainwaves issue offers much in terms of its clinical value, having a strong focus on clinical conditions such as dementia and sleep disorders, as well as looking at how neuroimaging can assist in the neuropsychological assessment. We also pay tribute to one of the world's greatest clinicians and neurologists, Oliver Sacks.

We hope you enjoy perusing the pages, and we hope you find the information useful, to your practice, and professional development.

Elton Bloye

SACNA is on LinkedIn!
Members can now benefit from this new discussion group by logging in to www.linkedin.com and requesting an invitation to join.
You can find SACNA under Groups.



Comments, queries and suggestions can be sent to elton@bloyeneuropsych.co.za

President's CORNER

Dear members,

July and August, 2015 were extremely busy months for the National Executive Committee, and I'm glad to have the opportunity to recap some of the most important of the events that are now behind us:

1 On July 24, 2015 we held a Face to Face meeting in Johannesburg over the course of the day, with the aim of discussing our direction and purpose as an organisation, and to arrange our priorities over the next few years, bearing in mind the continuing flux and uncertainty in terms of the HPCSA's plans for the registration of neuropsychology. The last such meeting was convened in August, 2011, and we made every effort to preserve continuity across the two meetings.

From left to right: Mr. Ben Janecke; Ms. Andria Grobler; Dr. Rita Du Plessis; Mr. Elton Bloye; Prof. Ann Edwards; Mr. Trevor Reynolds; Ms. Barbara Donaldson; Dr. Vicky Alexander; Dr. Frances Hemp; Mr. Brian Mallinson; Dr. Sharon Truter; Ms. Annelies Cramer; Dr. Joachim Mureriwa; Dr. Ida Pienaar; Dr. Menachem Mazabow

A number of specific topics were debated and explored, including our ongoing educational initiative, the status of our current credentialing system- including suggestions for elaboration and revision of that system - and our role as a regulatory organisation with responsibility for protection of the public. It was an intensive, densely-packed day of discussion and planning, and we aim to implement the plans further via sub-committees established on the day.

2 We also used that meeting to perform a historic act in terms of the organisation, which was to amend our constitution, an event that occurred last in 2008 – and only 3 times in the past 20 years. This amendment was intended to bring our constitution in line with the requirements for application for registration as a Non-Profit Organisation, in accordance with the Non-Profit Organisation Act (Section 12), under the guidance of an attorney, Mrs R Ebersohn. We also took the opportunity to make provision for email votes, to allow for more convenient future amendments, if these become necessary.

The meeting was attended by more than the required quorum of full members, and, together with the current full members within the executive, we were able to host three other Full Members, making for a total of 18 votes out of the 45 Full Members.
The changes were accepted and passed unanimously by the 18 Voters.

3 In line with our ongoing educational initiative, which we initiated in 2012 and the goals of which we reiterated at our Face to Face meeting in July, 2015, we ran a very successful series of workshops in August, 2015, both in Cape Town and in Johannesburg. The idea was to provide a forum for the dissemination of professional and scientific knowledge of the neurosciences to practitioners, presented by experts in their respective fields. We consequently arranged workshops by a neuroanatomist (Dr Coenie Hattingh- in neuroanatomy and neuropathology), a psychiatrist (Dr S Saffer – in neurochemistry and neuropsychopharmacology) and 2 neurologists (Dr T Townsend and Dr J Pearl – in clinical neurology).

These 2–day workshops were well-attended, with around 110 attending on each of the 2 days in Johannesburg, and with more than 70 attendees in Cape Town on each of the 2 days. As of now, we have covered the following topics in terms of our original goals laid down in 2012: General Physiology/Anatomy; General Pharmacology; Introductory Neurology; Neuroanatomy; Clinical neurology; Neurochemistry/ Psychopharmacology.

The plan for 2016 is to present courses/workshops and CPD activities in Paediatric Neuropsychology, and also to hold our biennial AGM at one of these workshops in that year (our regular biennial national conference, due for 2016, will be postponed in light of our co-hosting the INS Congress in 2017, together with PsySSA and Prof Ann Watts).

ATTENDEES AT THE NEUROSCIENCES "REFRESHER" WORKSHOPS, HELD IN JOHANNESBURG AND CAPE TOWN

4 Towards the end of August, we ran additional CPD half-day workshops in Cross-Cultural Neuropsychological Assessment, hosting Prof Juan Arango from the University of Bilboa. The attendance at these workshops was excellent, with some 55 persons in Cape Town and 95 in Johannesburg (and with 6 CPD Ethics points secured). We were reminded of the many pitfalls involved in the testing-process, which are magnified in the cross-cultural context, and we were impressed by Prof Arango's extensive international efforts to compile normative data for many neuropsychological instruments.

A highlight of that event was the announcement that SACNA intend to make a practical contribution to the efforts towards fair, ethical and relevant assessment, and to add to the body of local cross-cultural norms for neuropsychological tests, by providing a bursary of R50 000 to be used to assist in normative data compilation, ideally in collaboration with university-based projects. We look forward to seeing this yield results over the medium-term.

FROM LEFT TO RIGHT: DR SHARON TRUTER (WORKSHOP COORDINATOR), DR. MENACHEM MAZABOW (SACNA PRESIDENT), PROF. JUAN ARANGO (UNIV. OF BILBOA), MR. ELTON BLOYE (SACNA PRESIDENT-ELECT)

Our agenda for the next 2 years is already filling up with further plans and projects relating to education, research and training, in addition to liaising with other organisations and administrative bodies, and continuing to update our media-infrastructure and our NPO status, and maintaining our monthly regional meetings.

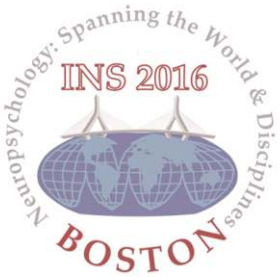
I would like to take this opportunity to thank the members of the National Executive Committee for their ongoing efforts and service towards promoting Neuropsychology, and the interests of neuropsychologists, in this country.

