
Final Program
2020 Virtual Event
International Neuropsychological Society
July 1-2, 2020

WEDNESDAY, JULY 1, 2020

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| 1:00 AM - 2:00 AM | CE Workshop 1: Neuropsychological Aspects of Dementia Presenter: Andreas U. Monsch 1. MONSCH, AU Neuropsychological Aspects of Dementia |
| 1:00 AM - 2:00 AM | CE Workshop 2: Stroke in Neonates and Children: Ischemic Injury and Its Impact on Neurodevelopment Presenter: Christine Mrakotsky 1. MRAKOTSKY, C Stroke in Neonates and Children: Ischemic Injury and Its Impact on Neurodevelopment |
| 1:00 AM - 2:00 AM | CE Workshop 3: Executive Functioning: A Function-Led Model of the construct Presenter: Yana Suchy 1. SUCHY, Y Executive Functioning: A Function-Led Model of the construct |
| 1:00 AM - 2:00 AM | CE Workshop 4: How Virtual Reality Related Technology May Add Value to Neuropsychological Assessment Presenter: Unai Diaz-Orueta 1. DIAZ-ORUETA, U How Virtual Reality Related Technology May Add Value to Neuropsychological Assessment |
| 11:00 AM - 3:00 PM | Day 1 Stream Moderators: Sandra Lettner, Laura Hokkanen, Martine van Zandvoort, Margaret O'Connor, Morten Kringelbach, Michel Thiebaut de Schotten, Robert Stickgold |
| 11:00 AM - 11:30 AM | Program Welcome Presenters: Sandra Lettner, Laura Hokkanen, Martine van Zandvoort |
| 11:30 AM - 12:00 PM | INS Presidential Address: From the Rat Man to HM: What Single Case Studies Teach Us About Theories of the Mind |

- Presenter: Margaret O'Connor**
From the Rat Man to HM: What Single Case Studies Teach Us About Theories of the Mind
1. O'CONNOR, M
- 12:00 PM - 1:00 PM**
- Keynote 1: Eudaimonia and Hedonia: Brain Systems for Thriving and Surviving**
Presenter: Morten Kringelbach
Eudaimonia and Hedonia: Brain Systems for Thriving and Surviving
1. KRINGELBACH, M
- 1:00 PM - 2:00 PM**
- Keynote 2: The Architecture of Functional Lateralization and Its Relationship to Callosal Connectivity in the Human Brain**
Presenter: Michel Thiebaut de Schotten
The Architecture of Functional Lateralization and Its Relationship to Callosal Connectivity in the Human Brain
1. THIEBAUT DE SCHOTTEN, M
- 2:00 PM - 3:00 PM**
- Keynote 3: Sleep, Memory and Dreams: A Neurocognitive Approach**
Presenter: Robert Stickgold
Sleep, Memory and Dreams: A Neurocognitive Approach
1. STICKGOLD, R
- 11:00 AM - 5:00 PM**
- Poster Session 01: Categories-Acquired Brain Injury; Concussion/Mild TBI; TBI**
1. COOK, NE
Neurocognitive Test Performance and Concussion-like Symptom Reporting Among Adolescents with Autism Spectrum Disorders
2. YMER, L
Cognitive Behavioural Therapy for Sleep Disturbance and Fatigue Following Acquired Brain Injury
3. ANZAKI, F
Analysis of Brain Function in Chronic Traumatic Brain Injury Cases with Working Memory Disorder using functional Near-infrared Spectroscopy
4. RAKERS, SE
Trajectories of fatigue after mild traumatic brain injury: a prospective study
5. REYES, J
An investigation of factors associated with head impact exposure in elite male and female Australian football
6. REYES, J
Concussion screening in community-level football: The association between observable signs of concussion, SCAT3 and Cogstate performance
7. VAN HEUGTEN, C
Do fear and catastrophizing thoughts about mental activities lead to fear-avoidance behaviour in a community sample? An experimental study
8. MATUTE, EA
Executive functions and brain connectivity after moderate and severe TBI in adolescence
9. MALINOWSKA, E
The dynamics of executive functioning changes after frontal lobes mild traumatic brain injury (mTBI) in adults
10. EVANS, F
Retrieval practice enhances memory for names in stroke survivors
11. BASILE, R
Three Factor Solution of CNSVS in Concussed Youth
12. MAKOVEC KNIGHT, J
The Association Between Soft-shell Headgear, Concussion and Injury Rates in Youth Australian football: A Prospective Cohort Injury Surveillance Study

13. MAKOVEC KNIGHT, J Soft-shell Headgear, Concussion and Injuries in Youth Team Collision Sports: A Systematic Review
14. STENBERG, J Self-Reported Cognitive Symptoms are Only Weakly Associated with Cognitive Test Performances after Mild Traumatic Brain Injury
15. GERALDO, A Relationship between premorbid intelligence, cognitive functioning and functionality after Acquired Brain Injury
16. GLAZER, S When “recovery” doesn’t mean “back to normal”: Detangling the neural substrates of behavioral morbidities after childhood TBI
17. GUTIÉRREZ MARTIGNON, M Cognitive outcome of a pediatric stroke case: moyamoya disease
18. CONNOLLY, LJ Light Therapy for Fatigue Following Acquired Brain Injury
19. CROWE, LM The development of attention following a traumatic brain injury in very early childhood
20. FRENCH, LM Influence of Resilience on Neurobehavioral Outcome following Mild, Moderate, and Severe Traumatic Brain Injury (TBI) in U.S. Military Service Members and Veterans
21. VAKIL, E The effect of facial expressions on the process of learning and memory of Face images among healthy individuals and those with traumatic brain injury (TBI), examined using eye movements
22. DOUCETTE, MM The influence of competitiveness on sports-related concussion reporting among athletes in high, low, or no contact sports
23. BLOCH, A Relationships between age, chronicity and community-based neuropsychological rehabilitation outcomes
24. WETHE, JV Preliminary Validation of a Sideline Concussion Identification Protocol for Trained Sports Parents
25. KINGSLEY, KT A group cognitive behavioral approach to social participation and community integration following acquired executive dysfunction
26. BLANCO-CAMPAL, A Application of the Boston Process Approach Methodology to the Evaluation of Sports Concussion: A Game Changer?
27. KARR, JE A Comparison of Psychological, Neuropsychological, and Symptom Outcomes following Complicated versus Uncomplicated Mild Traumatic Brain Injuries
28. FILIPCIKOVA, M Review of social disinhibition in moderate-to-severe TBI patients

11:00 AM - 5:00 PM

Poster Session 02: Categories- Addiction; Drug/Toxin Disorders; Psychopharmacology

1. GOODEN, JR You mean it’s not a brain injury? Challenges of diagnosing acquired brain injury in addictions
2. KIM, M-S Decision-making deficits in college students who binge drink: Iowa gambling task and prospect valence learning model
3. MATTE-LANDRY, A Cognitive outcomes of children who have experienced complex trauma: a systematic review of longitudinal studies
4. JORNA, LS The efficacy of anti-inflammatory treatment in postoperative cognitive decline: a meta-analysis
5. RUPP, CI Do social cognition deficits in alcohol dependence recover under controlled abstinence?
6. PRAWIROHARJO, P EEG Findings in Porn-Addicted Adolescents
7. HERNÁNDEZ VÁZQUEZ, M A case of frontotemporal dementia phenocopy of the apathetic behavioral variant

8. NARDO, T Executive Dysfunction in Drug and Alcohol Rehabilitation – Risk Factors & Remediation
9. RONOLD, EH A Longitudinal Five-year Follow Up Study of Cognitive Function in First Episode Major Depressive Disorder
10. KRENGEL, MH A Longitudinal Evaluation of Neurotoxicant Exposures and Symptoms of PTSD in Gulf War Veterans from the Ft. Devens Cohort (FDC)
11. AYELE, BA Neuro-medical complications of fluoride exposed populations in the Main Ethiopian Rift Valley

11:00 AM - 5:00 PM**Poster Session 03: Categories- ADHD; ASD; Learning Disabilities**

1. BALCONI, M The effect of an empowerment protocol based on Sensory Device on reading performance: evidence from a case-to-controls study
2. HERNÁNDEZ-TORRES, D Social cognition as a predictor of ADHD symptomatology in school-aged children
3. BRAW, YK Integrating the MOXO-d-CPT with an Eye Tracker: A Feasibility and Validity Study
4. VERCHE, E Differences in executive functioning in gifted children with and without ADHD
5. DOWNES, M Exploring the early development of preschool children with a familial history of ADHD
6. BODART, A Electrodermal reactivity and emotional appraisal in adults with autistic spectrum disorders
7. LIND, A Gender differences in visual perception and neural correlates in very preterm preadolescents
8. YÁÑEZ-TÉLLEZ, G Executive functioning in adult attention-deficit/hyperactivity-disorder and comorbid borderline personality disorder
9. ARELLANO- VIRTO, P-T Social Cognition and Executive functioning in Adult Attention-Deficit/Hyperactivity-Disorder with and without Antisocial Personality Disorder comorbidity
10. SUAREZ, I How is temporal processing affected in children with attention-deficit/hyperactivity disorder?
11. TÉLLEZ SILVA, M Learning disorder and ADHD comorbidity: Executive functions deficits and quality of life
12. HERNÁNDEZ VÁZQUEZ, M Effects of a phonological awareness intervention program. A case study of dyslexia
13. SEABRA, AG Cognitive profiles in reading components in Brazilian adolescents with ADHD and Dyslexia
14. BITAN, T Language-dependent neurocognitive compensation mechanisms for reading
15. DEGRÉ-PELLETIER, J Functional connectivity at rest in autistic children and adults: developmental overconnectivity and associations with reasoning
16. WESTERS, IA A literature review on the relation between habituation and intelligence beyond infancy
17. VEKETY, B Feasibility and efficacy of a neurofeedback-assisted mindfulness program with children
18. VELOSO, A Executive functioning impairments in children with Attention-Deficit/Hyperactivity Disorder: Performance-based measures versus behavioral-ratings

19. SAI, FZ Exposure to Auditory-Visual Cues improves Facial Expressions Understanding in Children with Autism and Down Syndrome

11:00 AM - 5:00 PM**Poster Session 04: Categories: Aging; Dementia (AD & Non-AD); MCI; Memory Functions**

1. PUCCI, V Reserve Physical Activity and Current Physical Activity in aging: What effect on cognitive performance?
2. DUBON, E Mini Mental Status Examination predicts Cognitive Impairment in Alzheimer's Disease
3. JANSSEN, N Speed of Word Finding Depends on Ventral Tract Integrity in Primary Progressive Aphasia
4. YOKOGAWA, M Memory recall testing of upper limb movement: Comparison of younger and older people
5. NAVARRO-PRADOS, A Are support groups effective for family caregivers of people with dementia?
6. SONCU BUYUKISCAN, E An Investigation of the Relationship between CSF Amyloid Beta Level and Episodic Memory Performance within the Alzheimer's Disease Continuum
7. FUJITA, T The Effects of Support for Medication Adherence Using Smartphones in Alzheimer's Patients Using Skype
8. YILDIRIM, E Processing Speed Is Associated with Social Media Use Among Healthy Older Adults
9. JOLOBA, SS Capacity of the health facilities to manage Alzheimer's and related dementia diseases in Mukono district: Challenges and recommendations
10. BABIRYE, I Implementation of Global Action Plan On the Public Health Response to Dementia (GAPD) in Sub-Saharan Africa: Comprehensive Reviews
11. IWAHARA, A Interoceptive awareness and cognitive functions in middle aged and older adults
12. DEMETER, G Decreased behavioural pattern separation in a patient with amnesia following herpes encephalitis
13. BERTENS, D A Dutch Adaptation and Validation of the Everyday Memory Questionnaire-Revised
14. SZOLLOSI, A Hippocampus-related behavioral pattern separation is equally high for emotional and neutral memories in OCD
15. GRAUPERA, MV People with Mild Cognitive Impairment (MCI) co-design a Smart City mobile phone solution (INFINITY) to promote healthy and cognitive activities.
16. HUA, M-S Unfamiliar Odor Recognition Ability in Individuals with Subjective Memory Decline
17. TSE, CK Prospective memory training in older adults: A systematic review
18. LEHTO, E Association between subjective prospective memory complaints and prospective memory performance in adults with a history of perinatal risks
19. BEZDICEK, O The learning/encoding versus retrieval deficit hypothesis in idiopathic REM sleep behaviour disorder
20. SKEA, N Evaluating the Patient Impact of Delirium in Australian Acute Care
21. MARKOSTAMOU, I Spatial naming deficits in mild Alzheimer's disease
22. GAROLERA, M Relationship between perception of social support and cognitive performance in people with Mild Cognitive Impairment (MCI)

23. QUINTANA, M Evolution of burden caregiver of subjects with mild cognitive impairment or mild dementia
24. DE WIT, L Repetition Priming in individuals with amnesic Mild Cognitive Impairment and Alzheimer's dementia: A systematic review and meta-analysis
25. FORET, JT Metabolic Syndrome and Cognition in Midlife
26. TER HORST, AT Does emotion recognition impairment in non-FTD dementia relate to empathy in daily life?
27. CASTELLS-SANCHEZ, A Sex differences in mechanisms involved in the exercise-cognitive benefits relationship
28. PEREZ-LAO, AR Socioeconomic status and its association with cognitive performance and functional autonomy in two cohorts of Panamanian elderly adults
29. DEKHTYAR, M Leptin- friend or foe?
30. PALMA CABRERA, I Cognitive performance and artistic practice in older adults
31. MEKKI BERRADA, L Identification of cognitive predictors of dementia in isolated rapid eye movement sleep behavior disorder using machine learning
32. HAYASHI, A Evaluation of the Episodic/lexical Memory Monitoring in Japanese Patients with Mild Cognitive Impairment and with Mild Alzheimer's Disease
33. AROLA, A Relationship between cognitive reserve and cognitive performance in subjects with cerebral white matter lesions
34. WONG, S Cognitive and socioemotional factors contributing to vulnerability to financial exploitation in dementia
35. MCGIBBON, T Detecting pre-clinical signs of MCI or dementia in healthy elderly populations: a new paradigm, the Verbal Associative Learning & Memory Task (VALMT), for assessing rapid forgetting
36. CECHOVA, K Spatial navigation performance and navigation-related brain structures in APOE E4 and BDNF Val66Met positive aMCI patients
37. CAVACO, S Memory impairment in systemic autoimmune diseases
38. VONK, JMJ The Role of Cognitive and Brain Reserve in Memory Decline and Brain Maintenance in Mid and Late-life: The SMART-MR study
39. NABUUMA, L Motivations for participating in the use of mobile smart phone App focusing on monitoring of hypertension among older persons in Uganda
40. NIKOLAI, T Changes in emotional creativity in Parkinson's disease
41. MATSUI, M Development of Japanese Cognitive Reserve Index questionnaire
42. ALHARTHY, MA Translation, cultural adaptation and validation of the Rivermead Behavioural Memory Test – 3rd edition (RBMT-3) into Arabic language-Pilot
43. OVIEDO, DC Association between ApoE4 expression and cognitive function in a Panamanian sample of elderly adults with mild cognitive impairment and Alzheimer's disease
44. BATTA, B Connection between source monitoring and suggestibility in the light of aging
45. BEREZUK, C Preliminary analyses validating the Functional Reserve Questionnaire in a clinical and cognitively normal older adult sample
46. HATTA, T Cognitive and physical activity functions in upper-middle aged people with urinary incontinence (UI): Evidences from the Yakumo Study
47. YLIRANTA, A Apraxia profiles differ between the clinical variants of frontotemporal dementia

48. URAZAN, JC Depression and Aging, Correlation in a Sample of Older Adults from Bogota-Colombia
49. NABANJA, A Non pharmacological factors associated with control of hypertension among older persons in Uganda: A cross sectional survey
50. MONTEMURRO, S Cognitive Reserve and world knowledge as predictors of naming performance in ageing
51. CONTRERAS, V Early onset cognitive impairment in a case of cortical siderosis
52. VESTBERG, S Biomarkers of Alzheimer's disease support neuropsychological MCI & SCD-classification
53. MITANOVSKA, T Effects of physical activity on mild Alzheimer's disease patients and everyday functioning through cognitive performances
54. ABREU, N Visuospatial Working memory binding performance on elderly with dementia and control

11:00 AM - 5:00 PM**Poster Session 05: Categories- Assessment; Intervention; EF; Forensic Neuropsychology; Education**

1. THOMAS, M Using CIRCuITS cognitive remediation therapy to improve the functioning of adults with schizophrenia
2. THOMAS, M Trial implementation of CIRCuITS cognitive remediation therapy for people with schizophrenia: Therapists' experiences
3. CRIVELLI, D Executive functions impairment and Substance Use Disorder: a new neurocognitive screening battery
4. CRIVELLI, D The effect of an intensive neurofeedback-based training on driving and stress management at the wheel: behavioural and autonomic outcomes
5. MOERMAN-VAN DEN BRINK, W Executive Dysfunction and Neuropsychiatric Symptoms in Patients with Korsakoff Syndrome
6. EVANS, J A pilot feasibility study of a randomized controlled trial of goal setting using the Values in Action Inventory of Strengths following brain injury
7. FITZPATRICK, C Screen time use in Canadian preschoolers: A short-term longitudinal study
8. ELKANA, O A modified version of the 2016 ACR fibromyalgia criteria cognitive item achieves improved correlation between subjective and objective measures of cognitive impairment
9. ELKANA, O Does the MoCA evaluate cognition in Fibromyalgia? Data from computerized cognitive assessment versus MoCA screening test
10. DVOŘÁKOVÁ, Z Adaptation and initial validation of the Czech version of Neuropsychological Assessment Battery Screening Module
11. VARAKO, N The single-case study of using the Formulation Template of the O. Zangwill Center and the Goal Attainment Scale for rehabilitation of a post-stroke patient
12. VERCHE, E Learning neuropsychological assessment through the use of clinical simulation: Students' perspective
13. NAVARRO-PRADOS, A-B Psychoeducational intervention on dysfunctional thoughts and problem-solving skills of dementia family caregivers
14. MARIANI, F Theory of Mind and Prefrontal Domains in Women and Men who committed homicides
15. DHILLON, S Development and Validation of the Cognitive Impairment Bias Scale for Depression

16. NAAMANKA, E The effects of neuropsychological telerehabilitation for traumatic brain injury - Supporting cognitive functioning and achievement of rehabilitation goals
17. SALAS, CE The Bangor Gambling Task: Development of a computerized version of an emotion based decision making task
18. KOKUBO, N A new tablet-based cognitive assessment tool, User eXperience-Trail Making Test (UX-TMT), sensitively detects subjective memory complaints in patients with Parkinson's disease
19. RABIN, L Development and preliminary validation of an informant report version of the Test of Practical Judgment (TOP-J-inf)
20. MAES, JHR Training and transfer effects of working memory training in abstinent long-term heroin users
21. WILLINGER, U Cognitive processing of telling lies: an event-related potential study
22. MARBERGER, TK Cognitive dysfunctions in chronic heavy drug abusers
23. RAMIREZ-HERNANDEZ, D A comparison of three methods to train the use of smartphone memory apps after acquired brain injury (ABI): A three-armed phase II randomised controlled trial
24. SHIBASAKI, M Cognitive Rehabilitation for Facial Expression Recognition in Patients with Traumatic Brain Injury: A Behavioral and Event-Related Potential Study
25. SHEN, C-H The Therapeutic Effects of Integrative Neuropsychotherapy Model for Executive Functions Deficits in School-age Children Born Very Low Birth Weight with Normal Early Development
26. COSTA, R Benefits of including cognitive rehabilitation through personalized virtual reality and paper-and-pencil interventions in the Alcohol Use Disorder treatment: a randomized controlled study
27. HUA, M-S Evaluation of dual processes in recognition memory using two verbal list learning tests in Taiwan: A preliminary study among young adults
28. FORET, JT Transcranial Laser Therapy Increases Resting State Functional Connectivity in the Default Mode Network
29. PINTO, J Sensory Stimulation Programs in Dementia: A Systematic Review
30. UDALA, MR Personality Assessment for Stroke Patients: Validation of the Personality Assessment Inventory – Short Form
31. MOTAMED YEGANEH, N Preliminary Effects of the Arrowsmith Intensive Program on Student Cognitive Functioning
32. GIOVAGNOLI, AR Creating abstract designs and frontal lobe epilepsy
33. MOROOKA, T Unique abnormalities of Rey-Osterrieth Complex Figure Test after an episode of status epilepticus
34. HAVLÍK, F Brief Visuospatial Memory Test–Revised: Czech Normative Study in Young and Middle-Aged Adults
35. STENBERG, J Developing a Cognition Endpoint for the CENTER-TBI Neuropsychological Test Battery
36. STENBERG, J Test-Retest Reliability for Cognitive Composite Scores in the CENTER-TBI Neuropsychological Test Battery
37. SEABRA, AG Intervention in executive functions improves performance in a fluid intelligence test in adolescents
38. BELLANI, CA Have young girls and boys already developed cognitive pre-requisites for driving?

39. HAMILTON, JM Unfortunately, they don't go away. Evaluation of executive function deficits in chronic TBI survivors using a new virtual reality task, the Jansari assessment of Executive Functions
40. MACHANDO, D The Trail Making Test: Normative Data from Zimbabwe Adult Population
41. MACHANDO, D Normative Data for a Brief Test of Attention in a Zimbabwe Adult Population
42. MACHANDO, D The Symbol Digit Modalities Test: Normative Data for an Adult Population from Zimbabwe
43. JANSARI, A Validation of the Hebrew version of the Jansari assessment of Executive Functions for Children (JEF-C©): translation, adaptation and validation
44. GUTIÉRREZ RUIZ, K Executive functions as determinants of bullying behavior at school age
45. HOLCOMB, MJ Are All Single Word Reading Tests Equivalent? A Head-to-Head Comparison of the TOPF and WRAT-4 in a Mixed Clinical Sample
46. HOLCOMB, MJ SVT meets PVT – Cross-Validating the New Incidental Memory Module for the Inventory of Problems-29 in a Mixed Clinical Sample
47. ZAPPAROLI, BML Coping Strategies and Executive Functions in Zambian Parents of Children with Developmental Disabilities
48. SEDO, MA “Five digit stroop”: Fluent speed of processing is the basis of reading development
49. FABIAN, R Development of an Indonesian test for symptom validity testing
50. JOLOBA, S Developing and Validating for Cognitive Screening Tools for Identifying and Intervening Dementia among Older Persons in Rural Uganda
51. MEGARI, K Healing hearts & protecting brains in the elderly
52. KOSKINEN, S Dual-Assisted Dance Rehabilitation (DARE): a novel multimodal rehabilitation tool for severe TBI
53. IBARRETXE-BILBAO, N Effectiveness of a psychoeducational intervention on cognition and functionality in family caregivers of patients with Parkinson´s Disease
54. MACHADO, A INSTACOG – A non-verbal screening test for cognitive impairment and dementia
55. LIGHT, S Empathy for Pleasure Recruits Frontal Executive Circuitry
56. ABREU, N Flii: Developing an Executive Function Program for Children to be Applied by Parents
57. ABREU, N Psychometrical Properties of a new Computadorized Measure of Attention: the Attentional Performance Test
58. ABREU, N Inhibitory Control and Cognitive Flexibility of Brazilian’s Pre-school and School Children
59. LAH, S Systematic Review of Paediatric Memory Questionnaires
60. HEPDARCAN SEZEN, I Validity and reliability of n-back task as a working memory task
61. BERNARDI, M Cross-cultural consistencies in neuropsychological profile of executive function in British and Brazilian children with poor motor skills
62. RYBKINA, J Brain care at home: feasibility and acceptability of a novel online memory intervention for individuals living with chronic neurological disorders
63. CASTAÑEDA-IBÁÑEZ, NN Crossfit: Neuropsychological functioning and psychosocial well-being
64. DIAZ-ORUETA, U Neuropsychological assessment and technology: can the infantry succeed without the artillery?
65. HIGGINS, D Neuropsychological assessment in individuals with low literacy levels: examples based on the Traveller Community in Ireland
66. BLANCO-CAMPAL, A Lost in Translation: Validation of the English-in-Ireland Philadelphia Repeatable Verbal Learning Test (EirPrVLT)

11:00 AM - 5:00 PM**Poster Session 06: Categories- Aphasia; Stroke; VCI; Visuospatial Functions**

1. STAROVASNIK ŽAGAVEC, B Relationship between information processing speed, attention capacity and verbal learning – pilot study on stroke patients
2. KADO, Y Visual cognitive function assessed using the Rey–Osterrieth Complex Figure test in children with difficulty in Japanese Kanji writing
3. LOETSCHER, T Can we improve the detection of spatial neglect with a Mobility Assessment Course?
4. HIGASHIKAWA, M Japanese aphasics' primary improvement mechanism using factor analysis - Is there a mechanism for universal language recovery?
5. KÖLBEL, M What are you looking for? Validation of VISMO-C a novel spatial memory test for children
6. JEON, M Visual spatial memory in children: Relationship with age, fluid intelligence, attention and sleep
7. CAMERINO, I White-matter microstructural integrity in small vessel disease with category fluency impairment
8. WOOD, L Sensitivity of Eye Tracking in Assessing Attentional Patterns in Allocentric Versus Egocentric Neglect
9. RUTLEDGE, K Using Visual Patterns Underlying Hemispatial Neglect Syndrome and the Implementation of Eye Tracker Technology to Predict Functional Outcomes in Stroke Patients
10. SCOTT, JL Hemispatial Neglect Interventions: An Investigation into Smooth Pursuit Eye Movement Training using Eye-Tracking Technology
11. OTA, S Echolalia in primary progressive aphasia
12. TIBURCIO CORTÉS, M Verbal-auditory attention in Language Development Disorder (DLD)
13. MLINARIČ LEŠNIK, V Multidisciplinary assessment of depression with the Aphasic Depression Rating Scale (ADRS) in aphasic stroke patients – a pilot study
14. GIL PAGÉS, M Cognitive recovery after stroke: Gender matters
15. VARAKO, N The effectiveness of the visual-spatial search in patients with unilateral spatial neglect
16. CONTRERAS, V Quantitative and qualitative evaluation of visuoconstructive skills. Comparison between a multiple figures protocol and Rey-Osterrieth complex figure test
17. THIELEN, H Post-stroke sensory sensitivity reduces quality of life: exploratory data
18. CHAMPOD, AS Behavioral and Electroencephalographic Effects of Prism Adaptation in Young Adults and Children
19. MAŃKOWSKA, A Leftward attentional bias in patients with end-stage renal disease - the effect of uremic toxicity or dialysis?
20. PERKINS, JD Post Traumatic Stress Symptoms in Newly Admitted Stroke Patients
21. VERBERNE, DPJ Early cognitive and emotional outcome after stroke is independent of discharge destination
22. VAN ZANDVOORT, MJE A Case of Pure Associative Visual Agnosia
23. VAN DEN BERG, NS The Neural Underpinnings of Facial Emotion Recognition in Ischemic Stroke Patients
24. IGNJATOVIČ BUGARSKI, V Wisconsin card sorting test and acute phase of ischemic stroke
25. BASAGLIA-PAPPAS, S Lexical processing impairment in people with post-stroke aphasia : between verbal and initiation impairment

26. HEIKKILÄ, J Neural processing of congruent and incongruent audiovisual syllables in children with specific language impairment (SLI)
27. HARTUNG, S Optic ataxia: evidence from a large stroke cohort

11:00 AM - 5:00 PM**Poster Session 07: Categories- Epilepsy; Movement Disorders; MS**

1. CASSIMJEE, N Performance on the Dementia Rating Scale-2 and deep brain stimulation screening in a South African cohort with Parkinson's disease
2. OLEJNIK, A Temporal lobe epilepsy and executive functions - the profile of patients functioning and analysis of clinical variables impact
3. DEI, R Does Memory Assessment Can Detect Lateralization and Localization in Temporal with Extra Temporal Lobe Epilepsy?
4. SEUBERT-RAVELO, AN Variables associated to PD-MCI in early-onset Parkinson's disease
5. DECKERT, M Long-term personality changes and memory functions in Multiple Sclerosis
6. NUSSBAUM, NL Neuropsychological Phenotypes in Pediatric Temporal Lobe Epilepsy
7. SARNO, ML Neuropsychological Outcomes of Bilateral Subthalamic Nucleus Deep Brain Stimulation in a Multicultural Sample of Parkinson's disease Patients
8. HONAN, CA Is the experience of cognitive fatigue similar across fatiguing illnesses? A comparison of chronic fatigue syndrome, multiple sclerosis and healthy individuals
9. SIQUIER, A Episodic memory impairment in Parkinson's disease: Disentangling the role of encoding, consolidation and retrieval
10. MANA, J The longitudinal cognitive trajectory in Deep Brain Stimulation treated Parkinson's Disease patients is predicted by processing speed before surgery
11. CALDERÓN VILLALÓN, J Higher-order visual processing in patients with Huntington's disease: an analysis based on neuroimaging techniques
12. HERNÁNDEZ MARTÍNEZ, A Non-motor symptoms in Parkinson Disease: association between cognitive status, neuropsychiatric symptoms, impulsivity, quality of life and caregiver burden
13. HERNÁNDEZ MARTÍNEZ, A Cognitive performance and neuropsychiatric symptoms in Parkinson Disease: the role of age at disease onset and motor phenotype
14. GIOVAGNOLI, AR The spectrum of social cognition in temporal lobe epilepsy
15. COENEN, MA Cognition in young patients with myoclonus dystonia
16. STROBER, LB Risk Factors of Unemployment in Multiple Sclerosis (MS): The Role of Disease, Person-Specific Factors, Coping, and Engagement in Health-related Behaviors
17. PARE, N Progressive Ataxia with Palatal Tremor and Cognitive Impairment: A Case Report
18. KRAMSKA, L Memory performance one year after temporal lobe resection
19. JAVURKOVA, A Liverpool adverse event profile (LAEP): correlation with anti-epileptic drugs (AEDs), affective domains and quality of life
20. SEDO, MA "EX.PRE.S.S": Moderate automatic knowledge, subaverage controlled performance are characteristic of students referred to special education
21. BOLDEN, LB The use of continuous theta burst stimulation (cTBS) as a therapeutic technique in patients with genetic generalized epilepsies (GGEs): A proof of concept study

22. OLEJNIK, A Quality of life in patients with drug resistant epilepsy – clinical and neuropsychological correlations
23. MANTIONE, M Psychotic outcome of epilepsy surgery: a systematic review

11:00 AM - 5:00 PM**Poster Session 08: Categories- Emotional Functioning; Psychosis**

1. FRONDA, G The use of a neuroscientific approach to investigate the moral decision-making in a company context
2. FRONDA, G A neuroscientific approach to investigate affective, social and informative gestures reproduction
3. BABINET, MN Facial Emotion Detection: The Role of Attention in Children with 22q11.2DS
4. HAGEN, BI Normal auditory attention performance in a depression sample with self-reported attentional difficulties
5. RAUDEBERG, R Retention Memory is Broadly Normal in Young People with Schizophrenia Spectrum Disorders
6. ANGIOLETTI, L Blind Shopping experience and emotional response in a sample of visually impaired people. First EEG and autonomic indices evidence from a neuroscientific study
7. KHOSDELAZAD, S Static and dynamic emotion recognition tasks: performance of healthy participants
8. DHILLON, S Objective and Perceived Cognitive Deficits of Depressive Severity and Functional Outcomes
9. SCHMOEGER, M Accuracy of Metamemory Judgements
10. LADWIG, S Determinants of depressive symptoms during the acute phase after stroke.
11. SIMOES LOUREIRO, I Overexcitability and sensory profile of highly gifted children and impact on emotional difficulties
12. BALA, A Social cognition in patients with cerebellar lesions
13. PEREA GUZMÁN, G Crisis intervention proposal in patients with neurodevelopmental disorders and follow-up to nine months after the earthquake of 19S-2017 in Mexico City
14. SOSA-MILLÁN, AL Subcomponents of processing speed in schizophrenia
15. SALAS, CE Exploring the Neuropsychology of Attention Deployment
16. BESHARATI, S Paralyzed Only in your Eyes: Preserved 3rd person Motor Awareness
17. IBARRETXE-BILBAO, N Explaining creativity in schizophrenia: cognitive and clinical correlates
18. PAWELCZYK, A Neurostructural underpinnings of pragmatic disturbances in schizophrenia: preliminary results of DTI study
19. ABREU, N Parent's Perspective of Developmental Changes on Emotion Regulation: A Preliminary Study

11:00 AM - 5:00 PM**Poster Session 09: Categories- Behavioral Neurology; Neuroimaging; EEG; Neuromodulation**

1. FRONDA, G Effects of prosocial behavior on individuals' cooperation and social bonds: evidences from brain responsiveness and inter-brain connectivity
2. RÉMILLARD-PELCHAT, D Reduced corpus callosum volume in idiopathic rapid eye movement sleep behavior disorder with mild cognitive impairment
3. SALGUES, S Lateralization of Attentional Processes that Contribute to the Perception of Spontaneous Sensations in Left-Handers

4. EHRLER, M Persisting alterations of white matter microstructure in adults with congenital heart disease and its association with cognitive function: A diffusion tensor imaging study
5. SHAPIRO, JS Incomplete and unreproducible: a systematic methodological critique of neuroimaging papers in paediatric post concussive syndrome
6. SALGUES, S Different contributions of the cerebral hemispheres to bodily awareness: Evidence from attending to spontaneous sensations arising on the hands
7. GAROLERA, M Left rostral middle frontal grey matter volume mediates the relationship between BMI and cognitive flexibility in adolescents
8. MICELI, A Processing of thematic and taxonomic relationships in adults: Evidence from an EEG study and semantic priming
9. FRONDA, G Intra- and inter-brain connectivity during the reproduction of social, affective and informative gestures
10. CHO, M Association of inferior longitudinal fasciculus and semantic knowledge processing in stroke patients
11. MAŃKOWSKA, A Prism Adaptation on Vertical Dimension
12. KARAPETSAS, AV The role of neuropsychology in the assessment and treatment of university students with Developmental Coordination Disorder
13. KARAPETSAS, AV Remediation effects on P300 waveform in third and fourth grade students with developmental dyslexia after an auditory musical intervention: A Neuropsychological study
14. NA, Y A Voxel-based lesion symptom mapping study of the representation of semantic knowledge in stroke patients
15. HIROMITSU, K Predicting factors of the perioperative cognitive function in the patients with brain tumours
16. VICENTE, SG Impact of a Cognitive Stimulation Program for People with Mild Cognitive Impairment and Dementia: A pilot study

11:00 AM - 5:00 PM

Poster Session 10: Categories- Inclusion/Diversity; Cognitive Neuroscience; Medical/Neurological Disorders

1. NIELSEN, T Cross-Cultural Dementia Screening Using the Rowland Universal Dementia Assessment Scale: A Systematic Review and Meta-analysis
2. DE HAAN, E Split-brain: one or two conscious agents?
3. TREMBLAY, T The Long-Term Effects of Screen Time on Cognitive Abilities
4. RUIS, C Psychological strain after awake brain surgery?
5. HOLMAN, B Social Engagement: A Longitudinal Study of Children with Dysgenesis of the Corpus Callosum
6. HOOPER, SR The Relationship Between Cardiovascular Health and Cognition in Adolescents
7. TESAR, B Gender differences in Theory of Mind: Performance and underlying electrophysiological activity
8. COMPANY-CÓRDOBA, R Cognitive Performance of Children and Adolescents from low SES Backgrounds: The Case of Guatemala
9. ZUNDEL, CG Verbal Memory Performance, Brain Volumetrics, and Blood Biomarkers of Neuroinflammation in Veterans with Gulf War Illness (GWI)
10. ALVAREZ MEDINA, N Variables associated with clustering and switching strategies during semantic verbal fluency tests in children from Colombia
11. ALVAREZ MEDINA, N Variables associated with clustering and switching strategies during phonological verbal fluency tests in children from Colombia

12. ALVAREZ MEDINA, N Cluster and switching strategies associated with verbal fluency performance
13. KROLL, A Cognition and communication disturbances in patients with cerebellar tumors
14. SEDO, MA Executive deficits at serial planning tasks in learning-disordered children: Unexpected intrusion of postural reflexes
15. PLUCK, G ABO Blood Groups and Neurocognitive Function
16. CANKURTARAN, S The sunshine vitamin: does it aid resilient cognitive aging?
17. BALA, A Quality of life of patients with pituitary tumors – a follow up study

11:00 AM - 5:00 PM**Poster Session II: Categories- Cancer; Genetics; Infectious Disease; Other**

1. IRESTORM, E Auditory hypersensitivity and attention in survivors of paediatric brain tumours
2. KAUTIAINEN, RJ Multiple Risk Alleles Increase Cognitive and Adaptive Deficits in Long-Term Survivors of Pediatric Medulloblastoma Tumors
3. GAWRON, N Memory performance heterogeneity, lowest ever CD4 lymphocyte count (CD4 nadir), and white matter integrity in HIV+ men on effective treatment
4. GAROLERA, M Predictive Capacity of Cognition and Personality in Body Mass Index (IMC)
5. JOHANSEN, HT Neuropsychology and employability – a review of the literature
6. PEREA GUZMÁN, G Neurocognitive Profile in Pediatric Leukoencephalopathy Associated with Deletion in the Cytobanda 17p13.3: Single Case Study
7. DOMÍNGUEZ, CM Long-Term Neuropsychological Outcome of a patient with Rickettsia Encephalitis
8. DOMÍNGUEZ, CM Neuropsychological Intervention in Attention and Visuospatial Abilities in children with Williams syndrome
9. VAN DONGEN, LCM Neuropsychology of rare genetic syndromes: cognition and behavior in Witteveen-Kolk, KBC, and Kabuki syndrome
10. HARDY, DJ Pleasure and Anxiety in Autonomous Sensory Meridian Response (ASMR)
11. CARRANZA ESCÁRCEGA, E A case of visospatial heminegligence secondary to corpus callosum glioblastoma
12. EGGER, JIM Cognitive decline and behavioural regression suggestive for early dementia in a patient with neurodevelopmental disorder due to a novel pathogenic variant of the MBD5 gene
13. ABREU, N Neuropsychological functioning and health-related quality of HCV-infected subjects in Direct-Action Antiviral treatment
14. PLETSCHKO, T Everyday life participation of patients with neurofibromatosis type 1 during childhood and adolescence
15. MEIJER, LL Affective touch reduces mechanically induced itch experience
16. PLETSCHKO, T Everyday life participation of childhood brain tumor survivors during childhood and adolescence
17. GRIFFITH, SP The neuropsychology of autoimmune encephalitis - A retrospective clinical audit

3:00 PM - 5:00 PM**COVID-19: A Global Threat to the Nervous System
Presenter: Igor Koralnik**

3:00 PM - 5:00 PM

1. KESSELS, R
2. PIAL, V
3. PARRA, MA
4. LAAKSONEN, R
5. STRUBREITHER, W
6. SIEBERT, JM

INS Awards

Awards Welcome- Awards Committee Chair
 INS Early Career Award Presentation - As We Speak
 Benton Mid-Career Award Presentation - Novel Paradigms for the Assessment of Memory in Ageing and Dementia
 Paul Satz Mentoring Award
 INS Lifetime Award for Education
 Nonword Repetition Tasks as Promising Speech Disorder Screening Tools for Linguistically Diverse Children *Winner of the Marit Korkman Award for the most outstanding student contribution at the Mid-Year Meeting on a topic in pediatric neuropsychology
 *INS Student Liaison Committee Research Awardee - Concrete signs facilitate wayfinding in patients with Alzheimer's disease dementia
 *INS Student Liaison Committee Research Awardee - The results from the Czech Brain Aging Study: Associative memory performance is related to change in volumes and thicknesses of medial temporal structures in cognitively normal older adults
 *INS Student Liaison Committee Research Awardee - Pain and cerebral blood flow in children following mild traumatic brain injury compared to orthopedic injury
 *INS Student Liaison Committee Research Awardee - Domain-specific cognitive deficits and depression as determinants of post-stroke functional disability: an individual participant meta-analysis from the STROKOG Consortium
 *INS Student Liaison Committee Research Awardee - Exploring the Role of Timing, Working Memory, Attention and Inhibition in Emotional Dysregulation in Adults with Elevated Levels of ADHD-Related Traits
 *INS Student Liaison Committee Research Awardee - Psychiatric and Neurological Contributions to Neurocognitive Profiles in Precariously Housed and Homeless Adults
 *INS Student Liaison Committee Research Awardee - Cognitive Benefits Related to Lifestyle Interventions: Aerobic Exercise and Computerized Cognitive Training in Healthy Adults

3:00 PM - 5:00 PM

1. BRAUN, K
2. LAH, S
3. BAXENDALE, S

Panel Discussion hosted by the INS Student Liaison Committee: Special Considerations for Epilepsy Across the Lifespan

Introduction: Anouk Smits

Presenters: Kees Braun, Sunny Lah, Sallie Baxendale

Influence of Epilepsy Surgery on Cognitive Development in Children
 Accelerated Long-term Forgetting in Children and Adults with Epilepsy:
 Our Challenge for the Future

Neuropsychological Outcomes in Older Adults Following Epilepsy Surgery

3:00 PM - 5:00 PM

Symposium 1: It's all in the body - The role of touch experience in neuropsychiatric populations

1. KEIZER, A It's all in the body - The role of touch experience in neuropsychiatric populations
2. KEIZER, A Perceived pleasantness of touch in personality disorders and its role in social exclusion
3. CROY, I C tactile mediated touch interaction through development
4. JENKINSON, PM Slow, gentle and pleasant: An introduction to affective touch
5. SPITONI, GF Affective Touch: From Disorganized Attachment Pattern to Borderline Personality disorder

3:00 PM - 5:00 PM

Symposium 2: CRATER Therapy, Neuropsychologically-Informed Psychotherapy with Embedded Cognitive Remediation for Adults with Mild Neurocognitive Impairment-Regardless of Etiology

1. ZEINER, H CRATER Therapy, Neuropsychologically-Informed Psychotherapy with Embedded Cognitive Remediation for Adults with Mild Neurocognitive Impairment-Regardless of Etiology
2. GREENMAN, K CRATER Treatment in Dyadic Family Units
3. NEWMAN, ND PEAT: CRATER Therapy's Software Based Cognitive Prosthesis
4. THOMPSON, RC CRATER: An Introduction into Non-Etiologically Specific and Customizable Cognitive Remediation Embedded in Individual Psychotherapy

3:00 PM - 5:00 PM

Symposium 3: A Cross-Cultural Examination of Sports Concussion from Youth to Professional Athletes Across the Globe

1. DIDEHBANI, N A Cross-Cultural Examination of Sports Concussion from Youth to Professional Athletes Across the Globe
2. PELTONEN, K On-field signs of concussion predicting cognitive deficits: Concussion management intervention in Finnish youth hockey
3. SCOLARO MOSER, R An Examination of Parental Knowledge of Concussion Across Cultures
4. TOEPPER, M German VBG concussion study - new algorithms of long-term concussion management in different contact sports
5. ECHEMENDIA, RJ Examining baseline data across cultures in professional soccer: A case for language-specific normative data

3:00 PM - 5:00 PM

Symposium 4: Examining the validity of a transnational lifespan ecologically-valid approach to the assessment of executive functions

1. JANSARI, A Examining the validity of a transnational lifespan ecologically-valid approach to the assessment of executive functions
2. JANSARI, A Cognitive correlates of everyday function after acute brain Injury: Comparison of the Jansari assessment of Executive Functions with standard tests of executive functions
3. JANSARI, A A virtual reality paradigm; the next step in understanding the neurobehavioural problems following prefrontal lobe lesions?
4. JANSARI, A It's my party! A new ecologically-valid virtual reality assessment of executive functions in adolescents

5. JANSARI, A Validation of a Persian version of an English language ecologically-valid assessment of executive functions to track development through childhood and adolescence

3:00 PM - 5:00 PM**Symposium 5: Understanding and treating progressive hippocampal and behavioural deterioration in at risk populations**

1. GREEN, REA Hippocampal and Cognitive Deterioration in Moderate-Severe Traumatic Brain Injury: Progressive Declines from 2 to 5 to 12 to 30+ Months Post-Injury
2. SHARMA, B Identifying Modifiable Predictors of Decline in Moderate-Severe Traumatic Brain Injury, and Implications for Treatment
3. COLELLA, B Scalable Treatments for Mood and Anxiety in Chronic Brain Injury
4. BELCHEV, Z Development of an Allocentric Spatial Navigation Brain Game for Memory and Hippocampal Neuroprotection: Pilot Findings

THURSDAY, JULY 2, 2020

11:00 AM - 3:15 PM**Day 2 Stream**

Moderators: Jonathan Evans, Laura Hokkanen, Sandra Lettner, Martine van Zandvoort, Georg Kranz, Glenn Smith, Jill Winegardner, Miriam Beauchamp, Lucette Cysique, Emilia Łojek

11:00 AM – 12:00 PM**Keynote 4: Don't Judge a Book by its Cover – Transgender Brains, and the Impact of Hormone Replacement**

1. KRANZ, G

Presenter: Georg Kranz

Don't Judge a Book by its Cover – Transgender Brains, and the Impact of Hormone Replacement

12:00 PM – 1:00 PM**Cognitive Remediation: A Dynamic Conversation**

Presenter: Glenn Smith, Jill Winegardner

1:00 PM – 2:00 PM**Keynote 5: Traumatic Brain Injury in Tiny Tots: How Studying Early Injuries Can Inform Testing, Treatment and Theory**

Presenter: Miriam Beauchamp

2:00 PM – 3:00 PM**COVID-19 Associated Challenges for Neuropsychology: *A work in Progress by the NeuroCOVID-19 INS SIG***

Introduction by: Anouk Smits

Moderator: Laura Hokkanen

Presenters: Lucette Cysique, Emilia Łojek

Discussion by: Lucette Cysique, Emilia Łojek, and Igor Koralnik

1. CYSIQUE, L

COVID-19 Associated Challenges for Neuropsychology: *A work in Progress by the NeuroCOVID-19 INS SIG*

3:00 PM – 3:15 PM

Closing Remarks

Presenter: Margaret O'Connor, Marc Norman

Abstracts Presented at the 2020 Virtual Event International Neuropsychological Society July 1-2, 2020

WEDNESDAY, JULY 1, 2020

CE Workshop 1: Neuropsychological Aspects of Dementia

Presenter: Andreas U. Monsch

1:00 AM - 2:00 AM

U. MONSCH. Neuropsychological Aspects of Dementia.

According to the World Health Organization (WHO), about 50 million people worldwide are currently affected by dementia; every year, about 10 million people develop dementia. These figures will double or even triple by 2050. One of the most important modifiable risk factors of dementia is lack of cognitive activity. Neuropsychology makes very important contributions to the diagnosis (screening/case-finding, diagnosis-specific cognitive profiles) and to the evaluation of new treatment attempts. In this interactive workshop these aspects will be critically reviewed and new possibilities for further development will be discussed. Learning Objectives: This workshop is designed to help you: 1) Discuss cognitive stimulation as a possible preventive measure of dementia using the technique of Motivational Interviewing; 2) Rate the contribution of neuropsychology to the screening/case-finding of neurodegenerative brain disorders and the differential diagnosis of dementia; 3) Identify the great potential of an optimized new neuropsychology for improving the early detection of neurodegenerative brain disorders and the evaluation of therapeutic efforts.

CE Workshop 2: Stroke in Neonates and Children: Ischemic Injury and Its Impact on Neurodevelopment

Presenter: Christine Mrakotsky

1:00 AM - 2:00 AM

C. MRAKOTSKY. Stroke in Neonates and Children: Ischemic Injury and Its Impact on Neurodevelopment.

Stroke- long recognized as an adult condition- is an important cause of acquired brain injury in children, occurring most commonly in the neonate and throughout childhood. Ischemic injury due to restriction of blood flow accounts for the majority of infarcts in newborns, and half of childhood strokes. Cause and

presentation differs from adult stroke, leading to delay in diagnosis and treatment, and consequently to significant physical, cognitive, and emotional long-term morbidities. Among main risk factors, new evidence points to the involvement of infection and inflammatory processes in the pathophysiology of ischemic stroke, potentially impacting neuropsychological outcomes. This course will review cause, risk factors and presentation of perinatal vs. childhood arterial ischemic stroke, cognitive and behavioral consequences at different ages, and risk factors contributing to cognitive, emotional, and adaptive development. Clinical implications of stroke outcomes for school, psychosocial and family functioning will be described. In a final part, neuropsychological assessment models in acute and long-term care, as well as current interventions to facilitate recovery and development will be discussed along with the need for targeted research. Learning Objectives: This workshop is designed to help you: 1) List the main causes and risk factors of pediatric stroke, including contributions of inflammation and infection to stroke etiology; 2) Describe cognitive and emotional outcomes of pediatric stroke at different ages, and risk factors; 3) Discuss acute and long-term neuropsychological assessment models and current standards of intervention.

CE Workshop 3: Executive Functioning: A Function-Led Model of the construct

Presenter: Yana Suchy

1:00 AM - 2:00 AM

Y. SUCHY. Executive Functioning: A Function-Led Model of the construct.

This workshop will provide a detailed overview of the Function-Led Model of executive functions. According to this model, executive functioning is comprised of four clinically meaningful subdomains, including executive cognitive functions, meta-tasking, initiation/maintenance, and response selection. For each subdomain, elemental neurocognitive processes, corresponding neuroanatomic underpinnings, and relevance to daily life will be detailed. Following a thorough exploration of the executive construct, typical clinical syndromes characterized by discrete patterns of executive dysfunction will be reviewed, highlighting behavioral, cognitive, and affective changes in daily life, as well as patient presentations during formal evaluations. Learning Objectives: This workshop is designed to help you: 1) Demonstrate a thorough and clinically useful understanding of the construct of executive functioning; 2) List elemental processes that comprise each of four subdomains of executive functioning; 3) Describe individual neurobehavioral syndromes characterized by discrete patterns of executive dysfunction.

CE Workshop 4: How Virtual Reality Related Technology May Add Value to Neuropsychological Assessment

Presenter: Unai Diaz-Orueta

1:00 AM - 2:00 AM

U. DIAZ-ORUETA. How Virtual Reality Related Technology May Add Value to Neuropsychological Assessment.

Using specific examples including within the domain of executive function, Dr. Diaz-Orueta will describe

how virtual reality, as well as augmented environments and speech analytics can add value to neuropsychological assessment providing granular data on brain-behavior relationships. Populations to be discussed include children as well as older adults. Future directions to make the digitization of assessments more useful and complimentary to clinical neuropsychology will also be outlined. Learning Objectives: This workshop is designed to help you: 1) List various technologies that may be used to augment clinical neuropsychological assessments; 2) Describe the means by which granulated data on behavior may compliment more traditional paper-and-pencil testing; 3) Critique the ways in which technology may need to be adapted for maximum benefit to neuropsychology.

Day 1 Stream

Moderators: Sandra Lettner, Laura Hokkanen, Martine van Zandvoort, Margaret O'Connor, Morten Kringelbach, Michel Thiebaut de Schotten, Robert Stickgold

11:00 AM - 3:00 PM

Program Welcome

Presenters: Sandra Lettner, Laura Hokkanen, Martine van Zandvoort

11:00 AM - 11:30 AM

INS Presidential Address: From the Rat Man to HM: What Single Case Studies Teach Us About Theories of the Mind

Presenter: Margaret O'Connor

11:30 AM - 12:00 PM

M. O'CONNOR. From the Rat Man to HM: What Single Case Studies Teach Us About Theories of the Mind.

Single case studies provide a unique opportunity to examine unusual neuropsychological syndromes. In this talk Dr. O'Connor reviewed single case studies of five amnesic patients who had different types of memory impairment - circumscribed dense amnesia, a dissociation between anterograde and retrograde memory, confabulation, delusional misidentification syndrome and epilepsy-related accelerated forgetting. She discussed the neural substrates and cognitive features of each patient's presentation. These case studies were reviewed in relation to antecedent models of amnesia and relevance for more recent neuroscientific studies.

Keynote 1: Eudaimonia and Hedonia: Brain Systems for Thriving and Surviving

Presenter: Morten Kringelbach

12:00 PM - 1:00 PM

M. KRINGELBACH. Eudaimonia and Hedonia: Brain Systems for Thriving and Surviving.

For Aristotle, the goal of human life was to live well, to flourish, and to ultimately have a good life. These goals can be conceptualised as “eudaimonia,” a concept distinct from “hedonia” (pleasure). Many people would argue that the arts play a large role in their wellbeing and eudaimonia. Music in particular is a culturally ubiquitous phenomenon which brings joy and social bonding to listeners. Research has given insights into how the ‘sweet anticipation’ of music and other art forms can lead to pleasure, but a full understanding of eudaimonia from the arts is still missing. What is clear is that anticipation and prediction are important for extracting meaning from our environment. In fleeting moments this may translate into pleasure, but over longer timescales it can imbue life with meaning and purpose and lead to eudaimonia. I will discuss some of the evidence from neuroimaging and whole-brain computational modelling for the role of sex, drugs and music in orchestrating eudaimonia, and propose future strategies for exploring these questions further.

Keynote 2: The Architecture of Functional Lateralization and Its Relationship to Callosal Connectivity in the Human Brain

Presenter: Michel Thiebaut de Schotten

1:00 PM - 2:00 PM

M. THIEBAUT DE SCHOTTEN. The Architecture of Functional Lateralization and Its Relationship to Callosal Connectivity in the Human Brain.

Functional lateralisation is a fundamental principle of the human brain. However, a comprehensive taxonomy of functional lateralisation and its organisation in the brain is missing. Here, we report the first complete map of functional hemispheric asymmetries in the human brain, reveal its low dimensional structure, and its relationship with structural inter-hemispheric connectivity. Our results suggest that the lateralisation of brain functions is distributed along four functional axes: symbolic communication, perception/action, emotion, and decision-making. The similarity between this finding and recent work on neurological symptoms give rise to new hypotheses on the mechanisms that support brain recovery after a brain lesion. We also report that cortical regions showing asymmetries in task-evoked activity have reduced connections with the opposite hemisphere. This latter result suggests that during evolution, brain size expansion led to functional lateralisation to avoid excessive conduction delays between the hemispheres.

Keynote 3: Sleep, Memory and Dreams: A Neurocognitive Approach

Presenter: Robert Stickgold

2:00 PM - 3:00 PM

R. STICKGOLD. Sleep, Memory and Dreams: A Neurocognitive Approach.

The benefits that sleep confers on memory are surprisingly widespread. For simple procedural skills – how to ride a bicycle or distinguish different coins in one's pocket – a night of sleep or an afternoon nap following learning leads to an absolute and dramatic improvement in performance. Sleep also stabilizes verbal memories, reducing their susceptibility to interference and decay, processes that all too easily lead to forgetting.

But the action of sleep can be more sophisticated than simply strengthening and stabilizing memories. It can lead to the selective retention of emotional memories, or even of emotional components of a scene, while allowing other memories and parts of a scene to be forgotten. It can extract the gist from a list of words, or the rules governing a complex probabilistic game. It can lead to insights ranging from finding the single word that logically connects three apparently unrelated words, to discovering an unexpected rule that allows for the more efficient solving of mathematical problems. It can facilitate the integration of new information into existing networks of related information and help infants learn artificial grammars. Disruptions of normal sleep in neurologic and psychiatric disorders can lead to a failure of these processes.

Dreams appear to be part of this ongoing memory processing, and can predict subsequent memory improvement. The NEXTUP (Network Exploration to Understand Possibilities) model of dreaming proposes that dreaming aids complex problem solving by supporting divergent creativity, acting more by exploring a problem's "solution space" than by searching for the solution, itself.

Poster Session 01: Categories-Acquired Brain Injury; Concussion/Mild TBI; TBI

11:00 AM - 5:00 PM

N. E. COOK, I. A. IVERSON, B. MAXWELL, R. ZAFONTE, P. D. BERKNER, G. L. IVERSON. Neurocognitive Test Performance and Concussion-like Symptom Reporting Among Adolescents with Autism Spectrum Disorders.

Objective: This is the first study to examine if there are meaningful differences in baseline neurocognitive functioning or symptom reporting between high school student athletes with and without Autism Spectrum Disorder (ASD).

Participants and Methods: Participants were 34,009 adolescents from Maine who completed preseason testing between 2009 and 2015. There were 231 students (0.7%) who self-reported having been diagnosed with ASD. Cognitive functioning was measured by ImPACT® and symptom ratings were obtained from the Post-Concussion Symptom Scale (PCSS).

Results: Compared to youth without ASD, those with ASD reported much greater rates of attention deficit/hyperactivity disorder (52.4% vs. 10.9%), special education (37.2% vs. 4.6%), learning disabilities (38.1% vs. 4.4%), and prior treatment for a psychiatric condition, such as depression or anxiety (21.6% vs. 7.1%). Groups differed significantly across all neurocognitive composites (p values $<.002$), except for Verbal Memory. However, all differences were negligible in terms of the magnitude of the effects (r values range from 0.02-0.03). Among girls, the ASD group endorsed 7 of the 22 individual baseline symptoms at a greater rate than the control group. Among boys, the ASD group endorsed 15 of the 22 symptoms at a greater rate. There were 5 symptoms that were endorsed at a higher rate among both boys and girls with ASD: balance problems (girls: Odds Ratio, OR=3.52 ; boys: OR=2.17), sensitivity to noise (girls: OR=4.18; boys: OR=3.88),

nervousness (girls: OR=2.11; boys: OR=1.90), difficulty concentrating (girls: OR=1.86; boys: OR=2.15), and difficulty remembering (girls: OR=2.82; boys: OR=2.53).

Conclusions: Students with ASD participating in organized sports are likely high functioning, on average. If they sustain a concussion, their clinical management should be more intensive to maximize the likelihood of swift and favorable recovery.

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Keywords: concussion, autism spectrum disorder

L. YMER, J. PONSFORD, A. MCKAY, D. WONG. Cognitive Behavioural Therapy for Sleep Disturbance and Fatigue Following Acquired Brain Injury.

Objective: Sleep disturbance and fatigue affect over half of the acquired brain injury (ABI) population. Cognitive behavioural therapy for sleep and fatigue (CBT-SF) shows promise in treating these symptoms, and the efficacy of CBT-SF in ABI has been demonstrated in pilot studies by Nguyen et al. (2017) compared to standard care. The current study aimed to build on these findings by comparing CBT-SF with an active health education control intervention (HE), to account for non-specific effects of therapy.

Participants and Methods: Thirty-two individuals with traumatic brain injury or stroke were randomised into an 8-week CBT-SF program, adapted for cognitive impairments ($N=20$, 60% male, mean age=49.2), or an 8-week HE program ($N=12$, 66% male, mean age=47.9) at a ratio of 2:1. Sleep quality (Pittsburgh Sleep Quality Index [PSQI]), fatigue (Fatigue Severity Scale [FSS]), and depression (Hospital Anxiety and Depression Scale [HADS]) were measured at baseline, post-treatment and 8-weeks post-treatment.

Results: A one-way ANCOVA controlling for baseline scores revealed significantly greater improvements in the CBT-SF group compared to the HE group on the FSS ($F(1, 29)=5.56, p<.05$, Hedges $g=.84$), which were maintained at follow up ($F(1, 28)=4.39, p<.05$, Hedges $g=.75$). Significant differences were not evident on PSQI ($F(1, 29)=2.27, p=.14$, Hedges $g=.54$) or HADS ($F(1, 29)=1.97, p=.17$, Hedges $g=.50$), although medium effect sizes were observed on both measures. One-sample t-tests also revealed significant improvements on all measures in the CBT-SF group from baseline to post-treatment, and at follow up on the FSS and PSQI. These gains were not evident on any measures in the HE group.

Conclusions: The current study supports the efficacy of CBT-SF over and above the non-specific benefits of engaging in therapy, particularly for alleviating fatigue after ABI. There are promising findings for sleep disturbance and depression, which may become more evident with continued recruitment.

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Keywords: brain injury, fatigue, cognitive behavioural therapy

F. ANZAKI, S. YAMAMOTO, M. SHIBASAKI. Analysis of Brain Function in Chronic Traumatic Brain Injury Cases with Working Memory Disorder using functional Near-infrared Spectroscopy.

Objective: Previous research has shown that the dorsolateral prefrontal cortex and anterior cingulate cortex are associated with working memory (WM). Christodoulou et al. (2001) exhibited that in traumatic brain injury (TBI) cases, cerebral activation was more lateralized to the right hemisphere, compared to healthy controls. Our objective was to reveal brain activity in TBI cases with WM disorder.

Participants and Methods: The participants were two right-handed men with chronic TBI (Case 1: 47 years, Case 2: 44 years) and a healthy control group (nine men and two women, average age: 23 years). Four different sounds were presented; two were different five-digit numbers and two were different five-mora pseudo-words. The digit listening task was to listen to the digits and say /a/ five times, while the digit retaining task was to remember and recall the digits. The pseudo-words task used the same procedure that was used in the digit listening and the digit retaining tasks. Using LABNIRS (Shimadzu Corporation, Kyoto),

relative changes in oxyhemoglobin were measured and compared during the retaining and listening tasks. Statistical analysis was done by a paired t-test between the listening and retaining tasks.

Results: In the digit span task, the control group showed significantly higher t-values in the right Brodmann area (BA) 6, right BA 8, and left BA 10. In the pseudo-word task, the control group showed significantly higher t-values in the right BA 6, left BA 8, and left BA 9. In both tasks, Case 1 showed higher z-values in the right BA 6 and the periphery, and Case 2 showed higher z-values in the left BA 22, compared to the control group. Both TBI cases showed low z-values in the right BA 8 for both tasks.

Conclusions: We examined whether healthy people had differentiated brain function by digit span and pseudo-word tasks. The cause of WM disorder in TBI cases seemed to be the inability to differentiate functions due to limited brain capacity caused by TBI.

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Keywords: TBI, Working memory, Brain function

S. E. RAKERS. Trajectories of fatigue after mild traumatic brain injury: a prospective study.

Objective: This is the first study examining distinct recovery trajectories from fatigue after mild traumatic brain injury using latent class growth analysis. Variables influencing fatigue trajectories, including emotional distress and coping styles, were investigated.

Participants and Methods: In an observational cohort study design (UPFRONT study) 456 mild TBI patients were assessed with questionnaires for fatigue, anxiety, depression, post-traumatic stress, and coping at 2 weeks, 3 and 6 months post-injury. For analysis, all variables were modelled simultaneously to identify clusters of patients showing similar longitudinal courses.

Results: Four distinct clusters of recovery from fatigue were found. The first cluster (30%) recovered completely, had low emotional distress and predominantly used active coping. The second cluster (25%) showed decreasing fatigue, low emotional distress and decreasing passive coping. However, the third cluster (27%) showed persistent high fatigue, low emotional distress and slightly increasing passive coping. The fourth cluster (18%) showed persistent high fatigue, high emotional distress and significantly increasing passive coping. Patients with adverse fatigue trajectories were more often women, suffered more often from sleeping problems and had a poorer long-term outcome.

Conclusions: The prognosis for recovery from posttraumatic fatigue is favourable for 55% of the mild TBI patients. Patients at risk for chronic fatigue can be signalled in the acute phase post-injury based on high fatigue, high passive coping and, for a subgroup of patients, high emotional distress. Latent class growth analysis proved to be a highly valuable and multipurpose statistical method to map distinct courses of disease-related processes over time.

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Keywords: mild traumatic brain injury, fatigue, latent class growth analysis

J. REYES, B. MITRA, A. MCINTOSH, P. CLIFTON, M. MAKDISSI, J. V. K. NGUYEN, P. HARCOURT, T. S. HORWARD, P. A. CAMERON, J. V. ROSENFELD, C. WILLMOTT. An investigation of factors associated with head impact exposure in elite male and female Australian football.

Background: Exposure to head acceleration events (HAEs) has been associated with sex, player position and player experience in North American football, ice hockey and lacrosse. Little is known of these factors in professional Australian football. Video analysis allows HAE verification and characterization of important determinants of injury.

Purpose: To characterize verified HAEs in the non-helmeted contact sport of professional Australian football and investigate the association of sex, player position and player experience with HAE frequency and magnitude.

Study Design: Descriptive epidemiology study.

Methods: Professional Australian football players wore a non-helmeted accelerometer for one match, with data collected across 14 matches. HAEs with peak linear accelerations (PLAs) ≥ 30 g were verified with match video. Verified HAEs were summarized by frequency and median PLA and compared between the sexes, player position and player experience. Characterization of match related situations of verified HAEs was conducted and the head impact rate per skill execution was calculated.

Results: 92 male and 118 female players were recruited during the 2017 season. Male players sustained more HAEs (median: 1; IQR: 0–2) than female players (median: 0; IQR: 0–1; $p = 0.007$) during a match. The maximum PLAs incurred during a match were significantly higher in male players (median: 61.8 g; IQR: 40.5–87.1) compared to female players (median: 44.5 g; IQR: 33.6–74.8; $p = 0.032$). Neither player position or experience were associated with HAE frequency. Of all verified HAEs, 52% ($n = 110$) occurred when neither team had possession of the football and 46% ($n = 98$) were caused by contact from another player attempting to gain possession of the football. A subset of HAEs ($n = 12$, 5.7%) resulted in players seeking medical aid and/or being removed from the match (median PLA = 58.8 g; IQR: 34.0–89.0), with two (male) players diagnosed with concussion following direct head impacts and associated PLAs of 62 g and 75 g respectively. In the setting of catching (marking) the football, female players exhibited twice the head impact rate (16 per 100 marking contests) than male players (8 per 100 marking contests).

Conclusions: Playing situations in which players have limited control of the football are a common cause of impacts. Male players sustained a greater exposure to HAEs compared with female players. Female players, however, sustained higher exposure to HAEs than male players during certain skill executions, possibly reflecting differences in skill development. These findings can therefore inform match and skill development in the emerging professional women's competition of Australian football.

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Keywords: Non-helmeted accelerometer, Head Impact Biomechanics, Sport-Related Concussion

J. REYES, B. MITRA, M. MAKDISSI, P. CLIFTON, J. V. K. NGUYEN, T. S. HOWARD, P. A. CAMERON, J. V. ROSENFELD, B. P. MAJOR, C. WILLMOTT. Concussion screening in community-level football: The association between observable signs of concussion, SCAT3 and Cogstate performance.

Objectives: Video surveillance and detection of players with observable concussive signs by experienced medical staff facilitates rapid on-field screening of suspected concussion in professional sports. This method, however, has not been validated in community sports where video footage is not available. The aim of this study was to explore the utility of observable concussive signs to identify community male and female Australian football players with poorer performance on concussion screening measures following an impact.

Design: Observational Prospective Cohort Study.

Methods: Non-expert personnel with basic training conducted live match observations across a season (60 matches) using observable concussive signs in the community-based Head Injury Assessment form (HIAf). Players identified to have positive concussive signs on the HIAf (CONC+) were compared to players without these signs (CONC-). Both the Sport Concussion Assessment Tool (SCAT3) and Cogstate were administered as outcome measures at baseline and post-match.

Results: CONC+ ($n = 22$) and CONC- ($n = 61$) groups were matched with respect to age, sex, education, baseline mood, and concussion history. Among CONC+ players, 100% (95% CI: 84% to 100%) demonstrated clinically-significant deficits in the SCAT3 or Cogstate tasks, compared to 59% (95% CI: 46% to 71%) of

CONC- players. All CONC+ players demonstrating a blank/vacant look had clinically-significant decline on the Standardized Assessment of Concussion (SAC).

Conclusions: Detection of observable concussive signs represents a rapid, real-time method to screen players suspected of concussion in community sports where video technology and medical personnel are rarely present. Consistent with community guidelines, it is recommended that all CONC+ players are immediately removed from play for further concussion screening.

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Keywords: Observable Concussive Signs, Sport Concussion Assessment Tool, Concussion Screening

C. VAN HEUGTEN, M. WIJENBERG, J. RAUWENHOFF, S. STAPERT, J. VERBUNT. Do fear and catastrophizing thoughts about mental activities lead to fear-avoidance behaviour in a community sample? An experimental study.

Introduction: Nowadays people are challenged with excessive information load and some report disabling post-concussion like symptoms such as cognitive failures or fatigue, even on a comparable level to patients with mild spectrum brain injuries. The fear-avoidance model explains post-concussion symptoms in traumatic brain injury as a result of catastrophizing and fear-avoidance towards mental activities. This experimental study investigated whether the fear-avoidance model can be applied to post-concussion like symptoms in healthy adults.

Participants and methods: A randomized crossover within-subject design with two measurements including 80 healthy participants. Post-concussion like symptoms, catastrophizing, fear-avoidance, behavioural avoidance, disuse, depression, heart rate, and state-trait anxiety were assessed. Participants were exposed to three difficult cognitive tasks and their simplified versions.