With best wishes
Menachem Mazabow

SOME OF THE ATTENDEES OF THE CROSS-CULTURAL WORKSHOP ENJOYING REFRESHMENTS ON THE WANDERERS CLUB TERRACE

Dates to diarise & NOTICES

International Conference



Register on www.the-ins.org

INS 44th Annual Meeting
Boston, Massachusetts, USA
Boston Marriott Copley Place
February 3-6, 2016

Neuropsychology: Spanning Disciplines & Countries

INS President: Ann D. Watts | Boston Program Chair: Rosemary Fama | CE Chair: Raul Gonzalez

Opportunities to participate in online research

- Prof. Juan Arango of the University of Bilboa, Spain and SACNA are collaborating on a SURVEY OF SOUTH AFRICAN NEUROPSYCHOLOGISTS – which will become part of his ongoing international research study, canvassing thousands of neuropsychologists (approximately 4000 thus far in 30 countries) about the state of the art of professional training in the field of neuropsychology (canvassing aspects of education, training, and professional practice of neuropsychologists).

  The survey is aimed at those who are involved in neuropsychological practice (assessment and/or rehabilitation) or who conduct other professional activities related to neuropsychology. Please either complete the survey yourself or pass it on to a friend/colleague who is involved in some way in the field, and who may not be on our various mailing-lists, in order to increase the reach of the survey in this country. It should take about 15 minutes to complete, and participation is completely anonymous.

  The survey can be found at: https://www.surveymonkey.com/r/soafrica

- Dr. Chrisma Pretorius (Clinical Psychologist) from the University of Stellenbosch is conducting research on Psychogenic Non-Epileptic Seizures. She is requesting clinicians and healthcare practitioners to participate in a confidential survey, to guide diagnosis and treatment, as well as to corroborate findings with international data.

  You can complete the survey at
  https://www.surveymonkey.com/s/PNES#sthash.ThKGyCrW.dpuf

  For more information about the study, contact Dr. Chrisma Pretorius at chrismapretorius@sun.ac.za.

Applications Now Open

CALLING FOR APPLICATIONS FOR THE VICTOR NELL ENDOWMENT 2015 TO 2016.

If you are a student in post-graduate study with a focus in neuropsychology research, then you are encouraged to apply for SACNA's once-off biennial grant to assist in funding your research. Students eligible for the grant must preferably be from a disadvantaged background, although this is not a prerequisite.

Applicants must provide:
a. Proof of acceptance into the Honours or Master's degree training course;
b. Justification of their requirement for financial assistance;
c. A brief statement of intent to focus on clinical neuropsychology in their research and practice;
d. Proof of background interest in the field of neuropsychology (for example, voluntary work at settings such as Headway);
e. A statement undertaking to carry out research for the purposes of the Master's dissertation in the field of neuropsychology; and
f. An undertaking to present the results of that research at the subsequent SACNA Biennial Conference.

Applications should be sent to Dr. M Mazabow: neuropsych@telkomsa.net

Regional Meetings

WESTERN CAPE
[Contact: Dr. Frances Hemp, franhemp@yebo.co.za]

30 SEPTEMBER | **Dr. Marc Combrinck,** Alzheimer's Disease: An update

28 OCTOBER | **Cath O'Leary & Nadine Kilchenmann,** Fetal Alcohol Syndrome in children

25 NOVEMBER | **Maja Kwiakovski,** The effects of metamphetamine on prenatally exposed children in CT: Cognitive & intrinsic brain connectivity

EASTERN CAPE
[Contact: Dr. Ida Pienaar, ida@hyperlink.co.za]

10 NOVEMBER | **Dr. Michaelis,** Epilepsy in children

5 DECEMBER | Masters Students**:** Cross-cultural norming of Neuropsychological tests

GAUTENG
[Contact: Ms. Andria Grobler, andriagrobler@gmail.com]

28 SEPTEMBER | **Dr. T Townsend (Neurologist),** Parkinson's Disease and related Disorders

26 OCTOBER | **TBA**

30 NOVEMBER | **Dr. Gian Marus (Neurosurgeon),** Secondary brain injury

KWAZULU NATAL
[Contact: Mr. Zethu Memela, zethum5@gmail.com]

23 SEPTEMBER | **Mr. Grant Strong,** Forensic Neuropsychological Assessments in Criminal Law cases: A case presentation

21 OCTOBER | **Ms. Kayleigh Pilkingtom-Williams & Ms. Sarah Okumu,** Psychotherapy and the brain (student presentation)

18 NOVEMBER | **TBC**

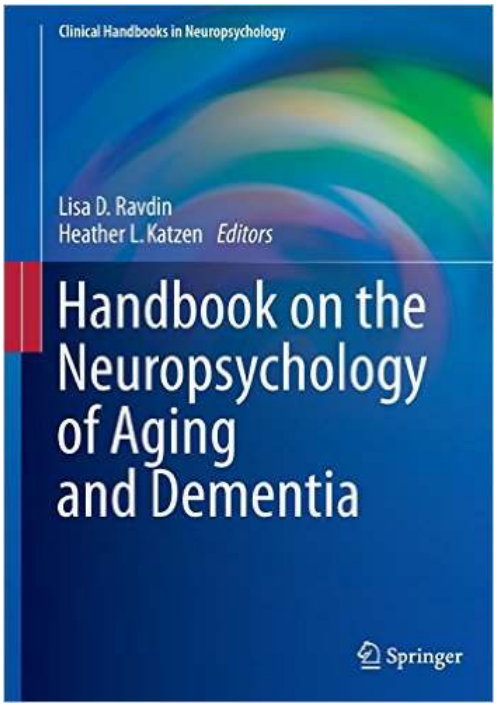
Congratulations to **Erika Steenberg** who obtained her SACNA Full Member certificate in September 2015.

BOOK REVIEW

Handbook on the NEUROPSYCHOLOGY of Aging and Dementia

Editors: Lisa D Ravdin & Heather L. Katzen. Springer Publishing, New York, USA.

written by
ELTON BLOYE



Advancements in medicine and science have produced wonderful fruits for humankind over the last century. The National Institute on Aging in the USA has cited that most babies born in 1900 did not live past the age of 50. However, life expectancy at birth now exceeds 83 years in Japan, and there are also many less developed countries who show a steady increase in life expectancy since World War 2. (Some notable exceptions occur in Africa due to the HIV/AIDS Epidemic). The reasons for the increase are broad, and not least of which include the development of immunization, better living standards, more nutritious diets, cleaner drinking water, and of course, advancements in medicine that keep people with chronic medical conditions alive for longer.

The flip side of this coin is that older adults are the fastest growing segment of the population, and neuropsychologists are increasingly being called upon to evaluate senior citizens for a range of cognitive, emotional and behavioural complaints that are considered abnormal. Predictions are that in the region of 15-20% of the baby-boomer generation will develop some form of cognitive decline over the course of their lifetime, with estimates escalating up to 50% for those achieving well advanced age.

With the above in mind, the Neuropsychologist working with aged populations faces a complex menagerie of diagnostic and treatment issues, that may at first bring about more questions than answers in more complicated cases:

- What is considered normal behaviour for a geriatric patient, and what is considered abnormal?
- How does one distinguish between neurological etiologies (e.g. dementia) and psychological etiologies (depression) having an impact on test scores?
- If dementia is diagnosed, what subtype is being presented?
- Are there chronic medical conditions or medication effects that may be affecting cognitive functioning?
- How do I accurately measure cognitive functioning, when the patient starts to fatigue 20 minutes into a testing session?
- At what point is it safe to say that an elderly individual cannot handle their own financial affairs, or live independently?

The Handbook on the Neuropsychology of Aging and Dementia (Ed. : Ravdin & Katzen) is a resource to assist psychologists in providing clarity and possibly some answers to the aforementioned questions. The book is a series of papers, written by expert practitioners, who have been recognised by their peers in the field of geriatric neuropsychology. The text is divided into two parts:

Part 1 deals with the special considerations for the evaluation of older adults, describing the complexities of conducting an assessment with the geriatric patient, encouraging contextualisation of assessment findings within the literature, and also reviewing potential treatment options and some of the practical implications in dealing with the healthcare and medico-legal systems in the USA.

Although some chapters are not directly applicable to the South African context, there are certainly a number of general points to draw from to guide the South African psychologist in their considerations for case management. An excellent feature of the book are the "Clinical Pearls" which occur at the end of chapter, which is a user-friendly list of items extracted from the text that include expert tips and key take-home messages on each topical area.

Below is a list of the chapter titles:
01_ Special Considerations for the Neuropsychological Interview with Older Adults
02_ Consideration of Cognitive Reserve
03_ Considerations for the Neuropsychological Evaluation of Older Ethnic Minority Populations
04_ The Assessment of Change: Serial Assessments in Dementia Evaluations
05_ After the Diagnosis of Dementia: Considerations in Disease Management
06_ Sleep and Aging
07_ Medications and Cognition in Older Adults
08_ Assessment of Depression and Anxiety in Older Adults
09_ Neuropsychological Assessment and Management of Older Adults with Multiple Somatic Symptoms
10_ Driving Evaluation in Older Adults
11_ Environmental Design for Cognitive Decline
12_ Prevention of Cognitive Decline
13_ Clinical Neuropsychology Practice and the Medicare Patient
14_ Professional Competence as the Foundation for Ethical Neuropsychological Practice with Older Adults
15_ Ethical Considerations in the Neuropsychological Assessment of Older Adults

Part 2 of the text deals with more diagnosis-specific content, and focuses on some of the more common referral questions that are likely to be encountered when working with this group. Neuropsychologists will be please to encounter suggestions for particular test batteries, as well as points on differential diagnosis between normal aging, dementia, psychiatric conditions and other chronic/non-chronic medical conditions which are so often present in the aged population. It is not only Alzheimer's disease that is the focus of attention. A multitude of conditions such as other dementias, cerebrovascular accident, Parkinson's disease and other neurological conditions are discussed specifically.

The chapter titles in Part 2 include the following:
16_ Mild Cognitive Impairment and Normal Aging
17_ Differential Diagnosis of Depression and Dementia
18_ Assessment of Alzheimer's Disease
19_ Vascular Cognitive Impairment
20_ Assessment in Acute Stroke Rehabilitation
21_ Accurate Assessment of Behavioural Variant Fronto-temporal Dementia
22_ Movement Disorders with Dementia in Older Adults
23_ Neuropsychological Considerations for Parkinson's Disease Patients Being Considered for Surgical Intervention with Deep Brain Stimulation
24_ Idiopathic Normal Pressure Hydrocephalus
25_ Episodic and Semantic Memory Disorders

The field of neuropsychology remains integral to the identification and management of late-life neurological conditions. This makes the Handbook of the Neuropsychology of Aging and Dementia an indispensible tool for any psychologist who regularly assesses cognitive and emotional functioning in the elderly. There appears to be much need for accurate assessment of cognitive functioning in aged individuals, especially in those cases of mild cognitive impairment where diagnosis is not clear, and where the neuropsychological assessment report is relied upon to quantify age-related cognitive impairment, and or assist with diagnostic issues. Not only does a text such as this give useful tips which assist in making the Neuropsychologists assessment more valid and reliable, but it also helps to provide a system to assist in management considerations within this patient population. This text is a worthy companion for any psychologist who assesses patients over the age of 50.