Results: Significant correlations between the factors of the fear-avoidance model were found. Furthermore, catastrophizers spent less time on difficult tasks (i.e. avoidant behaviour) compared to easy tasks. Both catastrophizing and female sex predicted time spent on the difficult tasks, while only female sex predicted time spent on the easy tasks.

Conclusions: This study shows that the fear-avoidance model is applicable to post-concussion like symptoms in a community sample. Furthermore, it provides evidence that catastrophizing is related to behavioural avoidance of mental activities. Future studies are needed to understand the applicability of the fear-avoidance model regarding the development and management of post-concussion like symptoms and treatment of these symptoms post brain injury.

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Keywords: cognitive functioning, anxiety, mild traumatic brain injury

L. F. BOHORQUEZ, E. A. MATUTE, M. GARCIA-BARRERA, M. ROSSELLI, O. INOZEMTSEVA, D. ZARABOZO-HURTADO. Executive functions and brain connectivity after moderate and severe TBI in adolescence.

Background: TBI during adolescence frequently impairs executive functioning (EF). However, the pathophysiological mechanism that underlies this persistent sequela is controversial. Diffusion tensor imaging (DTI) allows us to study in vivo, brain microstructure through statistical prediction of the direction and speed of water molecules by generating tensors for the estimation of the integrity of white matter fibers and tracts.

Objective: To determine if persistent EF deficits correlate with the integrity of the Superior Longitudinal Fasciculus (SLF).

Participants and Methods: Working memory (WM), inhibition and shifting were tested, and DTI was taken in 22 adolescents (aged 14.83±1.53) six months after moderate or severe TBI, 72.7% were boys; 36% of the patients had severe TBI and 64% moderate TBI. They were also studied 22 healthy, age-matched controls as our control group (CG).

Results: the TBI Group underperformed the CG on WM tasks, though inhibition and shifting scores were similar. Deterministic tractography revealed reduced fractional anisotropy (FA) values in TBI associated with the tracts studied (the SLF and inferior fronto occipital fasciculus –IFOF), while the cortico-spinal tract FA (projection tract) values were similar in both groups. Positive correlations between WM scores and SLF and IFOF tracts were also identified.

Conclusion: WM and associated brain tracts are especially vulnerable to damage after TBI in this developmental period.

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Keywords: traumatic brain injury, executive functions, neuroimaging: structural connectivity

E. MALINOWSKA. The dynamics of executive functioning changes after frontal lobes mild traumatic brain injury (mTBI) in adults.

Objective: The goal of the project was to describe the dynamics of executive functioning changes after frontal lobes mild traumatic brain injury (mTBI).

Participants: There were 17 patients taking part in the study (aged 18-73), who suffered from frontal lobes mTBI together with 12 participants included into the control group; according to their sex, age, education and handedness.

Methods: The research had longitudinal character, with four executive functions (EF) neuropsychological assessment sessions conducted within: from 24h to 48h, a week, two weeks and six months after acquired mTBI. During each meeting, among others, the following methods and tests were used: verbal fluency test (Spreen, Benton, 1977), serial seven test (SST) (Hayman, 1942), Trail Making Test (TMT) (Reitan, Wolfson, 1985); Tower of London (ToL) (Shallice, 1982); Digit Span, Digit Symbol Coding (WAIS-R) (Wechsler, 1997), Stroop Test and Wisconsin Card Sorting Test (WCST) (Heaton et al., 2000) used during the last meeting only. First meeting was associated by short autobiographical interview and choosing the correct interpretation of the selected proverbs.

Results and Conclusions: Statistical analysis (*hierarchical linear models*, HLM) revealed significant differences between the groups in short-term memory functions, verbal fluency, attentional control and the speed of information processing. In the process of recovery both time from the moment of injury as well as its placement (left, right, or both hemispheres) and the interaction of these factors played the most important role. Results are discussed together with short characteristics of the pathophysiological processes of the acute and subacute brain injury phases, as well as neuroplasticity and neural regeneration processes typical for the recovery. Results may indicate useful tips and directions for the neuropsychological rehabilitation of executive functioning within the first phase of recovery after the mTBI.

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Keywords: executive functions, longitudinal studies, mild traumatic brain injury

F. EVANS, R. STOLWYK, D. WONG. Retrieval practice enhances memory for names in stroke survivors.

Objective: There is a growing body of research suggesting that retrieval practice (testing during learning) may enhance memory in clinical populations with memory impairment. However, no study to date has examined the efficacy of retrieval practice in stroke survivors, despite the high prevalence of post-stroke

memory problems. We investigated whether retrieval practice enhances memory for names in stroke survivors and healthy controls.

Participants and Methods: Using a counterbalanced design, 19 stroke survivors ($M_{age} = 66.42$, $SD_{age} = 9.45$) and 19 healthy controls ($M_{age} = 68.37$, $SD_{age} = 8.95$) completed an experimental paradigm which required them to learn 18 name-face pairs divided equally across three learning conditions (spaced restudy, retrieval practice, massed study). A mixed factorial ANOVA was used to compare participants' recall for each condition after a 30-minute and 7-day delay.

Results: There was a large main effect of learning condition ($p < .001$, $\eta_p^2 = .68$), and there was a significant time by condition interaction ($p < .001$, $\eta_p^2 = .28$). Post-hoc comparisons revealed significantly better recall of names learnt through retrieval practice, compared to names learnt through spaced restudy and massed study in both stroke and healthy control groups after 30 minutes. After 7 days, both groups recalled significantly more retrieval practice names than those learnt through massed study; however, there was no significant difference between retrieval practice and spaced restudy, despite a trend for better performance in the retrieval practice condition.

Conclusions: Retrieval practice is a promising memory technique which significantly improved stroke survivors' memory for names in the short term, supporting the view that retrieval practice strengthens memory retrieval processes. However, the effect was lessened 7 days later. Booster sessions using retrieval practice may enable memory improvements to be sustained for a longer period.

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Keywords: stroke, memory, rehabilitation

R. BASILE, J. ELOI, A. SIDDIQUI, K. RUSSELL, M. PRICE. Three Factor Solution of CNSVS in Concussed Youth.

Objective: CNS Vital Signs (CNSVS) is a brief computerized cognitive battery consisting of seven primary subtests that yields eleven cognitive domain scores and an overall summary score. The domain scores were theoretically determined and not derived from empirical factor analysis (Gualtieri & Johnson, 2006). Brooks et al. (2018) conducted the first exploratory principal component analysis of scores from CNSVS in a with mixed neurological sample of children and adolescents, resulting in a 3-component solution representing factors of inhibition, speed, and memory. The aim of this study was to explore and confirm the validity of the proposed CNSVS factor structure in a homogenous sample of children and adolescents with concussion/mTBI.

Participants: Participants (N=115) were children and adolescents (ages 7-18) evaluated through the Outpatient Neuropsychology Service at Staten Island University Hospital as part of routine clinical care.

Methods: A confirmatory factor analysis (CFA), based on Brooks et al., 2018 was run on valid CNS Vital Signs' raw test scores of patients referred for post-concussion assessments, 7-10 days post-injury. An exploratory factor analysis (EFA) and CFA was conducted to investigate and confirm alternative factor structures that may more accurately characterize the underlying factor structure of CNSVS.

Results: CFA results did not support the previously proposed 3-component model. EFA yielded a novel three-factor model of Reaction Time, Inhibition, and Motor explaining 48% of the variance and adequate fit (KMO=.72;BTS Approx. $\chi^2=410.397, p < .0001$). CFA of the novel three-factor model showed a sufficient fit (RMSEA=.08;GFI=0.84;SRMR=.07).

Conclusions: The results suggest that a 3-factor model sufficiently captures CNSVS. However, the subtest scores loaded differently than previously proposed. Thus, the novel 3-factor model found in this study offers an alternate approach in interpreting performance on the CNSVS in youth following concussion.

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Keywords: concussion, computerized testing, factor analysis

J. MAKOVEC KNIGHT, C. WILLMOTT, B. MITRA, P. CLIFTON, J. V. ROSENFELD, A. MCINTOSH, M. MAKDISSI. The Association Between Soft-shell Headgear, Concussion and Injury Rates in Youth Australian football: A Prospective Cohort Injury Surveillance Study.

Objective: To investigate whether headgear (HG) use was associated with sports related concussion (SRC), head impacts and injuries to all body regions in youth Australian Football (AF) teams.

Participants: We enrolled 400 AF players (42.5% female, age 10.6 (SD 1.2) across two seasons (2018 & 2019).

Methods: We conducted a prospective cohort study. Demographic information, injury history and a questionnaire relating to risk-taking behavior were completed by players. Primary data collectors used standardized injury reporting forms to record HG use, SRC, head impacts and injuries to other body regions. Medical assessment after injury and the number of missed games post injury was used as surrogates for severity. Incidence rates and risk ratios (RR) were used to calculate the association of SRC, head impact and all injury risk among HG users compared to non-users. A multivariable logistic regression model was used to assess variables associated with injuries to all body regions.

Results: SRC incidence rates were not associated with the use of HG (RR= 0.64; 95% CI: 0.23-1.76), nor were head impact rates (RR= 0.63; 95%CI: 0.37-1.08). HG use was not associated with medical assessment after SRC (RR= 0.64; 95% CI: 0.11-3.79) or after head impact (RR=0.38; 95% CI: 0.12-1.21). There was no difference in the number of games missed following SRC (Risk difference= 0.015; CI: -0.002-0.031) or head impacts (RR= 2.88; 95% CI: 0.30-27.57). However, adjusted for potential confounders, HG use was independently associated with higher odds of sustaining injuries to all body regions (adjusted OR 1.7; 95% CI: 1.02-2.9).

Conclusions: HG use was not associated with the incidence or severity of SRC or head impacts in youth AF footballers. However, its use may be associated with higher incidence of injuries to all body regions. The mandatory use of current commercially available HG could not be recommended.

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Keywords: paediatric neuropsychology, concussion, protective headgear

J. MAKOVEC KNIGHT, J. V. K. NGUYEN, B. MITRA, C. WILLMOTT. Soft-shell Headgear, Concussion and Injuries in Youth Team Collision Sports: A Systematic Review.

Objective: Soft-shell headgear (HG) is used in youth team sports to prevent sports related concussion (SRC) in spite of conflicting evidence regarding its effectiveness. The objective of this systematic review was to assess the association between HG use, SRC, superficial head injury, and other injuries among youth (<18 years) collision sports teams.

Methods: Data was sourced from Ovid MEDLINE, Cochrane Library, Scopus, PsycINFO, and SPORTDiscus. Inclusion criteria were English-language *in-vivo* studies published after 1980 that evaluated the intervention of HG upon rates of SRC, superficial head injury or other injuries. Data on study design, sporting code, sample size, methods and injury outcomes were extracted from each study.

Results: N=8 studies met criteria. The majority (n=5) reported no difference in SRC rates in HG users versus non-users. One rugby study found that HG users had significantly lower rates of SRC (IR = 7.39 95%CI: 5.55-9.65) than non-users (IR = 12.62; 95%CI: 8.38-18.27), and a survey of soccer players revealed lower risk of SRC for HG users (RR: 0.38). Three of the four studies investigating superficial head injury found no significant differences with HG use. Increased incidence of injuries to all body regions for HG users was reported in two rugby studies with adjusted IRRs of 1.16 (95%CI: 1.04-1.29) and 1.23 (95%CI: 1.00-1.50).

Conclusions: The current evidence is not sufficient to recommend HG use for SRC or superficial head injury prevention in youth soccer and rugby. The possibility of increased injury risk with HG use in youth rugby was raised. Youth and particularly female athletes were under-represented in the literature and no studies have been conducted in Australian Football, representing ideal populations for further study.

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Keywords: paediatric neuropsychology, concussion, protective headgear

J. STENBERG, J. E. KARR, D. P. TERRY, A. K. HÅBERG, A. VIK, T. SKANDSEN, G. L. IVERSON. Self-Reported Cognitive Symptoms are Only Weakly Associated with Cognitive Test Performances after Mild Traumatic Brain Injury.

Objective: This study examined (a) whether self-reported cognitive symptoms after mild traumatic brain injury (MTBI) were associated with cognitive test performances, emotional and somatic symptoms and (b) whether improvement in self-reported symptoms from two weeks to three months after MTBI was associated with improvement in cognitive test performances.

Method: Patients with MTBI ($n=135$, aged 16–59, 35% women) completed cognitive tests (i.e., Controlled Oral Word Association, Coding, Rey Auditory Verbal Learning, and Trail Making test), the Rivermead Post Concussion Symptoms Questionnaire (RPQ), and the Brief Symptom Inventory 18 at two weeks and three months after MTBI. Spearman's rank correlations (ρ) were used to examine associations between self-report measures and cognitive test performances at each time point and between change scores (i.e., three-month score minus two-week score) on each outcome.

Results: At three months, 27% of the patients reported cognitive symptoms to some extent. At both assessments, greater severity of RPQ cognitive symptoms was very weakly associated with worse cognitive test performances (two-week ρ range: -0.19 to -0.01; three-month ρ range: -0.20 to -0.10). In contrast, RPQ cognitive symptoms were strongly related to greater somatic and emotional symptoms. Change (i.e., improvement) in self-reported cognitive symptoms from two weeks to three months was not associated with change in cognitive test performances (ρ range -0.11 to 0.05). In contrast, change in self-reported cognitive symptoms was strongly associated with change in somatic ($\rho=0.57$) and emotional symptoms ($\rho=0.58$).

Conclusions: These findings indicate that improvements in subjective cognitive symptoms after MTBI co-occur with improvements on other subjective metrics, but are not related to improvements in objectively measured cognitive functioning. Accordingly, interventions targeting emotional symptoms may also improve subjective cognitive symptoms.

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Keywords: assessment, mild traumatic brain injury, concussion

A. GERALDO, A. R. DORES, A. CASTRO-CALDAS, F. BARBOSA. Relationship between premorbid intelligence, cognitive functioning and functionality after Acquired Brain Injury.

Objective: Acquired Brain Injury is a clinical condition that can cause significant changes in several dimensions of the injured persons' life, with a direct effect on their cognitive functioning and functionality. We aimed to explore whether premorbid intelligence is related to both cognitive functioning and functionality levels after the occurrence of a brain lesion.

Participants and Methods: This study included 60 ABI patients (22 female), with a mean age of 42.4 ($SD = 10.6$) and at least 4 years of formal education ($M = 10.2$; $SD = 3.91$). We have assessed participants' premorbid intelligence through TeLPI – Teste de Leitura de Palavras Irregulares [The Irregular Word Reading Test], which allows to compute a score that is equivalent to WAIS full-scale IQ, overall cognitive functioning

through Montreal Cognitive Assessment (MoCA), and functionality through the Glasgow Outcome Scale – extended.

Results: Correlations were performed in order to explore the relationship between pre-morbid intelligence and both cognitive functioning and functionality. Results have shown a significant moderate positive correlation between premorbid intelligence and cognitive functioning ($r = .57, p < .001$) and a significant positive correlation, though weak, between pre-morbid intelligence and functionality ($r = .29, p = .03$).

Conclusions: Premorbid intelligence can be understood as an estimate of the injured person’s intellectual functioning prior to a brain damage. Considering this, it is relevant to explore its relationship with cognitive functioning and functionality after a brain lesion. The results of this study showed that higher scores of premorbid intelligence are related to better overall cognitive functioning and higher functionality levels following ABI, which points out to the protective role of cognitive reserve in this clinical condition.

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Keywords: Acquired Brain Injury, Neuropsychology, Premorbid intelligence

S. GLAZER, K. O. YEATES, E. A. WILDE, K. VANNATTA, K. R. HOSKINSON. When “recovery” doesn’t mean “back to normal”: Detangling the neural substrates of behavioral morbidities after childhood TBI.

Objective: Children with traumatic brain injury (TBI) face an increased risk of deficits in social, emotional, and behavioral functioning even after ostensible recovery. This may be explained by diminished volume in brain regions contributing to these functions, particularly anterior frontotemporal regions; detangling the unique role of brain volume versus the social and psychological sequelae of childhood injury of any kind can be done via comparison with children with orthopedic injury (OI).

Participants and Methods: 28 children with TBI (16 moderate-severe (msTBI), 12 complicated-mild TBI (cmTBI); 19 boys, $M=11.98$ yrs) and 18 children with OI (12 boys, $M=12.26$ yrs) participated. All completed high-resolution MPRAGE sequences that were quantified volumetrically with Freesurfer 6.0. Parents rated children’s executive function (BRIEF), behavioral and emotional problems (CBCL), and adaptive functioning (ABAS).

Results: Univariate ANCOVA with pairwise post-hoc comparisons showed that msTBIs had significantly reduced volume in frontotemporal regions and the corpus callosum relative to OIs and cmTBIs ($ps=.006-.018$). Parents rated msTBIs lower for social and adaptive functioning ($ps=.001-.003$), though executive function did not differ by injury group. Correlations revealed strong associations among cingulate, temporal, and frontal regions with social functioning and internalizing/externalizing symptoms ($ps<.05$).

Conclusion: msTBIs displayed lower frontotemporal volumes than OIs and mTBIs, and were rated with poor social and behavioral outcomes. Frontotemporal brain regions coincide with those implicated in social and behavioral domains, which supports the hypothesis that injury to neuroanatomical areas responsible for these functions can contribute to deficits. Next steps include corroboration with ecologically-valid peer ratings of social adjustment, and examination of regional and network-based MRI activation during executive function and social cognitive tasks.

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Keywords: neuroimaging; structural, pediatric neuropsychology, traumatic brain injury

M. GUTIERREZ MARTIGNON, D. M. BELEN PRIETO CORONA, J. BERNAL HERNANDEZ, M. RODRIGUEZ CAMACHO, J. SALVADOR CRUZ. Cognitive outcome of a pediatric stroke case: moyamoya disease.

Objective: The aim of the study was to describe the cognitive, academic and emotional profile in a pediatric patient that had multiple strokes due to Moyamoya disease (MMD) and analyze its outcome before and after surgery with unilateral encephaloduroarteriosinangiosis (EDAS).

Participants-Methods: A pediatric female patient from Mexico City diagnosed with MMD at the age of 14 years, 7 months old by a pediatric neurosurgeon. The patient presented ischemic strokes in white matter at ages 9 and 12 years old. EDAS was performed when the patient were 15 years 3 months old.

Neuropsychological assessment was applied in three moments. Two assessments at 8 months and 1 month before the surgery. The third assessment was made 8 months post-surgery. The specific cognitive areas explored were: intellectual functioning, language, verbal memory, visual and verbal attention, verbal and nonverbal fluency, executive function (flexibility, planning, working memory, processing speed), academic achievement and emotional-behavior problems that included family report.

Results: The patient showed a decline between the first and second assessment in visual attention, processing speed, memory and visoperceptual ability. There was a fluctuating outcome in the postsurgical evaluation. Executive function, full scale IQ, processing speed, perceptual reasoning and arithmetic was the most consistently affected during the three assessments, which is consistent with previous reports. The emotional-behavioral state was within the average range in the three moments.

Conclusion: The EDAS surgery provided subtle benefits in the neuropsychological profile of the patient; but it's important to consider that was unilateral and needs time to promote cerebral revascularization. This case gave us the opportunity to explore the cognitive outcome of a rare and chronic disease in Mexico, that affects directly the nervous system and determine the variables that influence neuropsychological function.

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Keywords: Moyamoya disease, Pediatric stroke, Neuropsychological assessment

L. J. CONNOLLY, J. PONSFORD, S. LOCKLEY, S. RAJARATNAM. Light Therapy for Fatigue Following Acquired Brain Injury.

Objective: Fatigue and sleep disturbance are debilitating problems following traumatic brain injury (TBI) and stroke and there are no established treatments. Building on research showing efficacy of blue light in reducing fatigue and sleepiness after TBI (Sinclair et al., 2014), this study evaluated the efficacy of a novel *in-home* light therapy in alleviating fatigue after injury.

Participants and Methods: This randomised within-subject, crossover placebo-controlled trial compared the impact of exposure to light therapy (treatment) with participants' usual lighting (control) on fatigue (primary outcome), as well as daytime sleepiness, sleep quality, insomnia symptoms, psychomotor vigilance and mood. Participants ($N = 19$, $M_{age} = 43.63$, $SD_{age} = 12.33$) had a mild-severe TBI or stroke > 3 months prior, and self-reported fatigue (Fatigue Severity Scale ≥ 4). After a 2-week baseline there were two 2-month treatment conditions, with a 1-month follow-up. Treatment consisted of blue-enriched high-intensity white light with correlated colour temperature of 5000-6500K. For 3 hours prior to sleep, light intensity was reduced and blue-depleted light was used ($\leq 3000K$). End of treatment outcomes were compared with baseline scores using paired-samples t-tests.

Results: There were statistically significant decreases in fatigue ($p = .037$), sleepiness ($p = .035$), and sleep disturbance ($p = .037$) from baseline to end-treatment, with r^2 indicating medium effect sizes. Insomnia, depressive symptoms, and psychomotor vigilance were non-significant, but showed trends with medium effect sizes. The control condition showed no significant changes in fatigue, sleep or mood relative to baseline, but showed reduced sleepiness.

Conclusions: This pilot of an *in-home* light therapy showed significant improvements in fatigue, sleepiness and sleep disturbance, and positive trends in insomnia, depressive symptoms and psychomotor vigilance. Data collection will continue to enable more rigorous analyses.

PTSD were significant factors associated with worse neurobehavioral outcome, and when combined resulted in worse outcome than either Low Resilience or PTSD alone (all p 's<.05). These findings were also replicated in two additional cohorts of SMVs at 3 and 10-years post-injury.

Conclusions: The influence of resilience on neurobehavioral outcome was very strong following TBI of all severities and injury without TBI. PTSD and resilience have a strong influence on neurobehavioral outcome, and greater when combined. Poor resilience may be a useful 'risk factor' that can be used clinically to identify individuals in need of early intervention.

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Keywords: traumatic brain injury, military, resilience

N. LUGASI, Y. SACHAR, E. VAKIL. The effect of facial expressions on the process of learning and memory of Face images among healthy individuals and those with traumatic brain injury (TBI), examined using eye movements.

Objective: Context-Dependent Effect (CDE) is a process by which restoring the original learning context enhances recall ability of the material being studied. One type of context that plays a role in perception is facial expression. Memory is one of the most common areas affected by TBI, but although the performance of people with brain injury is lower than that of healthy people in most memory-related parameters, both groups show evidence for CDE. In the present study, we examined the CDE of facial expressions through behavioral and eye movement measures.

Participants and Method: In this study, 23 healthy individuals and 23 patients with moderate-to-severe TBI from the Lowenstein Rehabilitation Hospital participated in a memory task. Participants were first exposed to stimuli and were asked to remember them for a subsequent memory test. In the testing session they were asked to determine whether or not the stimuli presented to them had appeared before, under two conditions: (1) where the context remains constant (facial expression was neutral as in the study phase – the Repeat condition) (2) where the context changes (facial expression changed to angry or happy expression – the Re-pair condition).

Results: While the TBI's memory was poorer than that of healthy participants, both groups exhibited CDE. Analysis of eye movements reveals that in both groups, there is a relationship between Dwell Time on the stimuli and better memory, as found in previous studies. This effect appeared in the study and the test phase.

Conclusions: This research supports previous studies showing evidence for CDE in the TBI group, and extends our comprehension of the relationship between eye movements, memory and context of facial expression.

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Keywords: TBI, Memory, Eye Tracking

M. M. DOUCETTE, R. WONG, S. DU PLESSIS, M. A. GARCIA-BARRERA. The influence of competitiveness on sports-related concussion reporting among athletes in high, low, or no contact sports.

Objective: Despite having general knowledge of concussions and understanding the high risk for long-term sequelae, many athletes choose not to report symptoms of a concussion when playing a sport. Thus, there is a need to identify other factors, such as competitiveness, that may help to better explain the nondisclosure of concussion symptoms. The current study examined whether competitiveness predicted concussion reporting in high, low, or no contact sports.

Participants & Methods: Participants included 161 Canadian athletes (ages 14–32; 41% female) participating in high contact (American football, rugby, or hockey), low contact (soccer), or no contact

(rowing) sports. Concussion knowledge and reporting were measured using the Rosenbaum Concussion Knowledge and Attitudes Survey-Student Version (RoCKAS-ST). Competitiveness was assessed using the Sport Orientation Questionnaire (SOQ). Two logistic regressions were performed to predict both past history and future intention of playing despite experiencing concussion symptoms. In both analyses, sex, age, concussion knowledge, competitiveness, and level of contact were included as predictors.

Results: Age, sex, and concussion knowledge were not significant predictors. Competitiveness was a significant predictor for both models, such that higher competitiveness predicted less likelihood to report concussion symptoms. Our findings indicate that athletes in high or low contact sports are more likely than athletes in no contact sports to continue to play with symptoms of a concussion but there are no significant differences in intention to report future concussions for all three contact groups.

Conclusions: High competitiveness may serve to decrease concussion symptom reporting. Our results suggest that interventions should focus less on general concussion knowledge and should target those with high competitiveness as well as sports teams who may have previously been overlooked for interventions due to low risk of concussion.

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Keywords: concussion, sports-related neuropsychology

A. BLOCH, D. HOOFIEN, L. SHARONI, N. BAR LEV, T. SHANY-UR, T. SALOMON-SHUSHAN, E. DRUKMAN. Relationships between age, chronicity and community-based neuropsychological rehabilitation outcomes.

Objective: Post-acute community-based neurorehabilitation programs following brain injury aim to address cognitive, behavioral, and psychosocial deficits, to enhance independence and integration into employment and society. Given the vast variability in patient characteristics and interventions, efforts have been made to identify variables that influence the efficacy of such programs. Studies on the extent to which time post-injury (chronicity) is related to program outcome have shown inconsistent results, suggesting that chronicity interacts with additional patient and/or injury-related variables. In the current study, we examined the relationships between age, chronicity and treatment outcomes.

Participants and Methods: 171 patients (121 males; age: $M = 34.45$ years, $SD = 10.55$, range = 19-59; years since injury: $M = 4.35$, $SD = 5.10$, range = 0.50-39) with acquired brain injuries who underwent community-based neuropsychological rehabilitation were examined in a retrospective, longitudinal cohort study. Community integration, perceived quality of life, employment status, and mood before and after treatment served as outcome measures.

Results: Community integration, perceived quality of life, and employment status improved significantly after program completion, while mood did not. Hierarchical linear and logistic regressions revealed interactions between chronicity and age, indicating that positive associations between chronicity and treatment outcomes (mood, perceived quality of life, and employment status) found in younger patients were not found in older patients.

Conclusions: Patient and injury characteristics in general, and age specifically, can moderate the relationship between chronicity and outcomes of post-acute neuropsychological rehabilitation. The findings suggest that age should be taken into consideration in determining treatment pathway for individuals with acquired brain injury.

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Keywords: Acquired Brain Injury, Neuropsychological Rehabilitation, Chronicity

J. V. WETHE. Preliminary Validation of a Sideline Concussion Identification Protocol for Trained Sports Parents.

Many youth concussions are missed (Chrisman et al 2019). Few youth leagues have healthcare providers (HCPs) on the sideline to recognize concussion (NATA, 2019). Available materials for parents/coaches rely heavily on subjective information. Coaches are uncomfortable with the ambiguity of making sideline decisions and desire tools to facilitate decision making (Guernon & Papdimitriou, 2019). Protocols that include objective information are needed to reduce ambiguity and facilitate removal from play. The KDT is a test of saccadic eye function that is reliable, sensitive to the effects of concussion, and available for use by lay people (Echemendia et al 2017; Galleta KM et al, 2015).

Objective: Address the absence of HCPs at youth sporting events by training parent Safety Officers (SO) in a protocol that includes the KDT. Evaluate the diagnostic efficiency of the SO protocol.

Participants and Methods: SO training included observable signs of concussion, screening for “Red Flags,” assessing symptoms, and proper administration of the KDT. 1 to 3 SOs were trained per team. SOs conducted 46 sideline evaluations (18 suspected injury; 5 controls; 23 unknown) on tackle football and ice hockey players aged 5-14 (1 female). HCP diagnosis of concussion was used as the criterion standard.

Results: 10 athletes were removed from play. 9 concussions were diagnosed. SO identification of concussion: sensitivity = 0.89, specificity = 1.0. SOs appropriately identified 9/10 athletes who should be removed due to concussion or other clear indication (i.e., Red Flag). In the one concussion that was missed by a SO, but identified by a HCP, the SO failed to follow the SO Protocol.

Conclusions: In the absence of a HCP, identification of suspected concussion and indications for removal from play is facilitated by training SOs in an evidence-based protocol that includes an objective measure of saccadic eye function.

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Keywords: concussion, youth sports, protocol

K. T. KINGSLEY. A group cognitive behavioral approach to social participation and community integration following acquired executive dysfunction.

Objectives: Group-based interventions may be considered for remediation of mild-moderate deficits in executive functioning (including deficits in awareness, problem solving, goal management, and emotional regulation) during post-acute rehabilitation after traumatic brain injury (Cicerone et al, 2019). The “Transitions” group intervention is a program intended to help patients with TBI or stroke understand, acknowledge and accept their cognitive and emotional deficits, reduce the use of avoidant coping mechanisms, take inventory and set specific, measurable, achievable, relevant and time referenced goals.

Participants: Subjects were diagnosed with TBI or stroke. All had chronic (at least 12 months post-onset) neuropsychological impairments, but were capable of independent living. Most described reduced capacity to use their cognitive resources, endorsed cognitive problems in daily activities, and showed significantly lower performance on tests measuring processing speed and, in many cases, working memory. Sessions involved: a) didactics; b) goal setting management; c) role play; d) assignments.

Results: Pre- and post-measures of mood and social participation were utilized. Positive trends were seen in the number of social interactions; significant impact was noted on a measure of self-efficacy. Reports were corroborated further by family as well as clinical observations.

Conclusion: Beside individual interventions frequently used in cognitive rehabilitation, a review of the literature supports the value of group interventions targeting impairments of the frontal lobe, by increasing awareness, goal management, and emotional regulation in the executive functioning domain. The “Transitions” group intervention is a cognitive behavioral therapy program intended to help individuals develop and apply coping strategies to increase their psycho-social well-being, social participation, increase self-confidence, and improve their quality of life in interpersonal situations.

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Keywords: traumatic brain injury, cognitive rehabilitation, executive abilities – abnormal

A. BLANCO-CAMPAL, T. BURKE, U. DIAZ-ORUETA, D. LIBON. Application of the Boston Process Approach Methodology to the Evaluation of Sports Concussion: A Game Changer?

Objective: The added value of traditional neuropsychological tests relative to computerized tasks (e.g. ImPACT) in sports concussion assessment remains a matter of debate. We aim to explore the potential clinical benefits of applying the Boston Process Approach (BPA) methodology to the neuropsychological interpretation of test performance in sports concussion.

Participants and Methods: A review of the literature of serial cognitive evaluation in sports concussion, using traditional neuropsychological measures, alone or in combination with computerized cognitive tasks ('hybrid approach'), was conducted. In addition, a short number of traditional neuropsychological measures best suited to capture the potential cognitive effects of concussion and to add clinical value to the evaluation were identified. A range of process oriented indices used to unearth the relative efficiency of the strategies used to solve these tasks were then selected.

Results: A relatively brief battery of traditional neuropsychological tests with the potential to generate parallel versions and be applicable as baseline and serial testing were identified.

Conclusions: We posit that the application of the BPA to the administration and interpretation of traditional neuropsychological tests offers the clinician the opportunity to detect subtle changes in cognitive functioning in the acute stage of concussion. We argue that without adding burden on the respondent, this methodology enhances the scope and depth of the neuropsychological interpretation of test performance by going beyond a total achievement score and capitalizing on the concurrent evaluation of multiple cognitive processes in a single cognitive task. This allows the detailed and multiple comparisons of the athletes' post-concussion scores relative to their own scores on baseline, affording the detailed tracking of qualitative aspects of performance, informing the clinician's decision of when is safe to return to the pitch.

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Keywords: sports-related neuropsychology, concussion, mild traumatic brain injury

J. E. KARR, G. L. IVERSON, M. W. WILLIAMS, S. J. HUANG, C. C. YANG. A Comparison of Psychological, Neuropsychological, and Symptom Outcomes following Complicated versus Uncomplicated Mild Traumatic Brain Injuries.

Objective: A complicated mild traumatic brain injury (MTBI) is an injury defined as mild by all severity indicators, but it is complicated due to a traumatic intracranial abnormality visible on neuroimaging. Researchers have reported mixed findings regarding whether neuropsychological and functional outcomes are worse than, or similar to, outcomes following uncomplicated MTBI. This study examined patients referred from a Taiwanese emergency department and those with complicated and uncomplicated MTBIs were compared on psychological, neuropsychological, and post-concussion symptom outcomes within 21 days of injury.

Participants and Methods: Participants with complicated MTBI ($n=42$; 57.1% men; $M=41.3\pm 14.2$ years-old; $Mdn=11$ days since injury, range: 0-21) and with uncomplicated MTBI ($n=77$; 39.0% men; age: $M=37.1\pm 13.0$ years-old; $Mdn=8$ days since injury, range: 0-20) completed the Paced Auditory Serial Attention Test, Taiwanese Word Sequence Learning Test, a semantic Verbal Fluency Test, the Checklist of Post-Concussion Symptoms, and the Beck Depression and Anxiety Inventories.

Results: The complicated and uncomplicated MTBI groups differed on only anxiety-related symptoms ($p=.031$). All effect sizes were small in magnitude ($r\leq .20$). Dizziness and attention difficulty were endorsed

more often after uncomplicated MTBIs. No group differences were significant after controlling for multiple comparisons.

Conclusions: Patients with complicated MTBIs did not have worse acute or subacute outcome than patients with uncomplicated MTBIs. These results are consistent with many studies finding comparable outcomes between complicated and uncomplicated MTBIs, and they add to a growing body of literature on TBI in Taiwan. The study is limited by small sample sizes and minimal granularity at describing intracranial abnormalities, categorizing groups based on positive or negative head CT as opposed to specific lesion types and locations.

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Keywords: mild traumatic brain injury, concussion, neuropsychological outcome

M. FILIPCIKOVA, S. MCDONALD. Review of social disinhibition in moderate-to-severe TBI patients.

Objective: This review focuses on the concept of social disinhibition following traumatic brain injury (TBI), its probable mechanisms, and future research

Participants: Moderate-to-severe TBI patients

Methods: Literature review

Results: Disorders of emotional regulation are common, pervasive and disabling after TBI. The main source of evidence is family reports that do not give precise insights into the probable mechanisms. One such disorder, social disinhibition, can be described as socially inappropriate behaviour that reflects a loss of inhibition or failure to conform to social and cultural behavioural norms. Several theories have been proposed that are relevant to understanding social disinhibition. Research into executive functioning suggests that general regulatory mechanisms such as inhibitory control may play a role in social disinhibition although how exactly and to which extent is, as yet, not well understood. The possible relationship between these two constructs has not been examined directly. One theoretical framework that addresses social inhibition precisely is that of social cognition. However, no significant relationship was found between emotion perception deficits per se and social disinhibition. One study examining the role of reversal learning impairment found a significant relationship with social disinhibition, especially for the social version of their task. A novel theory arising from the research of frontotemporal dementia suggests that deficiency in goal-directed behaviour, i.e. loss of sensitivity to different types of reward, and the simultaneous emergence of habits may provide additional insights beyond reversal learning theory. This theory is yet to be tested.

Conclusion: Various studies have tapped into the concept of social disinhibition, although many of them not directly. Further research is needed to gain additional insight into its mechanisms and develop an effective treatment approach for these problems following TBI.

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Keywords: traumatic brain injury, disinhibition

Poster Session 02: Categories- Addiction; Drug/Toxin Disorders; Psychopharmacology

11:00 AM - 5:00 PM

J. R. GOODEN, C. A COX, V. PETERSEN, A. CURTIS, P. SANFILIPPO, V. MANNING. You mean it's not a brain injury? Challenges of diagnosing acquired brain injury in addictions.

Objective: Current research on cognitive impairment in alcohol or other drug (AOD) settings often lacks clinical applicability by excluding those with high levels of complexity which is common in this population. In clinical settings, failure to consider these confounding variables can lead to misdiagnosis such as Acquired Brain Injury (ABI) and cause further harm. This study aimed to characterise rates of ABI diagnosis and predictors of cognitive functioning in AOD clients attending for neuropsychological assessment.

Participants and Methods: Clinical data from 200 clients with significant AOD histories who attended for assessment between 2014 and 2018 were analysed and a series of multiple regressions were conducted to explore predictors of cognitive impairment including demographic, diagnostic, AOD, and psychosocial variables.

Results: Following assessment, new diagnoses were conveyed in 25% of cases, predominantly comprising ABI (16% of cases) and developmental disorders (9% of cases). In the models undertaken, variables including years of education, medication sedative load, emotional distress, diagnoses of ABI, developmental disorders and mental health histories predicted aspects of neuropsychological functioning including processing speed $F(5,119)=4.41, p=.001, R^2=.12$, complex attention, $F(4,121) = 6.60, p<.0001, R^2=.15$, verbal memory, $F(6, 174)=4.59, p<.001, R^2=.11$, verbal comprehension $F(5,165)=12.01, p<.0001, R^2 =.25$ and perceptual reasoning, $F(5,161)=3.77, p<.01, R^2=.08$.

Conclusions: These findings highlight the importance of careful diagnostic formulation in clients with AOD histories who have high levels of unmet needs. They demonstrate the interaction of premorbid and potentially modifiable comorbid factors such as emotional distress and prescription medication on cognition. Ensuring that modifiable risk factors for cognitive impairment are managed may reduce cognitive impairment and improve diagnostic clarity.

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Keywords: Acquired Brain Injury, Addiction, Cognitive Impairment

M.-S. KIM, M. SEOK PARK. Decision-making deficits in college students who binge drink: Iowa gambling task and prospect valence learning model.

Objective: This study investigated deficits of decision-making in college students who binge drink (BD) using the Iowa Gambling Task (IGT) and the Prospect Valence Learning (PVL) model.

Participants and Methods: Based on the Korean version of Alcohol Use Disorder Identification Test (AUDIT-K) and Alcohol Use Questionnaire (AUQ) scores, BD ($n = 40$, 19 males and 21 females) and non-BD ($n = 40$, 6 males and 34 females) groups were determined. The IGT consists of four cards, including two disadvantageous cards (A and B) that result in a net loss, and two advantageous cards (C and D) that result in a net gain. Decision-making ability was measured by total net score, block net scores of the IGT. PVL parameters, i.e., feedback sensitivity, loss aversion, learning and response consistency, were estimated with the Markov chain Monte Carlo sampling scheme using OpenBUGS software in BRugs package which works from within R, and the estimated parameters were analyzed with the Mann-Whitney U-test.

Results: The BD group exhibited significantly lower total net score, block net score in the third block of the IGT, and selected B card more frequently than the Non-BD group. Additionally, the BD group had significantly lower values on the feedback sensitivity, loss aversion, and learning parameters of the PVL model. Significant positive correlations between total net score of the IGT and the values of the four PVL parameters were observed in the whole participants.

Conclusions: These results indicate that college students who binge drink experience deficits in decision-making, possibly due to failure in learning the expected value of each card, and applying the experiences of previous trials into the present trial.

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Keywords: Binge drinking, Iowa Gambling Task, Prospect Valence Learning Model

A. MATTE-LANDRY, M. E. GRISE-BOLDUC, D. COLLIN-VEZINA. Cognitive outcomes of children who have experienced complex trauma: a systematic review of longitudinal studies.

Children with complex trauma have been exposed to multiple traumatic events (e.g. abuse and neglect), which have wide-ranging impact, including on cognitive development. Previous systematic reviews on cognitive development of abused and neglected children have relied on very few prospective longitudinal studies to inform their analysis. Thus, the effect of age when experiencing traumas, as well as the effect of time since traumas remain unclear.

Objective: To assess cognitive outcomes of children who have experienced complex trauma in comparison to children who have not (controls).

Methods: Longitudinal studies were searched in APA PsycNET, PubMed Central, ERIC, CINAHL and Embase. Gray literature was also searched.

Results: The search yielded 1319 studies. Two independent evaluators performed study selection based on inclusion/exclusion criteria. Included studies ($n=8$) showed poorer cognitive skills (IQ, language, memory, perceptual) at various developmental periods (from 12 months to 18 years of age) in children with complex trauma than in controls. This was true regardless of children's age when experiencing traumas. There does not appear to have an effect of time since traumas; once children with complex trauma had poorer cognitive skills than controls, their skills did not appear to worsen or improve over time.

Conclusions: This systematic review showed that complex trauma have long-term impact on children's cognitive development. It further offered novel insights into the effect of age when experiencing traumas, as well as the effect of time since traumas. These findings are to be considered by clinicians working with children with complex trauma.

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Keywords: childhood maltreatment, cognitive functioning, systematic review

L. S. JORNA, J. M. SPIKMAN, R. G. SCHOEMAKER, B. L. VAN LEEUWEN, I. E. SOMMER. The efficacy of anti-inflammatory treatment in postoperative cognitive decline: a meta-analysis.

Objective: A decline in cognitive function, also known as postoperative cognitive decline (POCD), is a common complication after massive surgery. Although the exact mechanisms behind POCD are still unknown, there is increasing evidence for a key role of neuro-inflammation. Drugs with anti-inflammatory effects may slow down or stop microglial activation and consequently prevent or improve cognitive deterioration. This meta-analysis aims to investigate the efficacy of anti-inflammatory treatment on POCD.

Participants and Methods: An electronic search was performed using PubMed, Psychinfo, EmBase, Cochrane Database of Systematic Reviews and clinicaltrial.gov (until November 2019). No year or language restrictions were applied. The search yielded 574 papers, of which 19 fulfilled the inclusion criteria. Only randomized, double-blind, placebo-controlled studies that investigated clinical outcome were included. Studies included patients of all ages with surgery under general anaesthesia, except brain surgery. Post-operative cognitive functioning was measured as the post-operative change in scores on neuropsychological tests compared to pre-operative measurement.

Results: The current meta-analysis found a significant effect of different anti-inflammatory agents on the incidence of POCD ($OR = 0.67, p = 0.010$). Administration of COX-2 inhibitors ($OR = 0.31, p < 0.0001$), ketamine ($OR = 0.44, p = 0.38$) and lidocaine ($OR = 0.79, p = 0.33$) showed better results than placebo in a meta-analysis of at least two studies. Erythromycin ($OR = 0.14, p = 0.006$), erythropoietin ($OR = 0.15, p =$

0.07) and dexmedetomidine ($OR = 0.58$, $p = 0.03$) were significant in single studies. No beneficial effects on cognition were found for magnesium, 17β -estradiol, dexamethasone and melatonin.

Conclusions: There is some preliminary evidence for the efficacy of anti-inflammatory agents on POCD, but further research is necessary to determine which agents are most appropriate for clinical application.

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Keywords: postoperative cognitive decline, neuroinflammation, anti-inflammatory medication

C. I. RUPP, B. DERNTL, D. JUNKER, B. MANGWETH-MATZEK. Do social cognition deficits in alcohol dependence recover under controlled abstinence?

Objective: Growing evidence suggests that cognitive deficits in alcohol dependence (AD) include the neurocognitive domain of social cognition. Recently, impairments in social cognition have been found to be associated with social dysfunction and poorer treatment outcome in AD. Less is known about the course of social cognition deficits with abstinence. The aim of this prospective longitudinal study was to determine, whether deficits in social cognition may recover naturally under controlled abstinence.

Participants and Methods: Seventy-seven subjects (42 AD patients, 35 healthy controls/HC) performed social cognition measures, including facial emotion recognition (EMO), emotional perspective taking (PT), and affective responsiveness (AFF) twice (baseline/T1 and follow-up/T2) in comparable follow-up periods. Neuropsychological assessments of social cognition in abstinent AD patients were conducted at the beginning (T1) and at the end (T2) of about 8 week inpatient treatment for AD.

Results: Results indicate that at the beginning of treatment (T1) nearly 2 months abstinent AD patients showed poorer social cognition in all three components (EMO, PT and AFF) compared with HC. Group differences (AD vs HC) remained significant at the follow-up assessment (T2), indicating persistent social cognition deficits in AD patients following controlled abstinence at the end of inpatient treatment.

Conclusions: This is the first study to demonstrate that AD is accompanied with deficits in several clinically relevant social cognition components, that persist from the intermediate-term (after detoxification – 2 months) into the long-term abstinence period (>2 months) without specific interventions targeting these impairments (e.g. neuropsychological rehabilitation). Future research focusing on the improvement of these deficits in AD seems warranted.

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Keywords: alcohol, social cognition, neurocognition

R. EDMI EDISON, P. PRAWIROHARJO. EEG Findings in Porn-Addicted Adolescents.

It is known that many substances could be addictive and impair functions of brain. Although non-substances (e.g. behavior) may relate to addiction disorder, little is known about the corresponding neural activity. In this study, we compared the brain mapping of porn-addicted and non-porn-addicted adolescents by using resting-state EEG.

Participants included 15 porn-addicted and 15 non-porn-addicted adolescents aged 12–16 years old. The 10-20 international system was implemented for electrodes placement, and EEG was used to monitor the brain activity of participants during resting state. Cognitive functions were also measured.

Our experiment revealed no difference in term of cognitive functions between the two groups. However, we found characteristic EEG patterns among the porn-addicted group i.e. the domination of delta and gamma waves within the frontal region.

Based on our findings, we suggest to consider the indication that non-substances, such as pornography, may impair brain function similar to the effect of drug addiction.

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Keywords: Addiction, Porn, EEG

M. HERNÁNDEZ VÁZQUEZ, A. N. SEUBERT-RAVELO. A case of frontotemporal dementia phenocopies of the apathetic behavioral variant.

Objective: Phenocopies of the behavioral variant of frontotemporal dementia (phDFT) present an indistinguishable clinical from typical DFT without progressive deterioration, and are similar to other neuropsychiatric conditions. A case compatible with phDFT with a history of neuropsychiatric disorders, neurodevelopment and neurological complications is presented.

Participant: A 51-year-old woman, 13 years of schooling with learning problems, left-handed. Unspecified eating disorder reported, schizophrenia with predominance of negative symptoms, depression, 3 suicide attempts, the latter caused a serotonin syndrome and seizures. MRI with non-confluent frontal vascular lesion and SPECT with mild frontal, temporal and bilateral parietal hypoperfusion of right predominance.

Method: Interview with patient, parents and caregiver. The WAIS-IV, Barcelona Test, Tower of London, Stroop Colour and Word Test, Wisconsin Card Sorting Test and the Functioning Assessment Short Test were applied.

Results: A diminished emotional response was found, little social interest, complex ritualistic behaviors about food and water intake, executive deficits in initiative, processing speed, working memory, social cognition, planning and flexibility; preserved episodic memory, visospatial abnormalities, dyslexia and dyscalculia. The basic activities of daily life presented slight alterations. Behavioral improvements were reported in the last 2 years.

Conclusions: There are clinical similarities between neuropsychiatric disorders and DFT, without functional impairment, which gives a good prognosis to the patient and suggests that it is a phDFT. Some studies have proposed that the pathophysiology of phDFT cases may have a biological basis similar to that of primary psychiatric disorders, or that it may be a spectrum in which typical DFT is also found.

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Keywords: frontotemporal dementia, phenocopies, differential diagnosis

T. NARDO, J. BERRY, J. BATCHELOR. Executive Dysfunction in Drug and Alcohol Rehabilitation – Risk Factors & Remediation.

Objectives: Among adults in treatment for substance use disorders (SUDs), impairments are common across a range of cognitive domains. In particular, executive functioning deficits such as reduced impulse control and emotion regulation skills have been proposed to play a key role in perpetuating compulsive behaviours associated with substance use. The current study aimed to investigate the prevalence of risk factors for cognitive impairment in adults receiving treatment for SUDs, and their relationship with self-reported executive dysfunction.

Participants and Methods: 527 adults attending residential drug and alcohol rehabilitation services in Australia participated in the research as part of the Alcohol and Drug Cognitive Enhancement (ACE) study. Questionnaires were used to collect self-report data regarding the presence of risk factors for cognitive impairment alongside current executive functioning.

Results: Risk factors for cognitive impairment and executive dysfunction were highly prevalent in the sample. A moderate correlation was identified between the number of risk factors and self-reported executive dysfunction, with those with four or more risk factors falling within the ‘impaired’ range on average. Specifically, risk factors including history of overdose, learning difficulties, developmental disorders and being suspended or expelled from school were associated with significantly higher ratings of executive dysfunction.

survey of the FDC (1991), the mean age of this sample was 32.40 years old, with only 5.4% meeting the clinical cutoff on the Mississippi PTSD Scale.

Methods: GWVs responded to questionnaires assessing wartime experiences and exposure to neurotoxicants. Exposures assessed in this analysis include combustion by-products from tent heaters, anti-nerve gas pills, oil or diesel smells, and alerts for chemical/biological attacks. Repeated logistic regressions examined the association of each exposure and individual symptoms from the PCL over time. Models were adjusted for baseline age.

Results: Within veterans who reported experiencing a traumatic event, exposure to toxicants was associated with increased odds of reporting symptoms of avoidance, memory impairment, poor sleep, impaired concentration, and hyperarousal compared to those who experienced a traumatic event but did not have exposure to neurotoxicants.

Conclusions: Consistent with what has been found in 9/11 cohorts, neurotoxicant exposures appear to increase the severity of symptoms of PTSD, including self-reported problems with cognition.

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Keywords: Neurotoxicant exposures, Gulf War, Cognition

B. A. AYELE, T. RANGO, Y. YIFRU, R. TEKLE-HAIMANOT. Neuro-medical complications of fluoride exposed populations in the Main Ethiopian Rift Valley.

Aim: The aim of this study is to assess the neurological and pre-skeletal (medical) complications in populations chronically exposed to a wide range of fluoride concentrations in drinking water wells in the Main Ethiopian Rift (MER) Valley.

Method: We enrolled a total of 318 individuals from rural communities in fluoride-endemic areas of the MER. Drinking water samples were collected and measured for fluoride from 23 community wells. Detailed clinical evaluations of skeletal fluorosis, neurologic history, and physical examination were performed on the study participants.

Results: The concentration of fluoride in drinking water was ranged between 0.3 to 15.5 mg/L (mean: 6.8±4.3 mg/L). Headache, fatigue, and paresthesia accounted for 67%, 56.3%, and 37.5% of the observed neurologic complications in the study participants, respectively. Clinical signs of anemia were observed in 48% of the participants. Individuals exposed to high fluoride levels of 2-6 mg/L, 6-10 mg/L, and 10-15.5 mg/L are 2.9, 5, and 3.5 times more likely to report headache than those exposed to lower level of fluoride (< 2 mg/L) in drinking water, respectively. Impaired lumbar mobility, squatting, neck mobility, and knocked knee occurred in 22.3%, 6.6%, 2.2%, and 1.6% of the study participants, respectively. Impaired lumbar mobility and kyphosis showed statistically significant association with higher fluoride concentrations in drinking water (>10-15.5mg/L) ($p<0.05$), while impaired squatting did not ($p=0.9$) as compared to the baseline fluoride concentrations of < 2mg/L.

Conclusion: Our findings strongly suggest that adverse neurological and medical effects are associated with prolonged exposure to elevated concentrations of fluoride in drinking water. We recommend conducting a large-scale epidemiological study in fluoride-endemic areas using controlled populations to better understand non-skeletal fluorosis related to neurological and medical complications.

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Keywords: Skeletal fluorosis, neurologic complications, Ethiopian Rift Valley

Poster Session 03: Categories- ADHD; ASD; Learning Disabilities

11:00 AM - 5:00 PM

M. BALCONI, M. GRASSI, F. CASSIOLI, M. DAVID S. RUEDA, I. ORLANDO, D. CRIVELLI.
The effect of an empowerment protocol based on Sensory Device on reading performance: evidence from a case-to-controls study.

Objective: Due to the link between vision and perceptual information gating, an alteration of the visual information stream might result in motor and cognitive compensation syndromes, which might affect even higher cognitive skills such as reading. In the clinical field, the centesimal potential of prismatic lenses as a supportive tool in treating disorders of posture, relation between body and space, and sensory integration have been previously investigated. Building on previous evidence, this study aimed at investigating the potential of an intensive neurocognitive empowerment protocol supported by the Sensory Device, with a preliminary specific focus on reading skills.

Participants and Methods: Twenty volunteers including a person with dyslexia were randomly divided into experimental and control groups. The experimental group and the single-case completed a 4-week empowerment protocol supported by low-power prismatic lenses. The active control group completed an alternative visual training protocol. Pre-/posttraining assessment included measures for quality of vision, behavioral measures of attention and reading performance, and complementary task-related electrophysiological (EEG) markers of cognitive effort and information-processing.

Results: Between-group and case-to-group analyses highlighted a generalized reduction of reading times, and a significant increase of reading comprehension and fluidity ratings in the experimental group compared to the control one. Consistently, the participant with dyslexia also showed a post-training increase of gamma band power over left frontal sites during a reading task, which might mirror an improvement of cortical information exchange and integration.

Conclusions: Preliminary findings suggest that an intensive empowerment protocol based on Sensory Device might optimize visual exploration and reading skills, hinting at its potential as a supportive tool also in empowerment interventions for learning disorders.

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Keywords: Low-power prismatic lenses, Neurocognitive empowerment, Reading

D. HERNÁNDEZ-TORRES, MA. G. YÁÑEZ-TÉLLEZ. Social cognition as a predictor of ADHD symptomatology in school-aged children.

Objective: To compare a group of children with typical development (TD) and another with Attention-Deficit/Hyperactivity Disorder (ADHD), both school-aged, with regard to social cognition (SC) tasks and determine in the last group which variable of this domain can predict the symptoms of ADHD.

Participants and Methods: Children between 6 and 12 years of age were randomly selected (Mean = 8.8, SD = 1.9), 49 with referrals from an elementary school and 55 with ADHD channeled from various psychiatric units, all of them from Mexico City. The parents had a clinical interview and for the measurement of the symptoms of Hyperactivity/Impulsivity (H/I) and Inattention (I), the ADHD Rating Scale-5 for Children and Adolescents (based on the diagnostic criteria of the DSM-5), was applied. Regarding the measurement of SC, Theory of Mind (ToM), Facial Emotion Recognition (FER) and Affective Prosody (AP) tasks were designed for the present study, which were administered using a tablet computer and were considered the total hits for each variable.

Results: Statistically significant differences were found between the TD and ADHD groups ($p < 0.05$) with respect to the SC tasks (ToM, FER and AP). It was found that ToM was the only significant predictor ($p < 0.05$) of H/I symptoms, the combination of ToM and AP were significant ($p < 0.05$) for the combination of symptoms (H/I and I), while that no SC variable significantly predicted inattention symptoms.

Conclusions: Consistent with the current literature, failures in SC, specifically in ToM and AP seem to underlie and predict a part of the manifestation of the key symptoms of ADHD.

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Keywords: attention deficit hyperactivity disorder, social cognition, theory of mind

Y. K. BRAW, A. LEV, T. ELBAUM, Y. RASSOVSKY. Integrating the MOXO-d-CPT with an Eye Tracker: A Feasibility and Validity Study.

Objective: Continuous performance tests (CPTs) are routinely used for assessing cognitive functioning examinees with Attention-Deficit/Hyperactivity Disorder (ADHD) or suspected of having the disorder. Psychophysiological measures may enhance information derived from CPTs and, thereby, enhance clinical decision-making. The utility of eye movement variables to enhance the utility of conventional CPT indices was investigated in the current study.

Participants and Methods: Adult ADHD patients (n=33) and matched healthy controls performed an eye-tracker integrated MOXO-d-CPT.

Results: ADHD patients spent more time gazing at irrelevant areas, either on the screen or outside of it, than healthy controls. Moreover, classification accuracy was enhanced when eye movement variables were integrated with conventional MOXO-d-CPT indices, compared to the use of the indices as sole predictors of group membership.

Conclusions: The study indicated the feasibility of integrating an eye tracker with CPTs and their promise in clarifying the cognitive profile of the examinees. Findings, however, are preliminary and further research is needed.

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Keywords: CPT, Eye movements

E. VERCHE, C. J. RODRÍGUEZ CERVANTES, M. DE LOS DOLORES VALADEZ SIERRA. Differences in executive functioning in gifted children with and without ADHD.

Objective: Around 8% of gifted children has Attention Deficit and Hyperactivity Disorder (ADHD). These children with giftedness and ADHD usually can control better distractors for a longer time than children with only ADHD and have a better ability to respond in the academic field to issues of personal interest, and to get involved in academic tasks. The objective of this research is to analyze whether there are differences in executive functioning in gifted children with and without ADHD.

Participants and methods: Participants were 80 children from 7 to 10 years old. There were four different groups: gifted children, children with ADHD, gifted children with ADHD and healthy controls. They were all assessed using BANFE-2. This test assesses fifteen cognitive process associated to prefrontal cortex. The test groups the scores in three areas and provides as an IQ score: orbitomedial functioning, dorsolateral functioning and anterior prefrontal cortex functioning. An ANOVA test was used to see group differences.

Results: Significant differences were found in orbitomedial and dorsolateral prefrontal cortex processes IQ ($F(3)=3.42$; $p\leq 0.05$; $F(3)=6.21$; $p\leq 0.01$). In orbitomedial functioning ADHD performs significant worse than gifted children. In dorsolateral functioning differences ADHD group performs significant worse than gifted children and gifted children with ADHD.

Conclusions: Children with ADHD have more difficulties in executive functions than other groups. However, gifted children with ADHD seem to have some protection to these problems, especially in working memory, planning, and verbal fluency. ADHD seems to not have an effect on executive performance in gifted children. However, the social and academic implications of ADHD in gifted children should always be taken into account.

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Keywords: giftedness, ADHD, executive functions

J. KEATING, J. BRAMHAM, F. MCNICHOLAS, A. CARR, N. HASSHIM, S. CONROY, M. DOWNES. Exploring the early development of preschool children with a familial history of ADHD.

Objective: Attention deficit hyperactivity disorder (ADHD) is a neurodevelopmental disorder that affects approximately 5% of children worldwide. ADHD and its symptoms are considered highly heritable, however there is a lack of research on the early development of young children from families with existing ADHD diagnoses. Previous research has demonstrated links between sleep and family factors and the development of attention control in both children with ADHD and typically developing children. These factors may be particularly relevant to young children who are already at a higher likelihood of ADHD diagnosis due to an existing diagnosis in an older sibling or parent. The aim of the current study was to investigate potential differences in temperament, sleep and family factors for young children with and without a familial history of ADHD.

Participants and Methods: Parents of preschool children with or without a familial history of ADHD and a child under 6 years were invited to complete a series of questionnaires. Seventy-two parents of children with a familial history of ADHD (34.3% parent/65.7% sibling) and 139 parents of children without a familial history of ADHD completed the study. Parents completed questions related to family function (SCORE-28), parental functioning (Barkley's Functional Impairment Scale), child temperament (Childhood Behaviour Questionnaire), and child sleep behaviour (Child Sleep Habits Questionnaire).

Results: As expected, differences were observed between the high-risk and low-risk groups for parental functioning and family functioning, with the high-risk group reporting more home difficulties. Some emerging patterns for group differences in aspects of temperament and sleep behaviour were also observed.

Conclusions: Sleep and family factors should be explored further as potential modifiable targets for intervention in children who are at a higher risk of future ADHD diagnosis due to an existing diagnosis in their immediate family.

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Keywords: attention deficit hyperactivity disorder, sleep, attention

A. BODART, J. OMMENETTI, L. LEFEBVRE, K. EL BOURAGUI, M. ROSSIGNOL. Electrodermal reactivity and emotional appraisal in adults with autistic spectrum disorders.

Objective: To evaluate the relationship between electrodermal activity (EDA) and emotional appraisal of visual emotional stimuli in autism syndrome disorder (ASD) adults compared to healthy controls (HC). According to the James-Lange theory, the physiological arousal triggered by emotional stimulus may be at the origin of the emotional experience. Disturbances in physiological arousal in response to emotional stimuli have been observed in a variety of psychopathological disorders, including ASD (Lydon et al, 2016). Indeed, ASD has been associated with autonomic dysregulation characterized by an atypical EDA in response to emotional stimuli. However, few studies have been conducted to explore the role of sympathetic activity in emotional disturbances reported in ASD adults.

Methods: 10 men with ASD free of intellectual disability (mean age = 29.72; SD = 3.77) and 10 HC (8 males, mean age = 30.43; SD = 10.97) took part to the experiment. The experimental task consisted of appraising 24 positive, negative and neutral pictures from the International Affective Picture System. After each picture, participants had to provide an evaluation of valence and arousal. In a second part of the experiment, they were asked to passively view 3 positive, negative and neutral film clips. EDA was monitored during the entire experience.

Results: ASD and HC did not differ in their subjective appraisal of pictures, nor on EDA for neutral films and pictures. However, ASD produced significantly higher EDA for negative and positive films and pictures.

Conclusions: Our results suggest that physiological reactivity to emotional stimuli was increased in ASD, but this autonomic overactivation does not seem to be associated with an enhancement of subjective appraisal. Accordingly, physiological responses and cognitive evaluation of emotional stimuli appeared as dissociated in ASD adults. This dissociation between bodily reaction and cognitive appraisal could contribute to emotional disturbances in ASD.

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Keywords: autism spectrum disorder, emotional processes, electrodermal activity

A. LIND, L. HAATAJA, V. VOROBYEV, J. LÖTJÖNEN, J. KOIKKALAINEN, R. PARKKOLA.
Gender differences in visual perception and neural correlates in very preterm preadolescents.

Objective: Preterm boys have shown to have poorer developmental outcome than preterm girls but the underlying mechanisms of the differences are not known. The aim of this study was to assess visual perception and its neural correlates in very preterm girls and very preterm boys.

Participants and Methods: Very preterm subjects with neurodevelopmental impairments or major brain pathologies were excluded. Tasks assessing discrimination of a deviating figure from the Motor-Free Visual Perception Test, Third Edition were performed by very preterm (birth weight ≤ 1500 grams or gestational age <32 weeks; 14 girls, 23 boys) and full-term (18 girls, 16 boys) participants at twelve years of age during functional magnetic resonance imaging. The subjects also underwent structural magnetic resonance imaging, and regional brain volumes of areas related to visual perception were measured using an automated image quantification tool and normalized for total intracranial volume. Gray matter concentration in the same areas was assessed with voxel based morphometry.

Results: The accuracy in the visual perception task was significantly poorer in very preterm boys than in very preterm girls. Accuracy was also significantly poorer in very preterm boys than in control boys, while accuracy did not differ between very preterm girls and control girls or between control girls and control boys. Neural activation did not differ between very preterm girls and very preterm boys, neither did the regional volumes. Gray matter concentration in left thalamus and right parietal lobe differed significantly between very preterm girls and very preterm boys, the concentration was lower in boys.

Conclusions: Poorer visual perception in very preterm boys than very preterm girls is not explained by differing neural activation or regional brain volumes. Instead, altered gray matter concentration may be related to the gender differences in outcome of very preterm children.

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G. YÁÑEZ-TÉLLEZ, P.-T. ARELLANO-VIRTO, B. PRIETO-CORONA, A.-N. SEUBERT-RAVELO, A. WITT-GONZÁLEZ.
Executive functioning in adult attention-deficit/hyperactivity-disorder and comorbid borderline personality disorder.

Objective: Attention-deficit/hyperactivity-disorder (ADHD) has a high rate of psychiatric comorbidities, including borderline personality disorder (BPD). Several studies have identified deficits in executive functions in adults with ADHD but it is not clear the influence of comorbidity in these deficiencies. The objective of this work was to identify the possible differences in executive functioning between ADHD young adults without BPD and ADHD with comorbid BPD (ADHD + BPD).

Participants and Methods: Participants with previous ADHD diagnosis were recruited from a psychiatric care. Diagnosis was confirmed through retrospective and current symptom scales. The Personality Assessment Inventory was used to identify BPD symptomatology and participants were divided into two groups: with BPD (N=24) and without BPD (N=14). Both groups were compared regarding executive

functions measured ecologically through the Behavior Rating Inventory of Executive Function (BRIEF) and through classic performance tests.

Results: Significant differences were observed between groups with worse functioning for ADHD + BPD group in BRIEF-A Inhibit, Shift, Emotional Control, Initiate, Working Memory, Plan/Organize, Task-Monitor and Organization of Materials Scales. No differences were found in attention and working memory tasks in performance tests.

Conclusions: There are important differences between adults with ADHD and ADHD + BPD, with worse executive functioning scores as measured in self-report scales for the ADHD + BPD group. It is important to consider the possible contribution of comorbid disorders in the neuropsychological characterization of the adult with ADHD.

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Keywords: ADHD, borderline personality disorder, executive functions

P.-T. ARELLANO-VIRTO, G. YÁÑEZ-TÉLLEZ, A.-N. SEUBERT- RAVELO, B. PRIETO-CORONA. Social Cognition and Executive functioning in Adult Attention-Deficit/Hyperactivity-Disorder with and without Antisocial Personality Disorder comorbidity.

Objective: Adults with ADHD have different psychiatric comorbidities, being antisocial personality disorder one of the most frequent. Deficiencies in executive functioning (EF) and Social Cognition (SC) have been observed in ADHD adults, although it is not clear if they may be attributable to the associated psychiatric symptomatology. The objective of this work was to identify differences in SC and EF between ADHD adults with and without APD.

Participants and methods: Two groups were studied: adults with ADHD and APD (n= 18) and adults with ADHD without APD (n= 20) diagnosed by a psychiatrist and confirmed by self-rating scales. The Personality Assessment Inventory was used to identify APD symptomatology and participants were divided in two groups: with APD and without APD. Both groups were compared regarding Social Cognition measured by MSCEIT Test, COGSOC-AM Battery and IOWA Gambling Task; and executive functions measured ecologically through the Behavior Rating Inventory of Executive Function (BRIEF-A).

Results: Significant differences were observed between groups, with worse ability to understand emotional changes over time in the MSCEIT Test and worse functioning in Inhibit and Self-monitor Scales of BRIEF-A in adults with ADHD and APD.

Conclusions: There are important differences between adults with ADHD with and without APD, with lower emotional comprehension and executive functioning scores as measured in self-report scales for the second group. Knowing the neuropsychological components that are related to psychiatric comorbidities is relevant to improve diagnosis in adults with ADHD.

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Keywords: ADHD, Antisocial Personality Disorder, Social Cognition

I. SUAREZ, C. DE LOS REYES, T. IGLESIAS, L. CASINI. How is temporal processing affected in children with attention-deficit/hyperactivity disorder?

Objective: To develop the understanding of temporal processing in children with ADHD.

Participants and Method: We compared the performance of 40 children with ADHD and 42 typically developing children from the Caribbean community on two temporal tasks: a bisection task and a reproduction task.

Results: First, children with ADHD presented larger variability when performing temporal tasks whether they required interval estimation or interval reproduction, in both modalities. Second, they overestimated the durations in both temporal bisection tasks and underproduced duration intervals in the visual reproduction task.

Conclusions: This study confirms the existence of temporal deficits in children with ADHD. In the context of the pacemaker-accumulator model, the results suggest that temporal deficits might result from a dysfunction in the switch, probably due to fluctuations in sustained attention, and/or memory impairment. Moreover, temporal overestimation contradicts the idea of a selective attention deficit in ADHD, teaching us more about ADHD deficits.

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Keywords: attention deficit hyperactivity disorder, psychophysics, attention

M. TÉLLEZ SILVA, E. ESCARTÍN PÉREZ. Learning disorder and ADHD comorbidity: Executive functions deficits and quality of life.

Objective: To study the relationship between executive functioning and quality of life of schoolchildren with or without comorbidity of a learning disorder and Attention deficit hyperactivity disorder (ADHD).

Participants and method: The sample consisted of 10 children with a learning disorder and 10 children with a learning disorder and ADHD from a private Hospital in Mexico City and a public school in the metropolitan area.

Parents signed informed consent before the children's assessment.

Children were assessed using the Battery for Executive Functions and Frontal Lobes (BANFE) and the KIDSCREEN-52 questionnaire (quality of life). Besides, parents were asked to answer the Behavioral Assessment of Executive Functions (BRIEF-2).

Results: Both groups showed executive functions impairment, however, they displayed different profiles. Specifically, children with comorbidity had more difficulties in auditory and visual working memory, planning and verbal fluency. On the other hand, children with learning disorders had deficits in auditory work memory and inhibition. Regarding the quality of life, children with comorbidity were affected not only in the scholar domain but also on social, family and self-esteem, while those who have learning disorders had difficulties in scholar and self-esteem domains. A negative correlation was found between deficiencies in executive functioning and quality of life levels.

Conclusions: Our results showed that executive performance was altered in both schoolchildren with or without comorbidity of a learning disorder and ADHD, suggesting that learning disorders also include important executive deficits. Low scores of quality of life were not clinically relevant, however, we found a relationship between executive functions and low scores on quality of life. Finally, we found that children who have greater support from their parents and schools, tend to present higher scores of quality of life despite executive dysfunction.