Alzheimer's SOUTH AFRICA

I see her dressed in her white linen pants and flowered shirt, sitting in a chair. Her soft grey hair has been neatly brushed, though not (I know) by the hands that lie still in her lap. There is no expression to read in her face and her lovely brown eyes look straight ahead, seemingly right through the group of woman stringing bead necklaces at a nearby table. Though I am in her line of vision, she doesn't notice my approach. I reach out and touch her shoulder. She looks up, startled at first and then a little puzzled. I say: "Hi Mom, its Sandy! I'm here to see you". A tentative smile crosses her face and then spread to her eyes. I hug her and kiss her cheek. She reaches for my hand, draws it to her face and says: "OOOHHHH".

written by
PETRA DU TOIT
National Executive Director
Alzheimer's SA

Alzheimer's South Africa is a registered non-governmental welfare organisation rendering support and services to people affected by Alzheimer's disease and other forms of dementia. The organisation was started 30 years ago in 1985 and has grown to a national organisation with branches throughout South Africa. We are dedicated to improve the quality of life of people living with dementia and those affected by it.

Alzheimer's has become one of the fastest growing diseases in the world today. At present it is estimated that there are more than 44.4 million people living with dementia worldwide and the number will rise to over 135.5 million by 2050. Lack of awareness and understanding has resulted in insufficient resources to address this crisis. Worldwide, attention to this rapidly growing problem is so small that most of those affected continue to suffer without help, or hope. Our organisation strives to support these people and their families. For us it is important to treat Alzheimer patients with the utmost compassion and respect, and that those who take care of them are supported in the major task of looking after a person affected by Alzheimer's. We therefore offer a number of support services, including:

SUPPORT GROUPS THROUGHOUT SOUTH AFRICA

These meetings are invaluable sources of information, support and encouragement for both people with dementia and their caretakers. By means of monthly informal gatherings carers are given the opportunity to share information and experiences and learn essential management and coping skills. There are approximately 90 support groups in South Africa. One of our goals is to start support groups in rural areas of our country and thereby reach people who would not otherwise have access to support services.

COUNSELLING

Counselling services are available at our offices as well as telephonically and through the helpline. This remains an important source of support and information.

EDUCATION AND TRAINING

Alzheimer's SA provides an increasing number of courses relating to dementia care, throughout South Africa. Staff and trained volunteers are also available to give talks to interested community groups and national conferences are held regularly.

INFORMATION

Resource centres at our offices offer a growing selection of books, videos, journals, reports and information sheets. These can be mailed to members and interested parties at minimal cost.

AWARENESS

One of ASA's objectives is to increase awareness and acceptance of all forms of dementia in our country. We find that there is still a lot of disinformation and ignorance about dementia. There were various incidents where elderly people displaying strange behaviour were seen as bewitched/evil spells being placed on them by their ancestors. These individuals were abused and in some cases even stoned or burnt to death. In an effort to stop this abuse we are trying to create greater awareness amongst communities in rural areas by arranging talks on community radio stations, visiting schools and clinics in underserved areas to educate the youth and providing training to community based care-providers as well as ancillary staff of care centres.

In South Africa the most common forms of dementia include

- Alzheimer's disease
- Vascular dementia
- HIV/AIDS related dementia
- Korsakoff's dementia
- Post traumatic dementia

Alzheimer's SA is affiliated with Alzheimer's Disease International (ADI). According to ADI, Alzheimer's disease is the most common cause of dementia and accounts for 60 – 70% of all cases. Alzheimer's disease and some of the other dementias are progressive, degenerative illnesses that attack the brain. They affect people's abilities, impacting on all aspects of their life and upon others in their lives, particularly those who provide the day to day care.

As there is no cure for dementia, the main goal of management remains holistic physical and emotional care. Alzheimer's SA therefore wants to take hands with multi-professional specialists to strive towards the best medical and social care for patients and families in South Africa.

FUNDING

Although funding is always a challenge to us as a NGO, we try to be as creative and proactive as possible when it comes to fundraising.

Since 2013 ASA is a beneficiary of the annual national fundraising event in September, Casual Day. We also take part in other national events like cycle tours (Momentum 94.7 Cycle Challenge), road runs (The Race to End Alzheimer's – REA) and walks (Discovery 702 Walk the Talk). Fundraising initiatives are also launched by our regions and national office e.g. golf days, tea functions and a "ghost tour" as was recently held in Bloemfontein. The SA Lottery Distribution Trust Fund is one of our organisation's main sponsors at the moment. However, Alzheimer's South Africa is always in need of money to be able to render the much needed services throughout South Africa.

CONTACT DETAILS

Alzheimer's SA National Office:
Tel: 011 792 2511 / Fax: 011 792 7135

Eastern Cape Region:
Tel: 081 350 8079 / Fax: 086 501 2223

Free State Region:
Tel: 051 522 4894 / Fax: 086 647 0024

Gauteng Region:
Tel: 011 346 2757 / Fax: 086 634 2623

Kwazulu-Natal Region:
Tel: 031 702 8811 / Fax: 031 702 4321

Mpumalanga Region:
Tel: 013 007 0089 / Fax: 086 630 0509

Northern Cape Region:
Tel: 053 831 5815 / Fax: 086 275 6107

Southern Cape Region:
Tel: 044 533 0132 / Fax: 044 533 0132

Western Cape Region:
Tel: 021 979 2724 / Fax: 086 238 5366

Banking details: Absa
Account name: Alzheimer's SA
Current Account number: 4055402536
Branch code: 632005
International Swift code: ABSAZAJJ632005

National Helpline: 0860 102 681
www.alzheimers.org.za

SACNA
ONLINE ENHANCEMENTS

In an effort to make transactions easier and more user-friendly, SACNA has upgraded its website to accommodate online payments, as well as enhanced capacity for online member portfolio management. The current trends in e-commerce show that more and more people prefer to transact online as the years progress. In partnership with ABSA bank, Virtual Card Services (VCS) and our IT service provider, In-The-Net Technologies (ITNT), we hope that this new feature will only enhance the service that SACNA already currently provides.

IMAGE 1

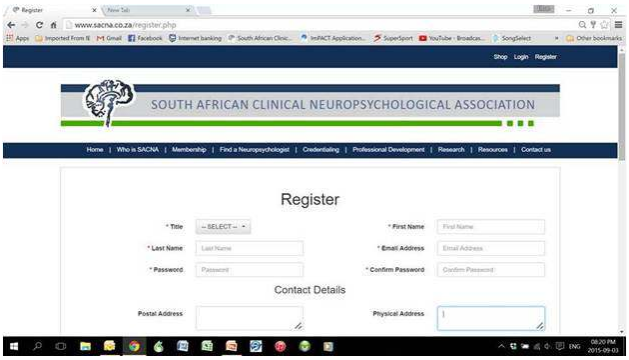


IMAGE 2

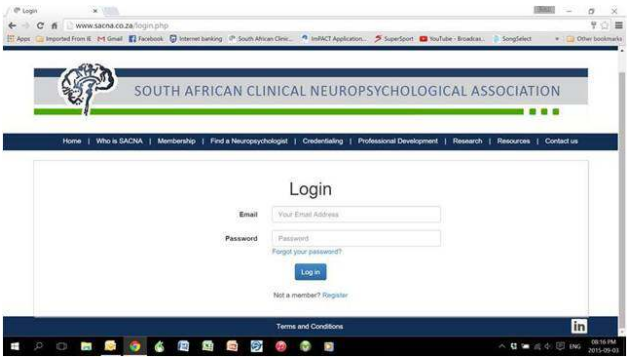
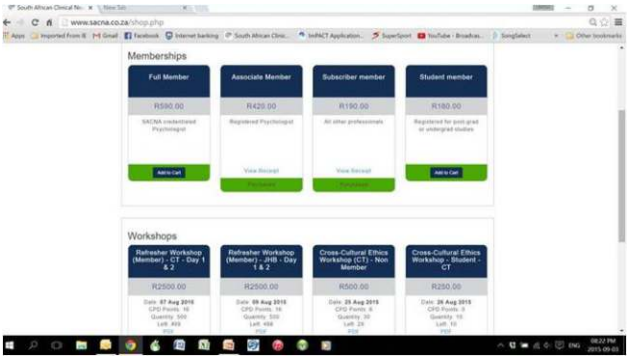


IMAGE 3



Below we provide you with a step wise process, that will allow you as a SACNA member to get the best out of the new website:

STEP 1: REGISTRATION

- If you are a paid up member, but have not yet registered on the website, please go to the registration page, by clicking [Register] in the top right corner of the website. Complete the form, and you will receive notification of your registration shortly. [IMAGE 1]
- If you are a Full Member, you have been pre-registered, and need to change your password in order to Login. Press [Login] in the top right hand corner, and then select [Forgot your password?]. A password will be sent to your email address, and you can then return to the [Login] page. [IMAGE 2]

STEP 2: ONLINE PAYMENT

- The online payment gateway is located on the page entitled [Shop] and can be used to purchase an annual membership subscription, or can be used to pay for courses SACNA offers. You will need to login to the website using your User Name and Password, and then select the product of your choice. Once you add a product, you will be taken to the VCS secure payment portal, where your Credit Card details will be required. Once the transaction has been completed, you will receive a receipt from SACNA as proof of your purchase. [IMAGE 3]
- With regard to annual subscriptions, two automatic reminders will be sent 1 month and 2 weeks prior to your subscription ending, offering you the chance to re-register for the forthcoming year.

Registration and payment of membership will allow you to qualify for course discounts, and will allow you to access the [Resources] page, where you can find up-to-date information pertaining to the field of South African Neuropsychology.

STEP 3: USER PORTAL

Accessing the User Portal enables you to do three things:
1) Edit your biographical information in the [My Details] tab
2) Track your CPD points using [My CPD registry}
3) Download any CPD certificates where you have purchased a course or workshop online. If you have registered for a workshop and have paid by EFT, the certificate will not be reflected as these need to be

For any questions relating to online registrations and tracking CPD points, please contact Elton Bloye on media@sacna.co.za.