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Keywords: academic skills, child development disorders, executive abilities

M. HERNÁNDEZ-VÁZQUEZ, J. BERNAL-HERNÁNDEZ, L. LUVIANO-VARGAS, B. PRIETO-CORONA, M. RODRÍGUEZ-CAMACHO, R. GARCÍA-JUÁREZ. Effects of a phonological awareness intervention program. A case study of dyslexia.

Objective: Phonological awareness (PA) has been described as one of the most important prerequisites for the development of reading skills. Its deficit may explain the low accuracy and reading speed in children

with dyslexia, so intervention in this component could reduce such difficulties. The effects of an intervention program on PA in a case of phonological dyslexia are described.

Participant and method: 11-year-old male, right-handed, with a history of prematurity, delayed language development, difficulties in acquiring and consolidating reading skills. An intervention program was carried out in PA and a pre and post evaluation with the Wechsler Intelligence Scale for Children-IV and the Neuropsychological Battery for the Evaluation of Learning Disabilities. The intervention program included syllabic and phonemic PA tasks with words and pseudowords. Two weekly sessions of one hour were made for 6 months.

Results: In the pre-evaluation it was identified that the patient's intelligence was normal, showed an average performance in the reading accuracy of frequent words, but a very low performance in PA tasks, speed and precision of infrequent words, pseudowords, sentences, texts and reading comprehension. After the intervention, clinically significant differences were observed in the performance in handling phonological units and reading skills, especially in accuracy and fluency.

Conclusions: The present study confirms that training in PA applied individually favors reading performance, which coincides with several studies that have reported the importance of training in PA to facilitate the subsequent development of grapheme-phoneme conversion in prevention and remediation of dyslexia.

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Keywords: dyslexia, phnological awareness, learning disabilities

A. G. SEABRA, G. BRITO, C. BRANCO, L. RENATO R. CARREIRO. Cognitive profiles in reading components in Brazilian adolescents with ADHD and Dyslexia.

Objective: Dyslexia and Attention Deficit Hyperactivity Disorder (ADHD) are frequent developmental disorders in children and adolescents, and often impact scholar reading performance. Thus, it is fundamental to find a differential profile in reading performance in such diagnoses. Competent reading depends on several cognitive processes such as word recognition, comprehension and fluency. The study aimed to characterize the performance of students with ADHD and dyslexia, in comparison with typical development students.

Participants and Methods: We assessed 165 Brazilian adolescents, 11-14 years old, from 6th to 9th grades, divided into three groups: ADHD (16 students), dyslexia (9 students) and typical development (140 students). The diagnoses were established by a multidisciplinary center and there were no comorbidities for any case. The instruments used were: Comprehension Test of Words and Pseudowords to assess word recognition; Reading Fluency Test to assess fluency; Cloze Reading Comprehension Test to measure reading comprehension; and the WISC vocabulary subtest to assess auditory comprehension.

Results: Non-parametric analyzes revealed statistically significant differences. In textual comprehension, dyslexic and ADHD participants had significantly lower performances than typical students. In word recognition, dyslexics had lower performance, but ADHD participants were similar to typical ones. The dyslexic group spent more time in reading than the ADHD group, which spent more time than typical one. The ADHD group had more omissions in text reading than the other two groups. There were no significant differences in auditory comprehension.

Conclusions: A differential profile was found in reading performance, consistent with the cognitive deficits classically pointed out for each diagnosis: phonological deficits in dyslexia, with problems in word recognition and fluency; attentional deficits in ADHD, with omission errors; and no auditory comprehension deficits.

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Keywords: Dyslexia, ADHD, Reading

T. BITAN, Y. WEISS, T. KATZIR, T. TRUZMAN, B. BAROUCHE. Language-dependent neurocognitive compensation mechanisms for reading.

Objective: The typical and impaired neural reading system is affected by unique properties of specific languages. We examined the hypothesis that morphological decomposition can compensate for deficient phonological decoding skills, and for the missing phonological information when reading opaque orthographies. Hebrew provides a unique opportunity to test these questions as it has a rich morphology, and a script with two levels of orthographic transparency: pointed (transparent) and un-pointed (opaque).

Participants and Methods: We examined adult typical and dyslexic readers, as well as children in 2nd-3rd grade and 5th-6th grade in 4 behavioral and fMRI experiments. Participants read aloud 48 mono-morphemic and 48 bi-morphemic words composed of a root and pattern, presented in the pointed and un-pointed script versions.

Results: Behavioral findings showed stronger morphological effects in dyslexic compared to typical readers and in young compared to older readers. For dyslexic adults these effects were facilitatory, while for young readers reading the opaque script the morphological structure increased competition. Neuroimaging showed for *all* adults morphological effects in un-pointed words, in left inferior and middle frontal gyri, associated with morpho-phonological decomposition. Additionally, dyslexic readers showed a morphological effect in left occipito-temporal cortex, associated with orthographic processing only in pointed words, which were harder for them. Finally, children showed morphological effects across age groups in bilateral anterior middle and superior temporal gyri, involved in morpho-semantic processing.

Conclusions: These findings suggest that morphological decomposition can compensate for the deficient or immature phonological decoding skills of the reader. Nevertheless, this is affected by unique properties of the language such as a rich morphology or an opaque orthography, with spares phonological information.

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Keywords: dyslexia, neuroimaging; functional, brain development

J. DEGRE-PELLETIER, E. DANIS, V. D. THERIEN, E. B. BARBEAU, I. SOULIERES. Functional connectivity at rest in autistic children and adults: developmental overconnectivity and associations with reasoning.

Objective: At cerebral level, long-range underconnectivity is often reported in autism spectrum (AS) adults relative to typically developing (TD) adults. However, an opposite pattern of overconnectivity was recently reported in AS children. We aim to 1) compare patterns of functional connectivity at rest in AS vs. TD children, and in AS vs. TD adults; 2) explore the associations between these connectivity patterns and fluid reasoning abilities.

Participants and Methods: 27 AS and 26 TD children (6-14y) and 28 AS and 26 TD adults (18-41y), matched on Raven's Progressive Matrices (RPM), completed a resting state scan (3T MRI). The superior posterior lobule (SPL), occipital fusiform gyrus (OFG), and temporo-occipital fusiform gyrus (TOFG) were used because of their involvement in fluid reasoning in autism.

Results: Seed-to-voxels analyses ($p < .001$ unc, $k=50$) revealed greater connectivity in AS compared to TD children, between right SPL and anterior cingulate gyrus, between left SPL and right middle frontal gyrus, left inferior frontal gyrus and right lingual gyrus, between OFG and right supramarginal gyrus and left posterior middle temporal gyrus, and between TOFG and right supramarginal gyrus. Relative to TD adults, AS adults only presented greater connectivity in the left hemisphere between OFG and inferior temporal gyrus. Performance on RPM correlated with connectivity only in TD adults between left SPL and right

middle frontal gyrus ($r=-.446$, $p<.05$) and in AS children between left middle temporal gyrus and bilateral OFG ($r=.404$, $p<.05$).

Conclusions: Patterns of overconnectivity in areas supporting reasoning, including long-range connectivity, characterize functional connectivity organization of the cortex at rest in AS relative to TD children, a difference not observed in adults. Contrary to the underconnectivity model in autism, a developmental pattern of change in functional connectivity is observed in autism relative to typical development (Uddin et al., 2013).

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Keywords: autism spectrum disorders, functional connectivity, developmental

I. A. WESTERS, R. J. H. MAES, J. I. M. EGGER. A literature review on the relation between habituation and intelligence beyond infancy.

Objective: Models of habituation suggest an association between habituation and intelligence, as assessed with IQ tests. Longitudinal research has indeed ascertained a moderate positive correlation between fetal or infant rate of habituation and later IQ. However, correlation levels seem to drop when measurement intervals between habituation and IQ increase. It is not yet clear whether the relation also holds when habituation is measured at a later age (childhood, adolescence or adulthood). Results of a previous systematic review (Berkson, 1961) were indecisive, with a trend towards lowered responsiveness in subjects with lower IQ. Here, we present a new systematic review.

Method: Eight studies, published between 1967 and 2018, were included. Another nine studies (published between 1965 and 1984) did not fulfill all inclusion criteria but were also considered highly relevant.

Results: Studies varied widely with respect to habituation measures, stimuli used, and participant characteristics, including age and IQ. Associations tended to be significantly positive when comparisons were made between participants of lower IQ and average/high IQ. No significant association tended to be found in older studies using specific habituation measures derived from the Galvanic Skin Response (GSR). When making use of the GSR, some studies revealed enhanced initial responses in the low IQ participants and a significant negative association between IQ and habituation rate.

Conclusions: Interpretation of results is complicated when GSR measures are used and initial response amplitudes differ between IQ groups. The GSR is not regarded as a preferred measure when assessing habituation. Overall habituation seems to positively relate to IQ when either measured in infancy or in participants of lower IQ. It is hypothesized that the decrease of this relation in older age or higher IQ is due to the IQ score in these cases being increasingly determined by enhanced general knowledge.

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Keywords: habituation, intelligence, learning

B. VEKETY, A. N. H. LOGEMANN, Z. TAKACS. Feasibility and efficacy of a neurofeedback-assisted mindfulness program with children.

Objective: Mindfulness meditation with real-time EEG neurofeedback is a novel method that aims to support the practice of mindfulness meditation by linking objective brain activity with subjective experience of internal attention through constant auditory feedback. This can provide a unique opportunity for children, given that learning to meditate can be especially difficult without easily detectable signs of performance. The aim of this study was to assess whether neurofeedback-assisted mindfulness can help children to increase their control over internal attention related brain signals through self-regulatory strategies.

Participants and methods: We assessed the feasibility and internal attention related learning process of an 8-session neurofeedback-assisted mindfulness meditation program adapted for 9-10 years old children in a local elementary school ($N = 15$). Feasibility was measured with a checklist, while brain activity measurement and real-time neurofeedback was implemented with the wireless Muse Interaxon EEG headband.

Results: Results indicated overall feasibility of the program with children, and an average progression in regulating internal attention related brain activity. However, plateaus and a turning point was evident during the learning process.

Conclusions: In conclusion, findings suggest that even a short neurofeedback-assisted mindfulness meditation program can improve children's internal attention related brain activity. The limitation of the program length and the absence of a follow-up measure highlights the direction for future research and intervention. Theoretical and practical relevance of the findings will be discussed.

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Keywords: neurofeedback-assisted mindfulness meditation, internal attention, children

A. VELOSO, S. VICENTE, M. FILIPE. Executive functioning impairments in children with Attention-Deficit/Hyperactivity Disorder: Performance-based measures versus behavioral-ratings.

Objective. Research has shown that Attention-Deficit/Hyperactivity Disorder (ADHD) is associated with core impairments in executive functions (i.e., an umbrella term that incorporates processes responsible for guiding, directing, and managing cognitive, emotional, and behavioral functions). Still, research findings have been mixed perhaps due to the diversity of tasks used to assess these functions. Thus, this study aimed to assess executive functions in children with ADHD through different types of measures: performance-based neuropsychological measures and behavioral-ratings.

Participants and Methods. Children with ADHD ($N = 18$; Mean age = 8.60 years) were matched to a typically developing (TD) group ($N = 18$) on age, gender, and non-verbal intelligence. Performance-based measures were used to assess working memory, mental flexibility, inhibition, planning, problem-solving, and affective decision-making. A behavioral-rating questionnaire was used to evaluate inhibition, shifting, emotional control, initiative, working memory, planning/organization, organization of materials, and monitoring skills in daily life.

Results. In performance-based measures, compared to TD children, the ADHD group demonstrated significant difficulties in measures of working memory, planning, and affective decision-making. In behavioral ratings, the ADHD group displayed greater difficulties in inhibition, emotional control, initiative, working memory, planning/organization, organization of materials, and monitoring.

Conclusions. This study explored the relationship between several commonly used performance-based measures of executive functions and behavioral-ratings of everyday executive functioning. Compared to performance-based measures, behavioral-ratings pinpointed a larger spectrum of difficulties. As such, it is paramount to devise performance-based measures with ecological validity to increase their efficacy in pinpointing executive difficulties.

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Keywords: Attention-Deficit/Hyperactivity Disorder, executive functions

F. Z. SAI. Exposure to Auditory-Visual Cues improves Facial Expressions Understanding in Children with Autism and Down Syndrome.

Objective: Children with Autism spectrum disorder (ASD) tend to avoid looking at faces and social stimuli. Two experiments were designed to investigate whether children with autism (AS) are specifically deficient on tasks involving recognition of facial expressions and actions.

Participants and Methods: Experiment 1 used 15 children with autism (AS) and 15 children with Down syndrome (DS). They were between 6 and 15 years old. The stimuli were facial expressions, body parts and actions. Each category had two sub categories. A Picture Identification Task was used to assess their ability to identify verbally cued animate stimuli by pointing to the picture they heard its label.

The results and conclusion: The results showed that children with autism were significantly poorer in identifying correctly animate stimuli, particularly facial expressions. Further, they were less accurate than children with D.S in identifying correctly the facial expressions as opposed to body parts and actions. Also, the children with AS made more errors by pointing to inanimate pictures in response to animate words. These data suggested that children with AS were deficient in understanding animacy and discriminating between animate and inanimate stimuli.

Objective: Experiment 2 examined whether training children with AS could improve understanding facial expressions.

Ten children with AS aged between 6 and 14 years, were exposed to an experimenter daily to for two weeks. The experimenter read a short story to the participants every morning. The same procedures were used as in Experiment 1.

The results and Conclusions: The result showed a better accuracy in identifying facial expressions task, with less errors in pointing to animate stimuli. Training improves performance at least on emotions recognition tasks. The present findings are interpreted in terms of an intermodal perceptual deficit most likely due to some underdeveloped neurological structures during the prenatal phase.

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Keywords: Understanding Facial expressions

Poster Session 04: Categories: Aging; Dementia (AD & Non-AD); MCI; Memory Functions

11:00 AM - 5:00 PM

V. PUCCI, S. MONDINI. Reserve Physical Activity and Current Physical Activity in aging: What effect on cognitive performance?

Objective The aging of the population leads us to identify how to preserve cognition and a good quality of life. Many studies (e.g., Blondell, et al., 2014) have shown that *Physical Activity* (PA) and exercise have positive effects on cognition in the elderly. However, PA carried out throughout the individual's lifespan may also have an impact on later cognition. We hypothesized a *Physical Activity Reserve* (R-PA), a flexible and dynamic construct which increases over the years, compensating for age-related cognitive loss.

Participants and Methods Two questionnaires to evaluate Physical Activity Reserve (R-PA, carried out throughout the individual's lifespan) and Current Physical Activity (C-PA, performed in the last 12 months) were developed. They were administered to 50 healthy individuals over 50 years old (range 50-89) to verify correlation with cognitive performance. C-PA and R-PA included not only physical exercise (structured activities to improve and/or maintain physical fitness), but also incidental physical activity, which is any kind of movement that leads to a metabolic cost above baseline (housekeeping, walking, etc.). In addition, for each participant Cognitive Reserve (CR), a reliable predictor of cognitive performance (e.g., Tucker & Stern, 2011), was measured through the CRIq (Cognitive Reserve Index questionnaire, Nucci et al., 2012). CR was included into the regression models with R-PA and C-PA.

Results The most influential factor for the performance is AGE ($\beta_{AGE} = -.630$, $p < .001$) and CR ($\beta_{CR} = .239$, $p < .001$). Interestingly, both R-PA and C-PA have an effect on global cognitive functioning ($\beta_{RPA} = .234$, $p < .01$; $\beta_{C-PA} = .274$, $p < .01$). Furthermore, R-PA seems able to explain, even by itself, the cognitive functioning variability within the regression models ($\beta_{RPA} = .527$, $p < .001$ with an $R^2 = .278$).

Conclusions Cognitive variability in the elderly population can be explained by both C-PA and R-PA which could be considered in promoting new preventive interventions.

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Keywords: aging, physical activity, reserve

E. DUBON, S. PARK. Mini Mental Status Examination predicts Cognitive Impairment in Alzheimer's Disease.

Objective: Alzheimer's disease (AD) is a progressive, neurodegenerative disorder, affecting approximately 5.7 million older Americans (Center for Disease Control and Prevention, 2018). A memory impairment is often the primary indicator of an AD diagnosis, with further impairment in other domains to follow (Adachi et al., 2013; Martyr & Clare, 2012; Stewart, McGeown, Shanks, & Venneri, 2014). Many cognitive domains are associated basic activities of daily living (ADLs) and instrumental ADLs, and when these domains are negatively impacted, real-world functioning can become challenging. The Mini-Mental Status Examination (MMSE) is a brief, cognitive screening tool that is used in assessing cognitive impairment and detecting cognitive and behavioral disruption in the domain of memory (Chapman et al., 2010). The aim of this study was to determine whether MMSE scores can be used as predictors in detecting a likely conversion to AD in individuals diagnosed with mild cognitive impairment (MCI).

Methods of synthesis: A meta-analysis was conducted using effect sizes from each study by weighting the average MMSE scores. To test for heterogeneity, a meta-regression and meta-ANOVA were used. Lastly, publication bias was measured by using Trim-and-Fill and Rosenthal's Fail-safe N.

Results: From an initial pool of 48 studies, 15 articles met inclusion criteria and were selected for this study. An overall analysis indicated that MMSE scores significantly detect future cognitive decline ($g = 1.1627$, $g = 1.8611$; $p < .0001$), particularly in individuals with MCI who later convert to AD. Age and gender did not have an impact on detecting cognitive impairment.

Conclusion: Findings indicated that the MMSE can be used a primary assessment tool in detecting cognitive impairment in individuals who will likely convert from MCI to AD. Implications, limitations, and risk bias are further discussed.

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Keywords: Alzheimer's Disease, MMSE, cognitive impairment

N. JANSSEN, V. PIAI, A. ROELOFS, R. P. C. KESSELS. Speed of Word Finding Depends on Ventral Tract Integrity in Primary Progressive Aphasia.

Objective: Primary progressive aphasia (PPA) is an acquired language deficit due to progressive neurodegenerative disease, with word retrieval disturbances as the most frequent presenting symptom. The picture-word interference (PWI) paradigm has been extensively employed in psycholinguistics to investigate word retrieval, yet very few studies have used this paradigm in PPA. The present PWI experiment was designed to examine object naming and interference control in PPA using reaction time (RT) and tractography analyses.

Participants and Methods: Twenty-three PPA patients aged 55-82 and twenty cognitively unimpaired controls (HC) performed a PWI task including an incongruent (semantically related word) and a neutral

(XXX) condition. Mixed-effects models and ex-Gaussian distributional analyses were performed on the RTs. MRtrix's fixel-based analysis was used to assess ventral white matter integrity in relation to PWI results.

Results: Naming RTs were longer for PPA patients compared to HC and, critically, PPA patients showed more interference compared to HC. RT distribution analysis showed a difference in the entire distribution (μ and τ) between PPA and HC. Integrity of the uncinate fasciculus and inferior fronto-occipital fasciculus predicted overall RT in controls, but only integrity of the inferior longitudinal fasciculus predicted the magnitude of the interference. In PPA patients significant interactions between condition and integrity were present for all ventral tracts.

Conclusions: The PWI task appears to be a feasible and potentially valuable method for clinical assessment as PPA patients show both prolonged naming RTs as well as increased interference. Whereas previous studies in PPA have primarily focused on naming errors, our study highlights the importance of RT analysis. Damage to the ventral pathways affects word production and interference control. These findings contribute to the scarce literature on this topic and require further investigation.

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Keywords: dementia – other cortical, language: aphasia, neuroimaging: structural connectivity

M. YOKOGAWA, M. NOTOYA, M. TOYAMA, K. TAKEMURA. Memory recall testing of upper limb movement: Comparison of younger and older people.

Objective: To examine memory recall of upper limb movement in younger and older people.

Participants and Methods: Participants were 12 university students with a mean (SD) age of 22.7 (2.8) years and 12 community-dwelling older individuals with a mean (SD) age of 70.3 (3.5) years. Testing comprised two preliminary practice tasks involving the upper limbs, followed by 10 sitting tasks: (1–3) bilateral shoulder movements; (4–6) asymmetrical shoulder and elbow movements; (7–10) asymmetrical upper limb movements and placing of part of the upper limbs on the body (i.e. uncommon daily movements). An image of each individual movement in the 10 tasks was projected for 5 seconds onto a screen in front of the participant, who was instructed to reproduce the movement immediately after the image had disappeared. The testing was carried out twice, reversing the sequence of the movements on the second trial. Participants' responses were video-recorded and evaluated by three examiners. In the event of disagreement, the examiners held additional discussions to determine the outcome. The rate of correct response (RCR) was determined by the total number of participants who responded correctly to each movement.

Results: In older participants, RCR for Tasks 1, 2, 3, and 8 was 92%–100% for the two trials. RCR for Tasks 4, 5, 6, and 7 was 17%–50%, but increased to 50%–83% for the second trial. For Task 10, RCR for both trials were 75% and 83%. In younger participants, RCR for all tasks except Task 9 was 92%–100% for both trials. RCR for Task 9 was 25%–33% in both older and younger participants.

Conclusions: RCR was higher for symmetrical movements than for asymmetrical ones, especially in older participants. Uncommon daily movements that are difficult to verbalize are associated with low memory recall. Memory recall tests of upper limb movement could be used to supplement written screening tests for cognitive function.

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Keywords: cognitive functioning, assessment, movement

S. JIMÉNEZ GARCÍA-TIZÓN, A. BELÉN NAVARRO-PRADOS, B. BUENO MARTÍNEZ. Are support groups effective for family caregivers of people with dementia?

Introduction and objective: Support groups are one of the most common interventions for caregivers to reduce the emotional discomfort associated with care. The effectiveness of a supportive intervention on stress, social support and problem-solving skills of family caregivers of people with dementia has been evaluated.

Participants and Methods: 10 family caregivers of people diagnosed with dementia from the city of Salamanca participated; 6 were women (3 daughters and 3 wives) and 4 men (3 sons and 1 husband). The intervention consisted of eight weekly sessions of 90 minutes. A pre-post intervention evaluation was performed with The Perceived Stress Scale –PSS-, The Adaptation of The Psychosocial Support Questionnaire –PSQ- and The Social Problem Solving Inventory-Revised: Short Form –SPSI-R:S-.

Results: Regarding stress, a non-significant reduction was found between pre and post scores ($t=1,860$, p -value= $0,096$) and a clinically reliable change was observed only in 10% of the participants, and an indeterminate change in 90% (most of them with a positive trend). The group data also showed non-significant differences in social support ($t=-0,195$, p -value= $0,847$). 10% showed a clinically reliable change, and 90% an indeterminate change (only three caregivers with a positive trend). Finally, in problem-solving skills the group data did not show significant differences ($t=0,135$, p -value= $0,896$). 100% of the participants showed an indeterminate change (half of them with a positive trend, four with a negative trend and one without variation between pre-post scores).

Conclusions: In spite of its wide use, the results of this study confirm that supportive interventions do not improve the situation of family caregivers in terms of stress, social support and problem-solving skills. Therefore, it is recommendable to use other types of interventions.

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Keywords: Dementia, Caregiver, Support Groups

E. SONCU BUYUKISCAN, E. YILDIRIM, A. DEMIRTAS-TATLIDEDE, B. BILGIÇ, E. DURSUN, M. ALAYLIOGLU, D. GEZEN AK, B. ACAR. An Investigation of the Relationship between CSF Amyloid Beta Level and Episodic Memory Performance within the Alzheimer's Disease Continuum.

Objective: Alzheimer's Disease (AD) is a neurodegenerative condition in which first clinical symptoms are generally observed in episodic memory. Recent studies suggest that in addition to hyperphosphoryllated tau accumulation, changes in amyloid- β ($A\beta$) 1-42 concentration might also be related to the neuropsychological profile associated with AD. This study therefore aimed to investigate whether cerebrospinal fluid (CSF) $A\beta_{42}$ concentrations are related to episodic memory performance among participants with subjective memory impairment (SMI), and amnesic mild cognitive impairment (MCI).

Participants and Methods: 53 individuals participated in the study. 27 of them were diagnosed with SMI while the remaining 26 was diagnosed with MCI. All participants went through neurological examination, structural MRI, neuropsychological assessment, and lumbar puncture. The main measure of episodic memory was identified as the participants' free and total recall scores on the Free and Cued Selective Reminding Test (FCSRT).

Results: $A\beta_{42}$ concentrations of the overall sample ranged between 522 and 1377 pg/mL. Each group was divided into 2 subgroups: low $A\beta$ and high $A\beta$. The cutoff $A\beta$ value was taken as 813 pg/mL (Wolfsgruber et al., 2019). Two-way analyses of variance were conducted, with diagnostic groups and $A\beta$ levels as the fixed factors, and FCSRT recall scores as the dependent variable. Age and total years of education were included as covariates. The two diagnostic groups significantly differed from each other on all measures of episodic memory. In addition there was a significant interaction effect of diagnosis and $A\beta_{42}$ level on total free recall performance.

cognitive functions, Digit Span test, Stroop test, Trial Making test (TMT), letter and category fluency test, Digit Symbol Substitution Test, Free and Cued Selective Reminding test were used.

Results: The participants who have a FB account performed better on TMT – A and B forms and Stroop test compared to other participants. After controlling for age and the years of education, only TMT – A performance was found to be higher among FB users. Moreover, performance on TMT – A form was found to correlate positively with the length of having an account and negatively with the frequency of passive use.

Conclusion: Our findings suggested that FB use is associated with the processing speed in older adults. In addition, they indicated that the active and passive use of FB might be differently related to cognitive functions. These findings will be discussed in terms of the importance of social relationships in SNSs for cognitive functions.

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Keywords: aging (normal), information processing speed, Social networking sites

S. S. JOLOBA, I. DDUMBA, D. KASIBANTE, D. SSENTAMU. Capacity of the health facilities to manage Alzheimer’s and related dementia diseases in Mukono district: Challenges and recommendations.

Background: With the projected increase in number of older persons in both low and middle income countries, the burden of Alzheimer’s and related dementia diseases (AD/ARs) is projected to increase as well. However, the health systems inadequately prepared to offer optimal care for patients with AD/ARs, despite the growing disease burden. Hence, the aim of this study was to assess the capacity of the health facilities to optimally manage Alzheimer’s and related dementia diseases in Mukono district.

Methods: We conducted a cross-sectional between August and December 2018. A survey of 32 facilities (3 hospitals, 2 health center IV (HCIV), 15 health center III (HCIII) and 6 health center II (HCII) and 6 Private health facilities) in Mukono district. We conducted a thorough assessment of medical records, interviewed heads of the facilities and questionnaire was administered to 46 health workers.

Results: Out of 32 health facilities assessed, 4 in 10 (42%) facilities reported managing (diagnosing/treating) clients with AD/ARs, and majority (90.2%) were run by Non-Physician Health Workers (NPHW). Only 2 in 10 had guidelines for managing AD/ARs. About less than half (46.4%) had AD/ARs medicines in stocks (mainly Haloperidol) and all of the private facilities lacked essential medicine to treat AD/ARs. All health center IIs lacked drugs for AD/ARs. A significant knowledge gap in assessing and diagnosing AD/ARs was observed among all the health workers. All health workers highlighted the need for addition training in AD/ARs. Multitude of client and health provider challenges were observed in this study.

Conclusion: Health facilities in Mukono district are inadequately prepared to offer optimal services for management of AD/ARs. AD/ARs drugs, knowledge gap and human resource for health presented a great challenge. In order to address the inadequately capacity to manage AD/ARs, emphasis should be dwelt on strengthening the health facilities.

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Keywords: Alzheimer’s and related dementia diseases, Uganda, health facilities, capacity, Capacity, Health facilities

I. BABIRYE, I. DDUMBA, F. MUSIIGE, S. S. JOLOBA. Implementation of Global Action Plan on the Public Health Response to Dementia (GAPD) in Sub-Saharan Africa: Comprehensive Reviews.

Background: Despite the fact that, age is a strongest know risk factor for onset of dementia, and developing countries are projected to have highest number of ageing population, few national dementia strategies have

been put in place to address this impending scourge. In 2017, World Health Organization (WHO) released and called for countries to adapt and contextualize the Global Action Plan on the Public health response to dementia, few Sub-Saharan countries have slowly adopted plan. The outcome of the unprecedented increase populations with dementia will be immense.

Methods: This paper is a view of published and grey literature relevant to Global Action Plan on the Public Health Response to Dementia (GAPD) in sub-Saharan Africa. The overall approach to the review had an exploratory and inductive focus. Articles were categorized around a guiding conceptual framework. Like; A description of structural arrangements and content of national dementia strategy development and normative underpinnings within policy frameworks

Results: Nearly all countries within the SSA hadn't developed the national dementia strategy plans. Countries like South African, Ghana, Kenya and Ethiopia had drafts of national dementia strategy, though not yet operationalized. Few countries highlighted some of the parallel targets of GAPD within their national mental health policy and strategy, but it was not comprehensive. Countries where Civil societies that advocate/champion dementia activities were strongly presently were more likely to possess a draft of GAPD.

Conclusion: Although there some initiatives for different countries to develop national strategy for dementia plans, there are gaps in the extent of engagement of different stakeholders and how these strategies will be operationalized may limit the impact on addressing the escalating burden of dementia in Sub-Saharan Africa.

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Keywords: Dementia,, Sub-Sarahan Africa,, national plans

A. IWAHARA, D. UENO, T. HATTA, T. HATTA, J. NARUMOTO. Interoceptive awareness and cognitive functions in middle aged and older adults.

Objective: Numerous human neuroimaging studies have implicated that the anterior insular and the anterior cingulate cortex are key structures in interoceptive processing. However, recent researches indicate that the hippocampus is involved in interoceptive processing. We tested which neuropsychological measure is associated with individual differences in performance on measures of self-report interoceptive capacity.

Participants: Participants were 430 community-dwelling middle aged and older persons without dementia (aged 40-88, 53.5% female).

Methods: The cognitive functions were measured by means of logical memory test, Money road test, Stroop test, D-CAT (digit cancellation test) and verbal fluency test. We assessed introspective awareness using the Multidimensional Assessment of Interoceptive Awareness (MAIA).

Results: We constructed a series of linear regression models to examine the association of introspective awareness with cognitive functions for each age group in their 40-50s, 60s and 70s- separately. In analyses controlling for age, gender, education, BMI, blood pressure and urinary indices, executive function measured by Stroop test or verbal fluency test was related to higher performance on some dimensions of MAIA (emotional reaction and attentional response to sensation, awareness of mind-body integration and trusting body sensation) in middle-aged people. On the other hand, memory function estimated by logical memory test was related to higher performance on same dimensions of MAIA in oldest people.

Conclusions: The results suggest that the hippocampus is involved in interoceptive processing in the aged but the anterior cingulate cortex is involved in interoceptive processing in the middle-aged. We demonstrate that the relationship between self-report interoceptive capacity and cognitive function has changed with advancing age.

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Keywords: aging (normal), cognitive functioning, interoception

G. DEMETER, A. LENCSES, B. MIKULA, M. RACSMANY. Decreased behavioural pattern separation in a patient with amnesia following herpes encephalitis.

Objective: A process considered essential in episodic memory and related to the hippocampus is pattern separation, which assumingly enables discrimination between similar memory representations. It is widely assumed that the study of pattern separation can make a fundamental contribution to the understanding of memory disorders. In herpes encephalitis (HE) patients one of the main cognitive deficits described in the literature is amnesia. Our main goal was to compare the pattern separation performance of a HE amnesic patient to healthy controls.

Participants and Methods: The patient was a 50-year-old male subject whose MR showed a large temporal high signal area bilaterally, with a left side overweight. A complex neuropsychological examination was applied, and autobiographical memory impairment was his core cognitive deficit. We enrolled 2 healthy subjects matched according to age and education. For detecting individual differences in behavioural pattern separation performance, we used a well-known recognition test, the incidental Mnemonic Similarity Task with old (target), similar (lure), and new (foil) items.

Results: Based on old/similar/new decisions given on the recognition test, there was no difference in the correct identification of target items as old ones. The patient gave more “old” responses to the lure and foil items compared to control subjects and significantly more “similar” responses to the foil items. The patient’s lure discrimination index (which is the most important behavioral indicator of pattern separation) was significantly lower compared to the controls.

Conclusions: We found evidence by an altered behavioural pattern separation memory performance in a HE amnesic patient. We suggest that his functioning was determined merely by false recognition decisions about lure and foil items. We think that our results can be used in neuropsychological rehabilitation by designing tasks focusing on items with similar features.

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Keywords: recognition memory, pattern separation, herpes encephalitis

D. BERTENS, N. FRANKENMOLEN, T. VAN LOENHOUT, R. P. C. KESSELS, L. FASOTTI. A Dutch Adaptation and Validation of the Everyday Memory Questionnaire-Revised.

Objective: Many brain-injured patients referred for outpatient rehabilitation experience memory complaints in everyday life. The Everyday Memory Questionnaire-revised (EMQ-R) has been proposed as a useful adjunct to traditional neuropsychological tests to improve assessment of memory problems in daily life. Aim of the study was to assess the feasibility, reliability and convergent validity of a Dutch adaptation of the EMQ-R for use in Dutch patients with brain injury.

Participants and Methods: The original EMQ-R was translated into Dutch (EMQ-R-NL) using guidelines for cross-cultural adaptation of self-report measures. The questionnaire was administered in 25 persons with acquired brain injury referred for outpatient rehabilitation (mean age=47.7, SD=13.4; 14 men). Moreover, a brief survey and the Cognitive Failures Questionnaire (CFQ) were administered to evaluate both the feasibility and convergent validity and Cronbach’s alpha was calculated to estimate the internal consistency of the EMQ-R-NL.

Results: The translation procedure including back-translation and consultation of an expert committee resulted in the EMQ-R-NL. The EMQ factor *Retrieval* was moderately correlated with the CFQ scales *Names and words* and *Distractibility* ($r = 0.50$ and $r = 0.70$ respectively). The EMQ factor *Attentional tracking* and the CFQ scale *Orientation* were moderately correlated as well ($r = 0.54$). Cronbach’s alpha was 0.80 for the total score of the EMQ-R-NL, indicating good internal consistency.

Conclusions: The present findings indicate that the EMQ-R-NL is a valid and reliable instrument for evaluating self-reported everyday memory problems. Although investigating the questionnaire in a larger group is indicated, it is feasible for use in individuals with brain injury in the chronic phase.

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Keywords: memory complaints, neuropsychological assessment, brain injury

A. SZOLLOSI, G. DEMETER, K. CSIGO, S. KERI, M. RACSMANY. Hippocampus-related behavioral pattern separation is equally high for emotional and neutral memories in OCD.

Objective: Among the diverse cognitive impairments in obsessive-compulsive disorder (OCD), it is attributed a prominent role to emotional information processing and hippocampus-related memory interference-resolution processes. Our main goal was to investigate the interaction between OCD, pattern separation functions of similar memory representations, and emotional information processing.

Participants and Methods: 27 OCD patients ($M_{age} = 38.0$ years, $SEM = 2.4$) and 27 healthy controls participated in the study ($M_{age} = 38.9$ years, $SEM = 2.6$). They were matched in age, gender, and education.

Memory for emotional stimuli was assessed by a visual memory paradigm. Participants saw negative, neutral, and positive scenes; then they completed a recognition test with three stimulus types. *Targets* were repetitions of images that were presented at encoding, whereas *foils* were totally new items. Crucially, *lures* were visually similar images to ones presented at encoding. Within each condition (negative, neutral, positive), there were targets, foils, and lures. Participants' task was to decide whether they had seen the image before (Old) or not (New) or just saw a similar image to one they had seen at encoding (Similar).

Results: While standard recognition memory performance (Old responses for the targets) did not differ between the groups, OCD patients were better in behavioral pattern separation (Similar responses for the lures). Importantly, better separation in patients was present only for the neutral, but not for the emotional stimuli.

Conclusions: Our most important finding is the triple interaction of emotional valence, OCD symptoms, and pattern separation functions. Recognition performance in OCD patients appears to remain intact. The only difference from the normal control is that they do not show the advantage of emotional stimuli in pattern separation. OCD patients appear to process arousal-inducing and neutral stimuli as equally detailed and distinct episodic memories.

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Keywords: obsessive-compulsive disorder, memory, emotion

M. VANCELLS GRAUPERA, M. GAROLERA. People with Mild Cognitive Impairment (MCI) co-design a Smart City mobile phone solution (INFINITY) to promote healthy and cognitive activities.

Objective: Smart Cities represent a huge opportunity for governments to integrate healthcare solutions that support Quality of Life (QoL) of citizens. INFINITY is a smart city mobile solution that aims to reinforce and support daily routines of people with MCI (PwMCI) while safeguarding their independence. The objective is to develop an ICT solution adapted to the needs and capacities of PwMCI following a co-design approach, considering PwMCI and informal caregivers during the entire development process.

Participants and Methods: (1) Definition: 10 dyads from Terrassa, Spain and Lodz, Poland. PwMCI mean age 72.7 (5.9), MoCa score 24 (2.3) and Lawton&Brody 6.8 (1.03). The sessions consisted of a guided individualized 1-hour interview to collect feedback about interface design, features, and constraints related to technology use; (2) Identify Point of Interest (PoIs): 3 participants with MCI and age mean 76 (4.4). PoIs were mapped tracking users' position during daily routines. Data collected was used to define categories that

represent PoIs more often visit. (3) INFINITY pre-test: 4 elderly people tested INFINITY by using it in daily activities around the city. Feedback was used to improve INFINITY and check accuracy of healthy messages activation when passing through PoIs. We design the testbed for a 3-month and outcomes that will be analyzed include QoL, functionality, emotional & cognitive state, social activity, and mobility.

Results: Participants provided feedback on interface design. Share GPS location and voicemail were the most useful perceived features. NFC cards were the most accepted (33%) format as an interaction tool with INFINITY. Heat maps and 12 categories of PoIs were produced based on data collected from mapping. Pre-tests confirm that messages are activated properly but conflicts about activation frequency were reported. Pilots with 78 PwMCI participants are running.

Conclusion: Design ICT solutions in collaboration with PwMCI ensure that technology is adapted to their needs and routines.

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Keywords: Mild Cognitive Impairment, Smart Cities, Healthcare solution

Y.-H. CHENG, H.-T. CHANG, T.-W. CHENG, Y.-M. LAI, H.-T. LIEN, M.-J. CHIU, T.-F. CHEN.
Unfamiliar Odor Recognition Ability in Individuals with Subjective Memory Decline.

Objective: To evaluate the odor-recognition function of individuals with subjective memory decline (SMD), mild cognitive impairment (MCI), and early dementia of the Alzheimer's type (DAT) in order to explore the clinical utility of this function in the early detection of Alzheimer's disease (AD) and in the differential diagnosis of SMD.

Participants and Methods: Sixty patients with memory complaints were recruited from a neurology clinic and diagnosed as having either SMD, MCI, or AD through clinical neuropsychological assessments. Thirty healthy community-dwelling volunteers without memory complaints were recruited as the healthy control (HC) group. The odor-recognition function of all participants was evaluated through the Odor Recognition Test (ORT) with unfamiliar odor stimuli involving the Le Nez du Vin olfactory training tool.

Results: On the ORT scores, the score differences between HC and two patient groups were significantly different while there were no significant differences between HC and SMD, and between SMD and MCI. The SMD group outperformed the DAT groups on both overall ORT and the "false-alarm" scores. By contrast, the "hit" scores of the four groups did not differ significantly. Moreover, two-way ANOVA and Hierarchical regression analysis revealed no significant interaction between participant age and total ORT scores. Regarding the clinical utility of the ORT, the Receiver Operator Characteristic Curves Analysis revealed a gradually-declined trend from SMD, MCI to DAT in odor-recognition functioning, suggesting that the ORT scores might provide another reference measure to early detection of AD.

Conclusions: The findings of this cross-sectional study indicate that the performance differential in the odor-recognition function may be a possible way for identifying the preclinical stage and prodromal stage of AD. However, the heterogeneity of SMD still needs longitudinally-monitoring studies.

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Keywords: Odor Recognition Test, Subjective Memory Decline, Mild cognitive impairment

C. KWAN TSE, H. CHING DAPHNE NG, Y. CAO, D. SHUM. Prospective memory training in older adults: A systematic review.

Background: Prospective memory (PM), remembering to remember, is important for everyday independent functioning in older adults (Sheppard et al., 2019). Older adults have been found to have poorer PM performance than younger individuals and some studies have been conducted to improve age-related PM

decline (Hering et al., 2014). Nevertheless, few attempts have been carried out to evaluate and synthesize the effect of PM training in older adults. This systematic review aimed to fill this gap.

Participants and Methods: Systematic searches of seven databases (Cochrane Library, PsycINFO, PubMed, CINAHL, EMBASE, Web of Science, and Scopus) were conducted from inception to July 2019. Studies that reported PM training in older adults (≥ 60 years) were included. The eligibility and methodological quality of studies were assessed independently by two reviewers.

Results: The search resulted in 43 eligible articles with different PM training: While 18 studies performed one-session training, 25 implemented a training program that lasted for three weeks to two years. One-session training studies included: implementation intentions (11) training (9), planning (2), space retrieval (2), enactment encoding (2), social feedback (1), familiarization (1) and future thinking (1). Training program studies comprised: memory training (9), II or imagery related training (5), cognitive training (4), PM training (3), executive training (2), space retrieval (1) and virtual week game (1). All studies demonstrated some positive training effects. Only seven RCTs were found. Three of them were at low risk of bias, one at some concerns and three at high risk of bias.

Conclusions: PM training was effective in improving age-related PM decline in older adults, though the quality of the studies was mixed. It is therefore recommended to develop a standard training protocol and conduct more high-quality training studies. Our findings may guide the future development of effective PM training program.

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Keywords: Prospective memory, Memory training, Aging

E. LEHTO, M. VIRTA, S. IMMONEN, I. JÄRVINEN, N. SCHIAVONE, J. LAUNES, K. MICHELSSON, L. HOKKANEN. Association between subjective prospective memory complaints and prospective memory performance in adults with a history of perinatal risks.

Objective. Subjective memory complaints (SMCs) have been shown to be associated with objectively measured cognitive performance in the elderly. Perinatal risks (e.g., low birth weight, LBW) have been found to be associated with subtle cognitive impairment. We investigated the association between subjective prospective memory complaints and prospective memory (PM) performance in adults with a history of perinatal risks at 40 years.

Participants and Methods. The study participants ($n = 335$) were part of the birth risk (e.g., LBW, asphyxia, hyperbilirubinemia) cohort prospectively followed since birth. The latest follow-up study took place at the age of 40. Subjective PM complaints were measured with the PM subscale of the Prospective and Retrospective Memory Questionnaire (PRMQ). PM performance was assessed using the new Finnish Proper Prospective Memory Test (PROPS) involving tasks in a laboratory setting, in a naturalistic setting, for time-based PM performance (TBPM), for event-based PM performance (EBPM) and the total score. We calculated Spearman's correlation coefficient between the PM subscale of the PRMQ and the five PROPS scores.

Results. The PM subscale of the PRMQ correlated significantly with the PROPS test in the laboratory setting ($r_s = -.16, p < .01$), in TBPM ($r_s = -.12, p < .05$), in EBPM ($r_s = -.11, p < .05$) and the total score ($r_s = -.15, p < .01$). There was no significant correlation between the PM subscale and the PROPS test in the naturalistic setting.

Conclusions. Subjectively reported PM complaints, measured with the PM subscale of the PRMQ, were associated with PM performance measured with the new Finnish Prospective Memory test (PROPS). Thus, the results indicate the PROPS test can be used as a clinical tool in assessing PM performance. Evaluating PM functions objectively in the clinical setting allows developing interventions to improve PM performance both in work and everyday life.

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Keywords: neuropsychological assessment, memory: prospective, perinatal risks

O. BEZDICEK, Š. WENKE, J. MANA, T. NIKOLAI, E. RŮŽIČKA, K. ŠONKA, P. DUŠEK. The learning/encoding versus retrieval deficit hypothesis in idiopathic REM sleep behaviour disorder.

Objective: Idiopathic rapid eye movement (REM) sleep behaviour disorder (iRBD) is a parasomnia characterized by dream enactment and by REM sleep without muscle atonia in the absence of significant neurological signs or lesion in the central nervous system. iRBD is considered as the initial stage of neurodegeneration with pathological storage of alpha-synuclein in the brain (synucleinopathy) that afflicts also cognitive functions. The aim of the current study was to test the retrieval deficit hypothesis of memory impairment that suggests impaired access to stored memories (as measured by immediate cued recall in Memory Binding Test; MBT) in comparison to learning/encoding hypothesis that states deficient encoding mechanisms (as measured by immediate free recall and delayed retention indices in Rey Auditory Learning Test; RAVLT).

Participants and Methods: 82 iRBD patients (mean age: 66.7 ± 7.9 , education: 14.5 ± 3.2) according to the International classification of sleep disorders and 50 age- and education-matched controls (mean age: 63.5 ± 8.8 , education: 14.9 ± 3.2) were included.

Results: Based on M-W U Test there were significant between-groups differences in RAVLT immediate recall score $p = .04$ and RAVLT delayed retention $p = .02$ in comparison to non-significant differences in MBT-TIP (total number of correctly cued recalled words) and MBT-PIP (total number of correctly cued recalled pairs of words).

Conclusions: The present results indicate a differential impairment of free recall, i.e., attentional and retrieval impairment of declarative memory in iRBD rather than hippocampal cued recall impairment.

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Keywords: memory disorders, sleep disorders, sleep

N. SKEA, J. BATCHELOR, V. MUMFORD. Evaluating the Patient Impact of Delirium in Australian Acute Care.

Objective: A common reduction in cognition that is experienced by patients in the 65 years and over age group, even those with normal cognition, is post-operative delirium (POD). The present research aims to determine the relationship between POD and cognitive, functional and emotional functioning. It further aims to determine whether the relationship is influenced by age, level of education/IQ (as proxies for cognitive reserve) and other confounding factors.

Participants and Methods: 35 patients aged 65 years and over who were undergoing elective or emergency orthopaedic surgery, were administered measures to assess their cognitive, functional and emotional functioning prior and 2-weeks post-surgery. Baseline characteristics and results were compared between those who experienced POD and those who did not experience POD (normative group).

Results: 20% of patients developed POD. The POD group were older ($M = 75$ years) and had a lower level of education ($M = 9$ years) compared to the normative group ($M = 64$ years of age and $M = 12$ years of education). 57% of patients who experienced POD had diabetes compared to only 11% in the normative group.

Prior to surgery, the POD group had lower mental control scores, psychomotor speed, executive functioning, mobility, personal care, ability to complete usual activities and higher stress symptoms when compared to the normative group.

Post-surgery, the POD group had higher levels of stress symptoms, reduced quality of life, increased executive dysfunction, and reduced verbal fluency when compared to the normative group. Overall, POD patient's post-surgery had reduced quality of life, lower mental control scores, increased cognitive decline and reduced executive functioning than they did prior to surgery.

Conclusions: The current study identified a number of likely bidirectional relationships between delirium and cognitive, functional and emotional decline and influencing factors. Potential implications of this will be discussed.

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Keywords: delirium, cognition, geriatric

I. MARKOSTAMOU, K. COVENTRY. Spatial naming deficits in mild Alzheimer's disease.

Objective: While impairments in visuospatial cognition among patients with Alzheimer's disease (AD) are well documented, little is known about their ability to communicate spatial information with verbal means. The present study investigated potential category-specific deficits in spatial naming in mild AD.

Participants and Methods: Seventeen patients with mild AD and 21 age-, gender-, and education-matched healthy controls were administered tests assessing object, action, and spatial naming abilities.

Results: While AD patients performed poorer than healthy controls across all naming tasks, naming deficits in mild AD varied as a function of the category involved, with greater impairments in naming spatial relations compared to object and action naming. Binary logistic regression models and ROC curves of sensitivity and specificity also revealed that spatial naming held a higher level of diagnostic accuracy and discriminative power for AD diagnosis compared to object and action naming.

Conclusions: Findings point to differential category-dependent effects on naming deficits in mild AD, with far larger deficits in naming spatial relations compared to objects and actions. Implications for early cognitive markers of the disease and our theoretical understanding of spatial cognition are discussed.

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Keywords: Alzheimer's disease, Naming, Spatial cognition

N. CANO, M. QUINTANA, M. VANCELLS, O. GELONCH, L. FARRAS, M. GAROLERA. Relationship between perception of social support and cognitive performance in people with Mild Cognitive Impairment (MCI).

Objective: The objective of this study was to identify the relationship between the perception of social support and cognitive performance in people with Mild Cognitive Impairment (MCI).

Participants and method: Participants were 89 individuals with diagnosis of MCI (different types) age=73.8 (7.31) and 49.6% female. More specifically, 32 of them were diagnosed with amnesic MCI (aMCI) (mean age 76,3 (4,99); 44% female). Participants were recruited from the Consorci Sanitari de Terrassa (Barcelona-Spain). The Duke-UNC Scale was used for the assessment of perceived social support and the Mini-Mental State Examination (MMSE) was used to evaluate the global cognitive functioning. The Pearson correlation coefficient was used to determine the association of the two variables. The statistical analysis was performed with SPSS 23.0, taking 0.05 as alpha level for statistical significance.

Results: The results of the correlation analysis did not show significant correlation between the MMSE and the Duche-UNC ($r=0,102$; $p=0,279$) in the whole MCI sample. However, a statistically significant negative correlation was found ($r=-0,56$; $p=0,001$) in the sample diagnosed specifically with aMCI. No significative association was found in the no aMCI subgroup ($r=0,17$; $p=0,20$).

Conclusions: In our study the lack of a relationship between social support and general cognitive function in MCI could be explained by the heterogeneity of the sample, given the association was significative in the

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Keywords: exercise, cognition, sex differences

A. R. PEREZ-LAO, D. C. OVIEDO, A. E. VILLARREAL, A. D. MATA, G. B. BRITTON.
Socioeconomic status and its association with cognitive performance and functional autonomy in two cohorts of Panamanian elderly adults.

Objective: To examine associations between socioeconomic status and cognitive function and independence in activities of daily living in elderly adults in Panama.

Participants and Methods: We compared clinical (n=303) and community (n=236) cohorts from the Panama Aging Research Initiative (PARI). We included years of education and income as indicators of socioeconomic status (SES). Cognition was measured with the Trail Making Test parts A and B, Clock Drawing Test and Mini Mental State Examination (MMSE), which was divided into memory and non-memory items. Independence in instrumental and basic activities of daily living (IADL and BADL) was assessed by self-report, and scores were transformed into indices to reflect degree of autonomy. Additional health measurements included number of chronic diseases, body mass index (BMI), and number of depressive symptoms as measured with the Geriatric Depression Scale 30-item version. Chi-square and independent sample t-tests were performed to examine univariate differences across categorical and continuous variables, respectively. A multivariate analysis of covariance (MANCOVA) was performed to examine cognitive and functional variables between cohorts introducing demographic, SES and health measures as covariates.

Results: The clinical cohort was older (M=79.0, SD=7.6), less educated (M=7.3 years, SD=4.1), had more chronic diseases (M=2.0, SD=1.0), lower BMI (M=25.7, SD=5.2), higher income and a higher number of symptoms of depression. MANCOVA analysis indicated significantly greater impairment in cognitive performance and less autonomy in the clinical cohort compared with the community cohort, even after adjusting for demographic, SES and health-related factors.

Conclusions: A significant association between SES and cognitive performance and functional independence was found in this study comparing two cohorts of elderly adults aged 65 years and older.

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Keywords: Aging, Socioeconomic status, Cognitive performance

M. DEKHTYAR, S. KAUR, E. JONES, S. OLESON, D. GOURLEY, H. TANAKA, A. HALEY.
Leptin- friend or foe?

Objective: Dementia is a rapidly expanding global epidemic. Currently, there is no cure and research efforts have focused on modifiable risk factors. One potentially modifiable risk factor for developing dementia later in life is mid-life obesity. Although the relationship between mid-life obesity and late-life cognition is still unclear, the adipokine leptin may play a role. Some studies have suggested that it may be neuroprotective while others have not supported this claim. As leptin sensitivity is altered in adults with obesity, it is important to understand the relationship between adiposity, leptin levels, brain health and cognition in mid-life.

Participants: One hundred and seventy-three healthy participants aged 40-62 (mean age= 49 \pm 6.35; mean education=16 \pm 2.68).

Methods: All participants completed a fasting blood draw and neuropsychological testing. Eighty-seven adults completed an MRI scan. Memory and executive function composite scores were computed from The California Verbal Learning Test, Letter Fluency, Trail Making Test, Stroop, and Digit Span. Leptin levels

were measured in plasma. Hippocampal volumes were extracted from T1-weighted high-resolution anatomical scans using a Magnetization Prepared Rapid Gradient Echo sequence.

Results: There was a significant interaction between leptin, memory, and BMI when controlling for age and sex ($t(172) = 1.99, p = 0.05$). Breaking down this interaction it appears that for those with BMI > 30, leptin levels were not predictive of memory performance. However, at BMI < 30, higher leptin levels were predictive of worse memory performance. There was no significant effect of leptin by BMI while controlling for age and sex on hippocampal volumes or executive function.

Conclusions: Although leptin has been suggested to be a protective factor for cognitive function, this assumption was not supported in our sample of middle-aged adults.

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Keywords: Aging, Leptin, Cognition

I. PALMA CABRERA, I. Y. DEL RÍO PORTILLA. Cognitive performance and artistic practice in older adults.

Objective: The present study aims to explore the effect of artistic practice on cognitive performance in adulthood and exploring the impact of artistic practice on the preservation of cognitive functions.

Participants and Methods: We conducted a comparative study of cognitive performance (attention, memory, executive functions and creative thinking) in older adults (> 60 years), in normal conditions of aging ($n = 10$), in contrast to adults of the same age and schooling with training on visual artistic production ($n = 10$).

Results: Preliminary data of 7 subjects from the artists group and the frequency distributions of the scalar scores in the screening test (orientation, attention and concentration, memory, language and executive, conceptual and motor functions) shown a tendency to high cognitive performance on the screening test (mean = 118, SD = 6.96). And a high score in the components of visual memory (mean = 0.7, SD = 0.4), semantic fluency (0.8 = 0.8, SD = 0.87) and phonemic fluency (mean = 1.1, SD = 0.82).

Conclusions: This data showed a tendency in the preservation of the cognitive functions of older adults with exposure to artistic practice, showing a performance preserved for age, in the tasks of visual memory, semantic and phonemic fluency. This suggests that exposure to artistic tasks could positively impact cognitive reserve and successful aging.

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Keywords: Aging, cognitive performance, creativity

L. MEKKI BERRADA, A. DEGHER, M. BRILLON-CORBEIL, R. B. POSTUMA, J. MONTPLAISIR, D. GÉNIEP MARCHAND, K. JERBI, J.-F. GAGNON. Identification of cognitive predictors of dementia in isolated rapid eye movement sleep behavior disorder using machine learning.

Objective: Isolated rapid eye movement sleep behavior disorder (iRBD) is a major risk factor for dementia with Lewy bodies (DLB) and Parkinson's disease (PD). Furthermore, approximately 50% of iRBD patients will develop DLB in the course of their disease. Current research in neurodegenerative diseases aims to identify and characterise their early stages, with the purpose to intervene as early as possible in its evolution. In this study, we aimed to apply machine-learning (ML) on cognitive tests in order to examine their predictive value on later dementia conversion, and evaluate their ability to discriminate DLB from healthy controls (HC).

Participants and Methods: One hundred iRBD patients were followed for a mean of 4 years. At follow-up, 20 patients developed DLB, 18 developed PD, and 62 were still disease-free (DF). We pair-matched for age,

sex, and education each of our patients who developed DLB with two HC (1:2). All participants underwent at baseline polysomnographic, clinical, neurological, and neuropsychological assessments. A supervised learning approach was implemented using an alternating decision tree (ADTree) classifier, using baseline cognitive tests.

Results: Different classifications with and without optimisation were carried out and for each one, a data cleaning, cross-validations and permutation tests were conducted to assess the significance of the area under the curve (AUC). Our results show that the ADTree classifier, using all features, differentiated iRBD patients who developed DLB from HC (AUC=0.88; $p=0.0001$). No significant differences were found for the other comparisons (DLB vs. DF or PD).

Conclusions: ML allow identifying iRBD patients at risk for dementia years before clinical diagnosis. Further studies with larger sample size are needed to assess the capacities of these methods to differentiate conversion subtypes in iRBD.

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Keywords: Rem sleep behaviour disorder, Dementia with lewy bodies, Machine Learning

A. HAYASHI, H. KOWA, H. TACHIBANA, K. SAKAI, Y. YAMAMOTO, S. AOYAMA, I. SORA. Evaluation of the Episodic/Lexical Memory Monitoring in Japanese Patients with Mild Cognitive Impairment and with Mild Alzheimer’s Disease.

Objective: Patients with amnesic mild cognitive impairment (MCI) and mild Alzheimer’s disease (AD) show memory impairments. However, it is not clear whether they have problems in monitoring their memory deficits. Here we compared their episodic and lexical metamemory with memory performances. We also examined how accurately they evaluate their memory activities using the metamemory scale.

Participants and Methods: Healthy elderly ($n=31$), MCI ($n=22$), and AD ($n=15$) groups participated in this study. In the episodic memory task, participants were asked to memorize ten Kanji words and to estimate the number of words they could recall after ten minutes. In the lexical memory task, they rated the likelihood that they could write a target Kanji word written in hiragana and then wrote them down. They were also asked to complete the metamemory in adulthood (MIA) questionnaire.

Results: In the episodic memory task, the performances of recall and metamemory of the healthy elderly were better than those of the MCI and AD groups. There was no significant difference between performances of both groups. In the lexical memory task, their writing performances were worse than that of the control group. However, metamemory performances of the MCI and AD groups were not different from that of the elderly controls. In MIA subscales, there was significant difference in “change” subscale, which scores of the MCI and AD groups were significantly higher than that of the controls.

Conclusions: We confirmed that MCI and AD patients overestimate their memory performances in the episodic task. But in the lexical knowledge, metamemory may be preserved even in AD. It is suggested that the results of memory monitoring differ depending on the type of memory. The results of MIA suggest that MCI and AD patients do not feel age-related changes in memory function more than healthy elderly.

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Keywords: Mild cognitive impairment, Alzheimer's disease, metamemory

A. AROLA, H. M. LAAKSO, S. MELKAS, A. KORVENOJA, T. ERKINJUNTTI, H. JOKINEN. Relationship between cognitive reserve and cognitive performance in subjects with cerebral white matter lesions.

Objective: Cerebral small vessel disease is characterized by progressive white matter lesions (WML) and cognitive decline. However, there is variability in how individuals maintain cognitive abilities despite

significant neuropathology, a paradox possibly related to cognitive reserve (CR). We examined the relationship between cognitive reserve and cognitive performance in subjects with/without WML.

Participants and methods: In the Helsinki Small Vessel Disease Study, 141 subjects (age 65-75) underwent brain MRI and comprehensive neuropsychological assessment. CR was determined by education (years) and a Finnish translation of Cognitive Reserve Scale (CRS) reflecting frequency of participation in cognitively stimulating activities across lifetime. Associations between CR, WML (none/mild vs. moderate/severe) and cognitive test scores were analyzed with hierarchical linear regression models.

Results: CRS total score correlated significantly with years of education, but it was not related to age, gender or WML severity. Together, CRS score and education were significantly associated with performance in a wide range of cognitive tests including measures of verbal learning, working memory, processing speed, attention, executive functions, visuoconstruction, verbal fluency and reasoning, but not with motor speed. Independently of education, CRS score had incremental predictive value on verbal learning and phonemic fluency. The significant associations between WML and cognitive performance were largely unrelated to CR.

Conclusions: CR has strong and consistent associations with cognitive performance in subjects with varying degrees of WML. The predictive power of education as a proxy of CR can be enhanced by a self-assessment of leisure habits. Increased participation in brain-stimulating activities shows a positive association particularly with verbal performance. CR is an important factor to consider when assessing age-related cognitive decline.

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S. WONG, E. SHATNAWI, O. PIGUET, F. KUMFOR. Cognitive and socioemotional factors contributing to vulnerability to financial exploitation in dementia.

Objective: In older adults, vulnerability to financial exploitation reflects increased susceptibilities to deception ('credulity') or manipulation for financial gain ('gullibility'), and is associated with age-related decline in both cognitive and socioemotional abilities. While poor financial decision making and increased susceptibility to scams are commonly reported in dementia, levels of credulity and gullibility, and their associations with cognitive and socioemotional functions, have not been explored.

Participants and Methods: The current study contrasted credulity and gullibility in two of the most common younger-onset dementia syndromes: Alzheimer's disease (AD) and behavioural-variant frontotemporal dementia (bvFTD). Credulity and gullibility were rated by informants using the Social Vulnerability Scale (SVS) for 23 AD patients, 29 bvFTD patients and 32 age-matched healthy controls. Cognitive and socioemotional functions were assessed using neuropsychological measures of attention, memory, executive function and emotion recognition.

Results: Relative to controls, both patient groups showed elevated scores on the credulity subscale. In contrast, gullibility scores were significantly higher in bvFTD patients only. Credulity was significantly associated with cognitive impairment in both patient groups, whereas gullibility was associated with deficits in emotion recognition in bvFTD.

Conclusions: Credulity was elevated across both AD and bvFTD patients, and was associated with level of cognitive impairment. Notably, bvFTD patients showed greater gullibility, which appears to be driven by deficits in socioemotional functions. These findings provide novel insights into the factors that contribute to financial exploitation in people with dementia, and open avenues for targeted interventions.

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Keywords: dementia, financial exploitation, social cognition

T. MCGIBBON, A. JANSARI, A. NEMES, J. DEMIRJIAN, A. OPRE. Detecting pre-clinical signs of MCI or dementia in healthy elderly populations: a new paradigm, the Verbal Associative Learning & Memory Task (VALMT), for assessing rapid forgetting.

Objective: Many elderly individuals pass standard tests of memory despite subjective complaints of memory problems; however, meta-analyses have shown that about 20% of these individuals go on to develop dementia. Given the personal and societal costs of dementia in an ageing population, and the benefits of early identification of those at risk of dementia, we evaluated the sensitivity of a new task, the Verbal Associative Learning & Memory Task (VALMT).

Participants & Methods: In Study 1, 26 healthy elderly (65-80yrs) participants were compared to 43 matched younger (20-30 yrs) participants on the VALMT at delays of 5, 30 and 55 minutes after learning-to-criterion had been achieved. In Study 2, performance on the VALMT and Logical Memory Scale (LMS) of the Wechsler Memory Scale as well as subjective complaints of memory were compared in 60 participants.

Results: In Study 1, significant main effects of delay ($F(2,121)=69.1$, $p<0.001$, $h_p^2=0.51$) and group ($F(1,67)=40.7$, $p<0.001$, $n_p^2=0.34$) were found, as well as a significant interaction ($F(2,121)=11.9$, $p<0.001$, $n_p^2=0.15$) indicating the elderly group experienced faster forgetting than the young group. Number of trials needed to reach criterion during the learning phase was bimodally distributed in the elderly group, so they separated into ‘fast’ and ‘slow’ learners. The fast learners were unimpaired at all three delays, while the slow learners drove the overall age effect ($F(4,118)=6.9$, $p<0.001$, $n_p^2=0.19$). In Study 2, it was found that while the VALMT again differentiated fast learners from slow learners, as well as subjective ‘complainers’ from ‘non-complainers’ ($F(1,28)=12.5$, $p=.001$, $n_p^2=0.31$), no difference was found on the LMS ($F(1,58)=1.41$, $p=.240$, $n_p^2=.02$).

Conclusions: Our findings suggest that the VALMT has potential for detecting rapid forgetting and Subjective or Mild Cognitive Impairment in healthy ageing populations to identify those at risk of developing dementia at earlier time points than is currently possible.

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Keywords: memory complaints, mild cognitive impairment, aging (normal)

K. CECHOVA, J. LACZÓ, M. PARIZKOVA, H. MARKOVA, T. NIKOLAI, V. MATUSKOVA, M. VYHNALEK, O. LERCH, V. MATOSKA, J. HORT. Spatial navigation performance and navigation-related brain structures in APOE E4 and BDNF Val66Met positive aMCI patients.

Background: The apolipoprotein E (APOE) $\epsilon 4$ allele is the primary genetic risk factor for late-onset Alzheimer’s disease (AD), associated with poorer episodic memory and less accurate spatial navigation in nondemented older adults. The combination with the brain-derived neurotrophic factor (BDNF) Val66Met is related to more pronounced memory impairment and may alter the risk for AD development. Their concurrent presence in spatial navigation deficits has not been studied yet. Thus, we examined the effect of APOE and BDNF Val66Met polymorphisms on spatial navigation and volumes of navigation-related brain structures in individuals with amnesic mild cognitive impairment (aMCI).

Methods: 116 aMCI patients from the Czech Brain Aging Study were stratified based on APOE and BDNF Val66Met polymorphisms into four groups: $\epsilon 4^-/BDNF^{Val/Val}$ ($n=29$), $\epsilon 4^-/BDNF^{Met}$ ($n=11$), $\epsilon 4^+/BDNF^{Val/Val}$ ($n=52$), and $\epsilon 4^+/BDNF^{Met}$ ($n=24$). All participants underwent complex neuropsychological examination, brain MRI and spatial navigation testing of egocentric (body-centered), allocentric (world-centered), and allocentric delayed navigation in a real-space human analogue of the Morris water maze.

Results: We found that, despite the similar demographic characteristics and global cognitive function among the groups, the $\epsilon 4^+/BDNF^{Met}$ group had less accurate egocentric navigation performance ($ps\leq.045$). The differences in allocentric and allocentric delayed navigation performance were not significant ($ps\geq.651$). The $\epsilon 4^+/BDNF^{Met}$ group had smaller volumes of the left hippocampus and entorhinal cortex compared to

the $\epsilon 4$ -/ $BDNF^{Val/Val}$ ($p \leq .019$) and $\epsilon 4$ -/ $BDNF^{Met}$ ($p \leq .020$) groups and smaller volumes of the right hippocampus and entorhinal cortex compared to the $\epsilon 4$ -/ $BDNF^{Met}$ group ($p \leq .038$).

Conclusion: The combination of *APOE* $\epsilon 4$ and *BDNF*^{Met} polymorphisms is associated with more pronounced egocentric spatial navigation impairment and atrophy of the medial temporal lobe structures in individuals with aMCI.

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Keywords: Mild cognitive impairment, Gene polymorphism, Spatial navigation

S. CAVACO, I. MOREIRA, I. FERREIRA, A. P. SOUSA, R. SAMÔES, E. SANTOS, A. MARTINS DA SILVA. Memory impairment in systemic autoimmune diseases.

Objective: To explore verbal learning and memory in three systemic autoimmune diseases (i.e., Systemic Lupus Erythematosus – SLE, Behçet’s disease – BD, and primary Sjogren’s syndrome – pSS).

Participants and Methods: 198 patients (108 SLE, 51 BD, and 39 pSS) underwent a neuropsychological evaluation, which included the Portuguese version of the Auditory Verbal Learning Test – AVLT. Regression-based norms were used to adjust for demographic characteristics. The 10th percentile of the norms was used as cut-off for impairment. A neurologist, blinded to the neuropsychological results, identified neurological involvement based on a neurological examination and the review of the clinical records. Nonparametric tests were used for group comparison.

Results: SLE, BD, and pSS groups were different ($p < 0.001$) regarding sex (94%, 73%, and 97% women) and age (median 38, 42, and 54 years), but not education (median 9, 9, and 6 years, $p = 0.195$). The frequency of impairment on AVLT total immediate recall (32%, 14%, and 26%, $p = 0.058$), delayed recall (35%, 18%, and 33%, $p = 0.072$), and delayed recognition (27%, 22%, and 21%, $p = 0.639$) was not statistically different between SLE, BD, and pSS groups. Forty-three SLE (40%), 15 BD (29%), and 29 pSS (74%) had neurological involvement. In SLE, neurological involvement was associated with more impairment on AVLT total immediate recall (54% vs. 17%, $p < 0.001$), delayed free recall (47% vs. 28%, $p = 0.045$), and delayed recognition (47% vs. 14%, $p < 0.001$). Though, no effects of neurological involvement in memory performance were found on BD or pSS.

Conclusions: Regression-based norms facilitated the comparison between groups with different demographic characteristics. The overall pattern of impairment is similar between diseases. Though, SLE and pSS tended to have more recall difficulties than BD. The presence of memory impairment in patients without known neurological involvement is suggestive of subclinical neurological involvement.

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Keywords: autoimmune disorders, memory, psychometrics

J. M. J. VONK, R. GHAZNAWI, M. H. T. ZWARTBOL, M. I. GEERLINGS. The Role of Cognitive and Brain Reserve in Memory Decline and Brain Maintenance in Mid and Late-life: The SMART-MR study.

To investigate effects of cognitive reserve and brain reserve on trajectories of memory decline in mid-life and late-life, and whether the relationship of brain volume loss over time with memory decline differs as a function of cognitive reserve or brain reserve.

Univariate growth curve models analyzed effects of cognitive and brain reserve on memory decline in 731 Dutch adults aged 40-80, followed up to 12 years with up to 3 measurements of memory and brain MRI. Multiple-group bivariate growth curve models tested whether the relationship between brain volume loss and memory decline differed as a function of low, medium, and high cognitive or brain reserve. The Dutch

National Adult Reading Test was used as a proxy of cognitive reserve, and intracranial volume for brain reserve. Models were also stratified by mid-life and late-life.

Cognitive reserve influenced rate of memory decline ($B=.015$, 95% CI [.005, .025]), particularly in late-life, but brain reserve did not ($B<.001$ [-.009, .009]). Rate of memory decline was slightly faster than rate of brain volume loss ($p=.011$), particularly in late-life and low cognitive reserve groups. The strength of the relationship between brain volume loss over time and memory decline did not differ as a function of cognitive reserve (low vs. medium $p=.508$; low vs. high $p=.131$; medium vs. high $p=.291$) or brain reserve (low vs. medium $p=.695$; low vs. high $p=.747$; medium vs. high $p=.423$); patterns were consistent across mid and late-life.

Within the large heterogeneity of inter-individual and intra-individual differences in cognitive aging, we found that higher cognitive reserve predicted a slower rate of memory decline. Deconstructing effects of cognitive and brain reserve on longitudinal outcomes could identify focus areas that have potential for intervention, which may allow some individuals to maintain normal cognitive performance longer despite the presence of neurodegenerative disease pathology.

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Keywords: cognitive reserve, longitudinal, neuroimaging: structural

L. NABUUMA, S. JOLOBA, I. DDUMBA, I. BABIRYE. Motivations for participating in the use of mobile smart phone App focusing on monitoring of hypertension among older persons in Uganda.

Background: Cardiovascular Disease (CVD) risk factors such as hypertension and diabetes are more prevalent among the older persons. The CVD risk factors contribute to over 60% of NCD related deaths in later years. Therefore, urgent need for strategies to optimally monitor and control CVD risk factors is paramount in averting morbidity and mortality among older persons. A mobile smart phone App focusing on monitoring of hypertension could be an innovative tool to encourage.

Objectives: To explore older persons motivates for participating in eHealth monitoring of blood pressure.

Design: A cross-sectional research using a qualitative approach (HTN SmartApp Study)

Setting and Participants: It's a nested study from the prospective study of "Testing the use of Smartphone App in control of CVD risk factors among older persons in Uganda". A total of 45 interview guides and 4 focus group discussions were conducted. The study included older persons with Smart phone, diagnosed with hypertension and he/she is on treatment.

Results: Eager to know about their Blood pressure numbers, benefits from other CVD risk reduction strategies, reminder to take medications, being functionally independent, daily check up their BP numbers, presence of individual at home and being the first cohort to participate in this trial, were some of the prominent motivators to participate in this trial. Although the design of the study could have influence the reasons to participate in the trial, physical navigating of Mobile SmartApp independently could have been a great motivator.

Conclusion and Implication: Individual benefits and social networks motivated seniors to participate in this trial; such features should be put into consideration while conducting recruitment for older persons for future trials. Additionally, maintenance of level of independence and optimal control of hypertension emerged as a great concern among older person living alone.

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Keywords: e-Health, Hypertension, Older persons

T. NIKOLAI, R. TRNKA, M. KUSKA. Changes in emotional creativity in Parkinson's disease.

version of the IGT. It has a similar structure with far less complex instructions and feedback. It has only one deck and participants have to make the choice to gamble, or not gamble, in relation to cards that present a progressive decrease in win-rate across five blocks (.75, .50, .25, .25 and .15).

The objective of this study was to develop a computerized version of the BGT and compare it with the classic pen and pencil version. **Participants and Methods:** 40 Spanish speaking psychology students performed the computerized version. The task was programmed using Matlab, replicating winning probabilities, sequence of cards and instructions. Data from the computerized version was compared to BGT data from previous studies (Bowman & Turnbull, 2004; Adlam et al., 2017).

Results: It took participants 8 ± 4 minutes to complete the task. The BGT score (good minus bad choices) in the computerized version exhibited a similar learning curve than previous studies. The normalized mean difference of scores was 0.2 and 0.4, indicating a successful replication. As a group, participants lost on average 59% of their money by the last trial and the gambling probability decreased from 0.54 in the first block to 0.21 in the last one. It was observed that only in the last block (winning ratio .25) participants betting behavior differed from the null model.

Conclusion: The computerized version presents similar properties than the pen and pencil version. Intra block analysis suggests that the last block might be especially sensitive to capture EBDM deficits. Future studies should explore the usability of the computerized version in populations with specific profiles of EBDM impairment.

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Keywords: emotion based decision making, bangor gambling task, emotion

N. KOKUBO, Y. SAITOH, Y. YOKOI, K. MARUO, S. YOSHIMOTO, M. HORIKOSHI, T. SUZUKI, M. MATSUI, M. MIMURA. A new tablet-based cognitive assessment tool, User eXperience-Trail Making Test (UX-TMT), sensitively detects subjective memory complaints in patients with Parkinson's disease.

Objective: Subjective cognitive complaints are frequently noted in patients with Parkinson's disease (PD), but tools to assess such complaints have been scarce. We have developed a new tablet-based neuropsychological assessment tool termed "User eXperience-Trail Making Test (UX-TMT)". The objective of this study was to explore correlation of the digital UX-TMT and subjective memory complaints of PD patients.

Methods: A total of 57 participants diagnosed with PD (PD group; $n = 28$, M / F = 14 / 14) and healthy controls (HC group; $n = 29$, M / F = 11 / 18) were included in this study. We administered the UX-TMT and the Mini-Mental State Examination Japanese (MMSE-J) as a general neuropsychological assessment. We asked them if they had a problem with their memory before starting the MMSE-J. We examined the effects of subjective memory complaints (SMCs) on the UX-TMT performance and the MMSE-J scores.

Results: The mean age was $68.6 (\pm 6.7)$ y in the PD group and $55.8 (\pm 13.7)$ y in the HC group. Eleven participants in PD group and 7 participants in HC group had SMCs. The mean MMSE-J scores were $28.7 (\pm 2.3)$ in the PD group without SMCs and $27.7 (\pm 2.4)$ in the PD group with SMCs. They were $28.6 (\pm 1.6)$ in the HC group without SMCs and $30.0 (\pm 0.0)$ in the HC group with SMCs. The mean UX-TMT scores were $23.3 (\pm 1.5)$ in the PD group without SMCs and $20.5 (\pm 2.8)$ in the PD group with SMCs. The mean contact duration (msec) in UX-TMT were $140.2 (\pm 37.96)$ in the PD group without SMCs and $264.7 (\pm 148.19)$ in the PD group with SMCs. Additionally, PD patients with SMCs showed a tendency of lower UX-TMT scores (p -value = .054), and significantly longer contact duration (p -value = .028) compared with PD patients without SMCs.

Conclusions: The UX-TMT may be more suitable to detect subjective memory complaints among patients with Parkinson's disease and the MMSE appears to be too insensitive to tap this problem; it can serve as a useful tool for screening subtle cognitive decline in such patients.

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Keywords: assessment, memory complaints, Parkinson's disease

L. A. RABIN, C. QUINN, L. ELLIS, N. PARE. Development and preliminary validation of an informant report version of the Test of Practical Judgment (TOP-J-inf).

Objective: Loss of judgment is a serious consequence of the dementing process, as executive functions that permit complex, goal-directed behavior progressively fail. Unfortunately, there are a limited number of validated clinical measures to assess judgment and no informant measures—even though neuropsychologists overwhelmingly report gathering data from significant others when assessing patients' judgment ability. We developed an informant-report measure to complement the widely used objective Test of Practical Judgment (TOP-J).

Methods: Based on review of the literature and analysis of existing subjective cognitive report measures, we generated items that would enable informants to report compromised judgment in areas tapped by the TOP-J (safety, medical, financial, social-ethical). The authors achieved consensus about the items and piloted them on 77 informants of patients from a memory disorders clinic. We then refined the measure, resulting in 15 items (e.g., "Comes up with various ways to solve a problem") with response options ranging from 0= normal ability to 3= severe difficulty.

Results: In a new sample of 192 patients (mean age=79; 67% female) with subjective cognitive decline (SCD), mild cognitive impairment (MCI), or dementia, the TOP-J-inf was unidimensional (based on factor analysis) and had strong internal consistency $\alpha=.945$ and convergent validity with another informant measure of cognition ($r(186) = .747, p < .001$). Importantly, informants of patients with dementia reported significantly more judgment problems than informants of those with MCI ($p < .001$) or SCD ($p < .01$).

Conclusions: The TOP-J-inf showed strong psychometric properties and distinguished between preclinical and clinical dementia conditions. Overall, this new measure provides a brief, cost-effective way to gather clinically-relevant data about patients' everyday judgment ability and informs issues of functional competence and level of functional assistance required in daily activities.

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Keywords: judgment, informant report, mild cognitive impairment

J. H. R. MAES, L. WANG, X. ZHAO. Training and transfer effects of working memory training in abstinent long-term heroin users.

Objective: Heroin abuse is associated with cognitive deficits that may contribute to relapse. A previous study (Rass et al., 2015) assessed the effects of working memory (WM) training on improving executive functioning in heroin addicts currently undergoing methadone treatment, which may limit WM training effects. The present study assessed WM training effects in abstinent heroin-dependent patients currently no longer receiving any pharmacological treatment.

Methods: Abstinent heroin-dependent inpatients were randomly assigned to a WM training ($n = 25$) or active control treatment condition ($n = 25$). All patients performed tasks before and after treatment measuring WM, interference control, response inhibition, and cognitive flexibility.

Results: Trained participants improved their performance on the trained task. Using the control group as reference, these participants also displayed a short-lived beneficial transfer effect to a non-trained WM task

(near transfer), but no far-transfer effects. Participants with a strong baseline WM capacity showed stronger training, but smaller transfer, effects than participants with a weak baseline WM capacity.

Conclusions: The combined results of the previous and present study suggest limited cognitive transfer effects of WM training in heroin addicts, irrespective of the current (non-) use of a methadone treatment. The present results also support evidence of individual differences in training and transfer benefits as a function of baseline executive functioning.

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Keywords: heroin addiction, working memory training, transfer effects

U. WILLINGER, M. DECKERT, V. TOCKNER, M. KATINIC, M. SCHMOEGER. Cognitive processing of telling lies: an event-related potential study.

Event-related potential studies show different cognitive processes underlying deception and telling the truth (e.g. Farahani & Moradi, 2013). This study investigated electrophysiological correlates of telling lies or the truth during high or low cognitive load conditions considering cognitive and emotional inhibitory control as well as theory of mind as covariates.

Fifty students, 33 (66%) females and 17 (34%) males with a mean age of 26.7 years (SD= .5) were randomly allocated to four groups (“telling lies/truth” x “low/high cognitive load”). There are no significant differences between the four groups regarding sex ($\chi^2(3)=1.2;p=.764$) and age $F(3,46)=1.6;p=.214$). After a mock crime scenario (“stealing a mobile” vs. “looking for a certain article in a journal”) the guilty knowledge test (m/c questions about crime details) was used. Corresponding EEG-recordings were taken with special interest in electrophysiological differences between “memory” stimuli (known by all subjects), “irrelevant” stimuli (irrelevant for all subjects) and relevant “crime” stimuli (only known by those who performed the mock crime and should lie about it). Cognitive load was manipulated by memorizing two or six numbers, covariates were measured with neuropsychological tests.

Results showed a significant main effect of group ($F(2,40)=9.3;p=.001$) with respect to difference of memory (dm) positive effect (340-800 ms), indicating higher differences in the “memory minus crime” components in the no crime group ($F(1,39)=7.4;p\leq.0001$) and lower differences in the “crime minus irrelevant” components in the no crime group ($F(1,39)=7.2;p=.010$). No significant main effect of cognitive load, no significant interaction or influences of the covariates were found for this specific memory component.

The electrophysiological correlate “dm positive effect”, reflecting not only memory but also other cognitive processes (Luck, 2014) was shown to be crucial for the differentiation of telling lies or the truth.

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Keywords: event-related potentials, deception, cognitive processing

T. KANESTRØM MARBERGER, Ø. ØSTBERG SUNDSETH. Cognitive dysfunctions in chronic heavy drug abusers.

Objective: Describe the use of Necker cube screening and WAIS-III/IV assessment in evaluating cognitive status in chronic drug abusers with known cognitive riskfactors – drug overdose, cerebrovascular incidents, head injury, hospitalization with a “critical disease”. The aim of the cognitive assessment was to optimize life quality, securing governmental financial support, and advice sufficient follow up treatments.

Participants: 157 chronic abusers (minimum 5 yrs) heroin, amphetamine, alcohol or mixed abuse, 25 years abuse (5-40 yrs), sge 45 yrs (18-67 yrs.).

Methods: Necker Cube Group 1 Sufficient copy first trial (N=60). Group 2: sufficient copy several trials/max 5 trials (N=46). Group 3: persistent failure (N=46). A Full Scale IQ (FSI), Verbal Comprehension Index (VCI), Perceptual Reasoning Index (PRI), Working Memory Index (WMI) and Processing Speed Index (PSI) was estimated on the basis of age corrected scaled scores and minimum 2 tests pr index. Group differences

where analysed with one way Anova, Bonferroni correction. (PASW statistical package version 26), and effect sizes evaluated in accordance with Cohens conventions. 5 participants were rejected due to lack of data.

Results: The one-way Anova analysis showed significant group differences (0.01 level), with large effect sizes on the full-scale, VCI, PRI measures, and medium to small effects in the WMI and PSI index. In group one the full scale IQ was 98,6 (sd 11,2), VCI 100 (sd 13), PRI 97 (sd 13,5), WMI 92 (13,8) PSI 81 (11,6). In group two the full scale IQ was 91,5 (sd 11,6), VCI 93 (sd 13,5), PRI 89 (sd 12,5), WMI 87 (sd 8,7) and PSI 83 (sd 14). Group three had an average full-scale IQ 84 (sd 11,4), VCI 85 (sd 12), PRI 82 (12,5), WMI 84 (10,2) PSI 77 (sd 12).

Conclusion: The Necker screening identified two groups with possible cognitive dysfunctions. Both fullscale IQ, VFI and POI of the WAIS then gave clinically significant information of cognitive status in the groups.

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Keywords: Wais III/IV, Necker Cube, Chronic drug abuse

D. RAMIREZ-HERNANDEZ, R. STOLWYK, D. WONG. A comparison of three methods to train the use of smartphone memory apps after acquired brain injury (ABI): A three-armed phase II randomised controlled trial.

Objective: Adoption of smartphones as compensatory memory aids after ABI in rehabilitation settings has been low. One potential reason is the lack of evidence-based guidelines for clinicians on how to train smartphone use. This study aimed to compare the efficacy of three methods (systematic instruction, error-based learning and trial-and-error) for training the use of a reminder app in ABI survivors with memory complaints. We also aimed to determine the effect of training on memory self-efficacy, smartphone confidence and frequency of use.

Participants and Methods: Participants with ABI (N = 28; 20 stroke, 6 TBI, 2 other; $M_{age} = 61.54$; $SD = 11.37$) were randomly allocated to one of three training groups and trained to use a reminder app in one session. The main outcome measure was proficiency of performance with the trained app. Secondary outcomes included generalisation of skills, number of errors, memory self-efficacy, confidence in smartphone use and frequency of use. Measures were collected by a blinded assessor pre-intervention, immediately post-training, one- and six-weeks post-training.

Results: There was no significant effect of the type of training on any of the outcome variables ($p > 0.05$). Confidence in smartphone use improved significantly at six weeks post-training compared with baseline ($p < 0.01$), especially with using the calendar, setting alarms and downloading and using unfamiliar apps.

Conclusions: Preliminary evidence indicates no significant differences in efficacy of the three methods for training the use of a reminder app. The small size and high variability of the sample may have influenced these findings. Encouragingly, our results suggest that confidence in smartphone use is positively influenced by exposure to any structured skills training session, regardless of the training method. This suggests that time spent training people with ABI to use apps to support their memory is helpful in addressing confidence-related barriers to smartphone use.

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Keywords: Brain injury, Memory rehabilitation, Smartphone use

M. SHIBASAKI, S. YAMAMOTO, F. ANZAKI, Y. MORITA, K. HAKAMADA, M. FUJII. Cognitive Rehabilitation for Facial Expression Recognition in Patients with Traumatic Brain Injury: A Behavioral and Event-Related Potential Study.

Objective: Facial expression recognition, an important element of social cognition, is frequently impaired in patients with traumatic brain injury (TBI). This study investigated the effectiveness of cognitive rehabilitation for facial expression recognition in TBI patients using behavioral and event-related potential (ERP) measures.

Methods: Six chronic TBI patients (mean age 40.2 ± 6.5 years) who exhibited facial expression recognition deficits received 7 months of intensive cognitive rehabilitation. The rehabilitation program hierarchically consisted of training tasks focusing on different stages of visual processing in facial expression recognition (e.g., configural processing of faces, perceptual and semantic classification of facial expressions, and facial expression recognition using contextual cues), with increasing task difficulty. All patients received neuropsychological assessments of face perception, facial expression recognition, and frontal lobe function before and after the intervention. We also examined training-induced changes in N170, a face-specific ERP component, to evaluate rehabilitation effects on early neural processing of face recognition.

Results: TBI patients significantly improved facial expression recognition, especially for anger, disgust, and fear, after training. ERP results revealed significant improvement of N170 response for upright and inverted face stimuli at T5 after training, suggesting increased involvement of the left posterior temporal area for face perception in TBI patients. Additionally, after training, TBI patients demonstrated significant improvement on the Faux Pas task and the behavioral-emotional self-regulation scale of the Dysexecutive Questionnaire (DEX).

Conclusions: In TBI patients, cognitive rehabilitation for facial expression recognition may improve behavioral measurements and lead to plastic changes in earlier neural processing of face recognition.

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Keywords: cognitive rehabilitation, traumatic brain injury, facial expression recognition

C.-H. SHEN, N.-W. GUO. The Therapeutic Effects of Integrative Neuropsychotherapy Model for Executive Functions Deficits in School-age Children Born Very Low Birth Weight with Normal Early Development.

Objective: The preschool children born very low birth weight (VLBW) still have executive functions (EFs) deficits even with normal early development (Ni, Huang, & Guo, 2011). Therefore, the study aimed to innovate an integrativeneuropsychotherapy (IN) model focused on EFs for school-age VLBW children with EFs deficits, and to discuss therapeutic effects.

Participants and Methods: The VLBW children, recruited from the Regional Cohort Network for premature infants who were admitted to neonatal intensive care units, had normal scores in Bayley and Wechsler Intelligence systems before 6 years old. They also received follow-up neuropsychological assessment for EFs at 6, 8, and 10-year-old. The deficits of EFs were defined from the result of Digit Span Subtest of WISC-IV, Knox's Cube Test (KCT), Tower of London (ToL), Wisconsin Card Sorting Test (WCST), and Comprehensive Nonverbal Attention Test Battery (CNAT). A total of 14 VLBW children with EFs deficits were recruited and received EFs training. The IN model combined with Comprehensive Memory Training System (CMTS), Executive FUNction Training (EFT), and multi-ecological materials focused on enhancing the four aspects of EFs, i.e. working memory, planning, cognitive flexibility, and inhibition ability.

Results: After 20 hours of IN, 14 VLBW children with EFs deficits had improved from an average of 3.2 aspects of EFs deficits to an average of 0.7 aspects. Furthermore, 8 of them had no more EFs deficits and 3 of them had 1 aspect of EFs deficits, 2 had 2, 1 had 3. It revealed that 92.9% children got benefits from this IN model.

Conclusions: This study showed that such a short-term IN model can enhance the EFs of those VLBW children who had normal early development but later growth into EFs deficits at school-age. But, there were

individual differences among therapeutic outcomes. Additional follow-up studies are needed for the long-term effects.

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Keywords: very low birth weight, executive functions, integrative neuropsychotherapy

R. COSTA, S. LIMA, A. L. FARIA, M. CAMEIRÃO, S. BERMÚDEZ I BADIA. Benefits of including cognitive rehabilitation through personalized virtual reality and paper-and-pencil interventions in the Alcohol Use Disorder treatment: a randomized controlled study.

Objective: Cognitive dysfunction is one of the consequences of excessive alcohol consumption and affects many domains associated with prefrontal and temporal lobes, including attention, verbal fluency and memory. Among several treatments, the Transtheoretical Model of Change, a multidisciplinary approach, is one of the most standardized. However, it lacks the integration of cognitive training. In this study, we propose two cognitive rehabilitation tools to promote cognitive improvements of Alcohol Use Disorder (AUD) individuals. Within a randomized controlled study, we intend to assess the clinical effectiveness of both a paper-and-pencil tasks training and a content equivalent virtual reality (VR) simulation of activities of daily living.

Participants and Methods: A sample of 45 AUD participants, starting the withdrawal treatment, was recruited in a Alcohol Rehabilitation Center, and on admission, were randomly assigned to three groups: VR using Reh@city (RC) (n=15), paper-and-pencil using Task Generator (TG) (n=15) and time-matched standard treatment control group (CG) (n=15). The intervention comprised 12 sessions of 30 minutes during four weeks of treatment. In addition to the usual interviews performed at the Center, participants went through a pre and post-intervention neuropsychological assessment.

Results: A within-groups analysis revealed improvements in executive functions, processing speed, sustained attention, working and visual memory in both RC and TG groups. The CG only improved in processing speed and visual memory. Between groups, the TG had a superior impact in general cognitive functioning, when compared to both RC and CG.

Conclusions: Results show that both experimental groups improved in important cognitive domains that are generally affected in this population. Our findings suggest that there are benefits of integrating personalized cognitive intervention tools in the treatment of AUD individuals.

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Keywords: Alcohol Use Disorder, Cognitive Rehabilitation, Virtual Reality

H.-T. CHANG, M.-S. HUA. Evaluation of dual processes in recognition memory using two verbal list learning tests in Taiwan: A preliminary study among young adults.

Objective: Memory assessment is critical in diagnosing Alzheimer's disease (AD). However, given that memory is not unitary and static in nature, current memory measures may hinder early and effective AD diagnosis. Dual-process theory posits that recollection and familiarity are two distinct memory processes supporting recognition memory. Neuropathological evidence suggests familiarity may change earlier than recollection in the course of AD. Verbal list learning tests (VLLTs) have been deemed potentially sensitive tasks in diagnosing AD. Nonetheless, few studies have directly compared processes of recognition memory among VLLTs. Our study was thus to explore this issue.

Participants and Methods: One-hundred and eleven undergraduates were randomly assigned into 5 conditions (a 15-minute, 2-hour, 2-day, 2-week, or 6-week delay) in which each participant received incidental recognition memory task of two modified VLLTs: Word Sequence Learning Test (WSLT) and

Chinese Version Verbal Learning Test (CVVLT) (sequence counterbalanced). We calculated average word frequency of items using the national norm.

Results: Average word frequency was higher on the WSLT than that on the CVVLT. However, the participants' performance on the CVVLT was better than that on the WSLT, irrespective of conditions. Receiver operant characteristic analysis revealed the WSLT provided an advantage over the CVVLT in evaluating familiarity after a short delay (a 15-minute or 2-hour delay) though recollection played a major role in all delayed-recognition conditions. Conversely, the CVVLT outperformed the WSLT in assessing familiarity on the longer delay (≥ 2 days) tasks.

Conclusions: Based on the present study results, materials of VLLTs may influence memory processes. Nevertheless, the two VLLTs did not provide a satisfactory performance in the short-delayed assessment of the familiarity component. Validation of our findings among individuals with healthy and abnormal aging is warranted.

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J. T. FORET, C. L. SAUCEDO, C. O'DONNELL, T. WENG, B. HICKSON, C. CRADDOCK, F. GONZALEZ-LIMA, A. P. HALEY. Transcranial Laser Therapy Increases Resting State Functional Connectivity in the Default Mode Network.

Objective: Dementia diagnoses are on the rise and interventions at late stages of the disease have been unsuccessful. Low-level light therapy (LLLT) is a promising intervention where red-to-near-infrared light is delivered transcranially with lasers. LLLT increases bioavailability of nitric oxide in the brain and upregulates cytochrome oxidase to promote increased energy metabolism and improve cognitive function. Functional connectivity in resting state fMRI (fcMRI) has emerged as a potential tool for detecting vulnerability to cognitive decline, particularly within the Default Mode Network (DMN). In this study, we set out to test if resting state fcMRI in the DMN changes with application of LLLT. We hypothesized that LLLT would result in increased connectivity in the resting state DMN.

Participants: 51 healthy older adults and 14 adults with Mild Cognitive Impairment (MCI) (ages 45+)

Methods: LLLT or placebo was administered once a week for 6 weeks and directed at the lateral and medial prefrontal cortices. Irradiance of 250 mW/cm², and cumulative fluence of 60 J/cm² was used as those parameters have demonstrated psychologically and cognitively beneficial effects in the past. Functional Connectivity in the DMN was analyzed using the FSL's dual regression tool. Mean connectivity in the DMN was extracted from the dual regression outputs generated from the DMN template outlined by Smith et al (2009). Pre-laser mean connectivity values were subtracted from post-laser values to determine change in DMN connectivity and tested for group differences.

Results: Mean change in DMN connectivity was significantly higher for laser treatment group ($M=.082$, $SD=.543$) than placebo ($M=-.255$, $SD=.798$); $t(63)=-2.007$, $p=.025$.

Conclusions: Our findings suggest that cognitive benefits of LLLT might be supported by changes in underlying brain function, such as increases in synchrony in the DMN. LLLT is a promising intervention for middle aged adults at risk for later cognitive decline.

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Keywords: neuroimaging; functional connectivity, mild cognitive impairment, low level light therapy

J. PINTO, A. R. DORES, A. GERALDO, B. PEIXOTO, F. BARBOSA. Sensory Stimulation Programs in Dementia: A Systematic Review.

Objective: Dementia can lead to sensory-perceptual alterations, compromising the functionality of the activities of daily living. Sensory stimulation is one of the non-pharmacological interventions that has receiving a growing interest from the researchers. However, previous systematic reviews that have evaluated

the effects of specific intervention programs (e.g., Snoezelen), focused on specific symptoms (e.g., behavioral), included non-sensory interventions, or have more than five years. The main purpose of this work is to review the characteristics of sensory stimulation programs in dementia and their efficacy.

Participants and Methods: Studies of efficacy of sensory stimulation programs were identified through a literature search, following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) and the Cochrane Collaboration Guidelines.

Results: Twenty studies were included in this review. The studies used multisensory stimulation at different stages of dementia. The results show that there is no consensus regarding the duration and number of sessions, frequency, duration of the intervention, and assessment instruments. The most widely used approach was multisensory stimulation, particularly Snoezelen. The most frequently stimulated senses were vision, hearing, touch, and smell. Most studies comprised a pre- and post-intervention assessment design, but few performed follow-up assessment. Interventions with positive results in dementia are: Snoezelen, multisensory environment not referred as Snoezelen, and multi-sensory behavior therapy.

Conclusions: This review shows positive results of sensory stimulation in dementia and provides useful information for rehabilitation. Neuropsychological intervention could consider the benefits of sensory stimulation with techniques such as virtual reality, which allows an approximation to the functioning in the activities of daily life.

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Keywords: sensory stimulation, dementia, systematic review

M. R. UDALA, A. LANGLOIS, J. SCOTT, L. WOOD, L. OHLHAUSER, M. CAMPBELL, D. LEITNER, E. CONCEPCION, H. MILLER, M. LIBBEN. Personality Assessment for Stroke Patients: Validation of the Personality Assessment Inventory – Short Form.

Objective: The Personality Assessment Inventory (PAI; Moorey, 1991; 2007) is validated in various populations (Morey, 1991, 2007; Slavin-Mulford et al., 2012); the PAI-SF has received less attention. The PAI-SF may have clinical utility when respondent burden and fatigue is a concern or when a respondent fails to complete all 344 items of the PAI (Morey, 1991, 2007). Research on the psychometric properties of the PAI-SF range from adequate to strong in psychiatric (Sinclair et al., 2009), forensic and civil (Sinclair et al., 2010), and outpatient and nonclinical samples (Ward et al., 2018); no studies have examined the PAI-SF in a neurological population. The present study examined the psychometric properties of the PAI-SF in a stroke sample.

Participants and Methods: Study patients from a tertiary hospital in Western Canada who had suffered a stroke (hemorrhagic $n = 35$, ischemic $n = 117$, undefined $n = 19$), following transfer to the rehabilitation department ($N = 171$), completed a neuropsychological evaluation including the PAI. Protocols were scored for both full (344 items) and short forms (160 items).

Results: Alphas were high for all PAI-SF clinical scales (0.49 [ALC] to 0.82 [ANX]) in a stroke population. Alphas were lower for PAI-SF validity scales (0.24 [INF] to 0.57 [NIM]). Treatment consideration and interpersonal scale coefficients were adequate (.54 [NON] to .78 [SUI]). Absolute difference values for mean scale t scores for the full- and short-form PAI were small and ranged from 0.16 to 2.77. At the individual level, mean absolute difference scores between full- and short-form scales ranged from 2.08 to 4.90 t score points.

Conclusions: The PAI-SF emerged as a valid measure of personality and psychopathology in a stroke sample. In comparison to previous studies, internal consistency indices were similar, generally high, and within acceptable ranges. Caution is warranted when making clinical decisions due to individual t score scale variability.

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Keywords: Psychometrics, Personality, Stroke

L. BOYD, R. WEBER, N. MOTAMED YEGANEH. Preliminary Effects of the Arrowsmith Intensive Program on Student Cognitive Functioning.

Objective: Children with neurodevelopmental disorders (Specific learning disorder, ADHD, ASD) often experience learning challenges, with underlying weaknesses in cognitive processes. These are some of the most common conditions to impact children's functioning, making them a priority for neuropsychologists. In addition, the task of designing effective cognitive interventions has proven one of the most difficult challenges for our field. The Arrowsmith Program is a novel approach compared to other recent cognitive intervention programs. We hypothesized that participation in this intensive program would lead to increased cognitive functions in students with neurodevelopmental disorders.

Participants and Methods: Thirteen students with neurodevelopmental disorders, aged 9 to 16, were recruited from Eaton Arrowsmith schools in Vancouver, BC, and Washington state. Cognitive baseline and post-intervention data were gathered using components of the Woodcock-Johnson IV Tests of Cognitive Abilities. The intervention consisted of a 6-week period of intensive practice of the Arrowsmith Symbol Relations Task.

Results: A repeated-measures MANOVA analysis indicated significant improvements in several cognitive processing areas: fluid reasoning, processing speed, and learning ($p < .05$). No improvements were observed in vocabulary or working memory ($p > .10$).

Conclusions: This exploratory study considered the potential benefits of a novel approach to cognitive intervention. Some improvements were observed after an intensive period of intervention, though these will need to be confirmed with further study including a larger sample and a control group comparison.

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Keywords: Cognitive intervention, Pediatric neuropsychology, Executive Functioning

A. R. GIOVAGNOLI, C. PATERLINI, M. JONES-GOTMAN. Creating abstract designs and frontal lobe epilepsy.

Objective: The creation of abstract designs may reflect different abilities, such as praxis, mental speed, and executive functions, involving widespread cortical areas. We evaluated creativity using a design fluency (DF) test in patients with focal frontal (FLE) or temporal lobe epilepsy (TLE) and healthy subjects. This study was aimed to evaluate the relation of DF to other cognitive performance and to compare the impact of frontal and temporal lobe dysfunctions on creativity.

Participants and Methods: A hundred patients with FLE or right TLE and a group of healthy controls underwent a DF test constituted by a free and a fixed condition. For each condition the number of accepted designs, unacceptable designs and perseverations were calculated. The Attentive Matrices, Wisconsin Card Sorting Test, Rey Complex Figure Copying, Word Fluency on phonemic cues, and Raven Colored Progressive Matrices were used to assess attention, executive functions, constructive praxis and abstract reasoning.

Results: Analysis of variance showed significant between-group differences in the number of correct designs, and post-hoc test revealed that the FLE patients produced less designs in comparison with the TLE patients and controls. No differences were found between the left and the right hemisphere patients. DF was predicted by the site of the epileptic zone, but it had no relation to attention, executive functions, constructive abilities or abstract reasoning.

Conclusions: Design fluency, as an index of creativity, is dissociated from other neuropsychological performance, which suggests that creativity is a specific cognitive dimension. Left or right frontal lobe dysfunctions caused by FLE may significantly impair DF. Impaired creativity, discriminating FLE from TLE, may contribute to define the cognitive phenotype of focal frontal lobe dysfunctions.

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Keywords: frontal lobe, epilepsy, creativity

T. MOROOKA, M. OKA, T. OGINO, H. YOSHINAGA, F. ENDOH, T. AKIYAMA, M. AKIYAMA, K. KOBAYASHI. Unique abnormalities of Rey-Osterrieth Complex Figure Test after an episode of status epilepticus.

Objective: To investigate long term course of executive function of a Japanese boy with frontal lobe epilepsy after an episode of status epilepticus.

Participants and Methods: A Japanese boy presented with generalized convulsive seizures, and was diagnosed with frontal lobe epilepsy at 12 years 8 months of age. He had no remarkable past history and was well behaved and intelligent before the onset of epilepsy. At 13 years 4 months of age, the patient had an episode of status epilepticus, and, soon after its suppression, he was admitted to Okayama University Hospital. On admission, electroencephalogram (EEG) showed numerous spike-waves mixed with high amplitude slow waves with dominance over the bilateral frontal regions. He could speak only several words, and, when he became able to talk, it was noted that his personality had changed and he behaved frivolously. Executive function were evaluated using Word Fluency Test, Trail Making Test, Stroop Test, Wisconsin Card Sorting Test and Rey-Osterrieth Complex Figure Test (ROCF).

Results: He had a full-scale IQ (FIQ) of 62 on the Wechsler Intelligence Scale for Children-Third Edition (WISC-III) one month after the episode. All of executive function tests (EFTs) were also low. Two months after admission, his seizures were completely suppressed with an improvement shown on EEG. After one year of seizure-freedom, although he regained an FIQ of 82, almost all of the EFTs showed improvements and his EEG normalized, his behavior remained frivolous, with poor performance in ROCF indicating a low score in Copy Organization and an even worse score in Delayed Presence and Accuracy. It took three years of seizure-freedom for him to largely recover in both behavior and improvement of ROCF scores to the normal range.

Conclusions: The low scores in ROCF indicated sustained frontal lobe dysfunction related to the deteriorations of personality and behavior after an episode of status epilepticus in the present patient.

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Keywords: executive functions, epilepsy, neuropsychological assessment

F. HAVLIK, P. DUSEK, R. JECH, E. RUZICKA, O. BEZDICEK. Brief Visuospatial Memory Test-Revised: Czech Normative Study in Young and Middle-Aged Adults.

Objective: A Brief Visuospatial Memory Test-Revised (BVMT-R) is a commonly used neuropsychological test of visual and spatial declarative memory. The BVMT-R measures learning, immediate memory, long-term memory and recognition. However, the absence of adequate Czech normative data limits the usage of BVMT-R in the Czech Republic. Therefore, this study aims to provide normative data based on the Czech sample of healthy adults.

Participants and Methods: Non-probability sampling was conducted. Participants underwent history taking and complex neuropsychological test battery including BVMT-R. A sample of 558 healthy participants aged from 17 to 60 years met inclusion criteria. Scores were computed and analyzed as reported in the BVMT-R manual. Further, the effect of age, education and gender on the test scores were examined.

Results: Statistical analyses showed that age was significantly associated with all main BVMT-R scores. Education was associated with all main scores except Learning. And gender was significantly associated with Trial 1, Trial 3 and Total score. Although education and gender were statistically significant ($p < 0.05$), the effect of these variables on the BVMT-R scores was negligible.

Conclusions: The present study provides regression-based norms for the BVMT-R in the Czech population. Further, this study shows that only age has considerable impact on the BVMT-R scores in the Czech population.

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Keywords: BVMT-R, normative data, neuropsychological assessment

J. STENBERG, J. E. KARR, D. P. TERRY, S. B. SAKSVIK, T. SKANDSEN, A. VIK, N. D. SILVERBERG, G. L. IVERSON. Developing a Cognition Endpoint for the CENTER-TBI Neuropsychological Test Battery.

Objective: There is no universally accepted method for combining cognitive test scores into composite scores. This study examined several possible composite scores for the test battery used in the large-scale study Collaborative European NeuroTrauma Effectiveness Research in Traumatic Brain Injury (CENTER-TBI).

Methods: At 2 weeks post injury, participants (18-59 years-old) with mild TBI (MTBI; $n=140$), orthopedic trauma controls ($n=72$), and healthy community controls ($n=70$) completed the CENTER-TBI test battery, including paper-and-pencil tests and the Cambridge Neuropsychological Test Automated Battery (CANTAB). Seven composite scores were calculated for the paper-and-pencil tests, the CANTAB tests, and all tests combined: the overall test battery mean (OTBM); three deficit-based scores assigning different weights to low scores; and the number of scores $\leq 5^{\text{th}}$, $\leq 16^{\text{th}}$, or $< 50^{\text{th}}$ percentile.

Results: When the MTBI, trauma control, and community control groups were compared, none of the composites differed significantly between the groups. Effect sizes (Cliff's delta) on the combined composite ranged from 0.08 to 0.11 when the MTBI group was compared to the trauma control group and from 0.01 to 0.15 when the MTBI group was compared to the community control group. Thus, effect sizes were negligible-to-small for all composites. Intercorrelations were high *within* the paper-and-pencil composites, the CANTAB composites, and the combined composites and lower *between* the paper-and-pencil composites and the CANTAB composites.

Conclusion: None of the composites revealed significant differences between participants with MTBI and the two control groups. Some of the composite scores were highly correlated and may be redundant. Additional research on patients with moderate to severe TBIs is needed to determine which scores are most appropriate for TBI clinical trials.

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Keywords: assessment, mild traumatic brain injury, concussion

J. STENBERG, J. E. KARR, R. H. KARLSEN, T. SKANDSEN, N. D. SILVERBERG, G. L. IVERSON. Test-Retest Reliability for Cognitive Composite Scores in the CENTER-TBI Neuropsychological Test Battery.

Objective: Seven candidate cognition composite scores have been developed and evaluated as part of a research program designed to validate a cognition endpoint for traumatic brain injury (TBI) research. Test-retest reliability has not yet been examined for these composite scores. This study examined test-retest reliability for these seven composite scores in the test battery used in the Collaborative European NeuroTrauma Effectiveness Research in Traumatic Brain Injury (CENTER-TBI).

Methods: Healthy participants ($n=63$; 18-59 years-old, 60% men) completed the CENTER-TBI test battery twice (3-month interval), including both paper-and-pencil tests and the Cambridge Neuropsychological Test

Automated Battery (CANTAB). The seven composite scores were the overall test battery mean (OTBM); three deficit-based scores; and the number of scores $\leq 5^{\text{th}}$, $\leq 16^{\text{th}}$, or $< 50^{\text{th}}$ percentile. The OTBM was calculated by averaging T scores for all tests. The other composite scores are deficit scores, assigning different weights to low scores, or counts of scores at or below specific percentiles. These composites were calculated for the paper-and-pencil tests (4 tests), the CANTAB tests (5 tests), and all tests (9 tests).

Results: The test-retest correlation was highest for the combined OTBM (Spearman's $\rho=0.87$). The test-retest correlation was 0.70 for the paper-and-pencil OTBM and 0.71 for the CANTAB OTBM. The test-retest correlation for the deficit composites ranged from 0.14 (number of scores $\leq 5^{\text{th}}$ percentile) to 0.66 (number of scores $< 50^{\text{th}}$ percentile) on the paper-and-pencil composites and from 0.48 (number of scores $\leq 16^{\text{th}}$ percentile) to 0.63 (number of scores $\leq 5^{\text{th}}$ percentile) on the CANTAB composites.

Conclusion: The high test-retest reliability of the OTBM appears to favor its use in TBI research; however, future studies are needed to examine these candidate composite scores in participants with severe TBIs and the association of the composites with functional outcomes.

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Keywords: assessment, mild traumatic brain injury, concussion

L. G. NUNES, A. G. SEABRA. Intervention in executive functions improves performance in a fluid intelligence test in adolescents.

Introduction: Fluid intelligence (FI) is related to three basic processes: a) perception, speed and accuracy in stimulus perception; b) ability to establish relationships between two or more ideas; c) ability to create new ideas, based on one already considered. Tests that measure FI can involve analysis of perception and problem solving of concrete or abstract stimuli. Many studies have demonstrated a relationship between executive functions and FI. In fact, FI tests are more sensitive to executive dysfunction than crystallized intelligence tests. Thus, the literature has been pointing out the relationship between FI and executive functions, but there is less evidence regarding to intervention.

Objective: To verify if an intervention in executive functions is related to the increase in FI measures.

Participants and Methods: We recruited 25 adolescents (11 to 17 years old) from schools in Três Lagoas city, Brazil, with complaints of executive dysfunctions, reported by parents and teachers. Initially they underwent a neuropsychological assessment, including executive functions tests, a matrix reasoning test to assess IF, and a vocabulary test to assess crystallized intelligence. So, they were divided in experimental (EG) and control (CG) groups. The EG was subjected to an intervention in executive functions, called Goal Management Training, and the CG was subjected to a psychoeducational intervention, both with 8 sessions. After, they were submitted to a post-intervention assessment.

Results: Comparisons between pre- and post-intervention tests revealed a large size effect ($g > 0.8$) in working memory and in the matrix reasoning test, which aims to measure non-verbal fluid intelligence, revealing gains in EG compared to CG. There was no effect on crystallized intelligence.

Conclusions: In fact, there was a greater gain on fluid intelligence measures after an executive function intervention, suggesting a relation between these abilities.

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Keywords: Fluid intelligence, Executive functions

C. A. BELLANI, R. S. OCCHIUTO, S. MONDINI. Have young girls and boys already developed cognitive pre-requisites for driving?

European legislation fixes eighteen years of age as a requisite to drive cars, but in other countries of the world (e.g., Australia) underage individuals are allowed to drive. Moreover, the variety of means of transport

in modern society allows many people of different ages (from the youngest to the oldest) to move through the traffic. Light motorcycles can be driven by sixteen-year-olds people and bicycles are used even before. Thus, it is interesting to explore whether basic cognitive processes involved in driving are already present in young people.

In order to investigate whether underage individuals have already developed the cognitive pre-requisites to drive, the Fitness to Drive Screening (DRIVESC) included in the Vienna Test System (Schuhfried) was administered to high school students younger than 18. The hypothesis was that underage individuals already have the cognitive pre-requisites for driving.

182 students (76 boys) under the age of 18, attending three different high schools in Padua (Italy), were evaluated with the DRIVESC battery of tests. Students performed three computerized tasks, lasting less than 30 minutes, aimed at exploring auditory and visual reaction times; executive functions and reactive stress tolerance; the ability to obtain a complex tachistoscopic traffic overview.

Most students performed within the range of suitability to drive, as adults. They showed fast and accurate reaction times, precise visual perception of traffic as well as adequate stress tolerance. Interestingly, significant differences emerged between males and females in favour of the former, although the majority of all the students' performances were average.

This research on a large sample of Italian high school students demonstrates that individuals younger than 18 years have already the cognitive pre-requisites to drive like adults. Moreover, it suggests that it is worth investigating gender differences which might result from social stereotypes about driving.

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Keywords: Cognitive screening, Driving, Adolescence

J. M. HAMILTON, K. NEUMAN, A. JANSARI. Unfortunately, they don't go away. Evaluation of executive function deficits in chronic TBI survivors using a new virtual reality task, the Jansari assessment of Executive Functions.

Objective: Challenges with Executive Functioning (EF) are common following Acquired Brain Injury (ABI). Typical evaluation of these abilities is conducted in the context of a standardized, quiet, and distraction free environment which creates a challenge for the accurate appreciation of the difficulties reported by patients, family members, and/or members of the rehabilitation team as the nature of the environment itself can often minimize the expression of executive dysfunction. The JEF has been shown to provide a “real world” assessment of EF skills. The primary aim of the current study was to investigate the utility of the JEF in understanding the nature of executive individuals in a group of chronic ABI survivors in a community setting.

Methodology/Participants: In this study, the JEF was utilized to evaluate the executive functioning of individuals who had sustained brain injury as the result of motor vehicle collisions, assaults, stroke, or infectious processes. The length of time since injury ranged from 14 months to 22 years. In addition, all patients and family members were administered the BRIEF and patients completed standardized measures of cognitive functioning (e.g., WCST, IOWA). Eleven adults participated.

Results: Results indicated that the JEF was able to identify executive dysfunction consistent with what is described in daily life. Individuals reported daily challenges in areas that were not clearly identified by typically administered measures of EF. JEF results revealed challenges in creative and adaptive thinking. Deficits in EF persist in the long-term following TBI, even when they are not evident on traditional measures.

Conclusions: The JEF was found to have utility in identifying and describing executive function deficits in those with chronic TBI. This information can then assist community based service providers direct care and continue with rehabilitation efforts.

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Keywords: Executive functions, Assessment, Ecological validity

D. MACHANDO. The Trail Making Test: Normative Data from Zimbabwe Adult Population.

Objective: To develop sociodemographic-adjusted norms for the Trail Making Test (TMT) for adults in Zimbabwe.

Participants and Methods: The sample consisted of 358 healthy adults without cognitive impairment from Zimbabwe. Inclusion criteria were a Mini-Mental State Examination (MMSE) score of ≥ 23 , a Patient Health Questionnaire (PHQ-9) score of ≤ 9 , and a Barthel Index score of ≥ 90 . Sixty percent of the participants were women, the mean age was 36.9 ± 12.1 , ranging from 18-72 years, and the average number of years of education was 12.5 ± 3.0 . Participants completed the TMT-A and TMT-B as part of a large comprehensive neuropsychological battery. Two regression models; age, age², education, education², sex, and all two-way interactions between these variables and the score of TMT-A and TMT-B as single dependent variable in each model were run. To generate adjusted norms, four steps were undertaken, 1) predictive values were obtained using the b-values of each regression model, 2) the residual values were obtained, 3) the residual values were standardized, and 4) tables of percentiles were calculated.

Results: The final regression models for TMT-A and TMT-B scores were affected by age (p 's $<.005$) and education (p 's $<.001$), showing that younger people and highly educated individuals, performed better. Neither age², education², sex nor two-way interactions were significant.

Conclusions: These norms will allow neuropsychologists in Zimbabwe to meaningfully measure attention as part of their neuropsychological evaluations.

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Keywords: neurocognition, neuropsychological assessment, information processing speed

D. MACHANDO, I. BENITO-SÁNCHEZ, K. NYAKUSENDWA, S. NÚÑEZ-FERNÁNDEZ, P. NJOMBORO, V. DZORO, D. RIVERA, J. C. ARANGO-LASPRILLA. Normative Data for a Brief Test of Attention in a Zimbabwe Adult Population.

Objective: To develop sociodemographic-adjusted norms for Brief Test of Attention (BTA) in a group of adults from Zimbabwe.

Participants and Methods: The sample consisted of 358 healthy adults from Zimbabwe. Inclusion criteria were a Mini-Mental State Examination (MMSE) score of ≥ 23 , a Patient Health Questionnaire (PHQ-9) score of ≤ 9 , and a Barthel Index of ≥ 90 . The sixty percent of participants were women, and the averages for age and years of education were 36.9 ± 12.1 (18-72), and 12.5 ± 3.0 , respectively. Participants completed the BTA as part of a larger neuropsychological battery. Multiple linear regression analyses were used to generate the normative data taking into account age, age², education, education², sex, and all two-way interactions between these variables. To generate adjusted norms four steps were done, 1) predictive values were obtained using b-values of each regression model, 2) the residual values were obtained, 3) the residual values were standardized, and 4) tables of percentiles were calculated.

Results: The final regression model for BTA score was affected by age ($p < .002$) and education ($p < .000$), showing that younger people with high level of education performed better than older people with low level of education.

Conclusions: This is the first study to create norms for the BTA in a sample of adult population in Zimbabwe. Clinically useful normative data of the BTA is presented to help researchers and clinicians interpret these scores, accounting for demographic factors.

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Keywords: neurocognitive assessment, neurocognition, attention

D. MACHANDO, K. LÓPEZ, S. NÚÑEZ-FERNÁNDEZ, K. NYAKUSENDWA, V. DZORO, P. NJOMBORO, D. RIVERA, J. CARLOS ARANGO-LASPRILLA. The Symbol Digit Modalities Test: Normative Data for an Adult Population from Zimbabwe.

Objective: The main goal of this study was to develop sociodemographic-adjusted norms for the Symbol Digit Modalities Test (SDMT) in a group for adults from Zimbabwe.

Participants and Methods: The sample consisted of 358 healthy adults from Zimbabwe. Inclusion criteria were a Mini-Mental State Examination (MMSE) score of ≥ 23 , a Patient Health Questionnaire (PHQ-9) score of ≤ 9 , and a Barthel Index of ≥ 90 . Sixty percent of participants were women, the average age was 36.9 ± 12.1 (range 18-72), and the average years of education was 12.5 ± 3.0 . Participants completed the SDMT as part of a comprehensive neuropsychological battery. A regression model including age, age², education, education², sex, and all two-way interactions between these variables as predictor variables, and the SDMT score as single dependent variable in each model was run. To generate adjusted norms four steps were followed, 1) predictive values were obtained using b-values of each regression model, 2) the residual values were obtained, 3) the residual values were standardized, and 4) tables of percentiles were calculated.

Results: The final regression model showed significant effects for age ($b = -.385$; $p < .001$) and education ($b = .989$; $p < .001$), so that the SDMT score decreased linearly as a function of age and increased linearly as a function of education. These variables explained 34% of the variance in the model.

Conclusions: This regression-based normative data for the SMDT will enable its use in the neuropsychological assessment of processing speed in a wide range of individuals in Zimbabwe.

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Keywords: assessment, neurocognitive, cognition

N. SIMON, Y. GILBOA, A. JANSARI. Validation of the Hebrew version of the Jansari assessment of Executive Functions for Children (JEF-C[©]): translation, adaptation and validation.

Objectives: The Jansari assessment of Executive Functions for Children (JEF-C[©]) is a non-immersive computerized assessment of executive functions (EFs); yielding scores for eight different constructs. Due to the paucity of reliable tests in the Hebrew language, our goal was to adapt and translate JEF-C[©] for an Israeli context. The new version, was then assessed for reliability and validity.

Methods: JEF-C[©] was translated and culturally adapted to the Israeli population using the simplified Guillemín criteria. Forty typically developing Israeli children aged 10-18 years were assessed with JEF-C(H)[©]. In addition, participants and their parents filled in the Behavior Rating Inventory of Executive Function (BRIEF) Self-Report & Parent questionnaires respectively.

Results: JEF-C(H)[©] was found to be feasible in Israeli children and adolescents. The internal consistency was acceptable (Cronbach's $\alpha = 0.79$) and a number of significant inter-correlations between individual JEF-C(H)[©] constructs were obtained. Most of the JEF-C(H)[©] construct scores and the total score showed significant positive high to moderate correlations with age, ranging from 0.40 to 0.78. Separating the participants into younger (10-13yrs) and older (14-18yrs) groups, it was found that there was a significant difference between the groups ($t(39) = 4.94$ $p < 0.0001$) on the total score. Further analysis showed that there were significant differences between the older and younger groups on five out of the eight constructs (all $p < 0.05$). Finally, multiple significant correlations were also found between JEF-C(H)[©] total score and the BRIEF indices and total score in the parents and self-report questionnaires.

Conclusion: These results indicate that JEF-C(H)[®] is feasible, as well as a reliable and valid tool demonstrating good discriminant and concurrent validity. Current findings demonstrate its potential clinical utility as an ecologically valid tool for Israeli children and adolescents in the assessment of EFs.

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Keywords: assessment, executive functions, ecological validity

K. GUTIÉRREZ RUIZ, P. VAZQUEZ MIRAZ, E. DOMINGUEZ DE LA OSSA, P. ESPINOSA. Executive functions as determinants of bullying behavior at school age.

Peer abuse due to abuse of power is a common problem among schools, regardless of their socioeconomic, religious or academic characteristics. It is defined as a series of negative actions, physical or verbal, that have hostile intentions, are repeated over time and imply a difference of power between the aggressor and the victim. Aggression and behavioral problems have been associated with deficits in various cognitive abilities, some of these associated with the functioning of the frontal lobes, however, there are few studies that investigate the relationship between peer abuse for abuse of power as a type of particular aggression, and cognitive skills related to the frontal lobes.

Objective: The aim of this study is to determine the influence of executive functions related to the processes of behavioral, emotional and cognitive regulation, in bullying behavior.

Participants and Methods: The sample included 181 children and adolescents between 7 and 17 years old and their parents, from three educational institutions in the city of Cartagena de Indias, Colombia. The children filled out the abbreviated scale of the bullying questionnaire (ICD-A) and their parents the Behavioral Assessment of Executive Function-2 (BRIEF-2).

Results: The influence of executive functions on bullying behavior was analyzed through a multiple linear regression analysis, and the results were analyzed based on the sex of the participants. The results showed that the ability to control impulses, to regulate behavior properly and to stop the behavior at the appropriate time is the best predictor of bullying behavior at school age, and the influence of this executive ability is mediated by sex.

Conclusions: It's recommended that intervention processes pay special attention to the ability of behavioral regulation and in particular the processes of behavioral inhibitory control to prevent bullying behaviors at school age.

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Keywords: Executive functions, frontal lobes, inhibitory control

M. J. HOLCOMB, J. PIZER, A. OIKLE, J. GASPERECZ, L. ERDODI. Are All Single Word Reading Tests Equivalent? A Head-to-Head Comparison of the TOPF and WRAT-4 in a Mixed Clinical Sample.

Objective: Premorbid cognitive functioning is an important point of reference in evaluating current cognitive decline. In the absence of baseline cognitive testing, single word reading tests are commonly used to estimate premorbid ability levels. There are multiple instruments available with little empirical evidence comparing their psychometric properties. The present study was designed to contrast two single word reading tests.

Participants: The study was based on a mixed clinical sample 129 consecutively assessed patients (43.3% male; $M_{Age} = 57.9$; ($M_{Education} = 14.8$) referred for neuropsychological evaluation by treating physicians.

Methods: A comprehensive battery of neuropsychological tests was administered to all patients, including various performance validity tests (PVTs), the Test of Premorbid Functioning (TOPF) and the Wide Range Achievement Test – Fourth Edition (WRAT-4).

Results: Patients scored significantly higher on the TOPF ($d = .48$, medium effect). PVT failure had a larger deleterious effect on WRAT-4 performance ($d: .56$ -.12 vs $d: .48$ -.76). Patients who passed PVTs tended to produce average scores commensurate with the normative mean on both tests. In contrast, patients who failed PVTs performed below normative means ($d_{\text{TOPF}}: .50$ -.85 vs. $d_{\text{WRAT-4}}: .35$ -.93).

Conclusions: The WRAT-4 systematically overestimated premorbid functioning. Although significantly lower scores were observed on both instruments in patients who failed PVTs, the TOPF was more robust to the deleterious effects of non-credible responding. Clinicians should consider such instrumentation artifacts during test selection and interpretation. The findings must be replicated by independent research groups to establish their generalizability to different geographic regions and clinical populations.

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Keywords: Premorbid Functioning, Psychometrics, Effort

M. J. HOLCOMB, A. OKIER, J. PIZER, L. ERDODI. SVT meets PVT – Cross-Validating the New Incidental Memory Module for the Inventory of Problems-29 in a Mixed Clinical Sample.

Objective: The Inventory of Problems-29 (IOP-29) is a novel, easy-to-administer, free-standing symptom validity test (SVT) which has recently introduced an incidental memory module (IOP-M) to serve as a performance validity test (PVT). The IOP-M consists of 34 forced-choice recognition items assessing memory for IOP-29 items. This study was designed to cross-validate the IOP-29-M in a clinical sample from the Southern US.

Participants: The study was based on a mixed clinical sample of 132 consecutively assessed patients referred for a neuropsychological evaluation.

Methods: A comprehensive battery of neuropsychological tests was administered. The IOP-29 was evaluated against the PAI validity scales, and the IOP-M was evaluated against various PVTs.

Results: The IOP-29 was a significant predictor of symptom exaggeration and random/atypical responding (AUC: .69-.83), but not a defensive response style (AUC: .51-.55). The default cutoff ($\geq .50$) was specific to failing PAI validity cutoffs (.84-.89) at variable sensitivity (.28-.67). The IOP-M was a significant predictor of criterion PVTs (AUC: .71-.83). The first cutoff to achieve minimum specificity (.84) was ≤ 29 . Lowering the cutoff to ≤ 28 improved specificity (.87-.96) at modest sensitivity (.31-.45).

Conclusions: There is an emerging professional consensus that administering several PVTs and SVTs is a necessary component of a neuropsychological evaluation. These practice standards conflict with increased volume pressures. Brief tests with robust classification accuracy may offer a solution. The IOP-29 already demonstrated excellent signal detection performance. The present investigation consolidated the instrument's growing reputation by providing evidence of its converging and diverging validity. In addition, results provide preliminary support for the use of the IOP-M as a free-standing PVT. Replication using different criterion measures from different geographic areas is necessary before widespread clinical use.

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Keywords: Performance Validity, Symptom Validity, Psychometrics

B. M. L. ZAPPAROLI, A. PERRY. Coping Strategies and Executive Functions in Zambian Parents of Children with Developmental Disabilities.

Objective: This study explored the relationship between executive functioning (EF) skills and coping strategies endorsed by Zambian parents of children with developmental disabilities (DD).

Participants: Participants were 75 Zambian caregivers (mostly mothers) of children with a DD.

Methods: A researcher-administered questionnaire was completed with parents of children with DD in Lusaka, Zambia. Carver's (1997) brief situational format of the COPE inventory (Carver, Scheier &

Weintraub, 1989) was used to measure coping strategies. A factor analysis was conducted to explore the factor structure of the COPE in the present sample, similar to the approach taken by other researchers (e.g., Krageloh, 2011). Roth and Gioia's (2005) adult version of the behavior rating inventory for executive function (BRIEF-A) was used to measure EF. Correlational analyses were then used to explore the relationship between EF domains and coping factors.

Results: Following Exploratory Principal Component Analyses with Varimax rotation of the brief COPE, a four-component structure, accounting for 63.3% of the variance and having 6 subscales with eigenvalues greater than 1, accounted for the most variance and had the most face validity. Factor 1 (Emotional Support, Instrumental Support, and Religion subscales) and Factor 4 (Positive Reframing and Venting subscales) were not significantly related to EF skills. Conversely, Factor 2 (Denial, Behavioural Disengagement, and Self Blame subscales) and Factor 3 (Active Coping, Planning, and the Acceptance subscales) were significantly related to a number of EF subscales of the BRIEF-A.

Conclusions: Hofmann, Schmeichel, and Baddeley (2012) propose that intact EF skills are necessary for self-regulation and are therefore related to the implementation of coping strategies. Additional research should further explore the relationship between coping strategies and EF among Zambian parents, with a goal of improving parental outcomes.

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Keywords: executive functions, diversity, developmental disability

M. A. SEDO, A. LUCENA, R. LEVENSON. "Five digit stroop": Fluent speed of processing is the basis of reading development.

Rationale: Between-network Functional Connectivity (BNFC) correlates test scores with blood-flow charts and EEG local tracings (Varangis, 2019). This approach makes clear that DAN (the dorsal attentional network) correlates beyond $p < .001$ with the DMN or Default Module Network of the brain at rest. Conflictive Rapid Naming tests with extremely low vocabulary and memory load (like the Five Digit Stroop test, FDS), are suddenly found to be a pure measure of the "accelerability" of the brain (its gas pedal) and its "flexibility" (its gear-box). (Fig. 1).

Methods: (Subjects) 95 Ss Brazilian school children ages 4 to 7 (N=93), male and female, were tested in Portuguese, in Belo Horizonte; classifying them into A on non-A groups (phonological and non-phonological analyzers) as per their score on the Ferreiro word dictation task. 50 1st graders were tested (in Spanish) at a bilingual school in Boston, in 1995 (that is, before immersion bilingual programs were introduced.)

(Materials) Five Digit Test (FDT, 2007) explores a) the rapid reading or counting of quantities 1 to 5, represented as groups of 1 to 5 digits or stars (parts 1 and 2) and groups of conflictive digits (one 5, two 3s, three 4s, etc) on parts 3 and 4.

Results: In BH, FDT scores increase quite obviously from parts 1 (descriptive naming) to part 4 (executive control, switching). Errors are only present on the executive parts 3 and 4. In Boston non-readers of Spanish words showed lower processing speeds.

Conclusions: Processing speed is a necessary component of reading acquisition (in phonologically-transparent languages). Spanish words (mostly polysyllabic and inflected) appear to be an unexpected hurdle for Spanish first graders. This difficulty may be increased by the sight-word approaches that are dearly beloved to Anglo-Saxon reading specialists).

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Keywords: executive functions

R. FABIAN, W. ADHIATMA, M. S. HALIM, M. P. H. HENDRIKS, R. P. C. KESSELS. Development of an Indonesian test for symptom validity testing.

Currently, there are no standardized neuropsychological tests available in Indonesia, except the WAIS-IV (Suwartono et al., 2014). The Indonesia Short-term Memory Test (ISTM) is a performance test for symptom validity testing which was constructed based on Amsterdam Short-term Memory Test (Schagen et al., 1997). The purpose of the test is to examine the validity of the (neuro)psychological test performances. In this study we proposed to examine the psychometric properties of the ISTM in normal participants.

Participants were in the age between 17-70 years old, minimum educational level was elementary school, with no history of Traumatic Brain Injury, or other neurological or psychiatric disorder, and were not under any drug usage. We examined 206 participants with three tests: the ISTM, and the Trail Making Test (TMT), and Rey-Osterrieth Complex Figure Test (ROCF) for external validation purposes.

The psychometric properties of the ISTM showed promising results with high split-half reliability ($r_{tt} = .74$). The highest score achieved by the participant was 90 of 90, and the lowest was 79 ($M = 89.22$, $Mdn = 90$), with all items having very easy difficulty. ISTM had a high correlation with ROCF-Copy (.30), ROCF-Delay (.34), and TMT part B (-.22), but the exception of TMT part A (-.09).

We concluded that the ISTM has promising results as a performance validity test for Indonesia. As expected, all items were easy to answer, and a very high proportion of the normal participants showed a high score. Further research using clinical participants is needed to examine the clinical utility of this test.

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Keywords: performance validity test

P. KIBUUKA, S. JOLOBA, I. DDUMBA, I. BABIRYE, L. NABUUMA. Developing and Validating for Cognitive Screening Tools for Identifying and Intervening Dementia among Older Persons in Rural Uganda.

Background: Although risk of developing dementia increase in later years, identification and assessment of older persons with dementia in developing countries is still low. Access to easy and user friendly cognitive screening tools by the health care professional in developing countries is difficult. The study aimed to develop, validate and field test the cognitive screening tool for use in outpatient departments within health facilities in Uganda.

Methods: In the rural eastern region of Uganda, twenty-three (23) purposively selected health facilities and administered a scientifically derived cognitive screening tools to all eligible older persons. We conducted an inter-rater reliability in all the health facilities using three raters. Diagnosis of dementia (DSM-IV) was classified as a major cognitive impairment and was quality checked by psychiatrist who were blinded to results of the screening assessment.

Results: The area under the receiver operating characterizes (AUROC) curve in health facilities was 0.912. The inter-rater reliability was good (Intra-class correlation coefficient of 0.692 to 0.734). the predictive accuracy of the tool to discriminate between dementia and other cognitive impairment was 0.892. In regression modal, the cognitive screening tool, didn't appear to be biased by age.

Conclusion: The cognitive screening tool if performed well among the older persons, can be proved useful for screening dementia in other developing countries.

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Keywords: Cognitive, Screening tool, Dementia

K. MEGARI, M. KOSMIDIS. Healing hearts & protecting brains in the elderly.

Objective: Although cardiac surgery procedures are lifesaving, they have negative effects on brain especially in the elderly. It is very important for the patients to have adequate brain protection against the side effects of surgery, affecting almost all aspects of their lives including postoperative cognitive dysfunction (POCD) in

memory, attention, executive functions and overall social functioning. This can be solved by a factor that provides brain protection and is called “cognitive reserve” (CR). The main purpose is to protect the brain while the heart is healed.

Participants and Method: We conducted assessments of 75 elderly patients (mean age 79) before and four months after cardiopulmonary bypass surgery. A broad range of cognitive functions, namely visuospatial perception, executive functions, attention, short and long-term memory using a battery of neuropsychological tests and a questionnaire measuring CR, including education, occupation and leisure activities.

Results: Patients were divided into two groups, the low CR (n=38) and the high CR (n=37), based on median split. Chi-square tests showed that patients with low CR were more likely to demonstrate POCD in attention, memory, visuospatial perception and executive functions ($p < .001$) than patients with high CR upon post-surgery neuropsychological assessment.

Conclusions: Cardiac surgery has improved life of millions of patients, but despite improvements in technology, POCD remains a concern for the increasingly elderly patients undergoing cardiac surgery. Our findings suggest that CR can predict neuropsychological outcome in the elderly and those patients with the greatest need for cognitive rehabilitation. This information could aid in the design of intervention programs that can enhance patients’ overall functional outcome after surgery. Cognitive stability plays a significant role in quality of life and daily activities, especially in heart surgery elderly patients.

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Keywords: cognitive functioning, cardiac surgery, cognitive reserve

S. KOSKINEN, T. SÄRKÄMÖ. Dual-Assisted Dance Rehabilitation (DARE): a novel multimodal rehabilitation tool for severe TBI.

Objective: The heterogeneous and complex nature of severe TBI presents a major challenge for rehabilitation. There is a need for novel rehabilitation tools which are able to address the multiple deficits caused by TBI simultaneously. Music-based interventions have emerged as highly promising and effective tools in neurorehabilitation. Among different music interventions, dance-based rehabilitation is a particularly well-suited and potentially effective method to improve the motor, cognitive, and emotional impairments in TBI. The aim of the present pilot study was to explore the feasibility of a novel dance-based intervention (Dual-Assisted Dance Rehabilitation, DARE), which combines dance training and physical therapy in the individual rehabilitation of chronic patients with severe TBI and extensive motor and cognitive deficits.

Participants and Methods: Using a cross-over design, 11 patients with severe / extremely severe TBI received a 12-week (2 times/week) DARE program during the first (N = 6) or second (N = 5) half of the study. Motor and neuropsychological tests and questionnaires measuring mood, executive functions, and quality of life were performed at baseline, 3-month, and 6-month stage. Self-perceived benefits were assessed with a post-intervention questionnaire.

Results: Overall, the adherence of the patients to the intervention (DARE) and the study was excellent. With one patient, the intervention had to be discontinued for safety reasons, due to the emergence of epileptic seizures. Pre-post treatment effects sizes were medium-large for self-reported depression (BDI-II: $d = 1.19 - 1.74$) and executive deficits (BRIEF-A: $d = 0.43 - 1.09$) and for test-assessed trunk movement control (TIS: $d = 0.47 - 0.76$) and reasoning (WAIS-IV: $d = 0.34 - 0.89$). Self-perceived benefits were largest for mobility and cognition.

Conclusions: Dance-based rehabilitation is a feasible and promising method in severe TBI and its efficacy should be assessed with a large clinical trial.

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Keywords: traumatic brain injury, treatment outcome, dance-based rehabilitation

I. SANCHEZ-LUENGOS, O. LUCAS-JIMÉNEZ, J. PEÑA, N. OJEDA, J. C. GÓMEZ-ESTEBAN, M.-Á. GÓMEZ-BELDARRAIN, R. VÁZQUEZ-PICÓN, N. FONCEA-BETI, N. IBARRETXE-BILBAO. Effectiveness of a psychoeducational intervention on cognition and functionality in family caregivers of patients with Parkinson's Disease.

Objective: The care of people with Parkinson's Disease (PD) is usually provided by informal caregivers, resulting in numerous health and psychosocial problems for the carers themselves. The aim of the study was to investigate effects of a psychoeducational program on neurocognition, functionality and clinical symptoms of PD family caregivers.

Participants and Methods: Forty-four family caregivers of patients with PD were divided into psychoeducation group (12 weeks) and control group. Participants underwent a neuropsychological, functional and clinical battery at baseline and post-treatment. Regarding neuropsychological evaluation, neurocognition composite score was created with attention, verbal memory, visual memory, working memory, visuoconstructive skills and processing speed domains. Differences between psychoeducation group and control group at baseline were calculated with Chi-square and Mann-Whitney U Test for categorical and quantitative variables. Variables that showed significant differences at baseline were included in subsequent of Repeated Measures Multivariate Analysis of Covariance (MANCOVA).