Sleep AND THE BRAIN

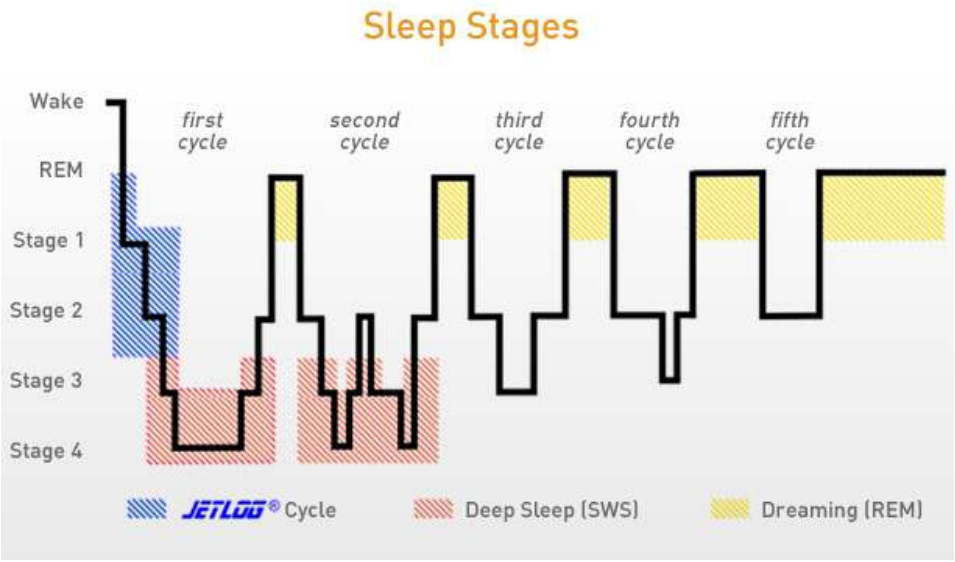
THE IMPORTANCE OF HEALTHY SLEEP AND ITS RELATIONSHIP TO PSYCHIATRIC DISORDERS

Sleep is a complex phenomenon that many researchers argue is common to all species of animals, from simple animals such as earthworms to complex animals such as mammals (Cirelli and Totoni, 2008). Humans spend approximately a third of their lives sleeping. From an evolutionary perspective, it is a vulnerable state where the individual is not conscious and is therefore susceptible to attack from other animals.

written by
DR. GOSIA LIPINSKA
Research Psychologist

Considering both the amount of time we spend in sleep and the fact that it is a vulnerable state, several authors have outlined important reasons for sleep. The most compelling reasons for sleep are related to theories of restoration and the importance of sleep for brain function (Cirelli and Tononi, 2008). Regarding theories of restoration, some evidence indicates that certain genes activate restorative processes specifically during sleep (Takahashi et al., 1968, Xie et al., 2013). Regarding the importance of sleep for brain function, studies report that sleep is important for off-line processing of waking experiences, such as the consolidation of memory (Walker, 2009).

Normal sleep is comprised of 5 electroencephalographic stages of sleep – 4 stages of non-rapid eye movement (NREM) sleep and rapid eye movement (REM sleep). In terms of NREM, stages 3 and 4 are considered slow-wave sleep (SWS). During a typical night of sleep individuals will cycle through stages NREM 1-4 and REM sleep approximately 4-5 times. The first half of the night is dominated by SWS, while the second half is dominated by REM sleep (Walker, 2009).



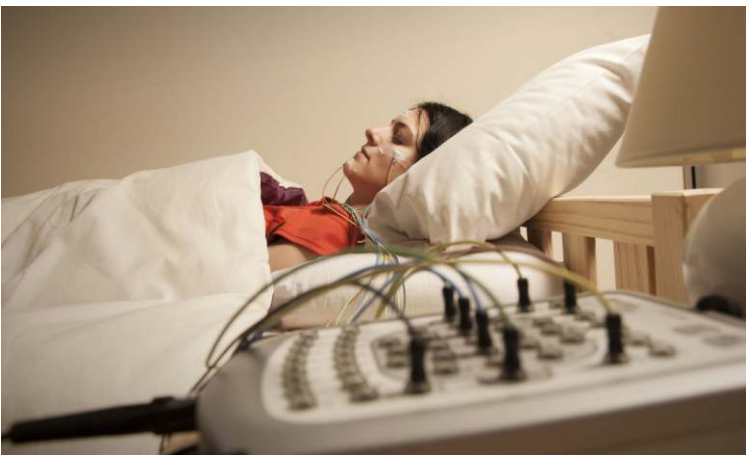
A fairly large body of research details the important role sleep plays in memory and emotion-related functions. Regarding memory function, SWS acts to redistribute memories from memory-specific areas in the brain, such as the hippocampus, to other areas where information can be integrated. Furthermore SWS acts to eliminate connections that are not salient, while retaining those that are. In contrast REM sleep strengthens individual synapses that are related to memory. In summary the progression of SWS to REM sleep through the night is important for memory consolidation (Diekelmann and Born, 2010).

Sleep is also important for emotion-related functions. For example emotional information is preferentially consolidated during sleep in comparison with neutral information (Walker and van der Helm, 2009). Sleep is also important for the extinction of previously conditioned fear responses – that is the attenuation and eventual elimination of such fear responses (Spoormaker et al., 2010).

Furthermore sleep is also important for emotional regulation – sleep deprivation leaves individuals with a bias for negatively valenced information and is associated with a pattern of brain activity akin to the fight-or-flight response. Concurrently sleep deprivation is associated with reduced inhibitory control from frontal regions that typically regulate areas of the brain associated with the fight or flight response, such as the amygdala (Yoo et al., 2007).

Most psychiatric disorders are associated with significant sleep disturbance. These disturbances are not all equal across various disorders but can include for example insomnia, nightmares or circadian disturbances. In addition psychiatric disorders are often characterised by compromised memory functioning and a

range of emotional disturbances. Traditionally these clusters of symptoms were studied separately, but mounting evidence suggests that sleep disruption contributes to memory and emotion-related disturbances in psychiatric disorders.



Research related to 3 of the most well-studied psychiatric disorders (depression, posttraumatic stress disorder (PTSD) and schizophrenia) suggest a relationship between sleep disruption and memory and emotion-related difficulties.

Sleep in depression is characterised by less SWS percentage, increased REM percentage and shorter REM latency (the time between sleep onset and the first REM period). Dresler and colleagues (2011) showed that medicated depressed individuals who had less SWS and REM percentage (less REM percent perhaps as a result of their medication) had poorer procedural memory consolidation in comparison with controls. Furthermore Cartwright and colleagues showed that REM sleep in depressed individuals is related to a negative self-concept and negative memories (Agargun and Cartwright, 2003). These results suggest that changes in REM sleep in depressed individuals are related to a bias for negative cognitions.

PTSD diagnosed individuals experience insomnia and nightmares. Polysomnographic studies demonstrate more NREM 1 light sleep, less SWS and increased REM density (the number of eye movements per REM period; Kobayashi et al., 2007). A study from the UCT Sleep Sciences laboratory showed that decreased REM percentage in PTSD-diagnosed individuals in comparison with controls, predicted difficulties with the consolidation of neutral declarative but not procedural memory (Lipinska et al., 2014). Furthermore Spoormaker and colleagues have hypothesised that sleep disturbance, particularly related to REM sleep, is a contributing factor to the heightened autonomic reactivity to threat-related cues in the environment in PTSD diagnosed individuals – described as a lack of fear extinction (Spoormaker et al., 2010).