Results: There was significant difference between psychoeducation group and control group at baseline in age. Psychoeducation group revealed significant improvements in neurocognition ($F=9.43$; $p=.004$; effect size=.187), general health ($F=5.16$; $p=.028$; effect size=.112) and anxiety symptoms ($F=8.65$; $p=.005$; effect size=.174) in comparison with control group.

Conclusions: Findings showed that family caregivers improved their cognition, general health and anxiety after taking part in the psychoeducational program. The application of intervention through psychoeducation can offer a comprehensive approach to the family caregivers of PD patients.

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Keywords: Family caregivers, Psychoeducation, Parkinson's Disease

A. MACHADO. INSTACOG – A non-verbal screening test for cognitive impairment and dementia.

In a longitudinal study that lasted 2 years, we assessed 150 subjects (91 control group / 59 dementia group) and compared their results in an experimental nonverbal test INSTACOG for cognitive impairment and dementia, with the results obtained by the same groups in two major screening tests, MOCA and ACE-R. To validate our test and to confirm the frontal assessment characteristics and the non-verbal abstract reasoning nature of INSTACOG, we also correlated the scores obtained, with the results in two other tests, (FAB) and the RPM-std. Finally, to have a characterization of the level of autonomy of our dementia group and follow any changes on this dimension throughout the study, we have also applied the Barthel Activities of Daily Living Index (BI). The result showed that, (1) INSTACOG total scores have a strong correlation with MOCA ($r=.796$, $p \leq .001$) and ACE-R ($r=.761$, $p \leq .001$) total scores and moderate correlation with FAB ($r=.551$, $p \leq .001$). (2) For an optimal cutoff score of 7,5 INSTACOG had a specificity of 80% and a sensitivity of 78%, with statistically significant differences with MOCA and ACE-R. (3) The evidences show that in both moments of evaluation, TUGA (78,0% – 96,6%), is not only more sensitive detecting cognitive impairment related dementia, but detects it earlier than ACE-R(6,8% – 66,1%) and MOCA(3,4% – 22,4%). (4) INSTACOG is as sensitive to dementia patients with frontal lobe deficits and/or with psychomotor slowing. (5) The individual Deck observation of INSTACOG results, gives useful qualitative and quantitative information about the possible etiology of the scores. (6) INSTACOG total scores have a moderate correlation with RPM-std ($r=.526$, $p \leq .001$) and as expected, a very strong correlation with INSTACOG Deck D RPM-std ($r=.914$, p

≤ .001), opening the wide range of clinical possibilities and application areas. These results become even more relevant if we consider the simplicity of tasks.

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S. LIGHT, Z. TAIWO. Empathy for Pleasure Recruits Frontal Executive Circuitry.

Empathy is the ability to contemplate and vicariously share in the emotional life of others. While certain theoretical models propose that higher-order cognitive abilities (e.g., executive function) may play a role in empathy, the specific contribution of executive function to positively-valenced empathic processing remains understudied.

Objective: Theory posits that the evolution of the prefrontal cortex allowed for the expansion of executive functions; and enhanced executive skill (e.g., problem solving) relates to trait positive emotionality. Thus, we hypothesized that increased executive function capacity would also relate to increased positively-valenced empathic ability. We examined the relationship between individual differences in executive function capacity (i.e., parsed into working memory, inhibition, and cognitive flexibility) and magnitude of prefrontal engagement during positively- (i.e., “empathic happiness” or vicarious joy) and negatively-valenced (i.e., “empathic concern” or vicarious sadness/concern) empathic responding.

Participants and Methods: A sample of 20 healthy adults (60% female, $M_{age}=22.65$, $SD=6.85$) underwent an fMRI-based empathy induction paradigm that utilized video clips extracted from the American television show “Extreme Makeover: Home Edition” to elicit empathic happiness and empathic concern at separate time points. Participants also completed standard neuropsychological tests outside of the scanner.

Results: Rostral prefrontal cortex (BA 10) was significantly activated during both empathic happiness and empathic concern trials (corrected p 's < .05). However, empathic happiness uniquely engaged a much broader network of prefrontal cortex sub-regions, spanning BA 8, 9 and 10. In addition, empathy-related prefrontal activation in BA10 was positively predicted by working memory capacity measured separately (all p 's < .05).

Conclusions: Differential prefrontal cortex activity—but common working memory capacity—predict empathy subtypes.

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Keywords: executive function, prefrontal cortex, empathic happiness

A. C. NEIVA, J. NEANDER ABREU. Flii: Developing an Executive Function Program for Children to be Applied by Parents.

General View and goals: Evidence based practices have been used to address executive function impairments in ADHD children. Previous studies and major literature points that clinical and school contexts are the most target environment to apply interventions. However, despite the fact the results show gains in executive functions, the acquired improvements do not seem to be generalizable to others contexts. Yet, children and parents still dealing with troubles in daily routine activities. The aim of this study is to share the process of developing an intervention program to be applied by parents in order to improve executive functions in the day by day tasks of children with ADHD.

Methods: Literature review of similar interventions covering main aspects that may support the design of the program and the tasks that compose it.

Results: The characteristics of tasks and time span intervention are important aspects to be observed by the developing processes. The knowledge about how game design manages and performs, motivation and rewards within gameplay experience could contribute to shape better strategies of children engagement with the program. **Discussion:** Executive functions interventions applied in multiple contexts might promote the generalization of different abilities. Using parents as mediators may improve the relationship with the children along the intervention process.

Conclusion: Executive function interventions applied by parents for ADHD children may develop children's performance in daily routine and also contribute for the quality of life.

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Keywords: executive functions, everyday functioning, child development disorders

J. BESSA, J. CAIRO, R. BEIRÃO, N. ABREU. Psychometrical Properties of a new Computadorized Measure of Attention: the Attentional Performance Test.

The main objective of this study is to present the parameters of evidence of validity based on the content, external variables and reliability analysis of a new computerized attention, the Attentional Performance Test (APT, TDA in Brazilian Portuguese language). Six experiments were run: The experts analysis had seven experts judged the instrument and it was obtained a high agreement; This suggests that the APT measures what it proposes, as well as the adequacy between its items and its execution to the target audience ($k = 0.84$, $p = 0.00$). In the semantic analysis, a sample composed by 12 adults performed a pilot study and indicated a high agreement what suggests that the test presented commands, figures and management of the test execution suitable for the indicated age groups ($k=0.77$, $p = 0.00$). The exploratory factor analysis ($n=431$) suggested that the instrument's indicators plotted four factors, which were named by: sustained attention, detection of stimuli, impulsivity and inattention profiles. The data referring to the reliability indexes of the APT indicated values close to 1 in all four factors. Evidence analyzes based on external variables suggested that the APT presented divergence with tasks that evaluate other types of attention, such as: selectivity, alternation and divided attention with weak correlations ($n= 149$). By other hand, it was presented a convergence with moderate correlations when compared the Attentional Performance Test with a test that measures sustained attention ($n= 49$). The regression analysis between the Attentional Performance Test indicators and the age variable of the participants ($n= 630$) indicated age prediction in the performance of sustained attention in most of the 12 indicators of the instrument, except for the indicators of commissions errors, commissions errors vigilance; motor perseverance; and motor perseverance vigilance. This analyze indicated that the APT is valid and reliable for the assessment of sustained attention.

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Keywords: Attention, Psychological Testing, Computerized Test

C. R. MARTINS, N. ABREU. Inhibitory Control and Cognitive Flexibility of Brazilian's Pre-school and School Children.

Objective: The present study aims to compare inhibitory control and cognitive flexibility of pre-school and school Brazilian's children with a new neuropsychological instrument.

Participants and Methods: The sample included 673 Brazilian's children, 38,6% pre scholars (04 to 06 years) and 61,4% scholars (07 to 10 years). The instruments used for data collection were: Inhibitory Control and Cognitive Flexibility Test (TIF) and a social demographic questionnaire. The TIF is a computerized instrument, based on the Stroop Paradigm, which uses animal images as stimuli and it is organized into four conditions: Naming (naming animal), Control (body of an animal with a geometric shape on its head), Inhibition (to inhibit the preponderant response, ie naming the animal from its body) and Cognitive Flexibility (toggle the previous rule according to the color change of the background of the image). Descriptive analysis and parametric tests (*Student t test*) were conducted for group comparison.

Results: Statistics differences were found on response time between the two groups (pre-school and school), regarding the following conditions: naming ($t=9,98$; $p=0,001$), control ($t=6,35$; $p=0,001$), inhibitory ($t=14,21$; $p=0,001$) and cognitive flexibility ($t=10,38$; $p=0,001$). The pre-school group took more time than the school pme to respond to these conditions.

Conclusions: This study provides information about the developmental difference on inhibitory control and cognitive flexibility on Brazilian's children. Older children (school) present developed inhibitory and cognitive flexibility when compared with younger children (pre-school group). Also, The Inhibitory Control and Cognitive Flexibility Test (TIF) is adequate to discriminating differences between age ranges.

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Keywords: Inhibitory Control, Cognitive Flexibility, Children

C. LAW, I. JURASKOVA, S. LAH. Systematic Review of Paediatric Memory Questionnaires.

Objective: Memory difficulties are commonly reported in children with neurological and neurodevelopmental disorders. Several paediatric memory questionnaires have been published but no systematic review has been conducted. This systematic review aims to evaluate paediatric memory questionnaires, which is important, as clinicians rely on the accuracy of measures to guide their work.

Method: Electronic searches were guided by the Preferred Reporting Items for Systematic Reviews and Meta-Analysis. CINAHL, Medline and PsychINFO were searched using pre-determined search terms, and limited to child and adolescents populations and English language. Selection involved comparing searches to inclusion and exclusion criteria, reviewing full manuscripts of potentially relevant studies and hand searching reference lists of relevant papers. The questionnaires were evaluated by two independent raters against the evidence-based assessment (EBA) criteria developed by the American Psychological Association – Paediatric Psychology Assessment task force and classified into 3 categories: well established, approaching well-established and promising.

Results: The electronic searches yielded 9888 articles, 24 of which met the inclusion criteria. Hand searches identified additional 20 studies. The 44 identified studies reported on 22 memory questionnaires that assessed memory domains ranging from working memory, everyday memory, prospective and retrospective memory to self-awareness of memory functions. Using EBA criteria we found that: 1 memory questionnaire (The Working Memory Rating Scale) was well-established, 6 were approaching well-established and 15 were promising. Most (n=19) had good reliability but lacked concurrent validity; had low or no correlations with objective memory tests, and low predictive power.

Conclusion: Our study highlights an urgent need for validation studies of paediatric memory questionnaires to increase evidence base and improve questionnaires' clinical utility.

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Keywords: memory disorders, psychometrics, memory questionnaire

I. HEPDARCAN SEZEN, S. CAN. Validity and reliability of n-back task as a working memory task.

Objective: The present study aims to investigate construct validity, alternate forms and test-retest reliability of the n-back task, in which a series of single stimuli are presented and required a response when a stimulus is identical to a stimulus n position before that is used extensively in measuring working memory.

Participants and Methods: A total of 30 healthy (15 female, 15 male) university students ($M_{age} = 20.37$) and 30 (15 female, 15 male) elderly participants ($M_{age} = 56.83$) took part in this study. Construct validity of n-back task was investigated by obtaining measurements from two different groups (young and elderly) while presenting n-back task (0-, 1-, 2-, and 3-back) by using two different stimulus type (letters and figures (Attneave shapes)). For the test-retest reliability of the task, 38 healthy university students ($M_{age} = 21.42$) participated. The test-retest consistency of measurements acquired from n-back task was investigated through re-administering the task after 3 weeks. For the parallel forms reliability, 30 healthy university students ($M_{age} = 20.88$) took part. In order to investigate parallel forms reliability, an alternative version of the same task was administered.

Results: Measurements obtained from young and elderly groups differ in favor of young group and this differentiation was similar for measurements obtained from two stimulus types (letter and figure). While sensitivity parameter calculated for each participant based on signal detection theory was analyzed by using linear mixed effects model in investigating validity of the measurements obtained from n-back task, reliability of the test-retest and alternative forms measures was estimated by using intraclass correlation coefficients.

Conclusions: Results provide evidence for validity and reliability of measures obtained from n-back task.

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Keywords: n-back task, validity, reliability

M. BERNARDI, R. SARTORI, R. PAZ FONSECA, N. C. VALENTINI, H. C. LEONARD, E. L. HILL, N. BOTTING, L. A. HENRY. Cross-cultural consistencies in neuropsychological profile of executive function in British and Brazilian children with poor motor skills.

Objective: Children with poor motor skills demonstrate executive function (EF) difficulties when compared to typically developing peers. However, no research to date has compared their EF profile across countries. Discrepancies identified in the prevalence of Developmental Coordination Disorder amongst British and Brazilian children may represent a challenge for the generalisation of findings from studies conducted in individual countries that examine the links between motor development and neuropsychological outcomes. The aim of this study was to investigate whether Brazilian and British children with poor motor skills demonstrate any difference in their neuropsychological profiles of EF.

Participants and Methods: 7–11-year-old children from the UK (London) and Brazil (Porto Alegre) were assessed on motor skills, intellectual ability, and EF across the verbal and non-verbal domains of working memory, response inhibition and cognitive flexibility. Inclusion criteria were matched between countries for both the typically developing children (UK=71; BZ=56) and those with poor motor skills (UK=56; BZ=92). Raw scores on EF tasks were transformed into z-scores using the typically developing group of each respective country as a reference. EF difficulties were classified as moderate (below 1SD from the mean) or severe (below 2SD from the mean).

Results: There was no significant difference in the frequency of moderate or severe EF difficulties between British and Brazilian children with poor motor skills in 5 out of 6 EF domains. In both the UK and Brazil 91% of children with poor motor skills demonstrated moderate difficulties in at least one EF domain, and severe difficulties were evident for 55% of British children and 66% of Brazilian children.

Conclusions: Neuropsychological profiles of EF in children with poor motor skills are remarkably similar across countries. Children with poor motor skills seem to experience comparable EF difficulties in both the UK and Brazil.

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Keywords: Executive Functions, Motor Function, Cross-cultural Issues

J. RYBKINA, Z. BELCHEV, E. JEFFAY, K. JOHNS, G. D'SOUZA, T. WORTHINGTON, R. DYDYNKY, A. DROHOBYCKY, R. SYRYDIUK, M. BOGACKI, R. KUO, M. KHAN, S. MUNCE, T. BRUNO, A. GILBOA, R. GREEN. Brain care at home: feasibility and acceptability of a novel online memory intervention for individuals living with chronic neurological disorders.

Objective. Gaps in remedial cognitive rehabilitation exist for individuals living with multiple sclerosis (MS) and complicated mild to severe traumatic brain injury (TBI). Given neurodegeneration and elevated dementia risk in these populations, novel infrastructure and effective treatment for remote delivery is

needed. We evaluate the preliminary feasibility and acceptability of an online, self-administered memory intervention. Data collection is ongoing.

Participants and Methods. Target: N=10 adults with complicated mild to severe TBI and N=20 adults with progressive MS are randomized to a novel allocentric spatial navigation intervention designed to lessen memory decline and hippocampal atrophy, or a control group. N=4 TBI and N=6 MS patients have completed the intervention to date and N=11 controls. For 16 weeks, participants allocentrically navigate unfamiliar cities via Google Street View for 1 hour/day, 5 days/week, from a home computer. TBI controls watch TedTalk videos for the same duration of intervention, answering daily questions. MS controls join a standard-of-care control group. Feasibility outcomes are recruitment, attrition and adherence rates. Acceptability outcomes include self-reported barriers and burden to participation. A semi-structured interview is administered post-intervention to evaluate barriers/facilitators to participation.

Results: For the treatment group, mean adherence was 93.1% for TBI and 97.3% for MS patients; attrition is zero to date. Participants from both populations reported memory improvements and increased reliance on allocentric navigation in every-day life. All who declined participation cited time commitment.

Conclusions: Early feasibility and acceptability data are encouraging. Remotely-deliverable, self-administered interventions have the potential to address the unmet need for cognitive rehabilitation in chronic TBI and MS patients, regardless of geographic location, mobility restrictions or financial status.

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Keywords: Online intervention, Cognitive rehabilitation, Neurological disorders

N. N. CASTAÑEDA-IBÁÑEZ, G. ZULUAGA-FRANCO, A. RUBIO-MARTÍN. Crossfit: Neuropsychological functioning and psychosocial well-being.

Objectives: Identify the contributions of the CrossFit in the executive operation when carrying out activities of daily living. This objective was achieved by identifying the executive functions in the development of the practice of CrossFit and in the development of daily life activities.

Method: It is considered a cross-sectional, quantitative study of a descriptive, comparative nature, with contrast models, in order to know and compare the executive functioning of those who perform CrossFit and who does not. For this, a control group and an experimental group were selected. Participants: 75 Adults between 18 and 60 years of age living in the city of Bogotá, healthy, who practice CrossFit for more than 3 months consecutively belonging to a box affiliated with the trademark registered in the city of Bogotá, D.C. Colombia and 75 adults between 18 and 60 years of age living in the city of Bogotá, healthy, who have never practiced CrossFit.

Instruments: BANFE 2 – NEUROPSYCHOLOGICAL BATTERY OF EXECUTIVE FUNCTIONS AND FRONT LOBBIES and Questionnaire for recording daily life activities.

Results: No significant changes were observed in the control group with respect to the neuropsychological evaluation for the measurement of cognitive functioning, while, in the experimental group, the 75 adults showed significant differences greater than 0.5 in their executive functioning for skills such as: Planning and monitoring, working memory, verbal fluency, cognitive flexibility and inhibitory control.

Conclusions: This study showed that the constant practice of CrossFit brings both physical and psychological benefits that also contributed positively to the quality of life. Also, noticeable changes were observed in the executive functions of inhibitory control and social cognition demonstrating a better psychological well-being, where participants began to show satisfaction with their new lifestyle.

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Keywords: Neuropsychology, Executive functions, CrossFit

U. DIAZ-ORUETA, D. HIGGINS, A. B. A. NAVARRO-PRADOS, A. BLANCO-CAMPAL, T. BURKE. Neuropsychological assessment and technology: can the infantry succeed without the artillery?

Objective: In both research settings and clinical practice, there is considerable interest in neuropsychological test administration using computer/digital technology. The aim of this paper is to identify the best in different neuropsychological testing approaches and to suggest potential best practice for the development of technology-based assessment. We argue that traditional paper-and-pencil tests face ongoing challenges with ecological validity that might be addressed by technology-based developments such as testing in virtual reality (VR) environments. We also argue that computerised tests that are mere digitalisations of their paper-and-pencil counterparts are of little added value for clinicians and fail to capitalise on the potential benefits of computerisation.

Methods: A review on existing technological developments that have aimed to enhance or improve the clinician's hand-recording and manual-scoring of neuropsychological tests was undertaken. In addition, neuropsychological tests that may benefit from computerisation were identified and critiqued.

Results: Based on this review, specific processes, strategies and test features that might best be captured with the aid of computerisation are identified and presented. Moreover, hypotheses on how VR and other technologies could be an asset for the future of neuropsychology are discussed, with a special emphasis on how a process-based approach (PBA) should guide development of a new generation of neuropsychological assessment tools.

Conclusion: We argue that while neuropsychological assessment will undoubtedly need to take account of technological advances, computerized tests will be adopted widely only if they add real value. These technological developments will be adopted in clinical practice only if they capitalise on the opportunities to address the challenges of ecological validity and only if they capture aspects of behaviour not currently possible (or easy) to capture in the clinical context.

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D. HIGGINS. Neuropsychological assessment in individuals with low literacy levels: examples based on the Traveller Community in Ireland.

Objective: There is a dearth of knowledge about dementia in populations of generally low literacy levels such as the Traveller Community in Ireland. Standard neuropsychological tests for screening and diagnosis of dementia often require high literacy levels for successful completion and those assessment tools are, therefore, inappropriate for use with individuals with low levels of literacy. The aim of this paper is, therefore, to highlight current literacy-based testing challenges and to describe our initial attempts to develop an assessment battery, for use within the Irish Traveller Community.

Participants and Methods: As part of a larger project, interviews and focus groups were conducted with stakeholders drawn from organisations working with Travellers in Ireland to identify literacy and cultural challenges in current cognitive tests. A systematic review will now be undertaken to identify components of current standard tests that may, and may not, be suitable for inclusion in a new assessment battery. The Boston Process Approach (BPA) to neuropsychological assessment is utilised as the framework for the creation of this new battery, allowing for collection of rich qualitative and quantitative data.

Results: Pending completion of the systematic review, examples of cognitive tasks that are considered suitable for use with individuals with low literacy, those in need of modification and/or adaptation and those that should be discarded entirely because of a high bias against low literacy individuals, have been identified and categorised.

Conclusions: To facilitate accurate assessment, and diagnosis, we have undertaken preliminary work to identify those tests clearly biased by educational or literacy levels and those best suited for inclusion in a new assessment battery. We are now in the process of developing this further, with a view to developing and validating a test battery that is more appropriate for individuals within our Traveller Community.

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A. BLANCO-CAMPAL. Lost in Translation: Validation of the English-in-Ireland Philadelphia Repeatable Verbal Learning Test (EirPrVLT).

Objective: The PrVLT, employed in detecting memory deficits in Mild Cognitive Impairment (MCI), is a repeated trials serial list-learning test, using 12 prototypical exemplars from 3 semantic categories. It was developed in the US influenced by the process-based methodology to neuropsychological evaluation. Comparison of words used in the original and culturally-adapted versions (e.g. Czech) reveals differences in the prototypicality ratings of words across cultures. Therefore, simply translating US-English words (e.g. eggplant) into their English-in-Ireland version (aubergine) may not be sufficient to guard against threats to validity. This study aimed to develop a culturally appropriate Irish adaptation of the US PrVLT and to develop normative-data for our population.

Participants & Methods: 58 ‘english-speaking’ Irish people (18-83y) participated in a frequency study to generate prototypical exemplars of the original PrVLT semantic categories for use in the EirPrVLT. Two 4-trials versions of the EirPrVLT were then developed and normative data collected from 135 older adults (60-96y) screened for dementia.

Results: Exemplars and prototypicality ratings of items in the semantic categories differed from those of the US version, resulting in word list differences between the PrVLT and EirPrVLT. Means and standard deviations of raw scores for a set of derived indices, reflecting distinct cognitive constructs of learning and memory, were stratified by age, education and gender, revealing significant effects of these variables.

Conclusion: A mere translation of the US PrVLT is not a guarantee for cultural equivalence and may compromise the validity of the test to detect distinct learning and memory processes. In this study, a 4-trials Irish version of the PrVLT was developed, offering Irish clinicians and researchers culturally appropriate norms, which now requires future clinical validation to confirm its capacity to detect distinct memory profiles in MCI phenotypes.

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Poster Session 06: Categories- Aphasia; Stroke; VCI; Visuospatial Functions

11:00 AM - 5:00 PM

B. STAROVASNIK ŽAGAVEC, V. MLINARIČ LEŠNIK. Relationship between information processing speed, attention capacity and verbal learning – pilot study on stroke patients.

Objective: The consequences after stroke often include impaired processing speed, which is compromised in almost half of the cases during the first year after the first stroke. Information processing speed and attention capacity represent the baseline of efficient encoding and further memory processes, that are crucial for learning during rehabilitation. The main purpose of this pilot study was to explore the relationship between information processing speed and verbal memory deficits in subacute patients after stroke.

Participants and Methods: The pilot study included 27 patients referred to neuropsychological assessment after stroke while being treated at the Stroke Rehabilitation Unit during the first year after stroke onset. Each assessment included results measuring attention (simple reaction times (TAP), coding task (RBANS), attention capacity (RBANS)) and verbal memory (RBANS subtest).

Results: Results show prominent deficits of processing speed (52% on the simple reaction time task, 40% on the coding task). Processing speed alone was not correlated with the verbal learning variables. On the

contrary attention capacity was independently moderately correlated with immediate recall. Time of stroke onset was also relevant for immediate recall efficiency. The delayed story recall was different in regard to lateralization and type of stroke.

Conclusions: The capacity of learning new information after stroke is important for different reasons, especially for the favorable cognitive and motor outcome. The pilot study showed correlations between information processing capacity and verbal memory. The study confirms the role of attention capacity in learning, but failed to obtain significant relations with information processing speed, which can result from the limited number of the pilot study.

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Keywords: information processing speed, attention capacity, verbal learning

Y. KADO, S. SANADA, S. OONO, K. NAKANO, T. OGINO, M. YASUDA, S. NOUNO, Y. OHTSUKA. Visual cognitive function assessed using the Rey–Osterrieth Complex Figure test in children with difficulty in Japanese Kanji writing.

Objective: Kanji (Chinese characters used in Japanese writing) have complex structures that are difficult for some children to learn. This study investigated the visual cognitive function of children whose parents were concerned that their children were having difficulty learning Kanji (DLK).

Participants and methods: Fifty-five children (6–15 years) with DLK were studied (mean IQ, 91.0±11.1). This study used the Rey–Osterrieth Complex Figure test (ROCF) to assess visual cognitive function. This study used the Boston Qualitative Scoring System (BQSS) and examined the following four summary scores: Copy Presence Accuracy (CPA), Immediate Presence Accuracy (IPA), Delayed Presence Accuracy (DPA), and Organization (ORG). We also used two qualitative fragmentation and planning scores for the copy condition, which are the ORG constituent scores. For comparison with the DLK group, we used the BQSS scores from typically developing (TD) Japanese children (Nakano et al 2006,2014). Subjects were divided into four age groups (6–7, 8–9, 10–11, and 12–15 years). The differences between the DLK and TD groups based on age were analyzed using a non-paired *t*-test. Age-related differences within the DLK and TD groups were analyzed using a one-way ANOVA followed by a Bonferroni post-hoc test.

Results: Ages 6–7 and 10–11 years in the DLK group showed significant unfavorable scores for ORG and planning, and ages 8–9 years in the DLK group showed significant unfavorable scores for all indices except fragmentation compared to the TD group. Both TD and DLK groups showed significant age group differences in CPA, IPA, and DPA, and the TD group also showed significant differences in ORG and planning. The DLK group did not show age-related differences in all organizational indices.

Discussion: The DLK group may have used a different strategy to draw the ROCF because of their insufficient organizational skills. These results provide clues for developing a Kanji writing strategy for DLK children.

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Keywords: writing difficulty, visual cognitive function, children

T. LOETSCHER, M. GRECH, M. PITTAWAY, L. WILLIAMS, T. STUART, C. CHEN. Can we improve the detection of spatial neglect with a Mobility Assessment Course?

Objective: Spatial neglect can be challenging to diagnose under standard neuropsychological assessment. The accuracy of these standard assessments and their lack of ecological validity has been repeatedly criticised. To address such concerns, other measures such as the Mobility Assessment Course (MAC) have been developed. Here, we present two studies that evaluated the diagnostic utility of the Mobility Assessment Course for the assessment of neglect.

Participants and Methods: Study 1 comprised 67 stroke survivors who completed a range of standard neglect tests and the MAC. While walking the MAC, participants were asked to locate left-sided and right-sided targets placed along the walls of the course. Study 2 assessed in an additional 20 patients whether the tracking of eye movements while completing the MAC improves the detection of neglect.

Results: The MAC is a highly sensitive measure for detecting neglect. However, the MAC's good ability to detect neglect patients came at the expense of relatively low specificity (many false positives). When the sensitivity and specificity measures were combined in a Receiver Operating Characteristic analysis, the MAC was not superior at detecting neglect compared to standard neglect tests. Study 2 established that neglect patients spent more time searching on the right and made more saccades towards the right than hemianopic patients. However, there was no evidence that the addition of eye movement measurements improved the MAC's diagnostic utility.

Conclusions: The MAC is an ecologically valid alternative for assessing neglect. However, there is currently not enough evidence to suggest that the MAC's diagnostic accuracy is better than commonly used neglect tasks. Its high sensitivity suggests that the MAC might be a great screening tool for spatial neglect – but positive MAC results should be further investigated due to the test's low specificity.

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Keywords: visuospatial neglect, assessment, ecological validity

M. HIGASHIKAWA, Y. MOTOKI, Y. HARA, T. MURAKAMI, W. HATA, Y. MIZUTO, K. YOSHIKAWA, I. ISHIZAKA, K. HADANO, T. HATTA. Japanese aphasics' primary improvement mechanism using factor analysis – Is there a mechanism for universal language recovery?

Objective: To ascertain the primary improvement mechanism in speech therapy, we applied factor analysis to the improvement scores of 26 subtest items on the Standard Language Test of Aphasia (SLTA) of 88 Japanese aphasic patients. Further, we compared the results with those of a similar study conducted in 2002, and analyzed whether a universal mechanism could be found for the improvement of aphasia.

Participants and Methods: The subjects comprised 88 patients who received intensive speech therapy during the recovery period of aphasia, from 2014 to 2018. We collected data from the SLTA performed at the beginning and at the end of speech therapy. The improvement scores were defined as the difference in scores obtained at the first and final evaluations. We applied factor analysis to the improvement scores, and designated the extracted factors to identify them respectively. The results were then compared with those of our 2002 study.

Results: Our factor analysis extracted 5 improvement factors whose eigenvalues were 1.0 or larger, and the 5 extracted factors accounted for 63.8% of the sum of the variance. The 5 extracted factors were identified as follows: f1: word finding, writing and complex language information processing, f2: comprehension, f3: oral reading, f4: word fluency, and f5: repetition.

Conclusions: The factor structure we extracted was similar to that extracted in the 2002 study. The 2002 factor analysis, a similar factor analysis of 195 patients, extracted 7 improvement factors. Each f1 extracted in the two analyzes was considered to be the core factor of improvement in recovery from aphasia; it indicated the trans-modal general language function constituting the basis of thinking, and each of the factors excluding f1 was strongly related to a particular modality. Finally, we confirmed the importance of speech therapy in enhancing the core factor of improvement during aphasia recovery.

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Keywords: aphasia, factor analysis, Standard Language Test of Aphasia (SLTA)

M. KOELBEL, M. JEON, K. DALLMAN, F. KIRKHAM, D. DIMITRIOU. What are you looking for? Validation of VISMO-C a novel spatial memory test for children.

Objective: Motor development enables a child to explore the world around him/her. Spatial cognition has been shown to play an important role in development of creativity and relationship between object(s) and place(s). Currently, few tests are available. Our aim was to develop a more ecologically valid test for children. The Visuospatial Memory test for children (VISMO-C) consists of a booklet that shows two scenes of an organised and disorganised bedroom with different objects.

Participants & Methods: Typically developing children born in the UK were recruited from the community in London, UK. The child was asked to remember the locations of 7 target objects over three trials. After a learning phase, the objects had to be recalled on two occasions: (1) immediate and (2) after ~30min delay. Additional assessment included Raven's (RSPM), visual CPT and Dots Location (DL).

Results: We recruited 35 children ($M_{age}=8.61$, $SD=2.82$; 20 boys; $M_{RSPM}=100.69$, $SD_{RSPM}=12.66$). VISMO-C total score (max 70) ranged from 19 to 51 ($M=33.89$, $SD=9.4$). Positive correlation was observed for RSPM and VISMO-C, $r(28)=0.517$, as well as for age and VISMO-C, $r(35)=0.480$, $p<0.01$. Reliability for VISMO-C showed an acceptable reliability, $\alpha = 0.92$ (All items were retained). All correlations between VISMO-C and DL were significant. Correlations ranged from $r_s(35)=.58$, $p<0.001$ to $r_s(35)=.41$, $p<0.05$. The same accounts for the disorganised scene $r_s(35)=.60$, $p<0.001$ to $r_s(35)=.39$, $p<0.05$. Most scores for the organised scene correlated with DL $r_s(35)=.48$, $p<0.001$ to $r_s(35)=.34$, $p<0.05$. Hierarchical multiple regression revealed that RSPM (33%) and CPT (35%), but not age, predicted a significant amount of variance in VISMO-C, $R_2=0.396$, $F(3, 25)=4.8$, $p=0.01$.

Conclusions: This study confirmed the validity of newly developed test to measure children's visuospatial memory, which is easy to use and enjoyable for children to play. Further validation is needed, as well as, comparing the test to other available measures.

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Keywords: test validity, cognitive functioning, visuospatial functions

M. JEON, M. KOELBEL, K. DALLMAN, F. KIRKHAM, D. DIMITRIOU. Visual spatial memory in children: Relationship with age, fluid intelligence, attention and sleep.

Objective: Sleep is important for memory and learning. Academic performance is negatively impacted by insufficient sleep and quality. Visual spatial skills are important for remembering objects and navigating oneself in the environment. The study intends to identify the relationship between developmental factors on visual-spatial memory skills in children.

Participants & Methods: Typically developing children born in the UK were recruited from the community in London, UK. Children were assessed using the Raven's (RSPM), visual CPT, Dots Location (DL) and Visual Spatial Memory test for children (VISMO-C). Sleep was assessed with MotionWatch8 (CamNtech) for 5-7 nights.

Results: Analysis included 24 participants ($M_{age}=9.21$, $SD=0.43$; 20 boys; $M_{RSPM}=100.69$, $SD_{RSPM}=12.66$). Children had significantly lower spatial memory and RSPM ($M_{Vismo-C}=33.66$, $SD_{Vismo-C}=7.6$; $M_{DL}=22.25$, $SD_{DL}=2.34$; $M_{RSPM}=23.08$, $SD_{RSPM}=4.70$) compared to young teens ($M_{Vismo-C}=40.67$, $SD_{Vismo-C}=7.56$; $M_{DL}=26.75$, $SD_{DL}=5.12$; $M_{RSPM}=32.67$, $SD_{RSPM}=4.33$), all $p<0.01$. Relationship was observed for VISMO-C and RSPM ($r=.463$, $p=.023$), VISMO-C and CPT ($r_s=-.424$, $p=.039$) but not for DL. Children slept less on average ($M=8h 29min$), with 23.33% sleeping 2h and 23min less than the recommended amount. Relationship was shown with sleep latency (SL) after controlling for age and RSPM for VISMO-C disorganised ($r=-.448$, $p=.037$) and organised scenes ($r=-.428$, $p=.047$) long delay. DL showed relationship with SL ($r=-.575$, $p<.01$ to $r=-.561$, $p<.01$) and sleep efficiency for long delay ($r=-.44$, $p=.039$). Relationships remained after controlling for attention ($r=-.437$, $p=.047$ to $r=-.568$, $p<.01$).

Conclusions: Visual-spatial memory performances show relationships with age, fluid intelligence, attention and sleep. Other factors at individual level might be contributing and compensating for sleep loss in terms of cognitive performance. It is important to keep in mind additional factors that contribute to the observed scores.

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Keywords: visuospatial functions, Sleep, cognitive functioning

I. CAMERINO, R. KESSELS, F.-E. DE LEEUW, V. PIAI. White-matter microstructural integrity in small vessel disease with category fluency impairment.

Objective. White-matter (WM) hyperintensities in anterior thalamic radiations (ATR) and forceps minor (FM) are associated with lower performance on category fluency in patients with small vessel disease (SVD). However, it is unclear whether the microstructural integrity in these tracts is compromised in patients with impaired category fluency. Our aim was to compare the microstructural integrity in ATR and FM between SVD patients who declined in category fluency performance over time (SVD-IP) and SVD patients with stable performance (SVD-NP).

Participants and Methods. 22 SVD-IP patients were identified who declined in category fluency in the course of nine years. Their microstructural integrity of ATR and FM was compared to that of 26 SVD-NP patients, matched on age, sex and education, who remained stable over that period. Microstructural integrity was obtained by quantifying fractional anisotropy (FA) and mean diffusivity (MD) in two ways: using TRActs Constrained by UnderLying Anatomy yielding total mean FA and MD, and using Tract-Based Spatial Statistics yielding voxel-wise FA and MD.

Results. Mean MD of all tracts was higher and mean FA was lower in SVD-IP than SVD-NP. Only the difference in mean MD of FM was statistically significant between SVD-IP and SVD-NP ($p=.025$). These results are consistent with the voxel-wise analysis, where only the MD of FM showed statistically significant voxels at different points in the tract. However, five SVD-IP and two SVD-NP patients developed dementia in the nine-year period. Excluding those patients from the analyses resulted in non-significant results (all p -values $>.05$).

Conclusions. Microstructural integrity of FM potentially differs between SVD-IP and SVD-NP. General lack of difference in integrity between the groups may be due to insufficient power. Our findings provide a starting point for future investigations on the role of WM integrity as a possible biomarker of fluency decline in SVD.

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Keywords: cerebrovascular disease, verbal abilities, executive functions

L. WOOD, J. UPSHAW, K. RUTLEDGE, J. SCOTT, H. MILLER, M. LIBBEN. Sensitivity of Eye Tracking in Assessing Attentional Patterns in Allocentric Versus Egocentric Neglect.

Objective: Commonly seen in stroke patients, hemispatial neglect is a failure to report, respond, or orient to stimuli on the contralesional side of space. Though prevalent and debilitating, few studies have investigated the specific visual attentional patterns underlying neglect. This study used eye tracking technology in conjunction with common behavioural assessments of neglect to further our understanding of where in the processing stream attentional deficits occur, and whether these deficits vary according to neglect subtypes. A clear understanding of the basis of attentional deficits is crucial for effective rehabilitation and treatment planning.

Participants and Methods: Participants included a sample of right hemisphere stroke inpatients. Each participant completed computerized eye tracking versions of the Ogden Figure Copy Task, the Line Bisection Test, and the Apples Test. Attentional patterns of neglect were investigated using eye tracking

metrics representing both location and duration of patients' eye movements. ANOVAs were conducted using Dwell Time and First Fixation Duration data to contrast early vs. late attention processes respectively.

Results: Individuals with neglect appear to direct eye-movements toward the neglected area of space in the early/automatic stages of processing, but not during later, more controlled scanning. This effect was more pronounced among individuals with egocentric or combined ego- and allocentric neglect, as opposed to those with pure allocentric neglect. Further, eye tracking data identified more cases of neglect than behavioural measures.

Conclusions: Results indicate that neglect patients can direct eye movements to the neglected side, but that they do not maintain gaze in this area long enough to permit full explicit awareness of information on the contralesional side of space. In addition, eye tracking may be more sensitive in detecting attentional impairments than traditional pencil-and-paper behavioural measures.

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Keywords: neglect, stroke, attention

K. RUTLEDGE, J. SCOTT, L. WOOD, J. UPSHAW, J. PIERCY, M. LIBBEN, H. MILLER. Using Visual Patterns Underlying Hemispatial Neglect Syndrome and the Implementation of Eye Tracker Technology to Predict Functional Outcomes in Stroke Patients.

Objectives: Neglect is characterized by the failure to perceive, report, or orient to stimuli on the contralesional side of space, and is often observed in stroke patients. Neglect may be divided into two distinct subtypes: egocentric neglect (which involves a failure to perceive contralesional space relative to the body midline) and allocentric neglect (failure to perceive the contralesional side of individual objects). While the consequences of neglect and its subtypes are well documented, few studies have investigated the specific visual attentional patterns that underlie neglect. We sought to use eye tracking data from common behavioural tasks (i.e., the Apples Test, the Ogden Figure Copy Task, and a Line Bisection task) to predict functional outcome following stroke and neglect.

Participants and Method: Stroke inpatients completed eye tracking versions of the behavioural measures listed above. Eye tracking data was analyzed to determine each participant's neglect classification (egocentric, allocentric, both, or none). Data from the Functional Independence Measure was collected for each participant.

Results: Patients with egocentric neglect had superior functional outcomes to those with allocentric or both neglect subtypes. Performance on eye tracking based tasks served as a better predictor of functional outcome as compared to pencil-and-paper behavioural performance. Integration of eye movement data from common behavioural tasks significantly strengthened models predicting functional outcome. Eye tracking data from the Apples Test specifically afforded the best predictive power in terms of functional outcome.

Conclusions: The ability to accurately predict functional outcome is crucial to the clinical assessment and rehabilitation of neglect. Results have the potential to provide enhanced models of prediction and further our understanding of the neglect subtypes and their relative impacts on patient prognosis and outcomes.

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J. L. SCOTT, J. UPSHAW, L. WOOD, K. RUTLEDGE, H. MILLER, M. LIBBEN. Hemispatial Neglect Interventions: An Investigation into Smooth Pursuit Eye Movement Training using Eye-Tracking Technology.

Objective: Hemispatial neglect is defined as a failure to attend to the contralesional side of space in patients who have suffered a stroke. Despite being a common and debilitating condition, there are currently very few effective treatments for neglect. However, recent research into smooth pursuit eye movement training

(SPMT) indicates that this intervention may show promise. This study used eye-tracking in parallel with SPMT in order to determine the underlying behavioural eye movement changes that may result in improvement of neglect symptoms post-treatment. We also sought to determine whether those with different neglect subtypes (i.e., egocentric vs. allocentric neglect) might show different patterns of attention during this intervention. This is the first study to evaluate SPMT while ensuring that the head is kept in a neutral position and while using eye-tracking technology to investigate how eye movements and subsequent attentional patterns might change behaviorally during SPMT vs. traditional visual scanning.

Participants and Method: Participants completed a pursuit movement-based task and a saccade-based visual search task in conjunction with eye-tracking. Eye movement and corresponding attentional patterns were compared between neglect subtype groups and task conditions.

Results: Results indicate worse performance among the egocentric neglect patients on the SPMT task. Specifically, it appears that egocentric neglect patients tend to exhibit rightward regressive saccades once they reach their leftward attentional limit, while allocentric neglect patients are better able to continuously track left-moving stimuli.

Conclusions: Results have the potential to provide valuable information as to which patients might be more appropriate for a particular treatment paradigm, identify important attentional areas for tailored intervention, and provide insight into the real-time eye movement changes that may be responsible for producing treatment effects.

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Keywords: Psychometric Assessment, Neglect Intervention, Stroke Population

S. OTA, S. KANNO, A. MORITA, W. NARITA, N. KAWAKAMI, K. KAKINUMA, Y. SAITO, E. KOBAYASHI, K. ENDO, K. SUZUKI. Echolalia in primary progressive aphasia.

Objective: Echolalia is automatic repetition of utterances spoken by another person. Although various types of echolalia have been reported, echolalia in primary progressive aphasia (PPA) has not been systematically investigated. We examined echolalia and related symptoms in PPA, and also measured regional cerebral blood flow (rCBF) using single photon emission computed tomography to explore the neural basis of the echolalia.

Methods: Forty-seven patients with PPA were included; 20 nonfluent/agrammatic variant PPA (nfvPPA), 5 semantic variant PPA (svPPA), 7 logopenic variant PPA (lvPPA) and 15 unclassified PPA patients based on the PPA criteria. Experienced neurologists or speech pathologists picked up echolalia in unstructured conversation. Western Aphasia Battery Japanese version (WAB), Test of Lexical Processing in Aphasia (TLPA), Mini-Mental State Examination, and Raven's coloured progressive matrices were administered. We explored the brain regions in which rCBFs were decreased in patients with echolalia.

Results: Echolalia was observed in 12 nfvPPA and 3 unclassified patients. We compared nfvPPA patients with echolalia (echolalia group, n=12) and those without echolalia (non-echolalia group, n=8). There were no differences in demographic and cognitive features across the groups. The echolalia group performed significantly worse in spontaneous speech, auditory comprehension, and categorical verbal fluency test of the WAB. The number of words per minute in the picture description task of WAB was significantly lower in the echolalia group than that in the non-echolalia group. The rCBFs in the posterior parts of the right middle and inferior frontal gyri, and the right supplemental motor area in the nfvPPA patients with echolalia were significantly decreased than those without echolalia.

Conclusions: Echolalia in PPA occurs in nfvPPA patients along with poor language output, which is associated with dysfunction of the right frontal lobe.

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M. TIBURCIO CORTÉS, I. GRACIELA GALÁN LÓPEZ, M. GALICIA ALVARADO. Verbal-auditory attention in Language Development Disorder (DLD).

Objective: This study aims to characterize and compare verbal-auditory attention in children with DLD and children with typical development.

Participants and Methods: Comparative cross-sectional study conducted at the National Institute of Rehabilitation. 16 children with DLD and 16 controls between 5 and 6 years old participated. The inclusion criteria were an IQ between ≥ 80 and < 120 , not neurological, auditory or intellectual disability diseases. The procedure consisted of a medical history with the parents, the screening of “Language problems test”, the “Digit Span” test with their respective subtests (forward and backward span), of the “Child Neuropsychological Evaluation” battery, in addition to Wechsler WPPSI and WISC IV intelligence scales. For the analysis, Ancova test was applied in the SPSS 24 statistical program.

Results: This data shown statistically significant differences were obtained in the measurement of verbal-auditory attention between groups, taking as a covariate the socioeconomic level (evaluated with 130 points, average level) and the school years of the children (evaluated in 25.7 months) in both subtests: forward span ($F = 7.48, p = .011$); backward span ($F = 9.50, p = .005$), in which the group with DLD had lower scores.

Conclusions: In this study children with DLD had significantly lower performance in two components of auditory-verbal attention, in the forward span as in the backward span compared to children with typical development. Although the most evident affected domain in DLD is language, the development of other cognitive processes that in turn support the acquisition of language comprehension and expression, such as attentional processes may also be involved and must be attended.

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Keywords: Language, Development, Attention

V. MLINARIČ LEŠNIK, B. STAROVASNIK ŽAGAVEC, P. ŠIRCA ULE, M. DRLJEPAN. Multidisciplinary assessment of depression with the Aphasic Depression Rating Scale (ADRS) in aphasic stroke patients – a pilot study.

Objective: Assessment of depression can represent a challenge in patients with aphasia after stroke due to language deficits, however current research highlights high prevalence of mood disorders in these patients. This pilot study examines the consistency of interdisciplinary rehabilitation team ratings on the Aphasic Depression Rating Scale (ADRS) which includes behavioral symptoms of depression.

Participants and Methods: The study included 8 patients hospitalized during the subacute stage after stroke at the University Rehabilitation Institute, Republic of Slovenia. The speech-language therapist diagnosed the presence of aphasia using the Frechay Aphasia Screening Test (FAST) in all 8 patients. Members of the rehabilitation team who were in daily contact with the patients (nurse, occupational therapist and physiotherapist) received a short education about depression prior to the study. After working with the patient for 3 or 4 weeks each rehabilitation team member completed the ADRS for their assigned patient.

Results: As physiotherapists and occupational therapist were not able to assess the patients in regard to 3 of 9 originally included behavioral signs of depression (insomnia, gastrointestinal signs and weight loss) the scale score had to be modified and therefore included only the remaining 6 items for further comparisons between team members. Using this narrowed screening test, we found that the assessments between different professions showed no correlation, while also showing a high variation for each individual patient.

Conclusion: The low consistency of ratings between rehabilitation team members, who are in daily contact with patients, emphasizes the difficulty in detection of various behavioral depression symptoms between different professional profiles and also the necessity for further adaptation of the ADRS scale when it is being used by different members of the rehabilitation team.

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Keywords: aphasia, depression, assessment

M. GIL PAGÉS, A. GARCÍA ROSAS, A. ENSEÑAT CANTALLOPS, A. GARCÍA MOLINA.
Cognitive recovery after stroke: Gender matters.

Objective: To establish any potential relationships between demographic factors and the rate of cognitive recovery among a cohort of stroke patients. We aimed to explore how age, gender, education and type of stroke influence cognitive performance throughout two different stages of stroke recovery: post-acute stage (< 6 months after stroke) and chronic stage.

Participants & Methods: This is a retrospective observational study. Medical records of former stroke patients from Neurorehabilitation Hospital Institut Guttmann with a mean time of evolution of 24 months were studied. Patients with aphasia were excluded. Thirty-four adult patients (women= 15) diagnosed with moderate to severe stroke (hemorrhagic=17; ischemic=17) were recruited. All patients underwent neuropsychological assessment at 2 months (admission), 6 months (discharge) and 24 months (recruitment) after stroke. Battery tests included 3 cognitive factors identified by confirmatory factorial analysis: Attention, Memory and Executive Functions. Change in cognitive domains was obtained calculating the difference of grades in cognitive factors between admission and discharge and between discharge and recruitment.

Results: We found significant differences between men and women when comparing their Attention factor ($p=0.03$, $d=0.8$) between admission and discharge. In contrast, this difference was not found between the time points of discharge and recruitment ($p>0.05$). We did not find any other significant differences based on demographics neither in Memory nor in Executive Functions factors.

Conclusions: Our results suggest that gender influences cognitive recovery after stroke. In this cohort, women showed less improvement in attention than men during post-acute stage of evolution. These results should be considered when planning post-acute rehabilitations programs.

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Keywords: stroke recovery, cognitive rehabilitation, treatment outcome

N. VARAKO, M. KOVYAZINA, E. RASSKAZOVA, A. MIRONCHOOK, J. ZUEVA. The effectiveness of the visual-spatial search in patients with unilateral spatial neglect.

Objective: The problem of measuring Unilateral Spatial Neglect (USN) concerns different results that are obtained in various tests. This study assumes that the effectiveness of the visual-spatial search varies depending on the purpose of the action (or task).

Participants and Methods: The study includes 2 groups of participants with right hemisphere lesions (6 female, 28-80y.o, m-62y.o.). Experimental group: 5 patients with USN, control group: 5 patients without USN. All participants were asked to complete 3 tasks (conditions). There were 24 cardboard parts with letters (like puzzles) that can be connected with each other. Patients were asked to 1) flip all puzzles (condition 1); 2) connect them together (condition 2); 3) make a phrase (condition 3). Number of omissions and active goal-directed actions were measured.

Results: Only experimental group had difficulties within these tasks. All types of omissions were highly related to each other. According to Mann-Whitney test, the patients with USN had significantly more omissions in condition 1 and 2 compared to the amount of omissions in condition 3 ($p<.05$). Quantity of active goal-directed actions did not differ in experimental and control groups but increased from condition 1 to condition 3 ($p<.05$). There were no significant differences in the number of omissions between three conditions, but the number of omissions was related to the number of goal-directed actions ($p<.05$).

Conclusions: In experimental group the number of goal-directed actions increases from condition 1 to condition 3. This might cause the decrease in number of omissions in visual-spatial search. Patients completed the third task more successfully because they used the visual-spatial search as an operation in the composition of the phrase.

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Keywords: Neuropsychology, Neglect

V. CONTRERAS, S. DANSILIO. Quantitative and qualitative evaluation of visuoconstructive skills. Comparison between a multiple figures protocol and Rey-Osterrieth complex figure test.

Objectives: To evaluate quantitatively and qualitatively a reduced version of Mendilaharsu et al's protocol (RVMP) in a sample of cognitive impaired adult subjects. Compare the RVMP with the of Rey-Osterrieth complex figure (ROCF).

Participants and methods: This is a pilot study. Test of 56 patients evaluated in the Neuropsychology Service of Clinicas Hospital, with an exhaustive neuropsychological assesment, from minor to major cognitive impairment, but Mini-Mental State Examination (MMSE) above 20, were evaluated. RVMP were qualitatively evaluated and tabulated dicotomously ("normal"/"abnormal") considering topological relationships, internal coordination, perspective reproduction, size and completion of details. A scoring system designed for the work was applied to these dimensions (score: 0-94). This test was compared with the ROCF copy.

Results: Sample characteristics: 30 women/26 men; mean age 56 years (20-83); mean of 9 years of education and 26.6 MMSE's score. RVMP: 34% were qualitatively normal and 66% abnormal, with a mean score of 74,5 and 66, respectively. Sample mean was 69, maximum score 88; a patient with this value was qualitatively classified as abnormal. There was a correlation between RVMP and ROCF scores. There were cases with ROCF above the 50th percentile and alterations in RVMP, in perspective or neatness on a simple cube. No significant correlation was found between education or age and copy scores in either of the two tests. There was an statistically significant association between MMSE and ROCF scores.

Conclusions: The qualitative evaluation of RVPM provides relevant information that cannot be substituted by sole quantitative assessment. We found a relation between the RVMP and ROCF performance but there are parameters of the tasks that are not contemplated reciprocally (e.g.: perspective). Thus, the use of both tests is considered complementary.

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Keywords: visuoconstruction

H. THIELEN, C. LAFOSSE, C. R. GILLEBERT. Post-stroke sensory sensitivity reduces quality of life: exploratory data.

Objective: Subjective (i.e. self-reported) sensory sensitivity is increased in up to 67% of mild traumatic brain injury patients (Stelmack et al., 2009). These symptoms have a significant impact on daily activities and are associated with poor functional recovery (Landon et al., 2012). Although stroke patients report similar sensory sensitivity symptoms, post-stroke changes in sensory sensitivity have, so far, received little scientific attention. Therefore, the prevalence of post-stroke atypical subjective sensory sensitivity and its impact on daily life remain unclear.

Participants and Methods: We assessed subjective sensory sensitivity and its impact on activities of daily life in 10 stroke survivors. Due to the absence of standardized measures to assess sensory sensitivity in the acquired brain injury population we used a self-developed questionnaire that was adapted to the stroke

population to measure subjective sensory sensitivity across multiple sensory modalities. To determine a cut-off value that constitutes *atypically high subjective sensory sensitivity* we acquired data in 19 neurotypical individuals. Additionally, we conducted a structured interview to evaluate the impact on daily activities of atypical sensory sensitivity symptoms. Lastly, to assess cognition we used the Dutch version of the Oxford Cognitive Screen (Huygelier et al., 2019).

Results: Four stroke patients reported sensory hypersensitivity across several modalities while one patient experienced modality-specific sensory hypersensitivity. Each of the stroke patients with atypically high subjective sensory sensitivity reported that these symptoms had a significant impact on their daily life: e.g. reduced social functioning, impaired ability to carry out leisure activities and reduced physical and/or mental health.

Conclusions: Our results suggest that post-stroke atypical subjective sensory sensitivity is clinically relevant and can reduce quality of life across multiple life domains.

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Keywords: Stroke, Sensory sensitivity

A. S. CHAMPOD, L. SMITH, F. COMEAU, B. FOUGERE, C. MACPHEE, J. FERGUSON, G. ESKES. Behavioral and Electroencephalographic Effects of Prism Adaptation in Young Adults and Children.

Objective: Spatial neglect is a common attentional disorder across the lifespan after stroke. Prism adaptation (PA) is a promising treatment for neglect but some studies have yielded mixed results. The present studies investigated PA effects induced by a new PA procedure (Peg-the-Mole; PTM) in a group of young adults and in a preliminary group of children. A possible neuromechanism (P300 wave) for the development of PA after-effects was examined.

Participants and Methods: Forty-two healthy young adults used PTM with 5-degree or 15-degree goggles (Study 1). Fourteen children used PTM with 15-degree goggles (Study 2). All participants alternated between wearing prism and sham goggles to allow for repeated adaptation. Proprioceptive and visual pointing straight ahead tasks were used before and after PTM to measure after-effects. The parietal P300 amplitudes elicited following the sound initiating pointing movements were examined in each condition.

Results: The use of PTM with 15-degree goggles induced after-effects on the proprioceptive and visual outcome tasks in adults and children ($p < 0.05$). In adults, the magnitude of after-effects was larger in the 15-degree than in the 5-degree condition ($p < 0.05$). Overall, a P300 response was generated in adults and children, with larger amplitudes for prism than sham blocks ($p < 0.05$). In adults, trends for the 15-degree goggles inducing larger P300 amplitudes than the 5-degree goggles were noted at electrodes P7 and P8.

Conclusions: After-effects were observed in both studies, suggesting that PTM may be a PA treatment that could be used across the lifespan. In adults, the study confirmed that prism power can alter the magnitude of after-effects suggesting that this protocol can be used to study the development of after-effects of different magnitudes. A P300 wave was observed during the use of PTM in both adults and children, suggesting that it could reflect a neuromechanism underlying the development of PA after-effects.

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Keywords: Prism Adaptation, Spatial Neglect, EEG

A. MAŃKOWSKA, K. M. HEILMAN, B. BIEDUNKIEWICZ, A. DEBSKA-SŁIZIEŃ, M. HARCIAREK. Leftward attentional bias in patients with end-stage renal disease – the effect of uremic toxicity or dialysis?

Objectives: Patients with end-stage renal disease (ESRD) receiving dialysis typically present with cognitive impairment that includes problems allocating spatial attention. Namely, we have recently shown that this group of individuals, when performing a line bisection task, has a significantly greater leftward spatial bias than demographically matched healthy controls. Nonetheless, it is not clear if this leftward bias is primarily an effect of the disease-related neurotoxicity, dialysis that specifically contribute to these patients cerebrovascular changes, or both. Thus, the aim of this study was to test these hypotheses.

Methods: Twenty-three healthy individuals were compared against 21 demographically matched dialyzed patients with ESRD as well as 15 non-demented preemptive patients with ESRD that at the time of testing were shortly before the initiation of dialysis or awaiting kidney transplant. The allocation of spatial attention was assessed using a horizontal line bisection test.

Results: The analyses revealed that, in general, all participants had a leftward bias while performing a line bisection test. However, although in comparison to healthy controls dialyzed and preemptive patients presented with a significantly greater leftward bias, there was no difference in the ability to allocate spatial attention between preemptive and dialyzed patients.

Conclusions: The results of this study confirm that patients with ESRD have a defective ability to correctly allocate their spatial attention. Although the exact reason for this phenomenon remains unclear, this research provides evidence that the enhanced leftward attentional bias seen in individuals receiving dialysis may primarily result from the uremic intoxication. However, future imaging as well as biochemical studies are needed to better understand the neuronal mechanism(s) underlying this increased leftward attentional spatial bias seen among patients with ESRD.

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Keywords: Chronic Kidney Disease, Visuo-spatial Attention, Dialysis

J. D. PERKINS, B. BABU, N. AKHTAR, A. OWN, S. KAMRAN, A. SHUAIB. Post Traumatic Stress Symptoms in Newly Admitted Stroke Patients.

Objective: Few studies have assessed bedside trauma symptoms in newly admitted stroke patients. In addition, pre-stroke psychology and other risk factors associated with post-stroke PTSD have rarely been reported. The aims of this study were to record the incidence and risk factors associated with PTSD symptoms in stroke patients at a maximum one-week post-admission.

Participants and Methods: 295 stroke patients were assessed for PTSD symptoms using the PCL-5 as part of routine post-stroke psychological evaluation. After excluding stroke mimics, patients with aphasia, non-strokes and patients seen after 7-days, 197 patients were included for further analysis. Medical, demographic and MRI data were recorded. Data were explored using mean, standard deviation, Pearson's correlation, and binary logistic regression.

Results: Mean age was 48.8 years (SD, 11.8) with 82.1% male. 42.9% presented with 2+ symptoms, 19.9% 3+ and 9.2% 4+. The most common symptoms were avoidance (52.0%), guilt (31.6%), arousal (27.0%), cognitive shifts (20.9%), and intrusion (18.9%). NIHSS scores correlated with PTSD symptoms ($r(194) = .81$, $p = .008$). Logistic regression showed previous trauma (OR 2.94, CI 1.39–6.23, $p=0.005$), left-sided strokes (OR 2.11, CI 1.00–4.46, $p=0.05$), NIHSS (OR 1.09, CI 1.02–1.16, $p=0.09$), previous anxiety (OR 3.67, CI 1.00–4.46, $p=0.05$) and depression (OR 3.81, CI 1.24–11.75, $p=0.05$), predicted 3+ PTSD symptoms.

Conclusions: Trauma signs are common in stroke patients. Pre-stroke mental health and previous trauma are prominent predictors of PTSD symptoms. Left-sided strokes increase the likelihood of PTSD symptoms, which is coherent with studies on left amygdala involvement in anxiety responses. The probability of PTSD symptoms also depends on stroke severity. It is recommended that stroke patients have psychological history taken, are screened for PTSD symptoms, and treated where appropriate to reduce the mental health burden of stroke and optimize patient recovery.

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Keywords: Cerebrovascular, Stroke, PTSD

D. P. J. VERBERNE, J. P. L. SLENDERS, J. M. A. VISSER-MEILY, R. M. VAN DEN BERG-VOS, V. I. H. KWA, C. M. VAN HEUGTEN. Early cognitive and emotional outcome after stroke is independent of discharge destination.

Objective: Cognitive and emotional problems occur frequently after stroke. Patients with minor stroke are more likely to be discharged home, with limited follow-up care. In this study, we examined the early cognitive and emotional outcomes in patients discharged home after stroke, compared to those discharged to inpatient rehabilitation. Additionally, we examined the effect of early cognitive and emotional outcomes on long-term participation.

Participants and methods: This multicenter prospective longitudinal cohort study included patients with stroke. The cohort was divided into patients discharged home after hospital stay, and those discharged to inpatient rehabilitation. Cognitive and emotional outcomes were assessed two months after stroke and long-term participation was assessed one year after stroke.

Results: This study included 332 patients, of whom 243 (73%) were discharged home and 89 (27%) to inpatient rehabilitation. Prevalence of anxiety symptoms and cognitive problems did not differ significantly between groups at two months after stroke, while depressive symptoms were significantly more frequent in patients who had inpatient rehabilitation. In patients discharged home, cognitive complaints showed to be predictive of long-term participation ($B=-2.03$; 95%CI = $-3.15,-0.90$) when controlled for demographic and stroke-related information. In patients discharged to inpatient rehabilitation, none of the cognitive or emotional outcomes were predictive of long-term participation.

Conclusions: Cognitive and emotional problems at two months after stroke were comparable between patients discharged home and those discharged to inpatient rehabilitation. Moreover, cognitive complaints were predictive of long-term participation in patients discharged home. These results justify screening and treatment for cognitive and emotional problems in the early phase after stroke, including for patients with minor stroke who are discharged home.

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Keywords: Stroke, Cognitive functioning, Anxiety

M. J. E. VAN ZANDVOORT, A. R. SMITS, A. DE GROOT, E. H. F. DE HAAN. A Case of Pure Associative Visual Agnosia.

Objective: Visual agnosia has first been described by Lissauer who made a distinction between apperceptive and associative visual agnosia. In which visual recognition follows from two stages I apperception: conscious awareness of sensory impression, and II association: in which simultaneous activation of object related concepts give rise to recognition. We present a case with left occipital and right temporal brain damage due to brain metastases presenting with associative visual agnosia, pure alexia, prosopagnosia and achromatopsia. We set out to evaluate the contribution of visual features (color, form, movement, orientation and texture) in both hemifields separately to assess the contribution of lateralized distinct disturbances in visual features.

Participants: Our case concerns a 72-year old male who presents with the sudden experience of inability to recognize faces, objects and visual orientation problems. MRI-scanning demonstrated a left occipital and right temporal brain metastases from a primary lung cancer (26 years ago).

Methods: Next to visual field examination, standard neuropsychological tasks and clinical observation (video-taped). We used a new diagnostic set-up with a gaze-contingent presentation for separate hemifield-testing of selective visual features: color, orientation, correlated motion, and texture.

Results: Visual field examination demonstrated a right upper quadrantanopsia, partial lower right quadrantanopsia and relatively spared left visual field. Color, form, correlated movement and orientation all showed severe deficits in the right field with relatively spared perception in the left field, for texture the opposite pattern was found. Moreover, in the right visual field signs of blindsight were present.

Conclusions: Separate hemifield-testing of selective visual features can help to better understand the role of higher order visual deficits such as associative visual agnosia and blindsight, including the ventral/dorsal dichotomy.

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Keywords: Visual Agnosia, visuospatial functions, prosopagnosia

N. S. VAN DEN BERG, E. H. F. DE HAAN, R. B. HUITEMA, J. M. SPIKMAN. The Neural Underpinnings of Facial Emotion Recognition in Ischemic Stroke Patients.

Objective: Impairments in facial emotion recognition occur frequently after stroke, with adverse socio-behavioral consequences. However, there can be many inter-individual differences. The aim of this study was to investigate the neural underpinnings of overall emotion recognition and of the distinct basic emotions (anger, disgust, fear, happiness, sadness and surprise), in a large group of ischemic stroke patients.

Participants and Methods: A group of 118 ischemic stroke patients and 162 matched healthy controls (HC's) were included. Emotion recognition was assessed with the Ekman 60 Faces Test of the Facial Expressions of Emotions – Stimuli and Test (FEEST) and whole brain voxel-based lesion symptom mapping (VLSM) on 3-Tesla MRI-images of all patients was performed.

Results: Patients were significantly worse than HC's on the overall recognition of emotional expressions, particularly of disgust, fear and sadness. VLSM showed significant lesion-behavior associations for FEEST-total in mainly the right fronto-temporal region (insula, caudate nucleus, the lenticular nucleus, putamen, middle frontal gyrus, inferior frontal gyrus, rolandic operculum and the middle and superior temporal gyrus). Additionally, VLSM for the distinct emotions showed, apart from overlapping brain regions (rolandic operculum, insula and caudate nucleus) separable regions, uniquely related to a specific emotion, i.e. Anger: middle and superior temporal gyrus, heschl gyrus and middle occipital gyrus; Disgust: putamen; Happiness: superior corona radiate white matter tract and middle frontal gyrus.

Conclusions: Our results provide insight in the neural underpinnings of emotion recognition in ischemic stroke patients. Emotion recognition as such was depending on a general network in fronto-temporal regions, while distinct locations were related to specific emotions. These findings help in understanding how deficits in specific basic emotions can be related to particular behavioral disturbances.

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Keywords: Emotion Recognition, Stroke, Voxel-based Lesion Symptom Mapping

V. BUGARSKI IGNJATOVIĆ, M. SEMNIC, Ž. NIKOLAŠEVIĆ, T. VUJANIĆ STANKOV, A. KOVAČ. Wisconsin card sorting test and acute phase of ischemic stroke.

Objective: Cognitive functions and, in particular, executive function (EF), are commonly affected after ischemic stroke. Stroke cognitive outcomes can be improved if EF deficits are identified on time. Objective of this study was to assess EF in acute phase of ischemic stroke using Wisconsin Card Sorting Test (WCST), which comprises of measurement of strategic planning, organised searching, directing behavior toward achieving a goal and modulating impulsive responding.

Participants and Methods: The study included a total of 80 subjects divided in two groups: 40 hospitalised patients in the acute phase of ischemic stroke and 40 healthy subjects with no history of neurological disease. Both groups were age, sex and educationally matched. Patients had mild ischaemic stroke based upon National Institute Health Stroke Scale (NIHSS). The eight WCST scores were used to measure of EF: number of categories achieved (NCA), perseverative responses (PR) and errors (PE), nonperseverative errors (NPE), correct (CA) and incorrect answers (IA), failure to maintain set (FMS) and conceptual level response (CLR). The significance of differences between the patients with acute ischemic stroke and healthy controls in WCST scores was analyzed using Student's t-test for independent samples.

Results: It was found that the groups significantly differ in all assessed WCST scores (NCA, $p < 0.001$; PE, $p < 0.05$; NPE, $p < 0.01$; PR, $p < 0.01$; FMS, $p < 0.05$; CLR, $p < 0.001$; CA, $p < 0.01$; IA, $p < 0.01$), where acute ischemic stroke group showed poorer performance than the healthy group.

Conclusions: EF deficit can be identified already in acute phase of ischemic stroke by using WCST as traditional neuropsychological instrument. Even though patients suffered from mild stroke, EF are significantly impaired. Therefore, much greater consequences are evident in mild stroke phase aside to motor and sensory impairment, like strategic planning, organised searching or modulating impulsive responding.

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Keywords: executive function, acute ischemic stroke, Wisconsin Card Sorting Test

S. BASAGLIA-PAPPAS, A.-L. DUSSOL, A. PEILLON, I. SIMOES LOUREIRO, L. LEFEBVRE. Lexical processing impairment in people with post-stroke aphasia: between verbal and initiation impairment.

Objective: Lexical processing is often decreased in patients with post-stroke aphasia. Verbal fluency tasks are widely used in clinic to investigate this disorder. However, these tests involve language but also executive functions (Henry & Crawford, 2004), such as flexibility, inhibition and energization, that is the process of initiation (Stuss & Alexander, 2007; Stuss, 2008, 2011). In this study, we aimed to investigate the contribution of design fluency in lexical assessment in order to study frontal lobe involvement, and more particularly initiation, in anomic aphasia.

Participants and Methods: We recruited nine right-handed participants with anomic aphasia due to a left-hemisphere lesion. Participants underwent a verbal (semantic, phonemic, grammatical) (GRÉMOTs battery) and design (Five-Point Test) fluency assessment, and a confrontation naming task (BETL battery).

Results: Results were analyzed qualitatively, using reference norms of the tests. Four participants, who showed a verbal fluency deficit (the fifth percentile or below for the three tasks) and preserved scores in confrontation naming test (above the fifth percentile), presented impaired results in design fluency task (the fifth percentile or below). In contrast, two patients, who showed a preservation of verbal fluency (for the three tasks) but a naming impairment, scored successfully in design fluency. Three participants presented a verbal fluency and a confrontation naming deficit, as well as a design fluency impairment.

Conclusions: Our results suggest that initiation processing is prominent in design fluency tasks but also in verbal fluency tests: when one task is decreased, the other one is also decreased. A design fluency task can provide additional information in a neuropsychological assessment: a loss of energization, that is a delayed initiation, may underlie a lexical evocation disorder.

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Keywords: anomic aphasia, frontal lobes, energization

J. HEIKKILÄ, K. TIIPANA, O. LOBERG, P. LEPPÄNEN. Neural processing of congruent and incongruent audiovisual syllables in children with specific language impairment (SLI).

Objective: Children with specific language impairment (SLI) rely less on audiovisual and visual aspects of speech than typically developing (TD) children. Previous studies show that the McGurk effect is weaker in children with SLI than their typically developing peers, suggesting differences in audiovisual speech integration. In adults, an incongruent audiovisual syllable (McGurk stimulus) activates an auditory change-detection response even without changes in the auditory stimulus. In children with SLI, neural processing of congruent and incongruent audiovisual syllables has not been studied before.

Participants and methods: The brain responses for congruent and incongruent audiovisual syllables were investigated in 14 children with SLI (mean age 9;4 years) and 18 TD children (mean age 9;1 years) using ERPs and eye-tracking method. An oddball paradigm with congruent audiovisual /mi/ as the standard stimuli and congruent audiovisual /ni/ and incongruent A/mi/V/ni/ (McGurk stimulus) as the deviant stimuli was used in this study.

Results: The change detection response for the congruent audiovisual deviant syllables was more positive in TD children than in children with SLI at frontal and central areas at the time window of 210-317 ms. The change detection response for the deviant incongruent syllables was more negative in TD children than in children with SLI at central and occipital areas at the time window of 243-313 ms.

Conclusion: The results of this study show that there are differences in the neural processing of congruent and incongruent audiovisual speech in children with SLI compared to their typically developing peers. This may reflect an impairment in the ability to process visual speech cues in SLI.

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Keywords: specific language impairment, speech processing, event-related potentials

A. SMITS, E. VAN GRINSVEN, C. DIJKERMAN, J. KAPPELLE, E. DE HAAN, M. VAN ZANDVOORT. Optic ataxia: evidence from a large stroke cohort.

Objective: Optic ataxia refers to a deficit in visually guided reaching that is not caused by primary motor weakness or sensory loss. It involves damage to parieto-occipital regions and can be observed after bilateral and unilateral damage. In unilateral cases, specific errors have been described for the contralesional hand (hand effect) and visual field (field effect). The critical neural correlates and underlying mechanisms are still under debate. Misreaching is most evident in peripheral vision, though the mechanisms behind this apparent central sparing are unclear. Here, we systematically address the pattern of reaching errors and investigate how central the visual modality is to optic ataxia.

Methods: For optic ataxia, a paradigm was developed in which we manipulated target eccentricity, hand used and target modality (visual/proprioceptive). Spatial perception was assessed using a gaze-contingent presentation for separate hemifield-testing of location, orientation and correlated motion. Each patient completed the experimental tests, a cancellation test (Bells Test), and a visuoconstruction test (CFR). 120 patients who suffered from ischemic stroke within the last 3 months participated and 25 matched controls were included.

Results: Results indicated that the paradigm for optic ataxia is sensitive to individual differences in reach-to-grasp performance and is able to discriminate hand and field effects. Furthermore, in several patients a dissociation was found based on target modality. The association between optic ataxia and impairments in spatial perception, visuoconstruction, and spatial attention is described and a multi-dimensional model is suggested.

Conclusion: We developed a standardized paradigm to screen for optic ataxia. The distribution of errors across space, hand and target modality, can help to clarify the underlying nature of misreaching in a specific patient and contributes to models of optic ataxia and the functional organization of reaching.

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Keywords: optic ataxia, stroke, visuospatial functions

Poster Session 07: Categories- Epilepsy; Movement Disorders; MS

11:00 AM - 5:00 PM

N. CASSIMJEE, R. VAN COLLER, D. MAREE. Performance on the Dementia Rating Scale-2 and deep brain stimulation screening in a South African cohort with Parkinson's disease.

Objective: To determine socio-demographic, cognitive and psychiatric correlates of global cognitive functioning on the Dementia Rating Scale-2 (DRS-2) in a South African cohort with Parkinson's disease presenting for deep brain stimulation (DBS) screening.

Participants and Methods: The DRS-2 total score range provides an interpretive guideline for establishing DBS suitability. Motor and non-motor factors have the potential to influence estimation of cognitive status. A retrospective review was conducted on data, collected during 2013 – 2019. The review included socio-demographic (age, education & gender), cognitive (DRS-2 scores) and psychiatric profiles (Beck Depression & Anxiety Inventories). Incomplete records and patient's with atypical Parkinsonism were excluded and 132 protocols were analysed using Pearson correlation, independent group t-tests and simultaneous multiple regression.

Results: Mean age was 65.82 (SD = 5.96), mean education was 13.66 (SD = 2.58), with 61% male and 39% female. Except for CONST, all subscales, several subscale tasks and education contributed significantly to Total score. The I/P subscale ($r = .808$, $p = .000$) and fluency ($r = .767$, $p = .000$) showed the highest correlations with Total score. Depression was a significant correlate of DRS-2 total, I/P, MEM and fluency scores. Regression indicated that IP and MEM scores were the foremost predictors of variance in Total score. There were gender differences in education and on CONST and CONCEPT subscales.

Conclusions: Fluency and the I/P subscale were significant contributors to estimation of overall cognitive functioning. Depression and education level were associated with these cognitive indicators. Limited research is available on the use of the DRS-2 as a screening measure for DBS candidacy determination in a South African context. Understanding the multiple factors influencing estimation of cognitive status on the DRS-2 is an essential component in the DBS patient selection process.

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A. OLEJNIK, A. BALA, A. RYSZ, A. MARCHEL. Temporal lobe epilepsy and executive functions – the profile of patients functioning and analysis of clinical variables impact.

Objective: Epilepsy is one of the most common neurological diseases affecting all spheres of patients' lives, including their cognitive functioning. Previous research, due to the location of epileptic foci, most often focused on patients' deficits in the memory and language functions. In recent years, the level of executive functions in patients with TLE has been also examined, taking into account the impact of epilepsy on the entire brain network, which was also the purpose of this study.

Participants and Methods: Twenty-five patients with TLE and 25 matched healthy control subjects were examined with a battery of neuropsychological tests to screen general cognitive status (MoCA) and executive function (CTT, ToL, VST, WCST).

Results: Compared with controls, TLE patients exhibited significantly lower scores in the MoCA test ($p = 0.000$) and needed significantly more time ($p = 0.000$) in the second part of CTT. Additionally, the significant differences were also found in ToL test: total correct ($p = 0.004$), additional moves ($p = 0.038$), execution time ($p = 0.001$), problem-solving time ($p = 0.003$) and on almost all WCST scores, among others: error responses ($p = 0.003$), conceptual level responses ($p = 0.000$), categories completed ($p = 0.007$), perseverative responses ($p = 0.004$), perseverative errors ($p = 0.009$). In contrast, neither lateralisation of epileptogenic zone nor the average number of seizures had clear effects on tests results.

Conclusions: Patients with TLE exhibit wide ranges of executive function deficits. The obtained results constitute a significant enrichment of knowledge concerning the specificity of functioning of this group of patients.

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Keywords: epilepsy, executive functions

R. DEI, N. LEVY, O. ELKANA. Does Memory Assessment Can Detect Lateralization and Localization in Temporal with Extra Temporal Lobe Epilepsy?

Objective: Neuropsychological assessments evaluate cognitive abilities which assist in the lateralization and localization of the epileptogenic focus in pre-surgical patients with intractable focal epilepsy. It is well accepted that the pathophysiological borders of the mesial temporal structures are involved in memory decline in pre-surgical epilepsy patients. However, evidences suggest the involvement of a larger network in memory function, that is not solely restricted to the mesial temporal structures. The current study examine whether memory decline can be detected when the pathology involves diffuse lateral temporal with extra-temporal (TLE+) regions or restricted to the mesial temporal structures (mTLE).

Participants and method: Memory functions were examined in 58 pre-surgical intractable TLE+ patients (R TLE: 23/ L TLE: 35) and in a subgroup of 23 patients with mTLE (R mTLE:10/ L mTLE:13). All patients undergo the Rey Auditory Verbal Learning Test (RVLT) that measured verbal learning and memory and the Rey Complex Figure (RCFT) and Diagnosticum für Cerebralschädigung (DCS-R) that measured non-verbal learning and memory.

Results: Impaired visuo-spatial memory performances were found in right TLE+ patients compare to left TLE+ patients ($0.14 < h^2 < 0.36$). Impaired verbal memory function was restricted to the left mTLE patients compared to right mTLE patients ($1.12 < \text{cohen's } d < 1.3$). Impaired DCS-R learning and memory performances, but not RCFT performances, differentiated right mTLE from left mTLE patients ($1.32 < \text{cohen's } d < 1.36$).

Conclusions: Both RCFT and DCS-R assist in lateralization of the epileptogenic focus in patients with TLE+, as oppose to the RVLT which was only sensitive to damage in the left mesial structures. The DCS-R was sensitive to damage in the right mesial structures.

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Keywords: Epilepsy, Neuropsychological assessments, Memory

A. N. SEUBERT-RAVELO, MA G. YÁÑEZ-TÉLLEZ, G. A. NERI-NANI. Variables associated to PD-MCI in early-onset Parkinson´s disease.

Objective: Although a lower rate of dementia is reported in early-onset Parkinson´s disease (EOPD; onset < age 50), Mild Cognitive Impairment (MCI) presents in a similar frequency to late-onset PD (LOPD). Consistent predictors of MCI in LOPD include older age at assessment and at disease onset, more severe motor symptoms and lower education. Variables that increase the risk of MCI in EOPD are not reported. Our aim was to explore the effects of such variables, as well as previous TBI and premorbid intelligence on the likelihood that EOPD patients receive a MCI diagnosis.

Participants and Methods. 135 EOPD participants were assessed to determine cognitive status (normal vs. PD-MCI) using international Movement Disorder Society MCI diagnostic criteria for PD. WAIS III Vocabulary subtest was used as a premorbid intelligence estimate. A binomial logistic regression was performed to ascertain the effects of age, age at PD onset, years disease progression, severity of motor symptoms, previous TBI and premorbid intelligence on the likelihood that participants received a MCI diagnosis.

Results: Participants' age at assessment $M=53$, age at diagnosis $M=40$, and years of disease progression $M=12.6$. The logistic regression model was statistically significant, $\chi^2(6) = 13.87$, $p < .05$. The model explained 13.4% of the variance in cognitive status. However, of the six predictor variables only premorbid intelligence was significant. Higher premorbid intelligence was associated with a reduction in the likelihood of presenting MCI.

Conclusions: Variables consistently associated to cognitive status in LOPD were not independent predictors of MCI in our EOPD sample, which suggest different underlying factors of MCI in EOPD. Only premorbid intelligence was a significant predictor of cognitive status, probably due to its association to cognitive reserve, with higher premorbid intelligence exercising at least a small protecting effect. Funding UNAM-PAPIIT IA301520

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Keywords: early-onset Parkinson's disease, mild cognitive impairment

M. DECKERT, M. SCHMOEGER, K. ZEBENHOLZER, C. SCHMIED, B. KORNEK, E. ARNDORFER, P. REZWANPANAH-POSHTEH, T. SCHNEIDER, C. PELZER, L. WOGROLLY, E. AUFF, U. WILLINGER. Long-term personality changes and memory functions in Multiple Sclerosis.

Certain personality traits in MS can be predicted by cognitive functions (Benedict et al., 2001). This study investigated long-term changes in personality and their association with memory functions, which are also seemingly impaired in less severe stages of MS (Pitteri et al., 2019).

60 MS-patients (age=21-65 years, $M=38$, $SD=10$; 60% female; Median-EDSS=1.5; mean disease duration=10y, $SD=10.5$; MS-type: 55 RR, 5 SP) conducted verbal learning (VLMT; Helmstädter et al., 2001), visual working memory (WM; Block Tapping, WMS-R; Härting et al, 2000), verbal WM (Letter-number sequencing, WIE; von Aster, 2006), incidental learning/information processing speed tasks (SDMT; Smith, 1973), and the IOWA personality questionnaire (Barrash et al., 2010) to address subjective long-term changes (since before the disease until baseline).

Cluster analysis yielded patients with stable personalities ($N=40$; EDSS-Mean=1.7; 38 RR, 2 SP) with minor changes, and patients with disadvantageous long-term personality changes ($N=15$; EDSS-Mean=2.7; 12 RR, 3 SP) with larger changes in motivation and emotion, distress, irritability, and executive functions but less in social behavior (classification accuracy=96%). The disadvantageous change group showed worse VLMT interference-competence ($F(1,53)=9.38, p=.003$), visual WM ($F(1,53)=4.86, p=.032$), verbal WM ($F(1,53)=6.30, p=.015$), and incidental learning performance ($F(1,53)=9.94, p=.003$) than stable patients.

This study adds new knowledge regarding the association between personality change and cognitive functions in MS; and implies the necessity of identifying more specific subgroups of MS, at least with respect to cognitive (see also Pitteri et al., 2019), behavioral, and emotional changes. Patients with long-term disadvantageous personality changes show weaker performances in visual and verbal working memory, incidental learning and information processing speed, as well as in learning new information that interferes with previously learned contents.

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Keywords: Multiple Sclerosis, Memory function, Personality Change

W. A. SCHRAEGLE, R. C. DELEON, N. L. NUSSBAUM. Neuropsychological Phenotypes in Pediatric Temporal Lobe Epilepsy.

Objective: The pattern of performance on neuropsychological measures has been fairly well described in adults with TLE. However, there is considerably less research and more variability in findings with children. Most studies rely on relatively small sample sizes and/or focus on limited domains of neuropsychological functioning. The purpose of the current study was to better characterize neuropsychological phenotypes in a sample of children with TLE.

Participants & Methods: The study included 59 children with TLE (59% male) age 7 to 16 ($M=12.67$; $SD=3.12$) who underwent comprehensive neuropsychological evaluation. Patient results were Z-scored and grouped into cognitive domains (reasoning, language, visuo-perceptual, verbal memory, executive function, and motor function). These factor scores were subjected to Ward's hierarchical clustering method with squared Euclidean distance.

Results: Cluster analysis revealed three distinct cognitive profiles: (1) normal functioning (20% of sample); (2) delayed verbal memory, language, and motor weaknesses (61% of the sample); and (3) global impairment (19% of the sample). Cluster 3 had a longer epilepsy duration and a higher proportion of mesial temporal sclerosis (MTS) compared to Cluster 1 ($p < 0.05$). There were no significant differences among the three cluster groups on demographic characteristics (age, gender, and racial background) or other clinical characteristics (age of onset, seizure frequency, number of current anti-epileptic drugs (AED), failed AEDs, and side of seizure onset).

Conclusions: Children with TLE present with distinct cognitive phenotypes ranging from average performance to global impairment. Results support previous findings that chronic epilepsy creates a cumulative neurobiological burden on the developing brain and provides a preliminary framework for the cognitive factors most vulnerable to the TLE disease process.

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Keywords: pediatric neuropsychology, epilepsy, temporal lobes

M. L. SARNO, K. CRESPO, J. ROOKS, A. MOLES, D. CARNS, C. LUCA, J. MARGOLESKY, D. SHPINER, J. JAGID, B. LEVIN. Neuropsychological Outcomes of Bilateral Subthalamic Nucleus Deep Brain Stimulation in a Multicultural Sample of Parkinson's disease Patients.

Objective: An estimated 20-57% of PD patients experience mild cognitive impairment, and 30-50% of patients experience depression and anxiety. Deep brain stimulation (DBS) surgery is a well-established and efficacious treatment for the motor symptoms of PD, however the literature is mixed regarding DBS outcomes on non-motor symptoms. The aim of this study is to examine pre- and post-surgical changes in cognition, mood, and sleep.

Participants and Methods: Thirty patients (M age = 64.48, $SD= 7.94$; 37% Hispanic) diagnosed with idiopathic PD and treated with DBS, underwent pre- and post-surgical neuropsychological evaluations of cognitive, emotional and sleep functioning. Paired sample t-tests were run to evaluate change in measures from pre- to post-surgery. Pearson's r correlation analyses were run to evaluate whether change scores were associated with demographic, medical, and global cognitive functioning.

Results: After Bonferroni correction for 20 multiple comparisons, there was a statistically significant ($p < .0025$) decline in phonemic fluency ($p = .002$, Cohen's $d = .65$) and improved anxiety symptoms ($p = .001$, $d = .70$). Change in these measures from pre- to post-surgery was not significantly associated with any demographic, medical, or global cognitive functioning. There were no significant changes on any other cognitive measure, depression, or sleep quality.

Conclusions: The safety of DBS from a cognitive and psychiatric perspective has been of clinical concern when judging the therapeutic benefit of DBS in PD. The goal of presurgical evaluation is therefore to assist in the evaluation of cognition and mood in DBS candidates and to help predict which individuals may be at increased risk after DBS. This study provided further evidence that DBS is associated with decreases in phonemic fluency. Our findings also emphasize decreased anxiety following surgery, which has significant implications for adequate patient selection as well as potential improved quality of life.

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Keywords: Parkinson's disease, deep brain stimulation, cognitive

C. A. HONAN, R. VENNETACCI, C. TURNER, H. FRANCIS, K. AHUJA, E. LIM. Is the experience of cognitive fatigue similar across fatiguing illnesses? A comparison of chronic fatigue syndrome, multiple sclerosis and healthy individuals.

Objective: Chronic Fatigue Syndrome (CFS) and Multiple Sclerosis (MS) are characterized by persistent debilitating fatigue. Whether cognitive fatigue is experienced similarly across the conditions however is not known. This study compares the pattern of change in self-reported fatigue and cognitive performance over a single testing session.

Participants and Method: Thirty-three CFS, 51 MS and 37 healthy participants were administered a battery of cognitive tests, which was repeated over a 2.5-hour session. A visual analogue fatigue scale was administered at baseline, and immediately following each battery administration. Fatigue self-efficacy or perceptions of fatigue management was also assessed.

Results: Spatial learning in MS and CFS declined relative to healthy participants, and processing speed ability in CFS declined relative to MS and healthy participants, over the session. In a 14-min sustained attention task, increased commission errors were evident in both CFS and MS participants, whereas increased omission errors and reaction time were evident only in CFS participants. Self-reported fatigue was highest, and increased more rapidly, in CFS participants followed by MS participants. While self-reported fatigue was related to commission errors in MS, it was related to omission errors in CFS participants. Higher self-reported fatigue was related to higher fatigue self-efficacy in CFS, but was related to lower fatigue self-efficacy in MS.

Conclusions: The pattern and experience of fatigue appears to differ in individuals with CFS and MS. The results may inform targeted fatigue treatment/management for these conditions and highlights the need to further investigate the etiology and experience of fatigue, across patient groups.

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Keywords: multiple sclerosis, fatigue, cognitive functioning

A. SIQUIER, P. ANDRÉS. Episodic memory impairment in Parkinson's disease: Disentangling the role of encoding, consolidation and retrieval.

Background: The source of episodic memory impairment in Parkinson's disease is still unclear. Previous research has established that both retrieval and encoding deficits account for memory impairment, but no study has established to what extent.

Objective: In the present study we sought to quantify specifically encoding, consolidation and retrieval process deficits in a list-learning paradigm by a novel method, the item-specific deficit approach (ISDA) to portray the pattern of memory functioning in patients with Parkinson's disease.

Participants and Methods: We applied the ISDA method to the Free and Cued Selective Reminding Test (FCSRT) in a sample of 15 PD patients and 15 cognitively healthy participants.

Results: The results revealed significant differences in free recall performance between PD patients and controls at immediate and delayed recall. They also showed that PD patients benefited from cues as much as controls did. Further, controlling for initial learning removed the group differences in delayed free recall, suggesting initial learning as a factor contributing to group differences in delayed free recall. Finally, using ROC analysis, the ISDA method revealed that both encoding and retrieval memory processes were affected in PD patients.

Conclusions: Our findings suggest that encoding and retrieval processes are affected in PD. Detecting the specific memory component affected may have a clinical value for early identification of different forms of cognitive profiles in PD and could help developing specific interventions for memory deficits in PD.

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Keywords: Parkinson's disease, ISDA method, episodic memory

J. MANA, T. NIKOLAI, F. RŮŽIČKA, A. FEČÍKOVÁ, E. RŮŽIČKA, O. KLEMPÍŘOVÁ, R. JECH, O. BEZDICEK. The longitudinal cognitive trajectory in Deep Brain Stimulation treated Parkinson's Disease patients is predicted by processing speed before surgery.

Objective: Cognitive decline is a serious non-motor sign of Parkinson's Disease (PD). There is a rising interest in understanding the evolution of cognitive impairment in PD patients treated with Deep Brain Stimulation (DBS). In the current study, we aimed at identifying specific cognitive predictors of the cognitive decline rate in PD patients after DBS.

Participants and Methods: A total of 111 patients with a clinical diagnosis of PD (age 58 ± 8 years at baseline, 67 % males) treated with DBS in combination with dopaminergic therapy participated in the study. Patients' cognitive functions were assessed cross-sectionally using a standard battery for PD mild cognitive impairment 0.5 \pm 0.6 years before the DBS surgery and after the DBS surgery, they were followed longitudinally using the Mattis Dementia Rating Scale (DRS-II) every 2 years (0.7–11.5 years). Principle Component Analysis (PCA) with varimax rotation was used to reduce the number of dimensions in neuropsychological data. Hierarchical Linear Models with 89% credible intervals (CI) were used to test a significance of prediction of global cognitive performance by specific cognitive domains identified with PCA controlling for age, gender, and DBS site.

Results: Four cognitive domains (labelled processing speed, episodic memory, verbal working memory, and spatial working memory) were identified with PCA. Mean global cognitive performance was predicted by processing speed (CI = [0.04, 1.15]), and verbal working memory (CI = [0.74, 1.95]). Rate of cognitive decline was predicted by processing speed (CI = [0.31, 0.91]), and episodic memory (CI = [0.002, 0.72]).

Conclusions: Our results indicate that episodic memory and processing speed measures can be used as suitable predictors for the rate of cognitive decline in the longitudinal follow-up of PD-DBS patients.

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Keywords: Parkinson's disease, deep brain stimulation, cognitive screening

J. CALDERÓN VILLALÓN, V. H. GÁLVEZ ZÚÑIGA. Higher-order visual processing in patients with Huntington's disease: an analysis based on neuroimaging techniques.

The Huntington disease (HD) is a neurodegenerative process in which higher-order visual processing (HOVP) is affected in early stages, this domain has two components: a visuospatial component, related with posterior brain areas; and an executive component, related with anterior brain areas. Although, today is unknown which of these components is altered in HD. **Objective:** The aim of this research is to identify and

describe, by neuroimaging techniques as VBM, the neurological basis of the altered HOVP in patients with HD. Method: The sample is composed of 44 participants, 22 with HD in early stages and 22 controls. The MoCA visuospatial/executive subdomain and the Stockings of Cambridge subtest are applied to measure HOVP. Also, all the participants have a structural resonance image T1. Both measures are analyzed by the voxel-based morphometry technique to obtain the correlation between the behavioral data and the gray matter density. Results: There are found significant differences in the HOVP performance between HD participants and controls. Both instruments correlate with posterior areas such as the mid temporal gyrus, the fusiform gyrus, the lingual gyrus, (among others). Nevertheless, there is found a correlation with anterior areas (the premotor area, the anterior cingulate gyrus, and the opercular gyrus). Conclusions: The posterior areas are more related to the visuospatial component, specifically the visual imagery, meanwhile the anterior areas are more associated with motor features and executive attention. These findings mean that both components are altered in the HOVP tasks in HD patients, but the efficiency in this domain is affected mostly by the deterioration of the posterior areas.

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Keywords: neuroimaging; structural, Huntington's disease, visuospatial functions

A. E. HERNÁNDEZ MARTÍNEZ, A. N. SEUBERT RAVELO, D. A. GONZÁLEZ VARGAS.
Non-motor symptoms in Parkinson Disease: association between cognitive status, neuropsychiatric symptoms, impulsivity, quality of life and caregiver burden.

Objective: Non-motor symptoms arising from dopaminergic and non-dopaminergic brain dysfunction are common in Parkinson's disease (PD) and increasing evidence has linked them with decreased quality of life (QoL). Our aim was to evaluate the association between global cognitive status, neuropsychiatric symptoms (NS), impulsivity, QoL and caregiver burden.

Participants and Method: The sample consisted of 21 PD patients. Assessment instruments included: MoCA test, Beck Depression Inventory (BDI), Parkinson's Anxiety Scale (PAS), Personality Assessment Inventory (PAI), Parkinson's Disease Questionnaire (PDQ-39), Zarit Caregiver Burden Inventor and Barratt Impulsiveness Scale (BIS).

Results: MoCA score and dopaminergic medication were not associated with any NS, impulsivity, QoL or caregiver burden. BDI scores were positively correlated with NS: anxiety, psychotic symptoms and stress; as well as with level of impulsivity. Patient's QoL is negatively correlated with NS of depression, anxiety, avoidance behaviors, somatic complaints, psychotic symptoms and stress, and treatment rejection and impulsivity. Finally, caregiver burden correlates positively with patient's depression, anxiety, somatic complaints and stress.

Conclusions: Some studies have reported a negative relationship between depression and cognitive performance (Poletti et al. 2012), however the present study found no association between these variables. We found that distinct NS and behavioral characteristics interact with each other, and that these, rather than cognition, are associated with QoL and caregiver burden. Previous studies consistently recognize depression as a factor significantly associated with the presence of other psychiatric symptoms and as one of the main determinants of the patient's QoL, which is consistent with our results. Therefore, assessment and management of PD non-motor symptoms could significantly impact caregiver wellbeing and patient QoL.

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Keywords: Parkinson's disease

A. E. HERNÁNDEZ MARTÍNEZ, A. N. SEUBERT RAVELO, C. E. MARTÍNEZ CORTÉS. Cognitive performance and neuropsychiatric symptoms in Parkinson Disease: the role of age at disease onset and motor phenotype.

Objective: To determine whether significant differences in cognitive performance and in the frequency of neuropsychiatric symptoms (NS) exist in Parkinson's disease patients depending on 1) age at disease onset: early onset (EOPD; \leq age 50) vs. late onset (LOPD; $>$ age 50) and 2) motor phenotype: tremor dominant/not determined (TD) vs. akinetic-rigid (AR).

Participants and method: 218 patients were assessed. Neuropsychological assessment included 5 domains suggested by the International Movement Disorder Society: attention, executive function, visual-spatial ability, language and memory. Cummings Neuropsychiatric Inventory and BDI were used to assess NS.

Results: As expected, LOPD group was significantly older at assessment; AR group had a higher education mean, thus age/education appropriate norms were used to standardize all scores. Frequency of PD-MCI did not differ depending on age at disease onset or motor phenotype, although certain aspects of the neuropsychological profile did. EOPD group scored significantly lower in Stroop Color and in number of TOL rule violations. Both groups scored below the normal range in the superimposed images task, however, LOPD group had significant lower scores. Regarding motor phenotype, AR group obtained significantly lower scores in the superimposed images task (timed) and in phonological verbal fluency. As to NS, EOPD group had significantly more severe depressive symptoms. The AR group presented a significantly higher frequency of delusions, disinhibition and irritability.

Conclusions: Although overall cognitive status was similar between groups, EOPD patients showed greater disadvantage in specific cognitive tasks. Several studies report greater cognitive alterations in overall and specific domains of cognitive performance in AR compared to other motor phenotypes consistent with some of our findings. A higher frequency of NS was found in AR group which could be link to the worst OFF periods or higher medication doses.

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Keywords: Parkinson's disease

A. R. GIOVAGNOLI, A. PARENTE, G. TALLARITA. The spectrum of social cognition in temporal lobe epilepsy.

Objective: Theory of mind (ToM), the recognition of behaviour in social situations (RBSS), empathy, and sensitivity to moral and conventional rules (SMCR) are major aspects of social cognition (SC). We evaluated adult patients with temporal lobe epilepsy (TLE) aiming to characterize their SC pattern and to explore its determinants.

Participants and Methods: Sixty-two adult patients with TLE were evaluated using neuropsychological tests for ToM, RBSS and SMCR, the Empathy Questionnaire (EQ), and the psychopathology Symptoms Check List 90R (SCL90-R). A series of healthy adults similar to the patients in terms of occupation, income level, age, sex, marital status, and the number of family members constituted the control group.

Results: Multivariate analysis of variance with years of schooling, marital status, type of work and income level as the covariates showed that the patients had lower ToM and RBSS scores than the healthy subjects. Conversely, they had similar SMCR and EQ scores. The patients also had higher scores on the SCL90-R scales. Impaired RBSS was predicted by psychopathological symptoms, income level, schooling, and epilepsy duration; ToM was associated with TLE laterality, seizure frequency and epilepsy duration, and SMCR related to income level and the type of occupation.

Conclusions: In adult patients with TLE, SC shows a non-homogeneous pattern characterized by impaired ToM and RBSS and preserved SMCR and empathy. These aspects seem to depend on the integrity of the temporal lobe, as well as on adequate cultural and socio-economic conditions. This approach may help to clarify the spectrum of SC in patients with TLE and the planning of non-pharmacological interventions.

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Keywords: social cognition, temporal lobe epilepsy, theory of mind

M. A. COENEN, H. EGGINK, J. M. SPIKMAN, M. A. TIJSEN. Cognition in young patients with myoclonus dystonia.

Objective: Myoclonus dystonia (MD) is a form of inherited or idiopathic dystonia (in about 50% of cases associated with a mutation in the ϵ -sarcoglycan gene, SGCE+), characterized by sudden jerks and focal dystonia. In adult MD SGCE+ patients, executive problems (divided attention and working memory) have been found. MD patients with and without a mutation in the SGCE gene obtained lower scores on a semantic fluency task compared to healthy controls. Presence of cognitive deficits in childhood and adolescence is unclear. The present study aims to investigate cognition in young MD patients (SGCE+ and SGCE-).

Participants and methods: Twenty MD patients (age range 5.75-25.42 years, 14 male, 12 SGCE+) underwent a neuropsychological assessment covering tests of intelligence, memory, attention/processing speed, executive functioning, social cognition and language.

Results: Overall patients with MD had average or low average scores compared to normative data. MD SGCE+ patients scored significantly lower on an emotion recognition test than SGCE- patients. In addition, median scores on a planning test were lower in the SGCE+ group but this difference was not significant. The groups did not differ in other tests.

Conclusions: MD patients with a mutation in the SGCE gene had lower scores on a facial emotion recognition test compared to MD patients without such a mutation, which is a surprising and entirely new finding. We did not find executive deficits, found in a previous study on adult MD patients. It might be that these deficits only become apparent later in life (growing into deficit). Social cognition has not been investigated in the previous study, i.e. our finding adds to our knowledge about this complex disorder. Problems in social cognition are known to relate to other psychological problems later in life. Further research needs to investigate additional aspects of social cognition in MD patients and evaluate possible interventions.

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Keywords: movement disorders, social cognition, pediatric neuropsychology

L. B. STROBER. Risk Factors of Unemployment in Multiple Sclerosis (MS): The Role of Disease, Person-Specific Factors, Coping, and Engagement in Health-related Behaviors.

Objective: Rates of unemployment in multiple sclerosis (MS) are high, particularly early on in the illness. Identification of the factors most accountable for individuals leaving the workforce is imperative in hopes of intervening and assisting individuals in staying employed.

Participants & Methods: 254 individuals with MS completed a comprehensive survey of their disease symptoms, person-specific factors (e.g., self-efficacy, personality), coping, and engagement in health-related behaviors. Of the 254, 68 individuals identified themselves as “at risk” for leaving work. Comparisons between those at risk and those not at risk (N=186) were compared on all factors. Subsequent regressions were conducted to determine the greatest predictors.

Results: There were no differences with regard to gender, age, education, or disease duration. However, a greater number of individuals with a progressive course were “at risk” ($p=.003$). Individuals who reported being at risk for leaving work reported greater levels of fatigue, sleep difficulties, and pain (p 's $< .05$). They also endorsed higher levels of depression, anxiety and lower levels of locus of control and MS self-efficacy (p 's $< .05$). Those “at risk” also endorsed higher levels of neuroticism and lower levels of conscientiousness,

extraversion, and agreeableness. Finally, with regard to coping and health-behaviors they reported utilizing maladaptive coping and less engagement in positive health-related behaviors (p 's $<.05$). When all considered, pain, fatigue, and lack of engagement in healthy eating and exercise were the greatest predictors.

Conclusions: Findings suggest that pain and fatigue are significant contributors. However, there is also a host of person-specific factors that should be taken into consideration when assisting individuals in staying employed. Moreover, quite surprisingly, engagement in healthy eating and exercise proved to play a large role and should be further examined.

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Keywords: multiple sclerosis, employment, health-related behaviors

N. PARE, L. J. ELLIS, D. R. TORRES-RUSSOTTO. Progressive Ataxia with Palatal Tremor and Cognitive Impairment: A Case Report.

Introduction: Progressive Ataxia with Palatal Tremor (PAPT) is a rare syndrome characterized by symptomatic palatal tremor and slowly progressive cerebellar ataxia, accompanied by oculomotor disturbance. Cognitive dysfunction has been reported in some cases. The overlap with other ataxia and parkinsonian disorders may complicate the differential diagnosis. We present a case with an 8-year history of motor symptoms and cognitive decline.

Case presentation: A 69-year-old man presented with mild right hand tremor and loss of balance in 2012. A 2014 evaluation led to a diagnosis of myoclonus, followed by a diagnosis of ataxia in 2015. Brain MRI from 2018 revealed bilateral olivary nuclei hypertrophy, mild T2 hyperintensity, and diffuse moderate global and cerebellar atrophy. Patient developed hypophonia and ataxic speech in 2016, blurry vision in 2017, and palatal myoclonus in 2019. A diagnosis of MSA-C was made then. However, dopamine transporter scan demonstrated relative preservation of radiotracer uptake in basal ganglia, ruling out a Parkinsonian disorder. Neuropsychology was consulted to characterize cognition and assist with differential diagnosis.

Neuropsychological evaluation revealed executive dysfunction (retroactive interference, perseveration, intrusion, stimulus-bound processes, concreteness, impulsivity), which hampered performance on other cognitive tests, including processing speed, verbal memory, language, and visuo-spatial skills. Performance on some verbal tasks was hampered by dysarthria. Some written tasks were affected by poor motor control.

Discussion: This case illustrates the cognitive features and intricacy of differential diagnosis of syndromes characterized by cerebellar degeneration. While neurocognitive dysfunction has not been frequently reported in documented cases of PAPT, cognitive impairment may be present. Therefore, cognitive testing should be routine in PAPT, as deficits could impact functional independence and treatment planning.

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Keywords: Ataxia, Cognitive Impairment, Dementia-subcortical

L. KRAMSKA, Z. VOJTECH, J. SROUBEK, L. HRESKOVA. Memory performance one year after temporal lobe resection.

Objective: To assess memory performance and the effect of temporal lobe resection in the treatment of patients with medically refractory epilepsy.

Participants and Methods: 156 MTLE patients completed a one-year neuropsychological assessment. Seventy-seven patients were treated on the left side, seventy-nine on the right side. We compared Global, Verbal and Visual Memory Quotients (MQ), Attention/Concentration and Delayed Recall by WMS-R before the temporal lobe resection and one year after the intervention. All patients underwent standard preoperative neurological and neuropsychological evaluation, including the WADA test.

Results: Using paired t-test, we didn't identify any significant changes in memory performance one year after the surgery in Global MQ ($p= 0.377$), Verbal MQ ($p= 0.19$), Visual MQ ($p= 0.436$), Attention/Concentration ($p= 0,07$) and Delayed Recall ($p= 0.244$).

Conclusion: Epilepsy surgery is a widely respected therapeutic option for drug-resistant TLE patients. We found no memory deficit after temporal lobe resection in our group of patients. We can conclude that temporal resection is effective and relatively safe intervention for refractory epilepsy with no significant impact on memory performance.

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Keywords: temporal resection, memory performance, refractory epilepsy

A. JAVURKOVA, J. ZALUD, J. ZARUBOVA, J. RAUDENSKA, P. MARUSIC. Liverpool adverse event profile (LAEP): correlation with anti-epileptic drugs (AEDs), affective domains and quality of life.

Objective. Measurement of anti-epileptic drugs (AEDs) subjectively perceived side effects is currently under investigation as part of comprehensive care for patients with epilepsy. The aim was to determine the relationship between AEDs side effects, emotional domains and quality of life.

Participants and Methods. We examined $n=164$ epilepsy patients, 74 men and 90 women, with an average age of 40 years (19-76) and education of 12 years ($SD \pm 2.3$) as part as neuropsychological assessment. The average number of seizures in the last month was 1.9 ($SD \pm 9.7$), age at first seizure 17.1 ($SD \pm 13.4$), epilepsy duration 23 years ($SD \pm 13.7$). Focal epilepsy accounted for 79.8% of the sample ($n=131$), 70.1% of patients received polytherapy ($n=115$). Liverpool adverse event profile (LAEP) ($M=38$; $SD \pm 11.9$) was used to assess subjectively perceived side effects of AEDs, Neurological Disorders Depression Inventory for Epilepsy (NDDI-E) ($M=11$; $SD \pm 4.3$) and GAD-7 ($M=8$ $SD \pm 5.1$) to measure the degree of depression and anxiety. Quality of life was evaluated by QOLIE-10-P ($M=74.4$; $SD \pm 19.4$).

Results. Higher age ($p=0.00$), lower education ($p=0.00$), female sex ($p=0.00$), duration of epilepsy ($p=0.02$), polytherapy ($p=0.00$), phenytoin ($p=0.00$), clonazepam ($p=0.01$), anxiety ($p=0.00$), depression ($p=0.00$) and quality of life ($p=0.00$) were significantly associated with higher AEDs side effects measured by LAEP. Multiple regression analysis of all AEDs showed that a higher LAEP result was associated with the use of valproate ($\beta=0.19$; $p= 0.02$) topiramate ($\beta=0.19$; $p=0.02$) and phenytoin ($\beta=0.17$; $p=0.04$). Socio-demographic data explained the 20% variability of adverse events ($p<0.05$; $R^2=0.20$).

Conclusions. We found significant correlations between LAEP, anxiety, depression and quality of life. LAEP is a valid method for detecting side effects of AEDs within the comprehensive care of epilepsy patients.

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Keywords: adverse events of anticonvulsant, depression, anxiety

M. A. SEDO. “EX.PRE.S.S“: Moderate automatic knowledge, subaverage controlled performance are characteristic of students referred to special education.

Rationale: EX.PRE.S.S. (Exploration of Preparedness for School Success) is a neurodevelopmental-academic battery that compares automatic (“descriptive”) and effortful (“prescriptive”) responses in three fields: Verbal, Numerical and Motor; items are presented as parallel graded lists for ages 3 to 11. EX.PRE.S.S. compares spontaneous knowledge and planned executive performance. Verbal and Numerical items were taken from the schools curriculum. Gestures and Tappings were freely adapted from French tests of Berges-Lezine (1972) and Stamback-Luria (1958).

Methods: We used 90 normative students in 1st, 3rd and 5th grade level of the Boston Schools; comparing them to 28 successive SpEd referrals, male Hispanic students aged 7 to 9 in a city where SpEd referrals tend to functioning the lower 15% of the population their age.

Results: In the Verbal areas, regular and referred students obtained average grades 2.5/ 1.5, with a grade of difference; in the Numerical areas, scores were 3.5 and 1.5, more than one grade below. In the motor areas, scores obtained were 3.5 and K.5, (Gestures were produced as with a self-generated performance of sequences is three full grades below imitation).

Discussion: Separate knowledge and performance levels are characteristically below on SpEd referrals. These paired list separate well this basic characteristic: higher knowledge, lower performance. Imitation of gestures (performed as a well-rehearsed kinetic melody).

The difference between (reflected) Imitated Gestures and Planned Tappings may suggest an “interference” of postural reflexes with the development of self-generated sequences.

Conclusions: EX.PRE.S.S. does not just separate high knowledge from low performance and yield a list of teaching objectives – it also suggests the interference of postural reflexes with executive self-organization (as suggested by Ayres, Quiros, Bobath, etc). This may point towards an entirely new way of diagnosing learning disabilities.

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Keywords: executive functioning automatic functioning Movement disorders

L. B. BOLDEN, J. P. SZAFIARSKI. The use of continuous theta burst stimulation (cTBS) as a therapeutic technique in patients with genetic generalized epilepsies (GGEs): A proof of concept study.

Objective: It has been theorized that excessive cortical excitability (i.e. hyperexcitability) may be the pathophysiology underlying generalized spike and wave discharges (GSWDs) in genetic generalized epilepsy (GGEs; Meeren et al. 2005). Continuous theta burst stimulation (cTBS) is a neurostimulation technique shown to decrease cortical excitability in patients with GGEs for one hour (Koc et al., 2017), however the therapeutic utility of cTBS in patients with GGEs has not been examined. The aim of this study was to investigate whether decreasing hyperexcitability in refractory GGE patients using cTBS reduces interictal GSWDs, and is safe in terms of its effects on cognition, mood, and seizure frequency.

Participants and Methods: 13 patients with refractory GGEs were randomly assigned to receive one administration of cTBS at 80% AMT (treatment group; N=6) or 20% AMT (sham group; N=7). Frequency and duration of GSWDs (seconds) for 20 minutes following cTBS were measured with EEG. A neuropsychological battery was administered 1-hour post cTBS to assess aspects of attention, executive function, and mood state. Follow-up phone calls were conducted 1-month post cTBS to assess seizure frequency.

Results: Independent-samples t-tests revealed that participants who received 80% cTBS exhibited fewer GSWDs ($M = .67$) and less total duration of GSWD activity ($M = 1.00$) than participants who received 20% cTBS ($M = 5.71$; $M = 11.57$); however, these differences did not reach the level of statistical significance, at $p = .17$ and $p = .064$, respectively. There were no significant differences between groups on outcomes of cognition, mood, or 1-month post cTBS seizure frequency (all p values > 0.05).

Conclusions: These findings suggest that cTBS may be a useful, and safe therapeutic technique for decreasing epileptiform activity in patients with refractory GGEs. Future studies with larger samples and additional cTBS administration sessions are needed to explore this possibility further.

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Keywords: epilepsy, neurostimulation

A. OLEJNIK, A. BALA, A. RYSZ, A. MARCHEL. Quality of life in patients with drug resistant epilepsy – clinical and neuropsychological correlations.

Objective: Epilepsy is a chronic neurological disorder, which strongly affects patients' lives. It may have a negative impact on their cognition, emotions and social functioning and also cause physical disability. The study aimed at assessing health related quality of life (HRQoL) in patients with intractable epilepsy including the impact of some clinical variables.

Participants and Methods: The clinical group consisted of 120 subjects with drug resistant temporal lobe epilepsy: 58 women and 62 men in the mean age of $31,45 \pm 12,86$ and $12,47 \pm 2$. years of education. The average duration of epilepsy was $17,8 \pm 7,68$ years. For the assessment purposes a set of psychological tools was used, containing: quality of life questionnaire – QOLIE-31-P, theory of mind measure – Reading Mind in the Eyes Test (RMET), mood questionnaire – Hospital Anxiety and Depression Scale (HADS), and general cognitive screening test – Montreal Cognitive Assessment (MoCA). Moreover we gathered data about frequency of seizures, age of the onset of epilepsy, and time of duration of epilepsy.

Results: Patients with epilepsy achieved low scores in most of the quality of life subscales, with the lowest scores in Medication effects, Seizures worry and Distress scales and highest in Emotional well-being. Further analysis revealed significant correlations between some subscales of QOLIE-31-P and frequency of seizures, cognitive functioning (RMET, MoCA) as well as depression and anxiety scores in HADS. We found no significant correlations between quality of life and age of the onset of epilepsy, and time of duration of epilepsy.

Conclusion: The level of quality of life in patients with epilepsy, measured with the use of QOLIE-31-P is lowered and related with some clinical and neuropsychological variables.

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Keywords: epilepsy, quality of life, neuropsychological assessment

M. MANTIONE, M. VAN ZANDVOORT. Psychotic outcome of epilepsy surgery: a systematic review.

Background: Epilepsy and psychiatric disorders have a close relationship. Patients with epilepsy have an increased risk of psychiatric disorders including psychosis. Psychosis has been considered a contraindication for epilepsy surgery as it has been reported that symptoms lack improvement after surgery and this may complicate postoperative outcome. Also de novo psychosis has been reported. The aim of this review was to 1) determine if there is an increased risk of psychosis after epilepsy surgery, 2) determine the effect of psychosis on seizure outcome and 3) determine predictors of the development of psychosis after epilepsy surgery.

Methods: A literature search was conducted using PubMed, Embase and Psycinfo until June 2019 with the following search terms: epilepsy, seizures, surgery, schizophrenia spectrum disorder, psychosis, hallucinations.

Results: We found a decrease in the mean prevalence of psychosis from 9% preoperatively to 4.7% postoperatively. The mean prevalence of postictal psychosis (PIP) decreased from 3.7% preoperatively to 0.4% postoperatively and the mean prevalence of interictal psychosis (IIP) decreased from 4.1% preoperatively to 3.2% postoperatively. The mean incidence of de novo psychosis was 4.1%. 58% of the patients with psychosis were classified as Engel class I versus 82% of the patients without psychosis. No clear predictors of psychosis after epilepsy surgery were found.

Conclusion: Surgery can have a positive effect on psychosis in patients with epilepsy and a comorbid psychotic illness. The outcome for PIP is more positive than for IIP. De novo psychosis appears and must be closely followed. Patients with psychosis are at risk for a poorer outcome after epilepsy surgery, but they can benefit from surgery, also when psychosis persists. This review underlines the importance of close preoperative and postoperative neuropsychiatric evaluation.

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Keywords: epilepsy, surgery, psychosis

Poster Session 08: Categories- Emotional Functioning; Psychosis

11:00 AM - 5:00 PM

G. FRONDA, C. SPINOSA, F. CASSIOLI, M. BALCONI. The use of a neuroscientific approach to investigate the moral decision-making in a company context.

Objective: Moral decision-making is defined as a multi-component process based on cognitive and emotional processes. This study has used a neuroscientific approach to investigate behavioral and neurophysiological correlates underlying moral decision-making in a company context.

Participants and Methods: The electroencephalographic (EEG) activity and behavioral responses of 18 managers were recorded during the execution a task, consisting in a modified version of the Ultimatum Game, that proposed three different choice's contexts (professional fit, company fit, and social fit) and three different offers (neutral, fair and unfair). Specifically, professional fit condition required participants to decide to divide a money sum for a work done together with a colleague; company fit condition required to decide to divide a money sum for the introduction of company benefits and social fit condition required participants to decide to divide a money sum for help financially a sick colleague's parent. Concerning offer's types, neutral offers proposed an equal money division between proposer and respondent, fair offers proposed a favourable money division for the respondent, and unfair offers proposed an unfavourable money division for the respondent.

Results: Results have shown an increase in accepted responses for fair and neutral offers in professional and social fit conditions. Furthermore, from EEG results, an increase of left frontal beta, delta, and theta activity emerged for fair offers in professional fit conditions underlined individuals' positive emotional responses. On the contrary, an increase of right frontal delta and theta activity emerged for unfair offers in company fit condition, highlighting the presence of negative emotional responses.

Conclusions: This research provides information about different factors that can influence moral decision-making, as personal interests and fairness and unfairness perception.

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Keywords: decision-making, EEG, behavioral responses

M. BALCONI, G. FRONDA. A neuroscientific approach to investigate affective, social and informative gestures reproduction.

Objective: Verbal and non-verbal communication allows individuals to share different information, consisting of a joint action that characterized individuals' lives. Specifically, non-verbal communication entails the use of body movements to produce various gestures expressing different information, feelings, and emotional states. The present research aimed to investigate the neural (electrophysiological – EEG and hemodynamic) correlates underlying the reproduction of social, affective, and informative gestures through the use of the electroencephalography (EEG) and the Functional Near-Infrared Spectroscopy (fNIRS) in hyperscanning.

Participants and Methods: To this aim, the neural correlates underlying the use of these types of gestures were recorded during a non-verbal interaction in twelve dyads of participants composed by an encoder, who

was asked to reproduce the gesture to his partner and a decoder, who was asked to receive the gesture. Concerning neural activity, single brain and inter-brain analyses were conducted.

Results: Specifically, from EEG results, that has allowed to record inter-agents' interactions moment by moment, an increase of frontal delta, theta, and alpha brain responsiveness and inter-brain connectivity emerged for affective and social gestures, while an increase of parietal alpha activity was observed for informative ones. Concerning fNIRS, that has allowed to investigate emotional and cognitive processes in prefrontal cortex, an increase of oxygenated hemoglobin (O₂Hb) inter-brain connectivity in the dorsolateral prefrontal cortex (DLPFC) for affective gestures, in the superior frontal gyrus (SFG) for social gestures and the frontal eye fields (FEF) for informative ones has emerged.

Conclusions: This study, therefore, revealed the influence of different types of gestures on individuals' brain responsiveness and inter-brain connectivity, showing the presence of resonance mechanisms in specific brain areas underlying gesture reproduction.

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Keywords: gestures, EEG, fNIRS

M. N. BABINET, C. DEMILY, G. MICHAEL. Facial emotion detection: The role of attention in children with 22q11.2DS.

Objective: 22q11 syndrome (22q11.2DS) is the most common deletion syndrome which combines psychotic disorders, cognitive and social cognition disorders. Attention deficits are correlated with the onset of psychotic symptoms a few years later. The relationship between attention, social cognition deficits and psychotic symptoms is still poorly understood in people with 22q11.2DS, and the objective of our study is to clarify these links.

Participants & Methods: We focused on interactions between social cognition and neurocognition. For this, two groups of participants (age 5 to 13) have been established: 16 children carrying 22q11.2DS and 22 control children. An experimental paradigm assessing three components of social cognition has been proposed: (i) Facial emotion recognition; (ii) Contextual emotion recognition; (iii) Vocal emotion recognition. The six basic emotions were used, namely happiness, sad, disgust, anger, surprise and fear. In addition, several neurocognitive tests were proposed which are assessing attentional and visuospatial functions.

Results: The results suggest that patients with 22q11.2DS perform less well than controls in all three tasks. They also suggest that the ability to recognize facial emotions can be explained by their poor attention skills. An interesting finding was that when we added the IQ as a covariate, results of the emotion recognition task were explained by attention skills independently of group ($\beta = 0,005$; SEM = -0,484; $p < .01$).

Conclusions: Patients with 22q11.2DS had significantly lower performance in all three tasks. Difficulties in facial emotion recognition are linked to attentional difficulties. Moreover, visual selective attention can predict performance in a facial emotion recognition task, regardless of the person's intellectual level. Attention difficulties could lead to poor extraction of the characteristics necessary for recognizing facial emotions, and therefore explain the difficulties in decoding facial emotions.

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Keywords: 22q11.2DS, emotional processes, attention impairment

B. I. HAGEN, B. LAU, N. INGE LANDRØ, J. STUBBERUD. Normal auditory attention performance in a depression sample with self-reported attentional difficulties.

Objective: Deficits in attention is a well-established feature of major depressive disorder (MDD), which often persist in remission. The objective of the present study was to examine auditory attention, as measured by the Conners Continuous Auditory Test of Attention (CATA), in a sample with current or previous, mild to moderate MDD and self-reported attentional difficulties. To our knowledge, this is the first study to publish CATA-data in MDD.

Participants and methods: Data collection was part of a cognitive remediation trial. Baseline CATA performance of $n = 63$ participants (77.8 % female, age 42 ± 8.5 years) are presented. Sample characteristics include years of education ($M = 14.8 \pm 2.4$), depressive symptom severity (BDI-II: $M = 16.3 \pm 7.3$) and IQ-estimates (WASI, two subscales: $M = 110.1 \pm 11.0$). The CATA is a 14-minute test of auditory attentiveness, sustained attention and response inhibition. Standardized performance on the following CATA subscales are included: Omissions, Commissions, Hit reaction time, Hit reaction time SD, and Hit reaction time block change. Independent sample t -tests were applied to examine if the depression sample differed from the normative sample ($n = 480, T = 50 \pm 10$).

Results: A general pattern of normal or above normal performance on the CATA appeared with standardized T -scores in the range of 42.4-51.7 (lower scores indicate better performance). The t -tests revealed that the study sample performed significantly ($p < .05$) better than the normative sample on Omissions (CI 95%: -6.6 to -1.6) and Hit reaction time SD (CI 95%: -10.2 to -5.1), but not for the remaining subscales.

Conclusions: The lack of attentional deficits in the present study contrast with previous findings. This could be due to sample characteristics, such as above average IQ-estimates, but it might also reflect that the CATA lack sensitivity to detect minor attentional deficits.

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Keywords: Depression, Attention

R. RAUDEBERG, G. L. IVERSON, A. HAMMAR. Retention Memory is Broadly Normal in Young People with Schizophrenia Spectrum Disorders.

Objective: Deficits in strategic and organizational processing in the encoding stage have been proposed as an important factor for memory impairment in schizophrenia disorders. If so, people with schizophrenia should have memory retention rates rather similar to healthy people, and better than people with clinical conditions where retention rates are poor. To test this theory, we compare retention rates in people with schizophrenia with retention rates for people with memory disorders, and healthy controls.

Participants and Methods: A sample of 351 patients with schizophrenia disorders were included. Mean age and years of education were 24.72 ($SD=6.08$) and 12.30 ($SD=1.86$), respectively. Substance abuse was identified in 39.3%. There were more men (61.5%) than women. Retention rates on List Recall, Story Memory Recall, and Figure Recall subtests from the Repeatable Battery of Neuropsychological Assessment were calculated by dividing raw scores on delayed memory by immediate memory raw scores. Differences in retention rates between memory tests, between gender, and between substance abusers and abstainers were analyzed using t -tests. Results were compared to published retention rates for healthy older controls and a sample of patients with dementia or mild cognitive impairment.

Results: List Recall mean retention rate was 0.23 ($SD=0.07$), Story Memory retention was 0.53 ($SD=0.13$), and Figure retention was 0.73 ($SD=0.20$), $p < .001$. There were no significant differences relating to gender or substance abuse history. Retention rates were slightly higher than those reported for healthy older adults and 48–68% higher than for people with dementia.

Conclusions: Our patient sample had similar retention memory rates compared to healthy people, suggesting that deficits in the encoding stage might be a central mechanism underlying memory impairment in younger people with schizophrenia spectrum disorders. Targeting encoding strategies might be useful in memory remediation therapies.

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Keywords: schizophrenia, memory disorders, substance abuse

L. ANGIOLETTI, C. SPINOSA, M. BALCONI. Blind Shopping experience and emotional response in a sample of visually impaired people. First EEG and autonomic indices evidence from a neuroscientific study.

Objective: Autonomous grocery shopping in large-scale stores is a challenge for people with visual impairments, still it is an essential ritual evoking emotion connected to the valence of the experience. This study aims to unveil implicit reactions to blind-shopping experience in a sample of visually impaired consumers observed in a real-life context.

Methods: In a preliminary phase, we deepened blind-shopping habits by applying an online survey to 43 visually impaired subjects. The experimental phase was performed at a real-world supermarket and involved 21 subjects divided for the experimental group, including visually impaired participants, and the control group. The neurophysiological and autonomic activity was measured with wireless electroencephalography (EEG) and biofeedback systems (Heart Rate, HR; Skin Conductance Level, SCL) while participants were exploring three different areas inside the supermarket and were manipulating targeted products. Behavioral Inhibition/Activation System scale and a semi-structured interview were administered to evaluate participants' personality traits and to deepen the subjective in-store experience.

Results: Frequency bands analysis of EEG revealed lower beta and theta band power for the experimental group compared to controls while exploring all the three areas. Delta band was higher in the right *versus* left hemisphere for the experimental group and compared to controls, both for exploration and manipulation condition. Controls reported higher HR and SCL values compared to the experimental group, specifically for the exploration compared to the manipulation condition.

Conclusions: Overall, findings highlighted a right lateralization effect and an attenuated autonomic response for the experimental group, perhaps due to the sensory deprivation that reduces the emotional experience effect and to a less efficient sensory integration that might generate a less positive emotional involvement during autonomous grocery shopping.

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Keywords: emotional processes, neurophysiology, inclusion

S. KHOSDELAZAD, L. S. JORNA, S. E. RAKERS, R. B. HUITEMA, A. M. BUUNK, J. M. SPIKMAN. Static and dynamic emotion recognition tasks: performance of healthy participants.

Objectives: Facial expressions have a communicatory function; the ability to read them is a prerequisite for understanding feelings and thoughts of other individuals. Recognition of facial emotional expressions is frequently affected in neurological patients (e.g. stroke, TBI, FTD). Hence, neuropsychological assessment should also address emotion recognition deficits. However, there is debate regarding to which tests are most suitable. The current study evaluates and compares three different emotion recognition tests.

Participants and Methods: 84 healthy participants were included in this study. Three test were administered, in varying order: 1. Ekman 60 Faces Test (FEEST) 2. Emotion Recognition Task (ERT) 3. Emotion Evaluation Test (EET). The tasks differ in type of stimuli from static photographs (FEEST) to more dynamic stimuli in the form of morphed photographs (ERT) to videos (EET). The three tasks all present the same six basic emotions: anger, fear, disgust, happiness, sadness, and surprise.

Results: Comparing performances on the three tests, the lowest total scores (67.3%) were found for the ERT. Significant, moderate correlations were found between the total scores of the three tasks. There were

no significant correlations between the same emotions among the tasks. Moreover, we found cross-over effects of the FEEST and EET to the ERT; participants had higher total scores on the ERT when another emotion recognition test was administered beforehand.

Conclusions: The present findings indicate that despite some overlap, each emotion recognition task measures a unique part of the construct. The ERT seemed to be the most difficult task: performances were lowest and practice with the other tasks led to better performance. This may imply that the ERT is less sensitive to pathology and results should be interpreted with caution in clinical settings. However, future research is needed to examine both dynamic and static emotion recognition tasks in neurological patients.

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Keywords: Emotion Recognition, Neuropsychology, Social Cognition

S. DHILLON, K. K. ZAKZANIS. Objective and Perceived Cognitive Deficits of Depressive Severity and Functional Outcomes.

The cognitive impairment bias (CIB) hypothesis in depressive disorders and its relationship to functional disorder was investigated. Following initial work, we examined differences in CIB between groups with increasing degrees of depression severity.

Participants were young adults ($N=130$; 87 women; $age_m = 18.96$, $SD = 2.25$) with unremarkable neurological history. Participants were parcelled into 3 groups of depression severity based on empirically derived cut scores: Non-Depressed; $n = 65$, Dysphoric; $n = 25$, and Dysphoric-Depressed; $n = 24$ and completed a clinical screen, depression severity measures, neuropsychological tests, self-report measures of perceived cognitive impairments and functional impairment. Between-group analyses supplemented with estimates of effect size (e.g., Cohen's d) are provided.

No significant differences were observed across all group comparisons on objective measures of cognitive impairment (ranged = .05-.13); Across all functional and perceived cognitive domains, there were significant differences between groups: the largest effects observed between non-depressed & dysphoric-depressed on perceived cognitive domains ($md = .86$) and functional domains ($md = 1.28$). Significant effect sizes were also observed between non-depressed and dysphoric groups on the same domains ($md = .70$ and $.65$, respectively). Greater effects were found between the dysphoric & dysphoric depressed groups across all functional domains; medium effects were observed for 2 of 4 perceived cognitive deficit domains.

Results suggest that perception of cognitive impairment – CIB – and functional impairment vary as a function of depression severity, and that objective measures of cognitive impairment do not fully differentiate these groups. CIB may contribute to subjective complaints of cognitive impairment in the absence of objective psychometrically derived evidence of cognitive impairment in patients with depression. This has important prognostic and treatment implications.

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Keywords: depression, cognitive functioning, everyday functioning

M. SCHMOEGER, M. DECKERT, U. WILLINGER. Accuracy of Metamemory Judgements.

The relationship between confidence in memory and accuracy of metamemory judgments is known to be complex (e.g. Schmoeger et al., 2019) and a high confidence in inaccurate memories, for example, can lead to mild to severe problems in everyday life (e.g. DoLam et al., 2012). The present study deals with the influence of framing in terms of remembering or forgetting and emotions on the accuracy of metacognitive judgements.

A sample of 96 students (50.0% women, 50.0% men, age 18-32 years, $M=24.63$, $SD=3.61$) was successively presented with either 33 neutral, positive, or negative emotional pictures, selected from the International Affective Picture System (IAPS, Lang et al., 2008). After each picture participants were asked to form a

metacognitive judgement, a so-called Judgement of Learning (JOL, e.g. Arbuckle & Cuddy, 1969) i.e. they had to rate the likelihood that they will either forget or remember the given picture. Memory performance was measured in terms of a free recall. A calibration score (JOL – recall) was calculated as a measure of agreement between self-assessment and actual memory performance with higher scores showing greater overestimation of one's own memory performance (e.g. Finn, 2008).

A 2 [framing (remembering, forgetting)] X 3 [Emotion (positive, neutral, negative)] covariance analysis with the calibration score as dependent variable and the covariates age and gender shows a significant main effect of the factor framing [$F(1,88)=8.05, p=.006$] as well as no significant main effect of the factor emotion and no significant interaction effect after controlling for age and gender. The calibration scores in the remember frame condition (MD=0.15, SD=0.23) are higher than those in the forget frame condition (MD=0.03, SD=0.16).

The present result shows that framing in terms of remembering or forgetting influences metamemory accuracy. Metacognitive judgments of remember framed pictures are more overconfident than those of forget framed pictures.

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Keywords: metamemory judgments, framing, emotion

S. LADWIG, M. SÜDMEYER, K. WERHEID. Determinants of depressive symptoms during the acute phase after stroke.

Objective: A third of all stroke survivors develop post-stroke depression with marked consequences for rehabilitation and quality of life. In post-acute stroke, history of depression, stroke severity, impairment in cognition and activities of daily living as well as social support are well-established predictors. However, little is known about risk factors appearing in the closely monitored acute phase. This study aims to identify predictors of depressive symptoms in a stroke unit setting.

Participants and Methods: Participants with ischemic stroke ($N = 224$) were consecutively recruited from a stroke unit and assessed within $M = 4.0$ days ($SD = 1.5$) after admission. Assessment included demographics, medical history, stroke severity (NIHSS), dependence in activities of daily living (BI), impairment in cognition (MMSE) and language (AST) as well as perceived social support (FSozU-14). Determinants of depressive symptoms (PHQ-9) were identified in stepwise multiple linear regression analysis.

Results: Severity of depressive symptoms was predicted by the number of previous ischemic strokes, history of depression, recent use of psychotherapy, younger age, higher ADL dependence, and lower scores in semantic word fluency (all $p < .05, R^2 = .27$). Stroke severity, social support, and overall language impairment did not determine severity of depressive symptoms in the acute phase.

Conclusions: Stroke-unit patients with a history of depression and previous psychotherapy use, younger age and more severe impairment in the domains of language and everyday functions are more likely to develop depressive symptoms in the first days after stroke. These predictors overlap only partly with those in later phases of the rehabilitation process.

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Keywords: depression, stroke, acute phase

I. SIMOES LOUREIRO, E. WAUTHIA, C. SCHERPEREEL, M. ROSSIGNOL, L. LEFEBVRE. Overexcitability and sensory profile of highly gifted children and impact on emotional difficulties.

Objective: Overexcitability (OE), defined as intense sensations for internal or external stimuli, is often described in highly gifted children (HGC) and can trigger anxiety. However, results concerning OE and anxiety in HGC are quite fluctuating. The aim of this study was to assess OE in HGC and to explore which aspects of OE are linked to anxiety symptoms.

Participants and method: We tested 20 HGC (Total Intellectual Quotient=132.45+/-8.6; 11 boys; age=132.15 months+/-18.68) and 20 control children (General Ability Index=105.5+/-7.6; 11 boys; age=129.95 months+/-18.78). The Sensory Profile (SP) (measuring sensitivity for auditory, visual, tactile, body position, multisensory processing and emotional reactivity) was administered. Body perception (BP) awareness was evaluated with the BP Questionnaire. The Revised-Children's Manifest Anxiety Scale (RCMAS) (including measures of physiological symptoms of anxiety, worries and oversensibility) and the Childhood Anxiety Sensitivity Index (CASI) (including measures of social concerns and concerns about physical symptoms of anxiety) were also administered.

Results: HGC showed an heightened sensitivity for auditory, visual, tactile, body position and multisensorial information processing as well as an emotional overreactivity (SP) and more social concerns (CASI) ($p < .05$). Regression analyses led on HGC showed that physiological symptoms of anxiety (RCMAS) were explained by an increased BP awareness and by the fear of losing the control over their symptoms (CASI) ($p < .05$). Oversensibility (RCMAS) was explained by the presence of concerns about their physical symptoms ($p = .049$) as by the total anxiety sensitivity level (CASI) ($p = .001$).

Conclusions: Our results suggest a specific sensory profile in HGC, with heightened sensitivity and intensity of experience. Moreover, emotional difficulties, that are frequently reported in HGC, could be attributed to disturbed perception, interpretation of and worries about symptoms.

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Keywords: Highly gifted children, Sensory profile, Anxiety

A. BALA, A. OLEJNIK, A. MARCHEL. Social cognition in patients with cerebellar lesions.

Objective: For many years cerebellum was a structure related exclusively to motor functions. However, some studies indicate that cerebellum may be also important for experiencing, recognizing and understanding emotions. The aim of the study was to investigate how patients with cerebellar lesions recognize emotions on the basis of facial expression, biological motion and what are their meta-emotional abilities.

Participants and Methods: The study involved patients with cerebellopontine angle (CPA) tumor, significantly penetrating into the cerebellum ($n=35$) and a control group ($n=35$) consisting of demographically equal, healthy volunteers. The subjects from both groups were evaluated with a set of tests measuring: emotion recognition with the use of faces (SIE-T test) and eyes photographs (RME test), ability to understand the meaning of biological movement (CID-5) as well as meta-emotional abilities (TRE test). The Hospital Anxiety and Depression Scale (HADS) was also performed to control emotional state of the subjects.

Results: The results of the research revealed the lowered emotion recognition from whole faces ($p < 0,01$) and eyes pictures ($p < 0,05$) in patients with CPA, which matches previous findings. Moreover, emotion comprehension and meta-emotional abilities were also impaired in the group of patients with CPA as compared with healthy controls ($p < 0,01$). Patients with cerebellar lesions had problems with understanding intentions of an observed person in biological movement paradigm ($p < 0,01$). HADS scores were only slightly lowered (statistically non-significantly) and did not correlate with other tests' scores.

Conclusions: Cerebellar lesions can affect the ability of recognizing and understanding emotions and intentions. Emotional state does not explain the experienced difficulties, which support the hypothesis concerning the role of cerebellum in social cognition.

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Keywords: emotion recognition, cerebellum, social cognition

M. A. BLASIO DUARTE, G. PEREA GUZMÁN, T. GIL MEZTA, D. GONZÁLEZ GALLARDO, J. CALDERÓN VILLALÓN. Crisis intervention proposal in patients with neurodevelopmental disorders and follow-up to nine months after the earthquake of 19S-2017 in Mexico City.

Objective: To implement an immediate intervention in the acute phase and a follow up nine months after the earthquake of 19S-2017 for pediatric patients, to identify possible cases of Posttraumatic Stress Disorder (PTSD).

Method: 36 children with neurodevelopmental disorders, aged [$x = 10.56$, $SD = 2.41$] years, and gender (male= 69%) participated. The intervention took place after the earthquake of September 19th, 2017, in Mexico City. We interviewed each participant to explore their feelings and perceptions about the earthquake; the Mexican adaptation of the book *The day the earth moved* was read to the children, then, the participants were asked to do a drawing entitled 'My earthquake,' followed by a game related to the story. Concurrently, their parents completed a questionnaire based on the DSM-5 criteria for Acute Stress Disorder (ASD). Nine months later, 24 children with neurodevelopmental disorders with age [$x=11.88$, $SD=2.659$] participated, of which 75% were boys. The UCLA Reaction Index PTSD was applied to children and caregivers. The children drew what they would do if there were an earthquake today to explore elements of stress and coping skills.

Results: None of the parents rated for ASD. The participants reported favorable emotional regulation and coping skills. None of the participants exceeded the cut-off point for PTSD; however, 20.83% presented symptoms associated with it. The participants and their parents showed significant differences in the scores of Negative Mood, Reactivity, and Cognition.