In schizophrenia sleep is primarily characterised by disorganised and fragmented circadian rhythms (Jagannath et al., 2013). Seeck-Hirschner and colleagues(2010) showed that over a nap-period individuals diagnosed with schizophrenia had impaired procedural but not declarative memory consolidation in comparison to controls.

In both depression and schizophrenia, researchers have shown that genes that are implicated in the development of the psychiatric disorder are the same genes that are important for the regulation of the circadian clock (genes such as CLOCK, Per, Snap-25, CREB1; Pritchett et al., 2012, Baier et al., 2014). This research suggests that sleep disruption is not only a symptom of depression and schizophrenia, but in fact may be associated with the pathophysiology of these psychiatric disorders.

In conclusion there are a number of important implications of research examining the relationship between sleep and memory and sleep and emotion regulation in psychiatric disorders. Firstly this line of investigation may explain why sleep, memory and emotion regulation difficulties co-exist in psychiatric disorders - that it is no accident that these symptoms cluster together. Secondly this line of research has implications for treatment, as it may demonstrate that sleep disruption is an active component of psychopathology in these disorders, rather than a passive symptom. The further implication of such a finding is that treating sleep disruption will result in an alleviation of other symptoms of the disorder. Thirdly this line of inquiry highlights sleep as a critical biological process that is integral linked to our psychological well-being.

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Neuroimaging

IN THE CLINICAL NEUROPSYCHOLOGY PRACTICE

Modern imaging techniques are able to visualise the brain in its most intricate detail, such as the unprecedented view of the vestibular and auditory apparatus seen in Fig. 1. Since neuroimaging forms an important part of the practice in all clinical neurological sciences and a substantial part of most neurological clinicians' research, familiarity with some of the intricacies of neuroimaging has becomes increasingly pertinent. If we consider that neuroimaging begins with the first radiograph of a skull taken in 1895, we could imagine the disappointment of those early pioneers as they realised that the brain was invisible to this 'new radiation'. Indeed most of the history of neuroimaging has involved the relentless pursuit of an image of the brain (Adam et al., 2015). This was achieved with the first CT images in 1972 (Fig. 2).

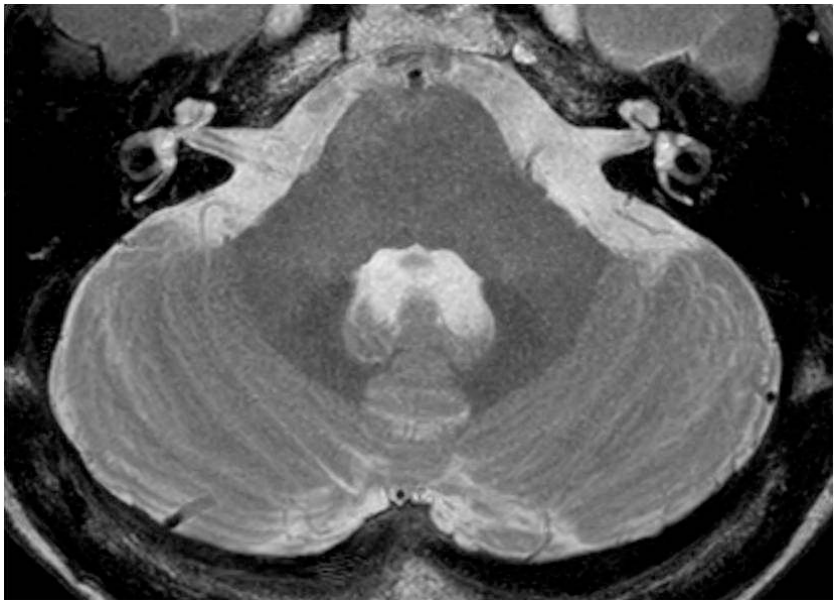

FIG 1

written by
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Despite the relative availability of high-resolution routine neuroimaging, it is rarely utilised to its full extent to inform the hypothetico-deductive method in clinical neuropsychological practice. The reason for this is two fold: firstly, most neuropsychologists today are established clinicians who don't necessarily have the time to invest in developing the interpretive skills required in reading brain scans; secondly, radiological reports of imaging are primarily concerned with diagnosis and rarely venture into describing in detail, the precise neuroanatomical involvement of the pathology or its morphology to the extent that the report offers a source of clinically meaningful information for the neuropsychologist of today.

Therefore, an important source of information, secondary only to the history taking of the patient, is not being utilised. Enter clinico-anatomical lesion analysis. This is essentially a formal report written upon examination of the brain scans, by a clinical neuroanatomist who has specialised in clinical neuroimaging, describing in great detail the precise neuroanatomical extent of the lesion. Neuropsychologists play a central and definitive role in determining whether cognitive deficits correspond with an imaging finding. The referral question: “correlate with clinical findings to determine significance” has graced the desk of many a neuropsychologist, and often all the clinician has to go by is the brief report of the radiologist.

Parsons et al., (2014) illustrates this beautifully with the following scenario: 67-year-old woman complains of memory problems to her primary care physician, who orders an MRI of the brain. The imaging demonstrates a parafalcine meningioma. The patient has been referred to your facility to be evaluated by a neurosurgeon for resection. The neurosurgeon refers this patient to you to determine whether or not her memory problems are directly related to the meningioma. If so, surgical resection of the mass is pertinent. If not, they'll likely opt to observe with serial imaging.