Conclusions: The participants did not report significant stress symptoms; this is attributed to various protective factors such as the cognitive training given in therapy and the function of the assessment as a form of intervention. The differences in the scores in the areas mentioned above may be associated with the parents coping skills and their anxiety related to the event since they experienced a similar earthquake in Mexico City on September 19th, 1985.

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Keywords: post-traumatic stress disorder, pediatric neuropsychology, emotional processes

A. L. SOSA-MILLÁN, C. A. MONDRAGÓN-MAYA, Y. G. FLORES-MEDINA. Subcomponents of processing speed in schizophrenia.

Objective: Cognitive impairment is a core feature of schizophrenia (SZ), particularly processing speed (PS). Research suggest that PS can be deconstructed into three subcomponents: behavioral execution (BE), response processing (RP) and accuracy (AC). Thus, the aim of the present study was to analyze and compare PS and its subcomponents in SZ patients and healthy controls (HC), and assess the relation between PS subcomponents and other cognitive domains (CD)

Participants and methods: Participants were recruited and divided into two groups: SZ ($n=20$) and HC ($n=20$). To assess and analyze PS subcomponents, the MATRICS Cognitive Consensus Battery (MCCB) subtests for PS and Attention/Vigilance (AV) domains were used. Comparisons between groups were performed using a *t* student test. To explore the associations between PS and other CD, a Pearson correlation coefficient was calculated.

Results: The sample was comprised mostly by men (60%), with a mean age of 33.62, 13.17 years of formal education, and disease duration of 9.9 years. SZ had significant lower scores in RP and BE but not in AC, than HC. Significant correlations were found between RP and specific CD of AV, working memory (WM),

and reasoning and solving problems (RSP). Otherwise, AC correlated significantly with AV, RSP, and verbal and visual learning.

Conclusions: SZ patients display PS disturbances, particularly in RP and BE, when compared to HC. Findings suggest that most of the CD are associated with RP, which support it as the most cognitive subcomponent. SZ patients with higher scores in AC showed better performances in BE and RP tasks, which suggest that PS could be influenced by errors made in a task. The lack of correlation between BE and other CD, indicate that this could be a valid measure of the motor-behavioral part of PS tasks. These findings are consistent with previous studies, demonstrating that a thoroughly analysis of PS brings complementary information about the cognitive profile of SZ.

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Keywords: reaction time, psychosis, psychomotor speed

N. NUÑEZ, C. E. SALAS, D. ROJAS-LÍBANO. Exploring the Neuropsychology of Attention Deployment.

Introduction: Attention Deployment (AD) is an emotion regulation strategy whereby individuals regulate their feelings by changing the focus of attention toward non-emotional aspects of a situation. An important number of psychiatric and neurologic syndromes can exhibit impairment of AD. Recently, a growing interest has emerged on the neural basis of AD, however we know little about the neuropsychological processes that support this regulatory ability.

Objective: The objective of this study is to explore whether attentional capacities and executive abilities predict performance on an AD task. **Participants and Methods:** 40 psychology students completed an AD task where they had to visually explore IAPS images of high negative valence under three conditions: free exploration, negative focus and neutral focus. Participants rated pictures from each condition in terms of valence and intensity. Attentional capacity was assessed using the ANT and executive abilities (inhibition, working memory, abstraction, flexibility, fluency) were captured using neuropsychological tests.

Results: Analysis of the AD task shows that attention manipulation is effective and individuals report in the neutral focus condition significantly lower levels of emotional intensity ($F [2,114]=3.46, p=0.034$) and lower levels of negative emotion ($F [2,114]=7.77, p=0.0007$). As for the relationship between attentional and executive functions and attention deployment ability, linear regression models showed that none of the cognitive variables predicted performance in the AD task.

Conclusion: negative results in this study challenge the assumption that AD rely on basic neuropsychological processes in normotypical participants. This result could be partially explained by the small variability observed in this sample across tasks. Future studies should explore AD ability using populations where attentional and executive capacities are altered due to psychiatric and neurological illness.

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Keywords: emotion regulation, attention deployment, emotion

S. BESHARATI, A. FOTOPOULOU, P. JENKINSON, V. MORO, M. SOLMS. Paralyzed Only in your Eyes: Preserved 3rd person Motor Awareness.

Objectives: Perspective taking involves the ability to *mentally* adopt another person's perspective and the mental rotation of the *body* in space. A deficit in 1st person perspective taking around ones own body occurs in some patients following right-hemisphere damage who are unaware of their left-sided motor paralysis, called anosognosia for hemiplegia (AHP). Anosognosic patients also present with specific deficits in 3rd

person mental perspective taking. However, no study has examined if taking the perspective of a different, 3rd person can directly effect motor awareness irrespective of 1st person anosognosia.

Participants and Methods: Two experiments were conducted to investigate differences in motor awareness when asked from 1st versus 3rd person perspective in a self-referent egocentric condition in real-time (experiment 1) and in an other-referent allocentric condition using videos (experiment 2), in a group of patients with right-hemisphere damage and severe AHP (n=17), compared to a control group with right-hemisphere damage and no AHP (n=17). Voxel-based lesion symptom mapping was used to determine the associated anatomical correlates.

Results: Experiment 1 found AHP patients more aware of their own motor paralysis (self-referent awareness) when asked from a 3rd compared to a 1st verbal perspective. In comparison, anosognosic patients were significantly more unaware of the paralysis of a patient shown in a video (other-referent awareness) compared to hemiplegic controls (experiment 2), but with no difference between 1st versus 3rd perspective. Lesion mapping comparison between experiments and conditions identified brain damaged areas specific to 3rd person and allocentric perspective taking, such as the supramarginal and superior temporal gyri and related white matter tracts.

Conclusions: Behavioural and neuroimaging results demonstrate the intersecting relationship between social-cognitive processes of perspective taking and bodily self-awareness.

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Keywords: mentalizing, self-awareness, anosognosia

A. SAMPEDRO, J. PEÑA, N. IBARRETXE-BILBAO, P. SÁNCHEZ, N. IRIARTE-YOLLER, C. PAVÓN, I. HERVELLA, M. TOUS-EPELOSIN, S. MALDONADO-MARTÍN, N. OJEDA.

Explaining creativity in schizophrenia: cognitive and clinical correlates.

Objective: The association between creativity and schizophrenia has been a research topic for decades. Literature has shown that impairment in working memory, cognitive flexibility, and theory of mind could lead to lower creativity in schizophrenia. In addition, other neurocognitive and social cognitive domains, as well as clinical symptoms could influence this relationship. Nevertheless, the extent to which each of these domains influences creativity in this pathology is unknown. Therefore, the aim of this study was to simultaneously analyze the predictive role of neurocognitive, social cognitive, and clinical symptoms on creative performance in schizophrenia.

Participants and Methods: One hundred and one patients with schizophrenia from the Mental Health Network from Álava (Spain) were assessed in terms of sociodemographic, clinical, neurocognitive, social cognitive, and creativity variables. Stepwise Multiple Regression analyses were performed to determine which variables predict creative performance, using IBM SPSS version 26.0.

Results: Regression analyses showed that higher theory of mind ($\beta = .256, p = .009$) and working memory ($\beta = .210, p = .033$) predicted creativity total score. Higher social perception ($\beta = .240, p = .017$) and processing speed ($\beta = .226, p = .026$) explained figural creativity. Higher theory of mind ($\beta = .242, p = .012$) and working memory ($\beta = .250, p = .011$) predicted figural strengths. Finally, higher social perception ($\beta = .243, p = .012$) and lower negative symptoms ($\beta = -.275, p = .004$) explained verbal creativity.

Conclusions: Results indicate that neurocognitive, social cognitive, and clinical symptoms play a role in creativity of people with schizophrenia. Furthermore, results suggest that social cognition is essential for creative thinking. Considering that creativity is a key factor for daily life problem solving, the understanding of which domains underlie this capacity has relevant implications for the treatment of schizophrenia.

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Keywords: creativity, cognition, schizophrenia

A. PAWEŁCZYK, E. ŁOJEK, T. PAWEŁCZYK. Neurostructural underpinnings of pragmatic disturbances in schizophrenia: preliminary results of DTI study.

Objective: Pragmatic language disturbances could be the result of white matter tract abnormalities. Although very limited in number, studies have examined the association between different language aspects, including pragmatics and arcuate fasciculus, extralinguistic skills and the corpus callosum and emotional prosody with the cingulum bundle. However, there is a dearth of such research in patients with schizophrenia. Consequently, this study explores the relationship between white matter and pragmatic skills in first-episode schizophrenia.

Participants and Methods: Thirty-four first-episode patients with schizophrenia and 32 healthy subjects participated in a pragmatic language and Diffusion Tensor Imaging study, where fractional anisotropy of the arcuate fasciculus, corpus callosum and cingulum were correlated with the measures of understanding of inferential meaning, humor comprehension, metaphor processing and prosody. Schizophrenia symptoms were measured by the Positive and Negative Syndrome Scale.

Results: The patients showed reduced fractional anisotropy in the right arcuate fasciculus, left anterior cingulum bundle and left forceps minor. Among the first episode patients, reduced understanding of written metaphors correlated with reduced fractional anisotropy of left forceps minor, and greater explanation of written metaphors correlated with reduced fractional anisotropy of the left anterior cingulum. The structural integrity of the left anterior cingulum bundle and the left forceps minor negatively correlates with schizophrenia-positive symptoms and structural integrity of left anterior cingulum bundle correlates with overall psychopathology.

Conclusions: The white matter dysfunctions may underlie the pragmatic language impairment in schizophrenia. Our results shed further light on the functional neuroanatomical basis of pragmatic language use by patients with schizophrenia.

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Keywords: schizophrenia, DTI, pragmatic language

A. F. BAHIA, C. MARTINS, N. ABREU. Parent's Perspective of Developmental Changes on Emotion Regulation: A Preliminary Study.

Objective: Considering the lack of data about Emotion Regulation of Brazilian children, the aim of this study was to verify and describe the parent's perspective of changes on Emotion Regulation through development.

Participants and Methods: The sample included 40 parents of children aged between 05 to 10 years, from a public school. The parent's perception of their children Emotion Regulation was evaluated with the Emotion Regulation Check list (ERC), which includes two-factors (Emotion Regulation – ER; Emotional Lability/ Negativity – L/N). Parents also answered a social demographic questionnaire. Descriptive analysis and group comparison were run by age range (Kruskal-Wallis).

Results: The sample was distributed in 4 groups (5 and 6 years, 7 years, 8 and 9 years, 10 and 11 years). No statistics differences were found on Emotion Regulation between the age ranges. However, the group of 7 years showed better emotion regulation (M=2,85; DP=0,21) than the group of 5 and 6 years (M=3,01; DP=0,22). The group of 8 and 9 years (M=3,00; DP=0,29) and 10 and 11 years (M=3,00; DP=0,33) presented constancy. Regarding RE-factor, the group of 7 years also presented better emotion regulation (M=3,03; DP=0,23) than the group of 5 and 6 years (M=3,27; DP=0,22), the group of 8 and 9 years (M=3,06; DP=0,33) and the group of 10 and 11 years (M=3,11; DP=0,33). On the L/N-factor the 7 years group obtained better performance (M=2,20; DP=0,35) than the group of 5 and 6 years (M=2,06; DP=0,33), followed by the older groups, 8 and 9 years (M=2,03; DP=0,36); 10 and 11 years (M=2,00; DP=0,48).

Conclusions: This descriptive and inicial study provides information about developmental changes on Emotion Regulation with Brazilian children. Parents' perspective showed that younger children (5 and 6

years) seem to present worst emotion regulation resources, improving by the age of 7 and having a decrease on performance later until they become 11 years old. Discussion about possible cause is provided.

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Keywords: Emotion Regulation, Development, Children

Poster Session 09: Categories- Behavioral Neurology; Neuroimaging; EEG; Neuromodulation

11:00 AM - 5:00 PM

M. BALCONI, G. FRONDA. Effects of prosocial behavior on individuals' cooperation and social bonds: evidences from brain responsiveness and inter-brain connectivity.

Objective: Daily interpersonal and social interactions are characterized by different exchange moments, such as gift exchange. Recently, anthropological, psychological and neuroscientific interest was directed to investigate the individual factors, social function and neurophysiological responses underlying interpersonal exchange, such as gift exchange. Specifically, the present study aimed to investigate the possible effects of prosocial behavior on individuals' cognitive performance and brain activity.

Participants and Methods: Behavioral performance and neural activity of 16 dyads of friends were collected through the use of Functional Near-Infrared Spectroscopy (fNIRS) and electroencephalography (EEG) with the hyperscanning paradigm. In particular, individuals' neural responses were recorded during the execution of a cooperative attentional task before or after a gift exchange.

Results: From the results of the present research an increase of perceived cooperation and of task accuracy emerged after the gift exchange. Concerning EEG results, instead, an increase of delta and theta inter-brain connectivity was observed after gift exchange. Finally, from fNIRS results emerged an increase of oxygenated hemoglobin (O₂Hb) inter-brain connectivity in dorsolateral prefrontal cortex (DLPFC), more involved in processes concerning social and interpersonal relations, following the gift exchange.

Conclusions: In conclusion, the present research highlights how prosocial behavior experienced after gift exchange can improve individuals' cognitive performance, cooperation and neural coordination, increasing intra and inter-brain connectivity mechanisms.

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Keywords: gift exchange, hyperscanning, EEG

D. RÉMILLARD-PELCHAT, S. RAHAYEL, R. B. POSTUMA, J. MONTPLAISIR, M. GAUBERT, P.-A. BOURGOUIN, J. CARRIER, O. MONCHI, J. GAGNON. Reduced corpus callosum volume in idiopathic rapid eye movement sleep behavior disorder with mild cognitive impairment.

Objective: Idiopathic rapid eye movement sleep behavior disorder (iRBD) is a parasomnia considered as a major risk factor for Parkinson's disease and dementia with Lewy bodies (DLB). Up to half of iRBD patients have mild cognitive impairment (MCI), the majority of whom will develop DLB. We aimed to investigate corpus callosum (CC) volume in relation to MCI in iRBD patients.

Participants and Methods: Fifty-one patients with iRBD, including 17 with MCI (iRBD-MCI), were recruited and compared with 40 healthy controls. All participants underwent extensive clinical, neurological and neuropsychological assessment, and 3-tesla MRI acquisition of T1 anatomical images. The CC of each subject was identified and divided into five subsections (anterior, midanterior, central, midposterior, and

posterior) according to Freesurfer's automated labeling of neuroanatomical structures. Subsections and total CC volumes were computed and corrected for the total intracranial volume, and a MANCOVA was conducted to compare iRBD-MCI patients to those with iRBD but without MCI (iRBD-nMCI), and controls. Correlations were performed between CC subsection volumes and cognitive performance (attention and executive functions, verbal learning and memory, and visuospatial abilities) among iRBD patients.

Results: iRBD-MCI patients had volume reduction in the midposterior segment of the CC, when compared with iRBD-nMCI patients ($p < 0.001$) and controls ($p = 0.018$). No significant differences were found between iRBD-nMCI patients and controls. Lower volume of the midposterior segment of the CC was associated with poorer visuospatial performance in iRBD patients ($p < 0.05$).

Conclusions: Volume atrophy of the midposterior segment of the CC was associated to cognitive deficit in iRBD patients. This result is in line with other neuroimaging studies reporting a more severe brain atrophy in iRBD-MCI patients.

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Keywords: dementia with Lewy bodies, mild cognitive impairment, corpus callosum

S. SALGUES, M. COMTE, G. A. MICHAEL. Lateralization of attentional processes that contribute to the perception of spontaneous sensations in left-handers.

Objective: The background of sensations that contribute to body awareness gives rise to spontaneous perceptions (or spontaneous sensations, SPS) that possess spatial and qualitative characteristics. Previous investigations showed that spatial attention plays an important role through amplifying or suppressing these SPS. Furthermore, it was shown that those mechanisms are primary dependent on the right cerebral hemisphere in right-handers. Given that spatial abilities are less lateralized in left-handers, we set to investigate whether attention effects on SPS would be less lateralized too.

Participants & Methods: 41 left-handers (Laterality Quotient -80.7%) were requested to focus on one hand while either gazing it (convergent focusing) or gazing a distracting object (divergent focusing), and then to describe those SPS they perceived on the tested hand. Each hand was tested separately and the two gazing conditions were balanced.

Results: Independently from the tested hand, we observed the typical enhancing effect of convergent focusing on SPS perceived on the fingers and the suppressing effect on the palm. When the hand was taken into account, we observed a pattern that was completely inverted to the pattern reported in right-handers (Michael & Naveteur, 2011; Michael et al., 2012). Indeed, enhancing effects were found in the left hand, while both suppressing and enhancing effects were observed in the right hand.

Conclusions: The results confirm once again that spatial attention operates to suppress or enhance SPS. However, contrary to the known absence of lateralization of spatial attention and tactilo-spatial processes in left-handers, attention to SPS seems more left-lateralized in left-handers. Some hypotheses about the lateralization of body awareness processes in left-handers are proposed.

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Keywords: Left-Handers, Attention, Hemispheric lateralization

M. EHRLER, P. BRUGGER, L. SCHLOSSER, M. GREUTMANN, A. OXENIUS, R. O'GORMAN TUURA, B. LATAL. Persisting alterations of white matter microstructure in adults with congenital heart disease and its association with cognitive function: A diffusion tensor imaging study.

Objective: Patients with congenital heart disease (CHD) are at risk for persisting executive function deficits, which are known to affect academic achievement and are thus of particular interest. This study aimed to

identify structural cerebral alterations potentially associated with executive function deficits in adults with CHD.

Participants and Methods: Diffusion tensor imaging and tract-based spatial statistics were conducted in 45 adults with CHD and 54 healthy controls aged 18-32 years. Fractional anisotropy (FA) of white matter diffusion was compared between groups and correlated with an executive function score, derived from an extensive neuropsychological test battery.

Results: Patients had lower executive functions ($p < 0.05$) and showed widespread bilateral reduction in FA ($p < 0.05$, multiple comparison corrected) compared to controls. Lower FA was driven by patients with moderate and severe CHD ($p < 0.001$). Executive function was associated with lower global FA ($p < 0.05$), and local reduction in the left superior corona radiata and the corticospinal tract (corrected $p < 0.05$).

Conclusions: Our findings suggest that alterations of the white microstructure persist into adulthood mainly in patients with moderate to severe CHD, and are further associated with executive functioning. A better understanding of the neurocognitive deficits can help guide the counseling and care of CHD patients across the lifespan and can thus improve their developmental outcome and quality of life.

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Keywords: congenital disorder, neuroimaging; structural connectivity, executive functions

J. S. SHAPIRO, V. RAUSA, M. SEAL, M. TAKAGI, V. ANDERSON. Incomplete and unreproducible: a systematic methodological critique of neuroimaging papers in paediatric post concussive syndrome.

Objective: There have been many attempts to understand the neural underpinnings of concussion and post concussive syndrome within a paediatric context. One of the more common approaches is to utilise neuroimaging in one form or another. This study aims to systematically evaluate the methodological and reporting quality of neuroimaging papers into paediatric post concussive syndrome.

Method: A literature search using the electronic databases MEDLINE, PsycINFO, EMBASE and PubMed for articles published between 01 January, 2000 and 15 July 2019 was conducted, with strict acceptance criteria requiring: i) a clear definition of mTBI or concussion, ii) a minimum of ten participants with a mean age between 0-18 years (maximum range 25 years) and (iii) a diagnosis of mTBI or concussion and neuroimaging data obtained subsequent to presentation to the ED. Papers excluded included: animal studies, articles published before the year 2000, retrospective analyses, non-accidental head trauma, and dissertations, case reports and other review papers. The review uncovered 58 eligible studies. These studies were assessed using the Newcastle-Ottawa Scale (NOS) as well as being assessed against a checklist of best practice guidelines considered crucial to the completeness of the reporting by the Committee on Best Practice in Data Analysis and Sharing (COBIDAS).

Results: Few studies managed to report at a standard that approached the bare minimum level required according to the COBIDAS guidelines, with many studies falling far below the requirements. Moreover, most studies assessed showed risk of bias according to the NOS.

Conclusions: The authors advocate for publishing a highly detailed method section as a supplement to future imaging papers to meet reporting standards without overburdening manuscripts.

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Keywords: Neuroimaging, concussion, pediatric neuropsychology

S. SALGUES, G. DURAN, G. A. MICHAEL. Different contributions of the cerebral hemispheres to bodily awareness: Evidence from attending to spontaneous sensations arising on the hands.

Objective: Spontaneous sensations (SPS) are perceived in the absence of any external trigger, possess spatial and qualitative characteristics, and are thought to reflect those processes that give rise to body awareness. Attention plays a role in the perception of SPS. However, whether attention affects SPS only at the location on which it is focused is still unknown. Furthermore, since different hemispheric processes control attention, we set to further investigate this issue.

Participants & Methods: 47 right-handers (Laterality Quotient 82.6%) were requested to focus either on the fingers or the palm of one hand and then to describe those SPS they perceived on the whole hand. Each hand was tested separately and the two focusing conditions were balanced.

Results: A main effect of focusing location was found. Indeed, focusing on the fingers increased perception in the fingers, while focusing on the palm, increased perception of SPS in the palm. However, when each hand was inspected independently, the effect of focusing location was present only in the right hand. In the left hand, focusing on the fingers produced widespread perception both in the fingers and the palm, while focusing on the palm had no effect.

Conclusions: The results confirm that the perception of SPS is enhanced at the specific location on which attention is focused. However, lateralized patterns suggest that each hemisphere has different contributions. The left hemisphere enhances SPS on the exact location of attention suggesting a rather specific role on local information processing and may thus contribute to conscious awareness of body parts (Leisman & Melillo, 2007). The right hemisphere rather focuses on more coarse parts of the body, probably giving rise to a more global awareness of the body structure and frontiers. The complementarity of these potential processes is discussed.

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Keywords: spontaneous sensations, body awareness, attention

X. PRATS-SOTERAS, M. ÁNGELES JURADO, S. LUIS-RUIZ, X. CALDÚ, A. PRUNELL, S. MISERACHS-GONZÁLEZ, C. SÁNCHEZ-CASTAÑEDA, J. OTTINO-GONZÁLEZ, I. GARCÍA-GARCÍA, M. JOSÉ SENDER-PALACIOS, C. SÁNCHEZ-GARRE, N. MIRÓ, C. TOR, M. GAROLERA. Left rostral middle frontal grey matter volume mediates the relationship between BMI and cognitive flexibility in adolescents.

Objectives: To address the relationship between BMI and adolescents' gray matter volume (GMV). To explore the link between cognitive flexibility and BMI. To test if flexibility is mediated by GMV changes BMI-related.

Participants and Methods: 65 healthy adolescents aged 12 to 21 (mean 15.89 ± 2.72 , 50.8% female, BMI range 15.72-45.15 kg/m²) underwent structural MRI acquisition (Siemens 3T trio) and were assessed in flexibility tasks. BMI was transformed into z-score (BMIz) using the 2000 CDC growth charts. GMV analysis was performed with FreeSurfer (v.6.0). The effects of age, sex, education and total intracranial volume were set as nuisance factors. Flexibility index (FI) was made including the COWAT, TMT B-A and the categories achieved and the perseverative errors of WCST. Spearman correlation between BMIz and standardized residuals of FI was performed. Next, we conducted mediation analysis using the PROCESS (v3.4) macro from SPSS (v.23).

Results: There was a positive relationship between GMV and BMIz in the left rostral middle frontal gyrus (size = 3591.51 mm³, X = -39.5, Y = 36.5, Z = 15.8, Z-value = 2.978, p-corrected < 0.001), the left superior frontal gyrus (size = 1711.40 mm³, X = -7.5, Y = 60.2, Z = 14.2, Z-value = 3.496, p-corrected = 0.024) and the right superior frontal gyrus (size = 1661.80 mm³, X = 10.4, Y = 25.2, Z = 50.9, Z-value = 2.853, p-corrected = 0.019). BMIz was negatively correlated with flexibility ($r_s = -0.286$, $p = 0.021$). Mediation model shows a significant indirect effect of BMIz on flexibility through changes in left rostral middle frontal GMV ($\beta = 0.10$, SE = 0.06, 95% CI [-0.221, -0.003]). However, there was no significant indirect effect through left

superior frontal gyrus ($\beta = -0.093$, SE = 0.06, 95% CI [-0.20, 0.018]) nor right superior frontal gyrus ($\beta = -0.024$, SE = 0.04, 95% CI [-0.109, 0.066])

Conclusions: Cognitive flexibility alterations BMI-related in adolescents seems to be mediated by changes in left rostral middle frontal GMV.

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Keywords: Body mass index, gray matter volume, cognitive flexibility

A. MICELI, C. COLLETTE, L. RIS, L. LEFEBVRE, I. SIMOES LOUREIRO. Processing of thematic and taxonomic relationships in adults: Evidence from an EEG study and semantic priming.

Functional and neural dissociations between thematic (which refers to contiguity relations based on co-occurrence in events or scenarios) and taxonomic (which refers to similarity relations based on shared features) systems have been reported in the literature (Mirman, Landrigan & Britt, 2017), with abundant developmental data (e.g. Coni, Ison & Vivas, 2019). Few studies have focused on young adults in this area, however, it would be relevant to consider the mature system of thematic and taxonomic network. The aim of our study was therefore to evaluate the associated neural processes of thematic and taxonomic priming in young adults by using electroencephalography. Eighteen young adults (14 females; mean age 24,83; SD=1,13 years) underwent a semantic priming paradigm. They had to decide if a picture-target was real or not. The target could be preceded by four types of picture-primers context: thematically related (milk-cow); taxonomically related (pig-cow); unrelated (lemon-cow) or neutral (random meaningless pattern-cow). Repeated-measures ANOVA demonstrated a significant main effect for Context priming ($F=3.48$, $p=0.023$). More specifically, planned comparisons have shown priming effects for thematic ($p=.041$) and taxonomic conditions ($p=.012$) compared to the neutral one, but not when they were compared to the unrelated condition ($p>.05$). Also, no difference between taxonomic and thematic condition was observed for behavioral data. Nevertheless, at the electrophysiological level, a larger P300 is observed in the thematic condition compared to the taxonomic one, demonstrating a faster thematic relation access. These preliminary results support the neural distinction between thematic and taxonomic relations in the semantic network of young adults and will be discussed in terms of embodied cognition.

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Keywords: electroencephalography, semantic memory, embodied cognition

G. FRONDA, A. BARTOLO, M. BALCONI. Intra- and inter-brain connectivity during the reproduction of social, affective and informative gestures.

Aims: Gestural communication marks out social interactions allowing the transmission of different information that is connoted by the use of specific gestures. Recently, studies in neuroscientific field have been interested in observing the neural correlates underlying gestures' reproduction. For this purpose, this research aimed to investigate the neural patterns underlying the execution of different gesture in twenty dyads of participants.

Participants and Methods: Individuals' neural activity was recorded through the use of functional near-infrared spectroscopy (fNIRS) in hyperscanning during the reproduction of positive and negative social, affective and informative gestures. In particular, hyperscanning paradigm allowed to record simultaneously the activity of the two individuals involved in the interaction: encoder, who reproduced the gesture and decoder, who received the gesture. Intra- and inter-brain analysis allow observing intra- and inter-cerebral synchronization during the reproduction of specific gestures.

Results: From the results of the study an increase of intra- and inter-brain connectivity has emerged in specific cerebral areas according to gestures' type. In particular, an increase of intra- and inter-brain connectivity was observed in dorsolateral prefrontal cortex (DLPFC) for affective gestures, in superior frontal gyrus (SFG) for social gestures and in frontal eye field (FEF) for informative ones. Also, results showed differences related to the role, with an increase of intra-brain connectivity in posterior parietal areas for encoder compared to decoder.

Conclusion: This research revealed the significant function of gestures' type in influencing individuals' neural tuning mechanisms that appear to be influenced by the nature and the valence of specific gestures.

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M. CHO, Y. NA, Y. M. HWANG, S.-B. PYUN. Association of inferior longitudinal fasciculus and semantic knowledge processing in stroke patients.

Inferior longitudinal fasciculus (ILF) is the white matter tract linking occipital lobe and anterior temporal lobe and is known to play a role in semantic, lexical processing and visual memory function. This study aims to identify the relationship of ILF related to semantic knowledge processing in stroke patients.

We collected the data of stroke patients from the Stroke Outcome Prediction (STOP) database of Korea University Anam Hospital and 77 patients who met the inclusion criteria; 1) first-ever stroke, 2) who underwent diffusion tensor imaging (DTI) within 6 months after onset of stroke, 3) ages between 20 and 85 years old. The patients who had past history of cognitive impairment or degenerative brain disorders were excluded for the study.

We collected data including demographic information (age, sex, education), MMSE and stroke characteristics (types and side of stroke). SKT was examined by selecting semantically related pairs of words or pictures of 60 items each. All DTI of subjects were preprocessed and reconstructed individually with DTI studio software. ILF was reconstructed in right and left hemisphere. And fractional anisotropy (FA), axial diffusivity (AD), mean diffusivity (MD) and radial diffusivity (RD), were extracted from the tract.

The result showed that there was no significant difference in SKT scores between picture and word test. However, significant differences were found, depended on the side of lesion. Also, there was significant positive correlation between FA of left ILF and SKT score in word ($r=0.244$, $p=0.033$). In the stepwise-regression analysis, the result showed that age and MMSE score were the significant predictors of the SKT picture score, whereas FA of left ILF and age on the word score.

The results indicated that the left ILF plays a significant role in semantic knowledge processing in words rather than pictures.

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A. MAŃKOWSKA, M. HARCIAREK. Prism Adaptation on Vertical Dimension.

Introduction: Horizontal prism adaptation (PA) is a promising rehabilitation technique for visuospatial neglect. However, vertical PA, due to its impact on dorsal vs ventral attentional stream, may influence the allocation of vertical attention and, thus, impact vertical line bisections. Specifically, PA with down-shifting prisms may activate the ventral visual stream, leading to increased allocation of attention to superior altitudinal visual space and thus resulting in increased upward bias on the line bisections. Bias in the opposite direction may occur after PA to up-shifting lenses inducing the activation of the dorsal stream. Nonetheless, the direct effect of vertical PA on vertical line bisection has never been studied. Thus, the main purpose of this study is to learn how orienting spatial attention upwards or downwards by using PA might lead to the alterations of vertical attention.

Participants and Methods: The study included 10 right-handed healthy adults ($M = 25.06$; $SD = 3.36$). Each person was randomly assigned to an upward or downward PA condition. To induce a directional change in spatial attention, we used a computerized method with lenses shifting visual field of 10° . Before and after each PA participants performed 10 vertical line bisections.

Results: There was a significant after-effect of vertical PA on the vertical line bisections, both for downward ($M=4.71$; $SD=2.21$; $t(4)=4.77$, $p=0.009$) and upward ($M= -2.9$; $SD=2.81$; $t(4)=-3.77$; $p=0.02$) shifting prisms. Nonetheless, the magnitude of after-effect of the upward versus downward PA was not significant ($t(9)=1.89$; $p=0.14$).

Conclusions: The present study demonstrates that PA with lenses shifting attention in a vertical plane may lead to sensorimotor plasticity. Whereas the mechanism inducing this vertical bias is not fully known, it can be explained in the light of the dorsal-ventral attentional stream imbalance caused by vertical PA. Future neuroimaging research is needed to test this explanatory hypothesis.

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Keywords: Prism Adaptation, Visuo-spatial Attention, Experimental Neuropsychology

A. V. KARAPETSAS, R. M. LASKARAKI, A. A. KARAPETSA, M. D. BAMPOU. The role of neuropsychology in the assessment and treatment of university students with Developmental Coordination Disorder.

Recent evidence suggests that Neuropsychological assessment may provide an *accurate diagnosis of Developmental Coordination Disorder (DCD)*, and therefore enable professionals to design effective interventions for patients with this disorder.

Objective: The purpose of this study was to investigate the efficacy of Neuropsychological Assessment including both Psychometric and Electrophysiological tests as well as to evaluate the *efficacy* of a rehabilitation program, designed for university students with DCD.

Participants & Methods: Five university students with DCD and a matched control group ($n=10$) were enrolled in this study. The study, being conducted in Laboratory of Neuropsychology, at University of Thessaly, in Volos, Greece, was carried out in three phases i.e. a. Assessment b. Intervention c. Reassessment. Assessment included both Neuropsychological tests (*i.e. Luria Nebraska Neuropsychological Battery – movement subscale*) and Neuroimaging techniques [i.e. Event Related Potentials (ERPs) esp.P300 waveform]. Assessment results indicated statistically significant lower performance for students with DCD to all applied tests, compared to control group. After assessment phase, children with DCD participated in a motor skill intervention, including activities of motor learning skills and motor imagery training.

Results: The electrophysiological measurements recorded after the intervention revealed almost similar, P300 latency values for students with DCD to those of the control group, indicating the training effects of the intervention program, thus enhancing students to improve motor proficiency. Similar scientific data confirm the vital role of Neuropsychology in both diagnosis and treatment of DCD.

Conclusions: The results of the current study underlie the significant contribution of Neuropsychology in accurate diagnosis of DCD as well as its potential impact on rehabilitation settings for this clinical population.

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Keywords: Neuropsychology, Movement clumsiness, Rehabilitation

A. V. KARAPETSAS, R. M. LASKARAKI, A. A. KARAPETSA, M. D. BAMPOU. Remediation effects on P300 waveform in third and fourth grade students with developmental dyslexia after an auditory musical intervention: A Neuropsychological study.

Recent advances in neuroimaging and brain electrophysiological techniques not only can provide insights into brain-behavior developmental issues but also allow researchers for a more concise investigation of brain function or dysfunction. Apart from diagnosis, electrophysiological recordings contribute to advanced rehabilitation services, as, via monitoring brain activation, professionals are enabled to design more efficient *interventions*.

Objective: The current study aimed at investigating the electrophysiological *ERPs* correlates (*P300* component) of an auditory musical training *program* designed for children with Developmental Dyslexia (DD).

Participants and Methods: Totally, ninety *third-*, and *fourth-grade* students participated in our study, being divided into two groups: experimental (DD group) and control group. The study was conducted in three phases .inc *Assessment*, *Intervention* and *Reassessment* phase, being carried out at Laboratory of Neuropsychology, at the University of Thessaly, in Volos, Greece. Assessment results confirmed statistically significant lower performance for students with DD, compared to that of the controls in both *Electrophysiological* and *Neuropsychological tests applied*. At the second phase of the study, a subgroup of the experimental group attended an auditory musical intervention program, including digitized *musical exercises* and at the end of the training, students underwent a new *P300* recording.

Results: Reassessment results confirmed a statistically significant -pre and after training period- difference among *P300* latency values. Indeed, intervention effects for the experimental group resulted in similar to controls *P300* values.

Conclusions: The current study offers direct evidence that electrophysiological recordings esp. *ERPs P300* proved to be a valuable tool not only in investigating brain dysfunction but also in designing appropriate interventions and evaluating their training induced effects on neural plasticity.

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Keywords: Learning Disabilities, Music, *ERPs*

Y. NA, M. CHO, Y. M. HWANG. A Voxel-based lesion symptom mapping study of the representation of semantic knowledge in stroke patients.

Objective Semantic knowledge is one of the significant properties in expressive and comprehensive language processing. This study aims to identify the core brain region related to semantic processing in Korean stroke patients through voxel-based lesion symptom mapping (VLSM).

Methods The data were collected from the Stroke Outcome Prediction (STOP) database of Korea University Anam Hospital. 39 patients who met the inclusion criteria; 1) first-ever stroke, 2) who underwent diffusion tensor imaging (DTI) within 6 months after onset of cerebral infarction, 3) ages between 20 and 85 years old; were enrolled. The patients with hemorrhagic stroke and those who had neurological/psychiatric history of illness were excluded.

We collected demographic data (age, sex) and semantic knowledge test (SKT) score of patients. The SKT was consisted of 60 items in picture (p) and word (w) version, and patients were examined by selecting semantically related pairs of items. Lesion identification was conducted on the basis of T2 FLAIR images using ITK-SNAP. Lesion binary images were spatially normalized into ICBM space template using SPM12, and simple regression between normalized lesions and SKT scores was conducted in Statistical non-Parametric Mapping (SnPM).

Results The averaged SKT-p score was 51.82 (SD=9.55), and mean SKT-w score was 52.36 (SD=9.17). The VLSM result showed that there was no significant correlation between lesions and SKT-p score. However, the VLSM result showed significant negative correlation with wSKT score ($p < .05$ FDR corrected). The areas that correlate to SKT-w were inferior frontal gyrus; frontal operculum/pars opercularis/pars orbitalis, Insula; short insular gyri/circular insular circus, and claustrum in the left hemisphere.

Conclusions The results that the left inferior frontal gyrus and insula correlate to semantic processing in written form of language.

Acknowledgment This work was funded by the National Research Foundation of Korea (2019R1A2C2003020).

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Keywords: semantic processing, neuroimaging, stroke

K. HIROMITSU, S. SAITO, K. HAMAMOTO, R. OCHI, Y. SUZUKI, Y. SHIGEMUNE, N. SHINOURA, R. YAMADA, A. MIDORIKAWA. Predicting factors of the perioperative cognitive function in the patients with brain tumours.

Objectives: Cognitive function is commonly impaired in patients with brain tumours. Previous researches have suggested that the cognitive function is the independent predictor in survival of brain tumour patients. However, the study considering the relations of brain tumours and cognitive function is still sparse. In respect of psycho-oncological balance, understanding the influence of brain tumours on perioperative cognitive function is crucial. In this study, we aim to examine the cognitive function in the patients with brain tumours before and after surgery in terms of the influence of affected brain regions, hemispheric laterality of the tumours, and tumour grade.

Participants and Methods: The study enrolled 103 brain tumour patients who underwent awake craniotomy for tumour resection. To assess the cognitive function, the Neurobehavioral Cognitive Status Examination (Cognistat) was administered in each patient before and after surgery. General clinical data including tumour locations, hemispheric laterality, and WHO grade were collected.

Results: The scores of subtests in Cognistat were compared before and after surgery. Preoperative scores were in impaired range on the Orientation, Attention, Comprehension, and Memory subtests. Postoperative scores on the Orientation, Comprehension, Memory, and Similarities subtests showed significant increase compared with preoperative ones. Multiple regression analyses demonstrated that tumour locations, hemispheric laterality, and malignancy were significant predictors of the perioperative scores of several subtests.

Conclusions: Several cognitive functions in impaired range improved after surgery, suggesting the critical cognitive domains to assess before and during surgery. Tumour locations, hemispheric laterality, and malignancy could be predicting factors of perioperative cognitive functions. These findings will be discussed in relation to issues for perioperative neuropsychological assessment of brain tumour patients.

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Keywords: Cognitive function, Brain tumour, Awake craniotomy

L. MEIRELES, S. G. VICENTE. Impact of a Cognitive Stimulation Program for People with Mild Cognitive Impairment and Dementia: A pilot study.

Objective: Cognitive stimulation is a powerful tool to deal with cognitive and executive decline. Using this cognitive approach and having in mind the practically no offer in this field in Portugal, we created *ImproveCog*, a cognitive stimulation program for people with Mild Cognitive Impairment (MCI) and Dementia. This program has two components: group cognitive stimulation sessions (twelve 90-min weekly sessions) and 330 pencil and paper cognitive stimulation exercises designed to be individually performed at-home. This study aimed to evaluate the effectiveness of *ImproveCog* in terms of global cognition, executive functioning, anxiety and depression levels, and stress perception.

Participants and Methods: Twenty-six participants with MCI and mild to moderate Dementia diagnosis (probable Alzheimer's Disease and Frontotemporal Dementia, behavioral variant) integrated the study. The

performance of the patients who participated in the cognitive stimulation program (experimental group, N=13) was compared to those who did not participate (control group, N=13) based on two neuropsychological evaluations conducted pre and post intervention.

Results: The results showed significant gains in executive functioning on the experimental group versus control group. Although not statistically significant, the results in the other measures were clinically relevant. In MMSE, it was found that in post intervention moment the MCI experimental subgroup had an improvement with no longer criteria for cognitive impairment, and the Dementia Experimental subgroup was also at this threshold.

Conclusions: Findings on this pilot study along with the feedback gathered in a previous study from focus groups with health professionals and individual interviews with patients, contributed to re-evaluate the first draft of the program and create a final version of ImproveCog. The application of this program in a large scale has already begun in order to evaluate the efficacy of the intervention.

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Keywords: Mild Cognitive Impairment, Dementia-Alzheimer's Disease, Cognitive Rehabilitation

Poster Session 10: Categories- Inclusion/Diversity; Cognitive Neuroscience; Medical/Neurological Disorders

11:00 AM - 5:00 PM

T. RUNE NIELSEN, K. JØRGENSEN. Cross-Cultural Dementia Screening Using the Rowland Universal Dementia Assessment Scale: A Systematic Review and Meta-analysis.

Objective: To quantitatively synthesize data on accuracy of the Rowland Universal Dementia Assessment Scale in different sociocultural settings and compare its performance to other brief screening instruments for detection of dementia.

Participants and Methods: Literature searches were performed in PubMed, EMBASE, and CINAHL from January 1, 2014 until September 1, 2019. Twenty-six studies reporting diagnostic accuracy of the Rowland Universal Dementia Assessment Scale were included with a total of almost 4000 participants. Procedures for translation and cultural adaption of the Rowland Universal Dementia Assessment Scale, and influence of demographic variables on diagnostic accuracy, were compared across studies. Bivariate random-effects models were used to pool sensitivity and specificity results, and diagnostic odds-ratios and the area under the hierarchical summary receiver operator characteristic curve was used to present the overall performance.

Results: The pooled sensitivity and specificity for detection of dementia were 0.82 (95% CI, 0.78-0.86) and 0.83 (95% CI, 0.78-0.87), respectively. In 11 studies making direct comparison, the RUDAS had slightly better diagnostic performance compared with the MMSE, with area under the curves of 0.88 and 0.84, respectively. In subgroup analyses, the RUDAS had comparable diagnostic performances across high-income (sensitivity 0.81 and specificity 0.87) and low-and middle-income (sensitivity 0.87 and specificity 0.79) settings and in samples with a lower (sensitivity 0.83 and specificity 0.85) and higher (sensitivity 0.85 and specificity 0.83) proportion of participants with no formal education.

Conclusions: The RUDAS has good diagnostic performance for detecting dementia across diverse sociocultural settings. Compared to other brief screening instruments, advantages of the RUDAS include its limited bias in people with limited or no formal education and a minimal need for cultural or language adaptation.

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Keywords: cognitive screening, cross-cultural issues, dementia

E. DE HAAN. Split-brain: one or two conscious agents?

Objective: The term “split-brain” refers to patients in whom the corpus callosum has been cut for the alleviation of medically intractable epilepsy. In the early studies, stimuli, for instance objects, that were presented to the left hemisphere, either physically in the right hand or as an image in the right visual half-field, could be readily named or pointed out with the right hand. When the stimuli were presented in the left visual field or in the left hand, the patient appeared oblivious to the fact that there had been a stimulus at all but was nevertheless able to select the correct object from an array of alternatives presented to the left hand or the left visual half-field. This led to the hypothesis that there might be two separate conscious agents. Recent studies have rekindled a discussion about this hypothesis (e.g. Corballis et al. 2018; Pinto et al., 2017a&b; Volz et al. 2017, 2018; de Haan et al, 2019), as it became clear that the breakdown is not absolute and several processes, such as action control, seem to remain unified.

Method: Here, I will summarise important old (and sometimes forgotten) and new studies on the split-brain phenomenon. The aim is to identify the empirical common ground, and to delineate the different interpretations.

Results: The consensus is that the body of evidence is insufficient to answer the central question.

Conclusion: I will argue that there is enough evidence to reconsider the original two-consciousness-hypothesis and suggest possible venues for settling the dispute. In addition, it is suggested that the answers might not be a simple yes or no but that intermediate conceptualization needs to be entertained.

References

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Keywords: split-brain, conscious agent, cerebral hemisphere

T. TREMBLAY, A. GAGNÉ, N. BIGRAS. The Long-Term Effects of Screen Time on Cognitive Abilities.

Objective: “Screen time” (ST) comprises sedentary activities, and the WHO considers it to be a public health issue affecting children (WHO, 2019). In fact, the consequences of ST extend beyond the physical and also affect children’s cognitive development (Carson et al., 2015). However, few studies have investigated this topic longitudinally. This study examines the effect of ST at preschool age on various cognitive abilities at school age. Now that some public health authorities are revising their recommendations about ST (Ponti, 2019; Schiffrin et al., 2015), it seems important to verify the validity of limiting ST to 1 hour a day in preschool-aged children –as suggested by the WHO– to ensure optimal cognitive development.

Participants: The sample was composed of 142 children (53% girls) from a database of 4-, 5- and 7-year-old children (Bigras, 2009-2011).

Method: When the children were 4 years old, their mothers answered questions on sociodemographic factors and ST (weekly time spent watching television and playing video games). At age 7, the children took the WISC-IV and the reading and math tests from the WIAT-II.

Results: Children who had more than 1 hour of ST a day at preschool age scored significantly lower on tests of language skills (verbal and reading comprehension) at age 7. These results applied even when family income was controlled for.

Conclusions: Limiting preschoolers' ST to 1 hour a day is a valid way of contributing to optimal cognitive development since language skills are particularly affected in the long term. Two explanations of the link between language skills and ST will be discussed. It is likely that ST decreases family literacy activities (Kiren et al., 2017) and real and contingent interactions between children and adults (Barr & Linebarger, 2016).

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Keywords: Screen-time, Cognitive abilities, Infants

C. RUIS, J. KAL, I. HUENGES WAJER. Psychological strain after awake brain surgery?

Objective: Awake brain surgery has been performed frequently in the past several years, especially in patients suffering from a brain tumor in an eloquent area. In comparison to surgery under general anesthesia, an awake procedure has weighty benefits such as more extensive resection and fewer neurological deficits. The procedure might however also be stressful for patients. Aim of this study is to analyze the presence and course of symptoms of depression, anxiety and posttraumatic stress disorder (PTSD) before and after awake brain surgery.

Participants and Methods: Sixty-five patients (age >18) who were candidate for (a first) awake brain surgery were included. Before surgery, the Hospital Anxiety and Depression Scale (HADS) was administered. Post-operatively (4 weeks and 3 months after surgery) the HADS and a Dutch self-rating Inventory for PTSD (ZIL) were administered. In addition, patients were asked whether they related the possible symptoms of PTSD to the diagnosis of the brain tumor, the awake brain surgery, or determination of the grade of the tumor. Paired t tests and Wilcoxon Signed Rank Tests were used for the analyses.

Results: Just before surgery 22% of the patients had a score above cut off on the anxiety scale. Four weeks and three months after surgery this percentage was respectively 20% and 23%. For depression the percentages above cut off were 16% (pre), 14% and 23% (post). On group level, anxiety and depression scores did not significantly change over time. Four weeks after surgery 6% of the patients reported symptoms indicative of PTSD. After three months this was 2%. The awake surgery was least linked to these complaints.

Conclusions: Awake brain surgery did not result in elevated anxiety or depression levels. Postoperatively, a small percentage of the patients reported symptoms of PTSD complaints. In most cases, these symptoms were however not induced by the awake surgery.

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Keywords: brain tumor, anxiety, depression

B. HOLMAN, A. VAN ASSELT, A. M. RICHMOND, G. ANDREWS. Social Engagement: A Longitudinal Study of Children with Dysgenesis of the Corpus Callosum.

Objective: This study investigates the social development at 2 time periods in children aged 2-17 with a diagnosis of Dysgenesis of the Corpus Callosum (DCC).

Participants and Methods: The original data set was gathered 4-years apart (n=511) from individuals with DCC. Using targeted age groups, 48 (16 girls, 32 boys) met criteria. Younger children (ages 2- 9 n=19) and older children (ages 10-17 n=29) were included. The data were gathered by mailing packets to parents that included the Child Behavioral Checklist, a demographic questionnaire, and developmental questions.

Results: A MANOVA was used to analyze social engagement patterns. There was no main effect for gender for the initial and 4-year data. A main effect was found between age groups at the initial time. Older children had less difficulty showing social and emotional give and take than younger children (p=.008,

$\eta^2=.151$). We also found a significant interaction between age and gender. Younger girls had the least difficulty with social and emotional give and take while older girls had the most difficulty ($p=.001$, $\eta^2=.211$). The 4-year follow up showed significant interactions between age and gender. Older girls had the most difficulty with developing peer relations while young girls and older boys had the least amount of difficulty ($p=.006$, $\eta^2=.158$). Young girls had the most difficulty with showing social and emotional give and take while young boys had fewer difficulties ($p=.017$, $\eta^2=.119$).

Conclusions: Gender alone does not determine hindrances in social engagement for children with DCC. “Regular” development appears to benefit children in their ability to engage in social give and take. Younger girls struggle the most with social reciprocity. As the challenges of social engagement increase, older girls struggle most with developing peer relationships. The results of this study can influence considerations for treatment and intervention for commonly experienced social obstacles among children with DCC.

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Keywords: Dysgenesis, Corpus Callosum, Social Development

S. R. HOOPER, M. LANDE, J. T. FLYNN, C. D. HANEVOLD, K. MEYERS, J. SAMUELS, P. KHOURY, E. M. URBINA. The Relationship Between Cardiovascular Health and Cognition in Adolescents.

Objective: The Study of High Blood Pressure in Pediatrics: Adult Hypertension Onset in Youth (SHIP AHOY) is a 5-site project designed to examine Target Organ Damage (TOD) in adolescents. This study has three aims: (1) Determine BP group differences in executive functions (EF); (2) Examine the predictive value of BP for EF after adjusting for targeted covariates; (3) Examine the predictive value of the Cardiovascular Health Score (CVHS; an index comprised of Obesity, SBP, Lipids) in the prediction of EF.

Participants and Methods: This observational cohort study includes 302 adolescents (M age =15.5 yrs.) of both sexes and all races/ethnicities with strict inclusion and exclusion. Participants were stratified across 3 casual Systolic BP (SBP) categories: high-risk (SBP>90th%, $n=121$), mid-risk (SBP>80th% to 90th%, $n=74$), and normal BP (SBP<75th%, $n=107$). Outcome variables included standardized measures of attention, working memory, nonverbal IQ (NVIQ), and parent ratings of EF.

Results: Preliminary findings revealed significant differences between the normotensive group and the other two groups; subsequently, we combined the elevated and hypertensive groups for further analyses. For aim 1, the two groups differed on the TONI-4 ($p<.05$), WJ-IV Working Memory Index ($p<.05$), and CPT-3 Errors of Commission ($p<.05$); however, none of these differences survived adjusted analyses. For aim 2, SBP was found to be a significant predictor of TONI-4 NVIQ, but not for the other outcomes. This finding survived when multiple covariates were entered into the analysis ($p<.02$). For aim 3, the CVHS was a significant predictor for nearly all outcomes, with NVIQ surviving the entry of covariates into the model.

Conclusions: Findings from this study show a small, but significant relationship between cardiovascular health and nonverbal abilities—even after adjustment for targeted covariates. These abilities may represent a vulnerable downstream effect of TOD secondary to elevated BP levels.

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Keywords: hypertension, adolescence, neuropsychological outcomes

B. TESAR, M. SCHMOEGER, M. DECKERT, U. WILLINGER. Gender differences in Theory of Mind: Performance and underlying electrophysiological activity.

Objective: Cognitive Theory of Mind (ToM) is the attribution of mental states to oneself and others (Wellman et al., 2011) and is based on either visual cues such as eye gaze or on verbal cues (e.g. Frith et al.,

1999; Gabriel et al., 2019). This study investigated gender differences in ToM processing and its electrophysiological basis, due to a dearth of studies addressing this topic.

Participants and Methods: 20 healthy, righthanded students (50% female; 20-33 years, $M=24.1, SD=2.9$), performed an event-related potentials (ERP) task (*Brainy-ERP* – Deckert, Tesar, Schmoeger, & Willinger, 2016) to record neurophysiological correlates of basic (1. order) and higher order (2. and 3. order – level of difficulty) cognitive ToM based on visual stimuli using a 64-channel-EEG. They further conducted the ToM stories (e.g. Willinger et al., 2017) assessing 1., 2., and 3. order ToM based on verbal cues.

Results: Males showed significantly more negative early slow wave (ESW) ERP components (260-470ms) in second order cognitive ToM of Brainy-ERP ($F(1,18)=4.94, p=.039$), significantly higher behavioral cognitive ToM total scores ($F(1,18)=5.76, p=.027$) and by trend lower mean response times ($F(1,18)=3.07, p=.097$) than females. Females, however, showed significantly higher ToM stories total scores than males ($F(1,18)=5.26, p=.034$).

Conclusion: Whereas the result of female superiority in verbal based cognitive ToM is in line with previous studies (e.g. Bosco et al., 2014), this study further indicates a male superiority in visual based Tom. Furthermore, an early electrophysiological difference regarding early stages of higher order ToM processing was demonstrated.

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Keywords: cognitive ToM, Gender, ERP

R. COMPANY-CÓRDOBA, I. C. SIMPSON, A. SIANES, C. GARCÍA DE LA CADENA, J. A. IBÁÑEZ. Cognitive Performance of Children and Adolescents from low SES Backgrounds: The Case of Guatemala.

Growing up in low-SES backgrounds is known to be a risk factor for cognitive development, especially for language and executive functions performance. The main goal of the study was to obtain an objective measure of how vulnerability conditions impact in the main cognitive domains, comparing a vulnerable and non-vulnerable group of Guatemalan children with 10 recently standardized neuropsychological tests.

The sample was composed of 347 healthy boys (52.16%) and girls with a medium age of 11.3 ± 3 , from which 144 boys (50.7%) and girls with medium age 11.4 ± 3.6 live in low-SES conditions. All participants met the following inclusion criteria: a) being between the ages of 6 and 17 years old, b) currently living in the Guatemala, c) been Spanish speaker, d) having an Intelligence Quotient of ≥ 80 , e) having a score of < 19 on the Children's Depression Inventory, f) scoring < 65 in an anxiety scale. The cognitive domains assessed were language (comprehension, vocabulary and verbal fluency), attention (concentration and speed of response), visual perception, memory (visual and verbal) and executive functions (inhibition, flexibility and problem solving).

According with the results, living in vulnerability conditions could affect the performance in language ($ps \leq .022$) and attention tests ($ps = .000$). The results in executive function tests have to be taken carefully due to the additional variables that may have intervened in the assessment as the bilingual condition of rural low-SES children. Furthermore, memory does not seem to be affected by disadvantaged conditions. Those results show the importance of creating scales for a fair assessment of healthy children who live in vulnerable conditions as well as the need to create intervention programs to mitigate the effects that context cause in the cognitive development.

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Keywords: cognitive development, SES, neuropsychological assessment

C. G. ZUNDEL, M. KRENGEL, R. TOOMEY, B.-B. KOO, R. KILLIANY, E. SISSON, T. HEEREN, P. JANULEWICZ, M. ABOU DONIA, L. STEELE, N. KLIMAS, K. SULLIVAN. Verbal Memory Performance, Brain Volumetrics, and Blood Biomarkers of Neuroinflammation in Veterans with Gulf War Illness (GWI).

Objective: Gulf War (GW) veterans were exposed to neurotoxicants during the war that have been linked to adverse health outcomes including Gulf War Illness (GWI). Veterans with GWI continue to experience fatigue, chronic pain and cognitive problems including memory decrements. Neurotoxicant exposures are known to induce cytotoxic and neuroinflammatory responses which may subsequently damage the brain and affect cognition. In this study, we examined cognitive functioning in GW veterans nearly 30 years post-deployment and its correlation with brain volumetrics and circulating cytotoxic and neuroinflammatory blood biomarkers.

Participants: 266 GW veterans (244 with GWI and 42 healthy controls) from the Boston Gulf War Illness Consortium (GWIC) were included in the analyses. The sample was 85% male and the mean age was 52.6 years.

Methods: Participants were administered a neuropsychological battery consisting of attention, executive function, memory, motor, and visuospatial tests as well as questionnaires assessing wartime exposures and chronic health symptoms. Brain MRI was performed and blood samples were collected to examine potential neuroinflammatory and neuroimmune biomarkers of the disorder.

Results: Veterans with GWI performed more poorly on Short Delay, Long Delay, and Total Learning Trials 1-5 on the California Verbal Learning Test II (p 's < 0.05). In veterans with GWI, CVLT II performance was significantly associated with smaller total hippocampal volumes, smaller right hippocampal head volume, increased white matter hypointensity volume, and increased blood levels of glutamate and glial fibrillary acidic protein (GFAP).

Conclusions: This study provides objective evidence of verbal memory decrements in veterans with GWI that correlate with brain imaging alterations and blood levels of neuroinflammatory biomarkers. These biomarkers should be targeted for treatment development in veterans with GWI, specifically for their memory complaints.

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N. ALVAREZ MEDINA, L. OLABARRIETA-LANDA, E. VERGARA MORAGUES, D. RIVERA, J. C. RESTREPO, N. CADAVID RUIZ, J.-A. CALDERÓN, J. FOLLECO, J. C. ARANGO-LASPRILLA. Variables associated with clustering and switching strategies during semantic verbal fluency tests in children from Colombia.

Objective: To determine whether child's age and sex, and parents' mean education (PME) are associated with cluster and switching strategies during semantic verbal fluency (SVF) tests.

Participants and Methods: Six hundred sixty-six children from Colombia participated in the study. Slightly over half were girls (54.4%) and from public schools (50.2%), with an average age of 11.33 ± 3.28 and PME of 12.35 ± 5.65 years. Inclusion criteria were: 6-17 years of age, Spanish as primary language, an IQ of ≥ 80 on TONI-2, and score <19 on the Children's Depression Inventory. Children with history of neurologic/psychiatric disorders were excluded. Participants completed the SVF Animal and Fruit category tests and three scores were obtained for each test: number of clusters (NC), cluster size (CS), and number of switches (NS).

Results: Multiple linear regression (MLR) models that included child's age and sex, the PME and the type of school (private vs public) as independent variables were conducted for each of the three scores on the two SVF tests. All MLRs were significant. Age was positively associated with CS ($\beta=.38$), NC ($\beta=.46$), and NS ($\beta=.47$) for both Animals and Fruits tests (p 's < .001). Type of school and PME was not related to Fruits. For Animals, type of school ($\beta=-.12$) was also associated with CS, such that those children with from private

schools had larger CS ($p=.001$). PME was not associated with any score. Sex was not associated with any score.

Conclusions: Children ability to use cluster and switching strategies increase with age, possible reflecting the development of executive functions. Public vs. private school have some impact on the use of strategies but are of lesser importance than age. More research is needed to explore school and home-environment related variables that may impact performance.

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N. ALVAREZ MEDINA, L. OLABARRIETA-LANDA, E. VERGARA MORAGUES, D. RIVERA, J. C. RESTREPO, N. CADAVID RUIZ, J.-A. CALDERÓN, J. FOLLECO, J. C. ARANGO-LASPRILLA. Variables associated with clustering and switching strategies during phonological verbal fluency tests in children from Colombia.

Objective: To determine whether child's age and sex, and parents' mean education (PME) are associated with cluster and switching strategies during phonological verbal fluency (PVF).

Participants and Methods: Six hundred sixty-six children from Colombia participated in the study. Slightly over half were girls (54.4%) and from public schools (50.2%), with an average age of 11.33 ± 3.28 and PME of 12.35 ± 5.65 years. Inclusion criteria were: 6-17 years of age, Spanish as primary language, an IQ of ≥ 80 on TONI-2, and score < 19 on the Children's Depression Inventory. Children with history of neurologic/psychiatric disorders were excluded. Participants completed the PVF (F, A, and S phonemes), and three scores were obtained for each test: number of clusters (NC), cluster size (CS), and number of switches (NS).

Results: Multiple linear regression (MLR) models that included child's age and sex, type of school (private vs public), and PME as independent variables were conducted for each of the three scores on the two PVF tests. All MLRs were significant ($p's < .01$). Age was associated with CS, NC and NS for all dependent variables for all tests ($p's < .001$). PME and type of school was not associated with any score.

Conclusions: The use of cluster and switching strategies increased as children got older, probably reflecting the development of executive functions. Type of school and PME were have not impact on PVF. Intervention should consider child age for the development of verbal fluency strategies.

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N. ALVAREZ MEDINA, L. OLABARRIETA-LANDA, E. VERGARA MORAGUES, D. RIVERA, J. C. RESTREPO, N. CADAVID RUIZ, J.-A. CALDERÓN, J. FOLLECO, J. C. ARANGO-LASPRILLA. Cluster and switching strategies associated with verbal fluency performance.

Objective: To examine the sociodemographic characteristics and verbal fluency strategies associated with verbal fluency total score in a sample of healthy children from Colombia.

Participants and Methods: Six hundred sixty-six children participated in the study. Fifty-four percentage of the sample were girls and from public schools (50.2%), with an average age of 11.33 ± 3.28 and parents' mean education (PME) of 12.35 ± 5.65 years. Inclusion criteria were: 6-17 years of age, Spanish as primary language, an IQ of ≥ 80 on TONI-2, and score < 19 on the Children's Depression Inventory. Participants completed the semantic (Animals and Fruits) and phonological (F, A, S, M, R, and P) verbal fluency test. Four scores were obtained for each test: total score, number of clusters (NC), cluster size (CS), and number of switches (NS).

Results: All total scores were positively correlated with the child's age, PME, NC, CS, and NS ($p's < .05$). NC and NS showed high collinearity, so NC was removed from the analyses. Hierarchical regression analyses indicated that higher total scores in animals and fruits categories were related to larger CS and higher NS

($p's < .001$). Fruits total score was also related to older age ($p < .001$). PME was not related to Animals and Fruits total score. Hierarchical regression analyses indicated that higher total scores for each phoneme were related to older age, larger CS and higher NS ($p's < .001$). R and P phonemes were also related to higher PME ($p's < .01$). PME was not related to F, A, S and M total score.

Conclusions: Individual semantic and verbal fluency test total scores increased with age (except Animals), and when using cluster and switching strategies. Parent's education is not consistently related to performance. Better performance according to age may reflect the development of executive functioning required to successfully complete the task. Hence, professionals should focus on training cluster and switching strategies to improve verbal fluency.

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A. KROLL. Cognition and communication disturbances in patients with cerebellar tumors.

Objective: The aim of this study was to examine which disturbances in the area of cognitive functioning and communication were present in patients with cerebellar tumors in various localizations.

Participants and Methods: The comparative case study of patients with cerebellar tumors was prepared. The study involved 10 patients with cerebellar tumors of various localizations. The neuropsychological assessment with structured observation and interview was held. WAIS-R, WCST, and BVRT were used. The analysis of patients' statements, as well as the analysis of the medical documentation, was made.

Results: All but one participant scored under 100 in general IQ examination. Considering medical documentation and autobiographical data the decline in cognitive functioning after surgery compared to the pre-illness state was highly probable. General cognitive performance was influenced mainly by attention disturbances (both the ability to focus and to avoid distractions). In all but one participants the disturbances in the area of visual perception occurred. In all participants some difficulties in the verbal area were present, in two participants the verbal disturbances were the most significant. All participants showed significant difficulties in planning, cognitive flexibility, and cognitive control. During interviews, the patients indicated that the symptoms they experienced were very non-specific and for a long time interpreted rather as tiredness or irritability.

Conclusions: It could be concluded that executive functions deficits, especially in the area of attention, as well as disturbances in visual functioning are typical in patients with cerebral tumors. The difficulties in verbal functioning were minor but tended to share some similarities.

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Keywords: cerebellum, brain tumor, executive functions

M. A. SEDO. Executive deficits at serial planning tasks in learning-disordered children: unexpected intrusion of postural reflexes.

Rationale: EX.PRE.S.S. (Exploration of Preparedness for School Success) is a neurodevelopmentally-oriented academic battery comparing *automatic* and *effortful* behaviors in the Verbal, Numerical and Motor areas, presented as graded lists. Gestures and Tappings were freely adapted from French tests by Berges-Lezine (1972) and Stamback (1958).

Methods: Ss were 90 normative control students in 1st, 3rd and 5th grade level of the Boston Schools; comparing them to 28 successive SpEd referrals, all of them male Hispanic students aged 7 to 9 In this city, new referrals are expected to function in the lower 15% of their population.

Results: In the Verbal areas, regular and referred students obtained grades 2.5/ 1.5, with a grade of difference; in the Numerical areas, scores were 3.5 and 1.5, more than one single grade below. In the motor areas, scores were 3.5 and K.5, with *self-controlled* sequential performance well under *reflected* motor imitation.

Discussion: Quite unlike other motor imitation tests, our test doesn't prepare hand gestures behind a screen (like in the original test), but presents them as a smooth "motor melody". The difference between (*reflected*) Imitated Gestures and (*self-generated*) Tappings was the most characteristic difference between both groups. (Low Tappings score may also betray a sizable deficit in working memory span.)

Conclusions: EXPRE.S.S. may help confirm the difference between the levels of knowledge and performance; and offers immediate verbal and numerical remedial objectives. It may also point to postural aspects of the learning problems of other-oriented learning disordered students, often suggested in the past by authors such as Jean Ayres, Bobath and de Quiros; and about the reason for the validity of posturally-organized remedial cross-modal methods (such as: Kodaly, Orff, sign-language, hand tracing, etc).

(Copies of protocol-response sheet – showing its item-content- will be offered at the poster site.)

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Keywords: executive functions, achievement, motor development

G. PLUCK. ABO Blood Groups and Neurocognitive Function.

Objective: The ABO blood group phenotypes influence plasma levels of von Willebrand factor, a glycoprotein involved with blood coagulation. People with the O blood type have less available von Willebrand factor and are at reduced risk of various circulatory disorders, including stroke. In addition, structural MRI has shown differences in brain structure between healthy individuals with O type blood compared to non-O type. The O phenotype has also been linked to reduced risk of cognitive decline and dysfunction in older people. The objective of the current research was to explore whether blood type is linked to variation cognitive functions in healthy young adult participants.

Participants and Methods: 132 student participants from two universities were evaluated with eight different assessments of cognitive functions, all of which have recognized neurophysiological substrates. These were precategorical shape recognition (occipitotemporal), visuospatial processing (posterior parietal), language-syntax (left perisylvian), focused attention (right perisylvian), declarative memory (medial temporal), procedural learning (basal ganglia), executive function (dorsal prefrontal) and advantageous decision making (ventral prefrontal).

Results: Ability in precategorical visual shape recognition was significantly better in participants with type O blood, compared to those with non-O phenotypes. This effect was evident in samples from both universities, and was unrelated to demographic factors. No other differences were observed between groups defined by blood type.

Conclusions: The ABO blood group system may be a hitherto unrecognized biomarker for normal variation in neurocognitive function. In particular, people with the type O phenotype may have better functioning in the ventral occipitotemporal visual processing stream. This finding adds to and extends the existing literature suggesting an advantage of the type O blood phenotype in cognitive and neurological health.

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Keywords: visuospatial functions, cognitive neuroscience, cognitive functioning

S. CANKURTARAN, E. CZERNIAWSKA, A. R. EGBERT, D. BÜYÜKGÖK, G. BAHAT ÖZTÜRK. The sunshine vitamin: does it aid resilient cognitive aging?

Objective: Worldwide, about 1 billion individuals have hypovitaminosis D. Only 15% of older adults reach appropriate levels of the "sunshine" vitamin D. This vitamin is related to brain and cognitive function, yet, the literature remains inconsistent. The current study examines the effects of vitamin D levels on cognitive functions in adults aged 50+.

Participants and Methods: Twenty-eight adults aged 56–86 years participated in the study. The cohort was divided into two groups, i.e., hypovitaminosis D (≤ 25 nmol/L, N=14) vs. appropriate vitamin D levels

(>40nmol/L, N=14). Participants completed the following assessments at the Istanbul University, Faculty of Medicine, Istanbul, Turkey: Benton Facial Recognition Test; Boston Naming Test; Stroop Test; Verbal Fluency Test; Clock Drawing Test; Oktem Verbal Memory Processes Test; and Digit span; Logical Memory; Mental Control; Proverbs; Visual Reproduction subtests of Wechsler Memory Scale- Revised. Hierarchical multivariate regression assessed the influence of vitamin D on cognitive function after accounting for the effects of age, sex, and education.

Results: The most comprehensive regression model explained 68% of variability in scores on mental control subtests of WMS-R. After accounting for demographic characteristics, hypovitaminosis D was significantly related to decreased scores on these tests ($p= 0.031$, 95% CI = -30.14, -1.55). No statistically significant relationships were noted between vitamin D levels and scores on other cognitive measures.

Conclusions: In adults aged 50+, hypovitaminosis D can contribute to decreased sustained attention, working memory and inhibition. These findings suggest that maintaining optimum vitamin D levels may play an important role for resilient cognitive aging in adults 50+.