In such a situation, the appearance of the lesion on imaging can provide a wealth of data when integrated with your neuropsychological evaluation. The history of this patient demonstrates a circumspect and insidious decline in cognitive function over the past 3 years. There is also a family history of dementia. The radiologist report reads: “left sided parafalcine meningioma.

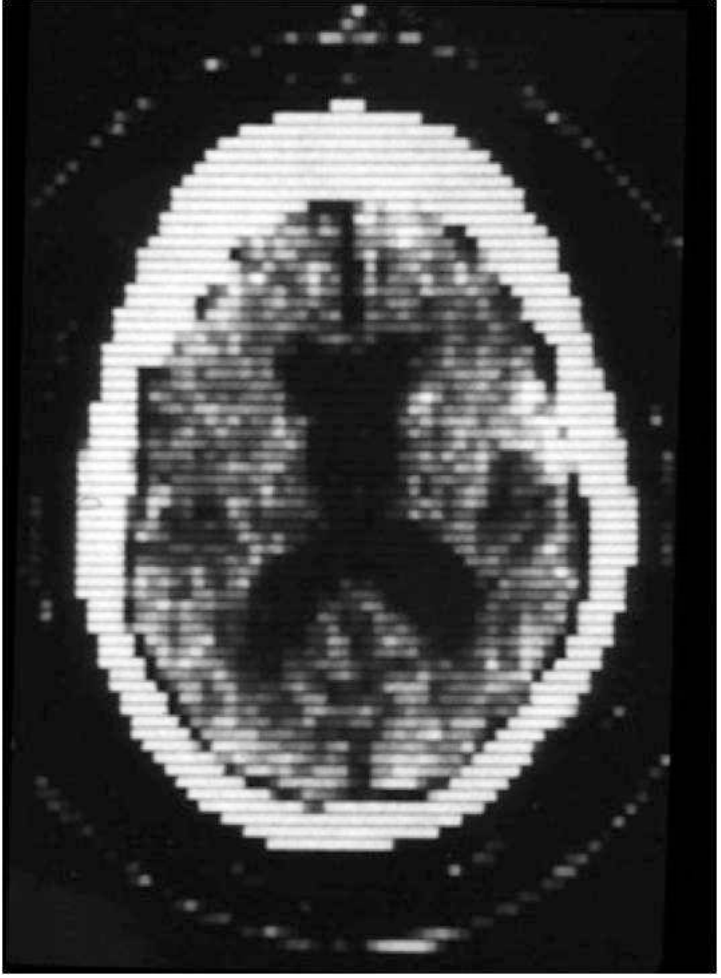

FIG 2

When you review the imaging, you see that the mass is about 1 cm in diameter, positioned along the interhemispheric fissure abutting the falx, near the frontal poles, with no surrounding parenchymal reaction and minimal mass effect. Let us assume that upon your assessment of the patient, there is evidence of a significant consolidation-based memory impairment, as well as milder but significant signs of language dysfunction.

With this confluence of findings, you can inform the neurosurgeon that the clinical picture is more in keeping with the early stages of a neurodegenerative disorder, possibly of an Alzheimer's type. Furthermore, you could advise that surgical resection would be unlikely to improve this patient's clinical status. A referral to a neurologist and a course of constant vigilance would be in the best interests of this patient.

A different clinical vignette demonstrates how even retrospective investigation of the imaging can fill in large missing pieces of the clinical picture. Consider a 46-year-old man who has a history of epilepsy, cerebral aneurysms and hypertension. He presents with memory problems ?status post flu vaccination. Neurology notes that this patient demonstrates a rapidly progressive dementia with motor signs, and refers him to neuropsychology to rule out Huntington's disease and several other degenerative subcortical pathologies. A radiology report of a CT brain reads “frontal and parietal encephalomalacia”. Upon examination, you find that the patient has a striking ideomotor apraxia, anomic aphasia and extrapyramidal rigidity with asymmetric motor disturbances. These findings are not in keeping with a subcortical degenerative picture. Only upon reviewing the imaging does the entire clinical presentation make sense.

Firstly, you notice that there is no evidence of degenerative changes to the subcortical gray matter. Secondly, you note there is evidence of significant post surgical **left hemispheric cortical** encephalomalacia. The posterior aspect of the middle frontal gyrus is lesioned, however the precentral gyrus, and motor association area directly adjacent to it is spared. You note that a large aspect of the left parietal/temporal/occipital heteromodal association cortex is lesioned, primarily involving the inferior parietal lobule. The damage seems to have been caused by surgical intervention, as there is evidence of aneurysm clips adjacent to the damaged cortex.

With this information, and your clinical impression from the assessment of the patient, you inform Neurology that the clinical picture seen here is more in keeping with corticobasal degeneration which is probably superimposed onto this patient's damaged left hemisphere – which accounts directly for the apraxia and the aphasia. Furthermore you can exclude a subcortical degenerative pathology as there is no evidence on imaging, or in your assessment of subcortically mediated cognitive deficits. Clinical neuroimaging therefore plays an important part in the neuropsychological assessment, and clinical lesion analysis makes the imaging findings accessible and clinically useful to the practicing neuropsychologist.

Dr. Hattingh conducts imaging analyses in a number of contexts applicable to the Neuropsychology practitioner.

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Oliver Sacks

9 JULY 1933 to 30 AUGUST 2015

On 30 August 2015, the world of neuroscience lost a great and most loved clinician, practitioner, researcher and author. Oliver Sacks died in his home as a result of a melanoma which had spread to his liver. His legacy as a Neurologist and Behavioural Scientist is well documented in the numerous publications, which has given insight into numerous unusual medical conditions, based on the case studies that he recorded throughout his long and interesting life. There was often a humorous bent to his writings and his influence has spanned a number of interconnected disciplines including medicine, the social sciences, the arts and the workings of the natural world. He was regarded as the "poet laureate of medicine", and he will be sorely missed.