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Keywords: aging(normal), medical disorders /illnesses, executive functions

A. BALA, T. DZIEDZIC, T. GOTLIB, A. MARCHEL. Quality of life of patients with pituitary tumors – a follow up study.

Objective: Pituitary tumors can cause a number of ailments related to their effect on hormonal secretion and/or the mass of tumor and its pressure on adjacent structures. Nose endoscopic surgery is considered to be less invasive than craniotomy and is also associated with a lower risk of complications. Study aimed to assess the quality of life, mood and the presence of nasal symptoms before and after endoscopic surgery of patients with pituitary tumors.

Participants and Methods: The study involved 33 patients with pituitary tumors. Neuropsychological and neurological evaluation was conducted before and six months after the surgery. The following set of questionnaires was used: Sino-Nasal Outcome Test (SNOT22), Anterior Skull Base Questionnaire, Acceptance of Illness Scale (AIS), Hospital Anxiety and Depression Scale (HADS), Quality of Life Questionnaire (WHO-QoL-BREF) and Beck Depression Scale (BDI-II). General cognitive status of patients was screened with Montreal Cognitive Assessment (MoCA) test.

Results: Most of the patients in the preoperative study had significantly lowered results in all analyzed variables (more than 1 SD below cut-off scores as compared with normative data). After the surgery, some patients reported nasal problems (e.g., running nose or breathing difficulties) and some of them complained of periodic headaches. However, most of the patients rated their overall quality of life higher than before and were in a better mood than before surgery. Moreover, we found a significant negative correlation between depression intensity (BDI-II scores) before surgery and quality of life (WHO-QoL-BREF) after the surgery. AIS scores correlated negatively with patients' QoL before and after the surgery. Older patients reported more symptoms. Cognitive status did not affect QoL or mood of the patients.

Conclusions: Pituitary tumors have a negative impact on the QoL and mood of patients. Endoscopic surgery is well tolerated and improves their general well-being.

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Keywords: pituitary tumors, quality of life, neurosurgery

Poster Session 11: Categories- Cancer; Genetics; Infectious Disease; Other

E. IRESTORM, I. TONNING-OLSSON, I. ØRA. Auditory hypersensitivity and attention in survivors of paediatric brain tumours.

Objective: Both auditory and visual hypersensitivity are clinical features of mental fatigue after acquired brain damage or in neurological disorders. Both types of hypersensitivity are also associated with attention deficits, especially in neurodevelopmental syndromes. The aim of this study was to examine auditory and visual hypersensitivity, and associations to attention, in a group of children and adolescents treated for paediatric brain tumours (PBTs).

Participants and Methods: Included in the study were 34 survivors of PBTs, 8–18 years of age (M: 13.6, SD: 3.0). Eighteen participants were female and 16 were male. Mean time since diagnosis was 4.2 years (SD: 2.2). Auditory and visual hypersensitivity were assessed using two items from the questionnaire Mental Fatigue Scale (MFS), scored on a 7-point Likert scale from 0 – 3. Scores above 1 indicate hypersensitivity. Attention was assessed using Conners Continuous Performance Test 3 (detectability, commissions, variability), and T-scores above 60 were considered impaired. Spearman correlations were conducted between the performance-based and self-report measures.

Results: Results from the MFS revealed that 53% of the survivors experienced auditory and 18% visual hypersensitivity as a sequela. Regarding attention, elevated scores were more common for detectability (18%) and variability (21%) than commissions (8%). Visual hypersensitivity was not significantly associated with any of the attention measures, whereas auditory hypersensitivity was significantly associated with detectability ($r=.42, p=0.013$) and variability ($r=.57, p<0.001$).

Conclusions: These results suggest that auditory hypersensitivity is common after treatment for PBT, and that it is associated with decreased attention. This relationship should be taken into consideration when assessing survivors of PBTs.

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Keywords: Brain tumours, Attention, Auditory hypersensitivity

R. J. KAUTIAINEN, B. DWIVEDI, T. J. MACDONALD, T. Z. KING. Multiple Risk Alleles Increase Cognitive and Adaptive Deficits in Long-Term Survivors of Pediatric Medulloblastoma Tumors.

Objective: Germline polymorphisms on pathophysiological pathways that contribute to neurotransmission, defense against oxidative stress, and folate metabolism have been associated with adverse cognitive outcomes in long-term cancer survivors. The additive effect of polymorphisms from multiple pathways has not yet been explored. We investigated the association of *GSTP1*, *MTRR*, *MTHFR*, and *COMT* polymorphisms with intellectual, neurocognitive skill, and adaptive outcomes. We hypothesized that the additive risk of polymorphisms from multiple pathways would be related to cognitive and adaptive deficits.

Participants and Methods: Eighteen pediatric medulloblastoma survivors, on average 12.42 years post-diagnosis, completed the Wechsler Abbreviated Scale Intelligence, Digit Span Forward and Backward, and Oral Symbol Digit Modality Test. Informants were interviewed with the Scales of Independent Behavior-Revised (SIB-R), a measure of adaptive functioning. *GSTP1*, *MTRR*, *MTHFR*, and *COMT* gene polymorphisms were detected using whole-genome sequencing data. Survivors were split into groups based on whether they had more than two risk polymorphisms (high-risk group), or two or fewer risk polymorphisms (low-risk group).

Results: High-risk survivors performed significantly worse on verbal IQ ($p = .009$), full-scale IQ ($p = .043$), SIB-R ($p = .014$), and working memory ($p=.048$) than low-risk survivors. We found large effect sizes between

survivor groups, with high-risk survivors obtaining lower mean scores, across measures of attention span ($d = .59$), processing speed ($d = .61$) and performance IQ ($d = .51$).

Conclusions: Replication of these findings in a larger sample will be critical to isolate risk factors beyond individual polymorphisms, a gene family or a single pathway, and inform precision medicine advances. The additive effect of polymorphisms on pathophysiological pathways affected by cancer treatment may explain variance in outcomes for long-term medulloblastoma survivors.

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Keywords: genetics, brain tumor, neurocognition

N. GAWRON, E. ŁOJEK, T. WOLAK, B. SZYMAŃSKA-KOTWICA, A. R. EGBERT, A. PLUTA, M. CHOŃSKI, M. SOBAŃSKA, A. DESOWSKA, A. HORBAN, E. FIRLAĞ-BURKACKA, P. BIEŃKOWSKI, H. SIENKIEWICZ-JAROSZ, A. ŚCIŃSKA-BIEŃKOWSKA, S. RAO. Memory performance heterogeneity, lowest ever CD4 lymphocyte count (CD4 nadir), and white matter integrity in HIV+ men on effective treatment.

Objective: The aim of the study was to explore memory profiles in a group of Polish HIV+ men receiving cART. We also examined associations between memory performance and white matter (WM) fractional anisotropy (FA) as well as clinical factors reflecting the severity of HIV infection.

Participants and Methods: Ninety-five HIV+ and 95 control volunteers ages 23–75 participated. At the time of the study HIV+ patients had undetectable viral load, no dementia, and were free of active opportunistic diseases. Memory was evaluated with CVLT, WAIS Digit Span, and Corsi Block Tapping. Test scores were assigned into working memory and learning components. Based on these components, k-means clustering divided HIV+ participants into 3 clusters. FA was measured using the diffusion tensor imaging technique.

Results: Cluster 1 ($n=32$) performed the lowest in both working memory and learning and included the oldest participants; cluster 2 ($n=33$) demonstrated low working memory and high learning; cluster 3 ($n=30$) had average both working memory and learning, and comprised the youngest subjects. Duration of HIV infection was longest in cluster 1 and shortest in cluster 3. Duration of cART was longest in cluster 1 and shortest in cluster 3. CD4 nadir was lowest in cluster 2 and highest in cluster 3. Among patients who took part in WM assessment ($n= 56$), these from cluster 2 had trend-like FA reductions in the right superior cerebellar peduncle when compared to patients from cluster 1, and in the right retrolenticular part of the internal capsule, right posterior thalamic radiation, right saggital striatum fasciculus when compared to patients from cluster 3.

Conclusions: The results of the study have revealed several profiles of working memory and learning performance in HIV+ virally suppressed individuals treated with cART. Our findings suggest that in some patients very low CD4 nadir values may have negative impact on later working memory functioning.

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Keywords: HIV, working memory, learning

F. J. LÓPEZ, M. QUINTANA, N. ANGLÈS, M. J. SENDER, C. TAOR, L. FARRÀS, M. A. JURADO, M. GAROLERA. Predictive Capacity of Cognition and Personality in Body Mass Index (IMC).

Objective: The interest for the personality in patients with eating disorders has increased. Studies suggest that the personality traits may be related to the development of obesity. In the same manner, cognitive performance is also linked to obesity. The study aims to check if obesity is determined by personality, cognitive and social demographic variables, granting it a predictive value.

Participants and Method: The sample size was of 175 adult participants, 71 male (40,6%) and 104 female (59,4%), with an average age of 30,81 years (SD=8,49) and 13,36 years of studies (SD=2,5). 68 participants (38,85%) had a BMI greater than 30. The personality variables were assessed with the Cloninger TCI-R. The cognition variables were attention, assessed with CPT-Test and working memory assessed with “letters and numbers” the WAIS-III. Social demographic variables were sex, years of studies and age, since they could act as confusion variables. The SPSSv21 was used for the statistical analysis and a predictive model was elaborated through a step by step linear regression. Alpha level of 5%.

Results: The study shows the existence of a significant correlation between BMI and the Omissions of CPT variables ($r=.220$), persistence ($r=.215$) and auto-direction ($r=.200$). Two predictive models were found, the first one only uses the omission of CPT variable ($r=.220$ and $r^2=.048$). The second model, with a greater predictive value, uses the personality persistence variable and the cognitive variable of omission in CPT ($r=.293$ and $r^2=.086$).

Conclusion: The study shows a correlation between cognitive, personality and BMI variables. The model with a greater explanatory power would imply two variables and it would only account for the 8,6% of the variance explained, an insufficient explanatory value, leaving 91,4% of the attributed variance to other variables not included. Future research will include other variables to increase the variance explained or that will better explain the variability.

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Keywords: Obesity, Personality, Cognition

H. T. JOHANSEN, J. JØRGENSEN, K. TROLAND. Neuropsychology and employability – a review of the literature.

Objective: The aim of the present review was to investigate the status of the literature on neuropsychological assessment and determining employability and job match. Work policies in Europe have shifted focus from whether or not a person can work given health problems towards the person’s possibilities to obtain employment despite health problems. Consequently, assessing employability has become one of neuropsychologist’s most common referral questions.

Methods: A systematic review was conducted to identify studies investigating the relationship between neuropsychological assessment and employability. Peer-reviewed, original papers were included if they contained: 1) a measure of neuropsychological functioning, 2) a measure of employment status and 3) a statistical test of the association between them.

Results: We identified 1512 potentially relevant articles, 38 studies met inclusion criteria. An additional 13 papers were retrieved from reference lists of review-articles. The final sample was 51 articles. Based on the objective of the studies, defined by their authors, we identified 3 main groups: 1) general utility of neuropsychological assessment in predicting employability, 2) validating neuropsychological tests or test batteries and 3) investigating functional outcomes and prognosis of specific diagnostic groups.

Conclusions: Our findings support the ecological validity of neuropsychological assessment by confirming the association between test data and employment status. Furthermore, neuropsychological functioning predicts employability better than do diagnoses. Very few articles, however, discuss whether and how data can be used to facilitate employability and job match. This is a paradox considering contemporary work policies. The field of vocational neuropsychology needs to develop, emphasizing how data could be used to enhance job match and help people obtain and keep employment.

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Keywords: Vocational neuropsychology, Employability, Job match

G. PEREA GUZMÁN, D. GONZÁLEZ GALLARDO. Neurocognitive Profile in Pediatric Leukoencephalopathy Associated with Deletion in the Cytobanda 17p13.3: Single Case Study.

The 17p13.3 deletion, including the YWHEA, CRK genes, except LIS1, is characterized by facial dysmorphisms, developmental delay, and epilepsy.

Objective: describe the first neurocognitive profile of a patient with a 17p13.3 deletion and the possible changes associated with a neuropsychological intervention.

Method: A neuropsychological evaluation was performed with the Wechsler Preschool and Primary Scale of Intelligence tests third edition [WPPSI-III], Neuropsychological battery for preschoolers [BANPE] and Adaptive Behavior Assessment System second edition [ABAS-II]; The Rourke development neuropsychological rehabilitation/rehabilitation model was chosen for the intervention. The patient was re-evaluated 10 months later with the same instruments.

Results: Magnetic Resonance Imaging [MRI] indicates hyperintensities and microcysts mainly in temporoparietal regions; Video Electroencephalogram [V-EEG] reports on cortico-subcortical left frontotemporal dysfunction and absence seizures; genetic results identified a deletion in 17p.13.3; the WPPSI-III [PSI] processing speed index showed a decrease and the General Language ratio reported an increase; BANPE identified a decrease in tasks related to expressive language, auditory memory, ISP and flexibility; ABAS-II reports changes in sub-areas.

Conclusions: part of the neurocognitive profile can be interpreted from MRI; for example, PSI failures may be related to the areas of demyelination and cysts. The findings related to failures in language, executive functions, and memory can be attributed to the V-EEG findings. The YWHEA and CRK genes are associated with processes of regulation of neurogenesis and differentiation, proliferation and migration, which conditions structural and functional alterations. The neurocognitive profile and its progress can be more easily interpreted under the paradigm of the connectome and can be understood as a structural-functional connectivity syndrome.

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Keywords: genetic neuropsychology, pediatric neuropsychology, neuropsychological outcome

C. M. DOMÍNGUEZ GARCÍA, D. M. BELÉN PRIETO CORONA, C. A. SERRANO JUAREZ. Long- Term Neuropsychological Outcome of a patient with Rickettsia Encephalitis.

Objective: Rickettsias are a diverse collection of intracellular gram-negative bacteria found in ticks, lice, fleas, mites and mammals. Rickettsia species cause a variety of spotted fevers, patients usually present febrile rashes, nausea, vomiting, abdominal pain, encephalitis, hypotension, renal failure and respiratory distress, although it may vary. The objective of this work was to assess the neuropsychological state of a 36-year-old female medical resident who referred memory and organizational problems; originated by a rickettsia encephalitis presented 6 years ago.

Participants and Methods: A 36-year-old female medical resident with a subspecialty in pediatric pathology, who underwent a semi-structured interview and a neuropsychological evaluation that included the following neuropsychological tests: Integrated Program of Neuropsychological Exploration (PIEN) short version, Neuropsi Attention and Memory, Verbal Spain-Complutense Learning Test (TAVEC), Wisconsin Card Sorting Test, Tower of London and selected subtests of the Neuropsychological Battery of Executive Functions and Frontal lobes (BANFE).

Results: She was able to actively record, code and maintain the information, but presented slight failures in evocation, as well as an alteration in executive functions: inhibitory control, planning, processing speed, self-monitoring and attention, nevertheless her cognitive flexibility was preserved. Despite having a fluent language and adequate verbal and written comprehension, anomies and circumlocutions were detected.

Conclusions: The few documented cases about the long-term cognitive repercussions of Rickettsia Encephalitis, make the evaluation relevant to contribute to the knowledge collection of this entity. Alteration in cognitive functions and the presence of anomies were found as the main affectations in this case.

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Keywords: Rickettsia, encephalitis, neuropsychology

C. M. DOMÍNGUEZ GARCÍA, D. M. BELÉN PRIETO CORONA, C. A. SERRANO JUAREZ. Neuropsychological Intervention in Attention and Visuospatial Abilities in children with Williams syndrome.

Objective: Williams syndrome (WS) is a neurodevelopmental disorder caused by the deletion of genes on chromosome 7q11.23. Its neuropsychological profile is characterized by significant difficulties in attention and visuospatial abilities. The objective of this study was to create and implement an intervention program focused on these difficulties.

Participants and Methods: 2 children, ages 9 and 13 (at the time of the evaluation) with the clinical diagnosis of WS. Participants underwent a neuropsychological evaluation with the following tests: Wechsler Intelligence Scale for Children (WISC-IV), Neuropsi Attention and Memory, Developmental Test of Visual Perception (DTVP-3), Child Neuropsychological Evaluation (ENI-2), Children and Adolescents Evaluation System (SENA) and Adaptive Behavior Evaluation System (ABAS II). At the end of the evaluation, a psychoeducational session was held with the family members of each children and subsequently the intervention program was applied two times per week for 6 months. The program consisted of 35 sessions of one hour each, plus the time needed to explain the parents the activities and exercises for home.

Results: After the intervention, clinically significant differences were found in attention as well as in visuospatial abilities. Additionally, parents reported improvements, especially in visuomotor coordination and reading. During the program, one of the children showed behavioral symptoms of anxiety that required additional intervention.

Conclusion: The Neuropsychological Intervention in Attention and Visuospatial Abilities in children with Williams syndrome appeared to improve the performance of these abilities as well as others such as reading and writing. The results also suggest that these interventions must contemplate emotional and social aspects, considering that people with WS have different needs in these areas.

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Keywords: Williams syndrome, neuropsychology, intervention

L. C.M. VAN DONGEN, E. WINGBERMÜHLE, T. KLEEFSTRA, J. I.M. EGGER. Neuropsychology of rare genetic syndromes: cognition and behavior in Witteveen-Kolk, KBG, and Kabuki syndrome.

Objective: New genetic techniques have led to an increase in identified causes of neurodevelopmental disorders. Knowledge of the specific strengths and weaknesses in both cognitive and behavioral functioning of individuals with rare genetic syndromes is important for the development of interventions for their accompanied learning and behavioral problems. Although most studies include descriptions of developmental delay, there is a lack of studies that focus on cognitive functioning in more detail.

Participants and Methods: The neuropsychological profiles of both children and adults with Witteveen-Kolk syndrome (WITKOS, $n= 5$), KBG-syndrome (KBGS, $n= 18$), and Kabuki syndrome (KS, $n= 29$) were identified in three separate studies. Measures of all cognitive domains were obtained and supplemented with

behavioral findings from structured observations and questionnaires. Performances were compared with normative means, and for the KBGS and KS studies supplemented with a comparison with a mixed control group of patients with other genetic syndromes ($n = 15$ and 17 respectively).

Results: A slow speed of information processing as well as problems in sustained attention, and executive functioning were found for WITKOS. As for KBGS, disinhibition, as well as impairments in sustained attention and cognitive flexibility were found. Furthermore, KS was characterized by weaknesses in visuoconstruction and relative strengths in auditory memory. Behavioral profiles included social difficulties and internalizing problems in patients with WITKOS and externalizing problems in patients with KBGS.

Conclusions: Syndrome-specific cognitive and behavioral profiles were identified for WITKOS, KBGS and KS, providing directions for personalized treatment interventions. Furthermore, the design of these studies, including the use of a patient genetic control group, may be a useful framework for future neuropsychological studies of rare genetic syndromes.

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Keywords: genetic neuropsychology, cognitive functioning, genetic disorders

D. J. HARDY. Pleasure and Anxiety in Autonomous Sensory Meridian Response (ASMR).

Objective: Autonomous sensory meridian response (ASMR) is a unique sensory experience characterized as a tingling electro-static sensation typically at the back of the scalp but sometimes other body regions as well (back of the neck, spine, etc.). Common ASMR triggers include whispering, personal attention, observation of slow or repetitive movements (e.g., folding towels), crisp sounds, and so on. For unknown reasons, ASMR seems to be experienced only in some people (including the author). Only a handful of formal studies of ASMR have been conducted to date, and the prevalence of ASMR is unknown.

Participants and Methods: The present study involved 496 college students and a survey that included questions on mood, personality, and other psychological factors, as well as an inquiry about possible ASMR experiences.

Results: Of this group, 104 participants (21%) reported they experienced ASMR, 260 (52.4%) reported no such experience, and 132 (26.6%) were unsure. Similar to previous research, whispering sounds was the most frequent trigger and the posterior scalp was the most common loci for ASMR. Interestingly, anxiety, as measured by the Beck Anxiety Inventory, was significantly higher in the ASMR group ($p = .005$). A majority (44.2%) of those in the ASMR group indicated that the experience did have an impact on mood.

Discussion: Because ASMR is typically a euphoric experience and associated with improved mood, it is tentatively proposed, based on these preliminary results, that ASMR is a unique and adaptive mechanism in certain individuals with generally higher levels of anxiety, to lower such anxiety to a more optimum level that results in improvement of mood as well. The possibility of ASMR having clinically ameliorative effects increases the importance of researching this curious phenomenon.

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Keywords: ASMR, anxiety, mood

E. CARRANZA ESCÁRCEGA, A. N. SEUBERT RAVELO. A case of visospatial hemineglect secondary to corpus callosum glioblastoma.

Objective: Unilateral spatial neglect is a relatively common and disabling neurological disorder after unilateral brain damage, specifically in the right parietal lobe. It is characterized by a lack of awareness of sensory events located towards the contralesional side of space (usually right lesions and neglect of the left visual side). Nevertheless, recently it has been described that lesions towards the right parietal lobe can cause

this syndrome, that's why the aim of the present study was to assess heminegligence symptoms in a patient with a corpus callosum lesion do to a tumour.

Participants and method: A 52-year-old female patient with a diagnosis of probable grade 3 glioblastoma multiforme, affecting two anterior thirds of the corpus callosum, with extension to the lower right parietal lobe. PIEN (Programa integrado de exploración neuropsicológica) in its short version to assess the general cognitive functioning of the patient.

Results: The patient presented classic signs of heminegligence that were evidenced in the following tasks: copy of complex figures, word and text readings, visual tracking and use of writing space. She also presented failures in immediate memory and working memory.

Conclusions: The effects of heminegligence are not explained exclusively by focal parietal lesions, but by diaschisis effect, affected projection and commissural fibers. Intra hemispherically it has been observed that disconnections due to damage of the upper longitudinal fasciculus causing hypoactivity of ipsilateral structures (frontal cortex and upper colliculus), would cause alterations to redirect attention.

Interhemispheric disconnections (lesions of the splenius of the corpus callosum) cause disinhibition of homologous structures contralateral to the lesion, which will cause abnormal inhibition of the injured tissue, the right hemisphere can't inhibit the left hemisphere, it is not possible to disengage the attention of the right visual side.

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Keywords: brain tumor, corpus callosum, visuospatial neglect

J. I.M. EGGER, W. M.A. VERHOEVEN, T. KLEEFSTRA. Cognitive decline and behavioural regression suggestive for early dementia in a patient with neurodevelopmental disorder due to a novel pathogenic variant of the MBD5 gene.

Objective: Patients with deletions, duplications or pathogenic variants of the MBD5 gene in the 2q23.1 region are subsumed in the group of MBD5-associated neurodevelopmental disorder (MAND) syndromes. These are characterized by intellectual disability, seizures and symptoms from the autism spectrum. Rarely, MAND is associated with regression starting either at early infancy or at midlife. Here a patient with a novel pathogenic variant is assessed in order to investigate the putative psychopathological phenotype.

Participants and Methods: Detailed description of a severely intellectually disabled 60 years old autistic female in whom therapy resistant complex partial epilepsy was present that started at the age of 16. Exome sequencing disclosed a novel heterozygous pathogenic frameshift mutation in MBD5.

Results: Neuropsychiatric and neuropsychological examination revealed autistic behaviors with echolalia, perseverations, lack of initiative, and low responsiveness. Formal intelligence testing was not possible. Vineland Communication, Daily performance and Socialization scores were 5;3, 3;8 and 3;9 y;m respectively, clearly lower as compared to the developmental age four years earlier (6;11, 6;11 and 5;1 y;m) confirming the observed decline in general functioning over the past years. ADOS-2 score of 21 (cut-off score = 10) corroborated a diagnosis of autism. Cognitive and behavioral regression was concluded to occur towards the patient's sixth decade. The novel heterozygous pathogenic frameshift mutation of MBD5 was considered to be causative for the combination of intellectual disability, treatment-resistant epilepsy and autism.

Conclusion: The presented patient is the second with a pathogenic MBD5 mutation in whom the course of disease is suggestive of early onset dementia starting in her fifth decade. These findings stress the importance of exome sequencing, also in elderly intellectually disabled patients, particularly in those with autism.

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Keywords: Neurodevelopmental disorders, Rare genetic disease, MAND

C. SANTOS-LIMA, N. ABREU, L. LOPES ARAÚJO-DE-FREITAS, B. LOPES DE SOUZA-MARQUES, A. P. JESUS-NUNES, L. LINS-KUSTERER, S. CUNHA, A. LYRA, M. I. SHINONI, R. PARANÁ, L. C. QUARANTINI. Neuropsychological functioning and health-related quality of HCV-infected subjects in Direct-Action Antiviral treatment.

HCV is the chronic viral infection that most affects the world population and it may cause impairment in mental health, health-related quality of life and neuropsychological functioning. The treatment with direct-acting antiviral (DAAs) is well tolerated and increases sustained virological response (SVR) of patients infected by HCV. However, there is no evidence of possible impacts on cognition, health-related quality of life and mood in HCV-infected individuals receiving DAAs treatment.

Objective: to evaluate cognition, health-related quality of life and depressive symptoms in HCV-infected subjects before and after treatment with DAAs.

Participants and Methods: twenty-one subjects completed neuropsychological and clinical assessments before and after treatment.

Results: significant differences were observed on entire response pattern and on the changing intervals between stimuli. In addition, the subjects presented an improvement of the impression of health-related quality of life comparing the two evaluations.

Conclusions: our findings, considering the SVR, suggest the improvement of attentional and health-related quality of life aspects, in addition to the absence of impairments related to cognition, depressive symptoms and general health.

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Keywords: hepatitis C, neuropsychological functions, DAAs treatment

L. FICHTINGER, N. HUBER, V. ROSENMAYR, L. DAUSEL, U. LEISS, I. SLAVC, P. DEIMANN, U. KASTNER-KOLLER, T. PLETSCHKO. Everyday life participation of patients with neurofibromatosis type 1 during childhood and adolescence.

Objective: Neurofibromatosis type 1 (NF1) is a disease with a broad range of cognitive, academic and social deficits. To date, there is a lack of studies that can yield information about the impact of these deficits on the daily life of the affected children and adolescents. Therefore, this study aimed to compare two questionnaires, the “Vineland Adaptive Behaviour Scales-II” (VABS-II) with the “Participation Scales 24/7” (PS 24/7), in its use to function as screening instruments in the neuropsychological aftercare. Thus, the quality of the PS 24/7 and VABS-II to predict neuropsychological test scores was evaluated. A secondary aim of the study was to investigate the predictive value of the two questionnaires concerning the implementation of special interventions in everyday life.

Participants and Methods: The study was conducted at the Department of Pediatrics and Adolescent Medicine at the Medical University of Vienna. At the NF1 outpatient clinic, 22 children and adolescents with NF1 received a routine neurocognitive aftercare where neuropsychological assessments took place. Regression analyses were used to evaluate the predictive values of the PS 24/7 and VABS-II subscale domains with 1. neuropsychological test scores (hierarchical multiple regression) and 2. relevant external criteria.

Results: Significant differences between the two questionnaires, VABS-II and PS 24/7, in regard to predicting neuropsychological test scores were found. Further, the PS 24/7 turned out to have high predictive values concerning the implementation of special interventions in everyday life in children and adolescents with NF1.

Conclusions: In this study, the largely unexplored assessment of functioning in children and adolescents with NF1 was addressed. In addition, the importance of the use of tools with ecological validity to successfully assess functioning and participation was underlined to ensure quality of surveillance in the aftercare of chronically ill patients.

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Keywords: Neurofibromatosis type 1, Children and Adolescents, Everyday life participation

L. L. MEIJER, Z. A. SCHIELEN, K. VAN REE, C. DIJKERMAN. Affective touch reduces mechanically induced itch experience.

Objective Research into pain, itch and affective touch (slow, light stroking of the skin) revealed an inhibitory relationship between affective touch and pain and between pain and itch. However, little research has been done on the relationship between itch and affective touch. This study investigated whether there is a relationship between itch and affective touch, and if so, whether affective touch inhibits itch.

Participants & Methods 61 healthy participants took part in this study. Exclusion criteria; skin condition with itch as a symptom or a pacemaker. Itch was induced with a current stimulator DS7 (electrode was placed on the radial side of the inside of the wrist), set on 200V with a frequency of 50Hz. The level of mA was adjusted during the experiment based on the experienced level of itch. Participants underwent two conditions, affective touch (stroking velocity of 3cm/s) and non-affective touch (stroking velocity of 18cm/s) (order was randomized). Stroking was applied to the same arm as the itch. Experienced itch and pleasantness were measured with VAS. Each condition had ten blocks of two minutes stimulation.

Results The VAS scores for itch were significantly lower during the affective touch condition. This relieving effect is independent of the experienced pleasantness. In addition, affective touch was shown to be most effective in reducing itch the first six minutes, whereafter the relieving effect stabilizes but still persists.

Conclusions Affective touch has a relieving effect on electrical simulated itch. The relieving effect is noticeable after two minutes, it stabilizes after 6 minutes and will persist up to 20 minutes. This effect is independent of the experienced pleasantness, which suggest that the relieving effect is likely to be caused by the activation of CT-fibers and not by how pleasantly affective touch is experienced. This could indicate that there is also an inhibitory relationship between the CT afferent system and itch.

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Keywords: Affective touch, Itch

L. DAUSEL, L. FICHTINGER, U. LEISS, I. SLAVC, P. DEIMANN, U. KASTNER-KOLLER, T. PLETSCHKO. Everyday life participation of childhood brain tumor survivors during childhood and adolescence.

Objective: The risk for diverse neurocognitive deficits in pediatric brain tumor (BT) survivors is well studied (Robinson et al., 2010). Importantly, neuropsychological functions appear to directly impact functional outcomes like academic achievement or adaptive functioning (Annett et al., 2015). Therefore, this study aimed to compare two questionnaires, the “Vineland Adaptive Behavior Scales-II” (VABS-II) with the “Participation Scales 24/7” (PS 24/7), in its use to function as screening instruments in the neuropsychological aftercare. The quality of the PS 24/7 and VABS-II to predict neuropsychological test scores was evaluated. A secondary aim of the study was to investigate the predictive value of the two questionnaires concerning the implementation of special interventions in everyday life.

Participants and Methods: The study was conducted at the Department of Pediatrics and Adolescent Medicine at the Medical University of Vienna. At the neurooncological outpatient clinic, routine neuropsychological assessments were conducted with 18 pediatric BT survivors. Regression analyses were

used to evaluate the predictive values of the PS 24/7 and VABS-II subscale domains with 1. neuropsychological test scores (hierarchical multiple regression) and 2. relevant external criteria.

Results: Significant differences between the two questionnaires, VABS-II and PS 24/7, in regard to predicting neuropsychological test scores were found. Further, the PS 24/7 turned out to have high predictive values concerning the implementation of special interventions in everyday life of childhood BT survivors.

Conclusions: In this study, the assessment of everyday life participation in childhood BT survivors was addressed. In addition, the importance of the use of tools with high ecological validity to successfully assess functioning and participation was underlined to ensure quality of surveillance in the aftercare of chronically ill patients.

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Keywords: childhood brain tumor, children and adolescents, everyday life participation

S. P. GRIFFITH, C. MALPAS, R. ALPITSIS, M. MONIF, T. O'BRIEN. The neuropsychology of autoimmune encephalitis – A retrospective clinical audit.

Objectives: Autoimmune encephalitides (AE) are rare, yet diverse, neurological conditions which are characterised by an immune-mediated inflammation of the brain & neuronal circuitry dysfunction. AE patients with autoantibodies targeting neuronal-cell surface antigens present with neurological, psychiatric & behavioural symptomology, as well as cognitive dysfunction in both the acute & post-treatment phases of the illness. The study endeavoured to determine the concordance & discordance between self-report & neuropsychological opinions, and establish the key domains to assess in this population.

Methods: 30 patients who met the 2016 Lancet Criteria for possible AE and had neuropsychological assessment were collated from 3 hospitals in Melbourne, AUS. Self-report cognitive symptoms & clinician opinions were extracted from reports, and word frequency, content, correlation & network analyses were applied to determine the relationships between patient self-reports & clinician opinions. Cognitive data was collated into domains, and each patient was classified as impaired ($z \leq -1.96$) or unimpaired. Frequency of patients with impairments was calculated to determine commonly impaired domains.

Results: Analysis demonstrated that patients primarily report memory impairments; while on formal assessment there were a number of domains commented on, including attention, processing speed, executive functions & psychopathology. This suggests that comprehensive assessment of cognition & psychopathology is required in AE patients. Cognitively, memory functions were commonly impaired; however, there was a diverse pattern of cognitive profiles.

Conclusions: AE patients present a picture of clinical complexity for neuropsychologists. To date, the cognitive profiles are heterogeneous and psychopathology looms large. Further collection of neuropsychological, psychological & phenomenological data from patients and clinicians perspective will assist in deriving comprehensive profiles.

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Keywords: autoimmune disorders, encephalitis, cognitive functioning

COVID-19: A Global Threat to the Nervous System

Presenter: Igor Koralnik

3:00 PM - 5:00 PM

INS Awards Ceremony

Awards Committee Chair: Roy P. Kessels

3:00–5:00 PM

INS Early Career Award Presentation: As We Speak

Award Recipient: Vitória Piai

3:00–5:00 PM

V. PIAI. As We Speak.

Producing words involves not only preparation and execution of an articulatory programme, but also the access of conceptual and lexical information in long-term memory, as well as controlled processes for selection and monitoring. In this talk, I will present how language functions are related to the domains of memory and executive functioning, how experimental approaches to language production can reveal difficulties otherwise undetected, and how the use of electrophysiology enables studying how the brain reorganises following disruptions of normal functioning.

Benton Mid-Career Award Presentation: Novel Paradigms for the Assessment of Memory in Ageing and Dementia

Award Recipient: Mario Alfredo Parra

3:00–5:00 PM

M.A. PARRA. Novel Paradigms for the Assessment of Memory in Ageing and Dementia.

Cognitive functions affected by dementia also decline in normal ageing and in several common age-related diseases. Such functions are sensitive to the cultural background of the affected individual. With the reconceptualization of dementia as a lifelong condition, increasing interest in its early detection and prevention, and emerging global initiatives to fight it, we are facing challenges of larger magnitude and different nature. Novel cognitive paradigms are urgently needed to meet such rapidly growing needs.

Korkman Award Presentation: Nonword Repetition Tasks as Promising Speech Disorder Screening Tools for Linguistically Diverse Children

Award Recipient: Julian Maximillian Siebert

3:00–5:00 PM

J.M. SIEBERT. Nonword Repetition Tasks as Promising Speech Disorder Screening Tools for Linguistically Diverse Children.

Objective: Around 1.4 million children in the UK experience speech, language, and communication needs (SLCN); an estimated 60% of them do not receive appropriate interventions because the paucity of large-scale early screening left their needs unnoticed (Bercow Report, 2018). At the same time, more than 1 million children in UK primary schools speak English as an additional language, further complicating the screening effort. This study addressed both of these issues by turning to nonword repetition, deficits in which were shown to indicate SLCN (Chiat & Polišenská, 2016), to screen for SLCN.

Participants and Methods: The study assessed the utility of Howell et al.'s (2017) Universal Nonword Repetition Test (UNWR) as a screening tool for SLCN in a population of 514 linguistically diverse children (LDC) aged 5 to 7 years. The study (a) established the measurement precision and diagnostic accuracy of an abbreviated (10 item with 2 syllables each) and prosodically neutral version of the UNWR (N = 259) and (b) investigated its susceptibility to sociodemographic and linguistics factors (n = 114) using multiple linear regression models.

Results: The UNWR has an internal consistency of $\omega = .69 - .77$ (depending on scale length). SLCN predictions have sensitivity and specificity values of .86 and .50, respectively. Further, the UNWR possesses high cross-linguistic validity; there is no statistically significant score difference between different language groups, and no linguistic variables predict UNWR performance in multiple linear regression models.

Conclusion: The abbreviated form of the UNWR possesses sound measurement precision, good diagnostic accuracy, and sufficiently high preliminary validity. Following further validation procedures in larger and more diverse samples, the 2-syllable UNWR has the potential to tackle the often underestimated, yet pressing issue of undetected SLCN in the increasing number of LDC in the UK's education system and around the world.

INS Student Liaison Committee Research Awardee: Concrete signs facilitate wayfinding in patients with Alzheimer's disease dementia

Award Recipient: Sebastian Boedeker

3:00–5:00 PM

S. BOEDEKER. Concrete signs facilitate wayfinding in patients with Alzheimer's disease dementia.

Objective: Patients with Alzheimer's disease dementia (ADD) often show impaired orientation and navigation particularly in unknown environments. Signs may offer an opportunity to compensate for these deficits and facilitate wayfinding. In previous studies, we examined the effects of different symbol characteristics on symbol comprehension. For ADD patients, results suggested an advantage of concrete symbols over conventional symbols that frequently occur in public life (ISO standards).

Participants and Methods: Based on these findings, different concrete signs were adapted to the cognitive capabilities of ADD patients and compared with conventional signs. Three identical doors were equipped with one target sign referring to sanitary facilities and two distractors. In another trial, double coded signs were presented, each one displaying written information in addition to a symbol. 30 healthy controls and 30

ADD patients were asked to find the sanitary facilities as fast and as accurate as possible. The impact of the different signs on decision accuracy and speed in the two experimental groups was examined using 2 (group) x 2 (coding condition) x 4 (type of sign) repeated measures ANOVAs including post-hoc t-tests to specify the effects.

Results: Repeated measures ANOVAs for decision speed revealed significant main effects as well as interaction effects. Healthy controls identified the sanitary facilities faster than ADD patients, without an impact of the sign type or coding condition on decision speed. ADD patients, by contrast, showed faster decisions at concrete signs than at conventional signs and benefitted most from signs displaying concrete symbols combined with additional written information.

Conclusions: In conclusion, the findings of the current work suggest an implementation of concrete double coded signs rather than conventional ISO-standardized symbols for patients with ADD.

INS Student Liaison Committee Research Awardee: The results from the Czech Brain Aging Study: Associative memory performance is related to change in volumes and thicknesses of medial temporal structures in cognitively normal older adults

Award Recipient: Adela Fendrych Mazancova

3:00–5:00 PM

A.F. MAZANCOVA. The results from the Czech Brain Aging Study: Associative memory performance is related to change in volumes and thicknesses of medial temporal structures in cognitively normal older adults.

Objective: We explored the association between hippocampal volumes, parahippocampal and entorhinal thicknesses and performance in a challenging memory test Face-Name Associative Memory Exam (Cz-FNAME-12) when compared to traditionally used episodic memory tests in cognitively normal older adults (CN).

Participants and Methods: Fifty-six CN (mean age 68.4 ± 5.8 ; mean years of education 16.6 ± 2.7) including adults with subjective cognitive decline ($n=42$) and CN without cognitive complaints ($n=14$) from the Czech Brain Aging Study underwent a comprehensive neuropsychological examination, including the Rey Auditory Verbal Learning Test (RAVLT), the Logical Memory I (LM I) and the cz-FNAME-12. MRI scans at 1.5T and FreeSurfer 5.3. algorithm were used to measure right and left hippocampal volumes (HV_R , HV_L - adjusted to the estimated total intracranial volume), right and left parahippocampal and entorhinal thicknesses (PHC_R , PHC_L , ERC_R , ERC_L). Individuals with significant vascular-related white matter hyperintensities (Fazekas > 2) were not included.

Results: The Cz-FNAME-12 Immediate Cued Recall of Name score correlated with HV_R ($r=0.307$, $p=0.022$; but not with HV_L), PHC_R ($r=0.278$, $p=0.038$) and PHC_L ($r=0.314$, $p=0.019$), ERC_R ($r=0.368$, $p=0.005$) and ERC_L ($r=0.422$, $p=0.001$). The 30-Minute Delayed Cued Recall of Name score correlated with HV_R ($r=0.271$, $p=0.043$; but not with HV_L), PHC_R ($r=0.282$, $p=0.035$) and PHC_L ($r=0.311$, $p=0.019$), ERC_R ($r=0.385$, $p=0.003$) and ERC_L ($r=0.435$, $p=0.001$). Conversely, no correlation was observed between RAVLT 30-Minute Delayed Recall or LM I and any of the medial temporal lobe measurements.

Conclusions: The subtests of recalling names in the cz-FNAME-12 test, but not traditional episodic memory tests, were associated with the medial temporal lobe volumes and cortical thicknesses in cognitively normal older adults. Our finding suggests that evaluation of associative memory is a promising approach to cognitive testing of individuals at higher risk for AD.

INS Student Liaison Committee Research Awardee: Pain and cerebral blood flow in children following mild traumatic brain injury compared to orthopedic injury

Award Recipient: Vivian Kwan

3:00–5:00 PM

V. KWAN. Pain and cerebral blood flow in children following mild traumatic brain injury compared to orthopedic injury.

Objective: To examine cerebral blood flow (CBF), in association to pain, among children with mild traumatic brain injury (mTBI) or orthopedic injury (OI). Current findings are based on partial data from a larger dataset, which will be the largest study of pediatric CBF following mTBI to date.

Participants and Methods: This was a prospective study of children (67 girls; 115 boys) aged 8-16 years following mTBI ($n = 106$) or OI ($n = 76$), recruited from emergency departments (Vancouver and Calgary). Children rated their pain and underwent MRI within 10 days of injury. Pain intensity (How much hurt do you have?) was measured from 0 (no pain) to 10 (worst pain possible). Pain unpleasantness (How much do aches or pains bother you?) was measured from 0 (not at all) to 4 (very much). Pseudo continuous arterial spin labeling was used to quantify CBF, globally (grey matter) and regionally (30 pain-related ROIs).

Results: Children with mTBI reported higher pain intensity ratings ($M = 5.51$) compared to OI ($M = 4.71$; $t(176) = 2.12, p = 0.035, d = 0.32$). Pain unpleasantness was rated higher in the mTBI than OI group ($M = 1.60$ versus $M = 1.25$; $t(175) = 2.26, p = 0.025, d = 0.35$). Global CBF was significantly lower in mTBI ($M = 58.66$ ml/100g/min) compared to OI ($M = 62.02$ ml/100g/min; $t(180) = -3.12, p = 0.002, d = -0.47$). Significant correlations were found between pain intensity ratings and CBF in the intraparietal sulcus ($r = 0.358, p = 0.001$), inferior ($r = 0.279, p = 0.009$) and superior parietal lobe ($r = 0.310, p = 0.001$), and primary somatosensory cortex ($r = 0.339, p = 0.003$) for the OI group, but not the mTBI group. In the mTBI group, the correlations between pain intensity and CBF were not significant ($p > 0.05$). Pain unpleasantness ratings did not correlate with CBF.

Conclusions: In children following OI– but not mTBI– pain intensity shortly after injury was significantly associated with perfusion in regions of the parietal lobe known to be important for pain processing.

INS Student Liaison Committee Research Awardee: Domain-specific cognitive deficits and depression as determinants of post-stroke functional disability: an individual participant meta-analysis from the STROKOG Consortium

Award Recipient: Hanna M. Laakso

3:00–5:00 PM

H. M. LAAKSO. Domain-specific cognitive deficits and depression as determinants of post-stroke functional disability: an individual participant meta-analysis from the STROKOG Consortium.

Objective: Cognitive impairment and depression are frequent consequences of stroke, yet our understanding of their joint effects on functional outcome is limited. This study investigated the combined

associations of domain-specific cognitive deficits and depression with activities of daily living (ADL) and instrumental ADL (IADL) by using individual participant data from the international cohorts of the Stroke and Cognition Consortium (STROKOG).

Participants and Methods: Eleven studies from eight countries participated in this study ($n=3291$, mean age 66.5 years). Within STROKOG, neuropsychological test scores, mood questionnaires and functional evaluations were harmonized to provide unified outcome measures. Associations of depression and cognitive impairment with functional disability were analyzed with separate logistic regression models for specific cognitive domains (attention, executive function, memory, language, visuospatial function) and global cognition.

Results: Deficits in every cognitive domain and depression were significantly associated with both ADL and IADL independent of age, sex, education and study cohort. Deficits in attention, visuospatial function and global cognition had the highest odds ratios (OR) for ADL 3-6 months after stroke (adjusted OR 2.7 to 2.8; $p<0.001$). The same pattern of results was found for ADL 12-18 months after stroke in a subgroup of patients with available follow-up data (seven studies, $n=1396$). Deficits in executive functions, attention and global cognition had the highest ORs for IADL 3-6 months after stroke (adjusted OR 3.2 to 4.3; $p<0.001$), and there were significant interactions between depression and both executive function and global cognition.

Conclusions: Domain-specific cognitive deficits and depression are independently related to post-stroke functional outcome. In particular, subjects with executive dysfunction or global cognitive impairment together with depression are at high risk of disability.

INS Student Liaison Committee Research Awardee: Exploring the Role of Timing, Working Memory, Attention and Inhibition in Emotional Dysregulation in Adults with Elevated Levels of ADHD-Related Traits

Award Recipient: Marie (aka Annabelle) Nankoo

3:00–5:00 PM

M. A. NANKOO. Exploring the Role of Timing, Working Memory, Attention and Inhibition in Emotional Dysregulation in Adults with Elevated Levels of ADHD-Related Traits.

Objective: Emerging literature indicates that neuropsychological deficits do not predict emotional dysregulation (ED) in ADHD unlike previously posited. Nonetheless, adults with ADHD and high ED perform more poorly in domains such as working memory, inhibition and attention than controls and ADHD counterparts without ED. Hence, these neurocognitive domains may moderate the link between ED and adult ADHD. Time perception is also commonly impaired in ADHD but remains unexplored in relation to ED. Yet, time perception guides goal-directed responses across situations including those eliciting high emotion. Using a non-clinical sample with varying levels of ADHD traits, this study examined whether time perception, working memory, inhibition and attention moderate the relationship between ADHD traits and ED.

Participants and Methods: Undergraduate students ($n=136$) aged 17 to 25 years participated. Time perception was assessed via accuracy coefficients and absolute discrepancy scores (AD) derived from a time reproduction task involving 2, 6, 12, 24, 36 and 48s durations. Verbal and visuospatial working memory were measured using the Digit Span, Letter Number Sequencing (LNS) and a spatial span task. A Continuous Performance Test measured attention and inhibition. ADHD symptoms and ED were assessed via the Conners Adult ADHD Rating Scale and the Difficulties with Emotional Regulation Scale respectively.

Results: Statistically significant interaction effects for AD 2s; $b = -.58$, 95% CI [-1.14, -0.02], $t = -.2.05$, $p < .042$, and for LNS; $b = -.15$, 95% CI [-.28, .03], $t = -.2.36$, $p = .020$ indicated that error in perceiving short durations and verbal working memory moderated the link between ADHD and ED. Attention and inhibition were not moderators.

Conclusion: Whilst past research suggests neurocognitive factors do not account for ED in adult ADHD, this study shows that some domains, namely timing and verbal working memory influence the strength of the link between ED and ADHD.

INS Student Liaison Committee Research Awardee: Psychiatric and Neurological Contributions to Neurocognitive Profiles in Precariously Housed and Homeless Adults

Award Recipient: Anna Petersson

3:00–5:00 PM

A. PETERSSON. Psychiatric and Neurological Contributions to Neurocognitive Profiles in Precariously Housed and Homeless Adults.

Objective: Psychiatric and neurological diagnoses are differentially linked to deficits in neurocognition. Yet, the contribution to neurocognition in precariously housed and homeless persons (PHHPs) with multimorbidities require further examination. Building on previous work, we characterized profiles of neurocognition and their associations with psychiatric and neurological conditions in a large community-based sample of PHHPs.

Participants and Methods: A total of 229 participants (age $M=43.7$ years; 75% male) with multimorbidity underwent comprehensive neurocognitive and psychiatric assessments. Scores from five cognitive domains were submitted to a cluster analysis: Processing Speed (PS); Attentional Control (AC); Long-Term Memory (LTM); Non-Verbal Set-Shifting (NVSS); and Decision-Making (DM). External validation analyses (ANOVA, chi-square) compared clusters on clinical variables.

Results: A three-cluster solution emerged: a large participant cluster ($n=103$) with comparatively good overall cognition (C1); a cluster ($n=87$) displaying better functioning on NVSS and DM, with a relative weakness in AC, LTM, and PS (C2); and a cluster ($n=39$) displaying the opposite pattern with relative weakness in NVSS and DM. External validation revealed that members of C2 were prone to schizophrenia ($\chi^2=9.22$, $p<.05$), had lower premorbid IQ [$F(2,201)=7.54$, $p<.05$] and higher negative symptoms [$F(2,223)=5.43$, $p<.05$] compared to C1. Members of C1 were less likely to have a schizophrenia diagnosis ($\chi^2=7.72$, $p<.05$). No cluster differences were found for traumatic brain injury, HIV, or substance use and affective disorders.

Conclusions: Expanding upon previous work, we found that a defining feature of the cognitive profiles of PHHPs is schizophrenia and associated symptoms, as opposed to traumatic brain injury, substance use/affective disorders, or HIV. These results highlight the need for targeted outreach to persons with severe mental illness who are vulnerable to cognitive-related risks.

INS Student Liaison Committee Research Awardee: Cognitive Benefits Related to Lifestyle Interventions: Aerobic Exercise and Computerized Cognitive Training in Healthy Adults

Award Recipient: Francesca Roig Coll

3:00–5:00 PM

F. ROIG COLL. Cognitive Benefits Related to Lifestyle Interventions: Aerobic Exercise and Computerized Cognitive Training in Healthy Adults

Objective: Lifestyle interventions such as aerobic exercise (AE), computerized cognitive training (CCT) and the combination (COMB) may have neurocognitive benefits in late-life normal cognitive decline. Individual factors such as sex and age could moderate these benefits. Projecte Moviment aims to examine if these interventions, improve cognition compared to a control group and assess the moderation effect of age and sex.

Methods: Projecte Moviment is a multi-domain, single blind, proof of concept RCT. 82 healthy adults (62% female; age=58.38 ± 5.47) completed the intervention with a level of adherence >80%. Participants were assigned to AE, CCT, COMB and a control group during 12 weeks 5 days per week. A battery of neuropsychological tests were applied assessing multiple cognitive domains (Executive function, Visuospatial function, Memory, Language and Attention-Speed). We regressed change in each cognitive domain on the baseline score, sex, age and years of education and the treatment variables. We used PROCESS Macro to analyze the moderation effect of age and sex on significant changes.

Results: AE significantly improved for Working Memory (SMD=.29, p.037) and Attention-Speed (SMD=.31, p.042), specifically for the Attention subdomain (SMD=.33, p.028) compared to Control. Fluency (SMD=.29, p.063) and Speed (SMD=.28, p.068) showed positive, but not significant changes. Participants in the COMB significantly benefited on Attention-Speed (SMD=.30, p.041), including both subdomains Attention (SMD=.30, p.043) and Speed (SMD=.30, p.044). CTT group did not show any cognitive change compared to control. There was no moderation effects of age or sex in the intervention-cognitive benefit association.

Conclusions: Results add scientific support to the clinical relevance of lifestyle interventions in the promotion of cognitive health. AE applied as walking, and the COMB are promising interventions to improve executive function and attention-speed in healthy older adults.

Panel Discussion hosted by the INS Student Liaison Committee: Special Considerations for Epilepsy Across the Lifespan

Introduction: Anouk Smits

Presenters: Kees Braun, Sunny Lah, Sallie Baxendale

3:00 PM - 5:00 PM

Symposium 1: It's all in the body - The role of touch experience in neuropsychiatric populations

Presenters: Anouk Keizer, Ilona Croy, Paul M. Jenkinson, Grazia F. Spitoni

3:00 PM - 5:00 PM

A. KEIZER, C. DIJKERMAN. It's all in the body – The role of touch experience in neuropsychiatric populations.

Throughout the lifespan touch is a very important sense. It is one of the first senses to develop prenatally, and one of the last senses to lose during old age. The role of touch experiences in neuropsychiatric populations is a relatively new field of study. With this symposium we would like to provide a first introduction to this topic. We will give a brief overview of what *affective touch* perception is and the role it may play development and several neuropsychiatric populations.

Affective touch, or CT optimal touch, is a term commonly used to describe activation of CT fibers that are present in the hairy skin. These CT fibers are activated by slow, soft touch at a 3-10cm/second stroking rate. Often individuals rate this type of touch as more pleasant than touch provided at a faster stroking rate, i.e. CT non-optimal stroking.

Individual differences exist in the experienced level of pleasantness of CT optimal stroking. CT optimal touch has been shown to have a modulating effect on a range of (social) processes (e.g. CT optimal touch reduces pain experience and feelings of social exclusion). Touch might therefore work as a buffer against e.g. stress and may be involved in successful social interaction and emotion regulation.

Over the past years interest has grown in the role of CT optimal touch in several neuropsychiatric patient groups. Researchers are now identifying differences in pleasantness perception of CT optimal touch between healthy participants and patients (e.g. anorexia nervosa). Questions that are currently of interest to the field are e.g. In which patient groups is CT optimal touch perception different?; Is it possible that altered perception of CT optimal touch also influences the buffering effect it is supposed to have?; Can altered CT optimal touch perception be traced back to an underlying transdiagnostic factor such as problematic attachment?; And, might altered CT optimal touch perception transgenerationally transduce mental illnesses?

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A. KEIZER, B. MONTAGNE. Perceived pleasantness of touch in personality disorders and its role in social exclusion.

Psychiatric patients with a traumatic background often have (a history of) negative touch experiences and may show severe problems in emotion regulation and social interaction. According to e.g. James-Lange theory of emotion, emotions are grounded in the body. In other words, in order to perceive and thus regulate emotions, it is crucial to adequately perceive and interpret bodily signals.

We investigated whether problems in emotion regulation and social interaction in psychiatric patients are related to abnormal perception/interpretation of bodily signals. In study 1 we assessed the evaluation of CT optimal and CT non-optimal stroking of the hand (90sec) in female patients with borderline (N=30) and trauma (N=23), and controls (N=32). Furthermore, we examined the link between evaluation of touch and self-reported severity of emotion regulation problems. In addition, in study 2, we explored the effect of CT optimal stroking on feelings of social exclusion in patients with borderline.

Results of study 1 showed a significant group difference in pleasantness ratings of CT optimal stroking. Specifically, controls rated CT optimal stroking as most pleasant, followed by borderline patients and then trauma patients. The three groups did not differ in evaluation of CT non-optimal stroking. Interestingly, trauma patients did not differentiate between CT optimal and non-optimal stroking, they rated them both as equally (un)pleasant. Moreover, in both controls and borderline patients there was a correlation between emotion regulation problems and the evaluation of touch, this correlation was not found in the trauma patients. Data collection for study 2 is in its final stages.

Taken together our findings show for the first time that patients with a history of trauma have an altered evaluation of both pleasantness and unpleasantness of CT-optimal stroking. The relation between touch perception and emotion regulation appears to differ per patient group.

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I. CROY. C tactile mediated touch interaction through development.

Affective touch perception is mediated by unmyelinated c-tactile fibers, which innervate the non-glabrous human skin and react to slow stroking. Mothers intuitively use stroking velocities that are suited for activation of those fibers and c-tactile targeted stroking leads to enhanced parasympathetic response and reduced pain reactivity in newborns. We therefore assume, that the activation of those fibers is one of the first channels signalling the presence of other people – and even more important –providing a positive association with social contact. Mothers with mental disorders have difficulties providing responsive tactile interactions and people reporting touch deprivation show reduced awareness for affective touch. In addition, we observe reduced awareness of affective touch in people with various mental disorders and in those people coding of affective touch in so called social brain areas is reduced and touch active touch behavior is less pronounced. Affective touch may be one mechanism of transgenerational transduction of mental disease.

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P. M. JENKINSON. Slow, gentle and pleasant: An introduction to affective touch.

Affective touch has been defined as tactile processing with a hedonic or emotional component. This talk will provide a general introduction to affective touch, including an outline of its main features, neurophysiological and neuroanatomical basis, and proposed functions. Specifically, work on peripheral neuropathies, as well as microneurography and functional neuroimaging studies in healthy participants, supports distinct functional roles for large diameter, fast-conducting, myelinated afferent fibres (A β -fibres) that underlie discriminative touch, and slow conducting, unmyelinated, C-tactile (CT) afferent nerve fibres, located on the hairy skin of the body. These CT-afferents respond preferentially to slow (i.e. velocities between 1 and 10cm/s), dynamic, light-pressure, touch, and their activation is positively correlated with subjective ratings of tactile pleasure. Anatomically, CT-afferents have been found to project mainly to the posterior insula, rather than primary somatosensory cortex, via a distinct ascending pathway. The function of affective touch remains a matter of debate, and is the focus of considerable recent research. In my talk, I will consider experiments in healthy individuals and clinical populations that shed light on the function of the affective touch system, including evidence that affective touch plays an important role in the communication of emotions and intentions, and the formation of a healthy body image and sense of self. Research on this subject suggests that the affective dimension of touch is of fundamental importance to health and well-being, and that affective touch may therefore have several health benefits and potential therapeutic uses.

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Keywords: affective touch, bodily self

G. F. SPITONI, G. L. CRUCIANI, P. ZINGARETTI, G. TITONE, M. BOCCIA, V. LINGIARDI, G. GALATI, G. ANTONICCI, G. GIOVANARDI. Affective Touch: From Disorganized Attachment Pattern to Borderline Personality disorder.

Tactile deficiencies are frequent in psychiatric population but also in healthy people with disorganized attachment; accordingly, it is likely that affective difficulties of adults with disorganized attachment may be

also reflected in an altered perception of Affective Touch. To test this hypothesis we combined methods from, clinical psychology, psychophysics and neuroimaging. We show that: 1) people with history of traumatic parental bonds and a disorganized attachment pattern (N=17 assessed through the Adult Attachment Interview = AAI), perceive a “caress like” stimulus as not pleasant whereas participants with an organized attachment perceive the same tactile stimulation as very pleasant; 2) differently from organized adults (N=43; assessed through AAI), disorganized respond to tactile stimulations activating paralimbic structures (namely Amygdala) in a fight or flight manner suggesting that the early experience of parental lacks may have a role in the physiological responses of peripheral CT-fibers and central nervous networks; 3) patients with Borderline personality disorder (N=12), show an altered evaluation of affective touch; in addition, if invited to choose independently an object with which to stimulate the forearm to feel pleasure, they choose painful stimuli systematically.

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Keywords: Affective Touch, Attachment pattern, Borderline Personality Disorder

Symposium 2: CRATER Therapy, Neuropsychologically-Informed Psychotherapy with Embedded Cognitive Remediation for Adults with Mild Neurocognitive Impairment-Regardless of Etiology

Presenters: Harriet Katz Zeiner, Kyle E. Greenman, Nicole D. Newman, Ryan Cantrell Thompson

3:00 PM - 5:00 PM

H. KATZ ZEINER. CRATER Therapy, Neuropsychologically-Informed Psychotherapy with Embedded Cognitive Remediation for Adults with Mild Neurocognitive Impairment-Regardless of Etiology.

Standard treatment in adults with Acquired Brain Injury (ABI), is cognitive remediation, after which patients are seldom accepted for behavioral mental health treatment due to remaining memory difficulties. Or, they are seen as lacking in effort and receive Motivational Interviewing, which fails as MI does not compensate for cognitive difficulties.

Repeated studies show pure cognitive remediation results in "no effect one year post training." Lack of persistent results is primarily due to not addressing psychological factors in "pure" cognitive retraining: Patients want their memory, processing speed, attention and ability to multitask to return to previous levels and manner of processing. They do not want to appear different from peers. Cognitive deficits impact primarily when patient is overwhelmed in social situations; cognitive remediation is taught individually. Patients are expected to generalize strategies for use in social context on their own. Self must include strategy performance.

Evidence from milieu ABI programs: success occurs if treatment includes: a) Cognitive remediation integrated with therapy. b) Techniques work for varied ABI etiologies. c) Patient uses remediation unassisted, forms positive alliance with therapist, reduces slowing.

CRATER is psychotherapy with embedded cognitive remediation focusing on strategies used in social situations, knowing altered learning characteristics, and shifting blame to the neurological insult. The use of intrusive PEAT software as prosthetic memory and initiation is crucial. Patients learn their new memory characteristics as a process variable. Only over learned behavior is available during the stress of social situations in which patient is cognitively overwhelmed.

We will present CRATER timeline, patient issues learning PEAT/PDA, demonstration of CRATER in adults with multiple etiologies of ABI, CRATER modification for couples, and treatment of ABI/PTSD comorbidity. Research findings discussed.

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K. E. GREENMAN. CRATER Treatment in Dyadic Family Units.

The challenge of effective cognitive rehabilitation is often made more complex when the family system is considered. The inclusion of partners, romantic and platonic, in treatment following an acquired brain injury (ABI) typically improves treatment compliance, promotes awareness of patient functioning, and leads to better outcomes.

CRATER treatment is well suited to adaption for use with couples, non-romantic partners, and supportive caregivers. We will discuss specific adaptations of CRATER therapy which have demonstrated qualitative effectiveness in our United States Department of Veteran's Affairs (VA) treatment population. Partner adaptations are focused on improving the quality of the patient-partner alliance and increasing patient function by reducing patient reliance on the partner to complete instrumental activities of daily living (iADLs). Patients and partner are seen jointly and separately to discuss outcomes and new issues on a weekly basis. Initial sessions are focused on the collaborative use of electronic devices and PEAT software to supplement cognitive weaknesses identified during the patient's neuropsychological examination. Future sessions are tailored to specific catastrophic reactions, cognitive strengths and weaknesses, and home-life challenges identified by patient, partner, and provider.

New strategies targeted at improving quality of life for both participants are introduced, modeled, and incorporated into treatment regularly. Strategies include comprehensive psychoeducation, 5:1/8:1 praise model, gumballing, identification and negotiation of intimacy issues, modeling effective communication approaches, triangulation of anger to the neurological insult, and other techniques identified to be effective in couples-based treatment of ABI. This approach has been found to be effective in our VA populations including LGBTQ partnerships, non-romantic dyads, caregiver environments, and others. Specific examples and a brief case will be presented.

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Keywords: cognitive rehabilitation, brain injury, mild traumatic brain injury

N. D. NEWMAN. PEAT: CRATER Therapy's Software Based Cognitive Prosthesis.

Smartphones are an integral part of our lives. They enhance our daily functioning, but what if they could act as an external prosthetic for cognitive impairment? CRATER therapy's PEAT™ was designed to do exactly that. PEAT is a smartphone application that compiles several iPhone features into a single location. They are presented in an aesthetically simple, stimuli-absent interface. Patients therefore need only to go to one place for the totality of their needs, and compensatory strategies. As a multimedia prosthetic, PEAT compensates for many commonly impaired cognitive domains: initiation, learning, multitasking, and memory.

Asking patients, especially those with MCMI, to periodically check or write down reminders is ineffective as it requires them to initiate. PEAT is intrusive –it relentlessly reminds patients with spoken cues, thus only requiring users to respond. PEAT becomes a new source of learning, allowing users to store, retrieve and practice information. Through use of the app, patients are able to establish physiological anchor points and acclimate to a regular day-night cycle with minimal assistance outside of therapy sessions. PEAT augments CRATER in helping patients to initially learn with assistance, learn with cues, and finally overlearn information. For patients struggling to multitask, PEAT offers its user the ability to establish a priority value for respective tasks by which it automatically orders tasks within the calendar.

The “Thought Catcher” feature lets users record and store information and not interrupt the flow of information, an episodic memory cache. Users are alleviated from simultaneously having to hold information while thinking/manipulating another. Providers can designate a time for users to review the information to offset episodic memory impairments. Information can be inserted as text, auditory recordings, video or pictures. Together, CRATER and PEAT enhance patient autonomy and provide respite to care givers and providers.

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Keywords: cognitive rehabilitation, PDA/prosthetic, brain injury

R. C. THOMPSON, S. G. ROSE, H. E. YOUNG. CRATER: An Introduction into Non-Etiologically Specific and Customizable Cognitive Remediation Embedded in Individual Psychotherapy.

CRATER is non-etiological specific cognitive remediation embedded in individual psychotherapy with modifications for familiarity with smartphone technology, level of general intellectual functioning, and various comorbidities (e.g., CVA, mTBI, substance abuse, Parkinson’s disease, HIV, ADHD, ABI/PTSD). CRATER strategies—initially determined by neuropsychological assessment—are tailored to patient needs by addressing specific cognitive inefficiencies in the patient’s problem-solving socially and by incorporating techniques to reduce patient resistance.

CRATER uses overlearned compensatory strategies to improve functional memory, facilitate independent problem-solving, and support decision-making through the use of an advisory committee of caregivers, medical professionals, and other trusted companions. Strategies are repeated 3–4 times per day via PEAT until overlearned. Overlearning is used first to train strategies and software features, then applied to learn any new skill. These strategies support independence and reliability, improve treatment outcomes in other medical specialties (e.g., organ transplant eligibility), and result in more daily activities and greater attendance to medical appointments.

CRATER integrates the concept of Kintsugi, or beauty in the broken, to promote resilience by reframing the use of compensatory strategies and making the Self reliable, resilient, and functional instead of being evidence of cognitive damage.

With ABI/PTSD comorbidity, cognitive and trauma-driven affective issues are co-mingled and challenging to disentangle concurrently. Cognitive and emotional overwhelm results in loss of routinization and compensatory strategies. Patients may signal that the work is too rapid or anxiety-provoking via circumlocution, verbal mediation, paralinguistic cues (transmitted through tone, pitch, slurring), and behavioral analogs of the catastrophic response: use of somatic, or other, metaphor to articulate what one is unable to voice.

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Keywords: CRATER, MCI, PTSD

Symposium 3: A Cross-Cultural Examination of Sports Concussion from Youth to Professional Athletes Across the Globe

Presenters: Nyaz Didehbani, Kati Peltonen, Rosemarie Scolaro Moser, Max Toepper, Ruben J. Echemendia

N. DIDEHBANI. A Cross-Cultural Examination of Sports Concussion from Youth to Professional Athletes Across the Globe.

Background: Increased attention to head injuries has improved concussion knowledge and focused research on sports related concussion (SRC), from youth to professional athletes around the world. The international concern for SRC led to the first international concussion in sport symposium (Vienna, 2001) and the formation of the Concussion in Sports group (CISG). Over the last 18 years, the recommendations of the CISG have been adapted to improve global concussion-related safety and welfare of athletes. The most recent meeting (Berlin, 2016) addressed the importance of neuropsychologists and neuropsychological assessment in SRC evaluation and management. The need for trained neuropsychologists in the area of SRC assessment and education has grown with the development of the Sports Neuropsychological Society with international members and divisions in the US, Canada, Finland, and Germany. This global representation has led to impressive cross-cultural examinations of SRC and differences in concussion knowledge and education around the globe.

Results: We will discuss (1) concussion knowledge of parents with youth athletes around the world with preliminary research in Sicilian families; (2) the relationship between on-field amnesia and neuropsychological functioning in Finish youth hockey players; (3) data from a multi-sport German study that underscores the utility of algorithms to address factors in concussion recovery; and (4) the need for language-specific normative data for neuropsychological tests based on results from multilingual hockey players in the NHL.

Conclusion: Sports are an integral part of many cultures resulting in broad-based international collaborations to study SRC. The role of neuropsychologists has become increasingly important in the assessment and management of SRC across the world. Continued international collaborations and research in SRC will lead to increased player health and safety in our culturally diverse athlete population.

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K. PELTONEN, S. KOSKINEN, L. HOKKANEN. On-field signs of concussion predicting cognitive deficits: Concussion management intervention in Finnish youth hockey.

Objective: The usefulness of on-field signs in predicting concussion outcome is under debate. We analyzed the predictive value of these signs for post-injury cognitive deficits in Finnish elite-level youth ice hockey players.

Participants and Methods: A total of 1823 players took part in baseline testing prior to the 2015–2017 playing seasons. Of the 570 consecutive athletes in the active follow-up group, 52 were concussed during the seasons. Twenty-one players were excluded from analysis due to pre-existing disorder or incomplete data, thus the analysis included 31 hockey players (14 – 20 years-old). Follow-up assessment was performed 3 days post-injury and compared to baseline. Cognitive performance was assessed using the Immediate Post-Concussion Assessment and Cognitive Testing (ImPACT®) battery and King-Devick test (KD-test). A multivariate analysis of variance and series of follow-up analyses of variance were used to analyze the change in overall cognitive performance from baseline to follow up between the group with and without a specific sign of concussion (loss of consciousness, amnesia, disorientation, postural instability, and vacant look).

Results There was a significant difference between the groups with or without amnesia in cognitive performance at 3 days post-injury. The presence of amnesia was a predictor of cognitive deficits ($p < .05$). The multivariate effect size of .40 implied that 40% of the variance in cognitive performance was accounted for by amnesia. Differences in verbal memory ($p=.01$), visual memory ($p=.03$), reported symptoms ($p<.01$) and KD time ($p=.01$) emerged in the groups with or without amnesia. Subjects with amnesia performed worse in cognitive tests at follow up, than at baseline.

Conclusions: The presence of on-field amnesia may indicate more severe injury and predict the need for extended cognitive follow-up.

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R. SCOLARO MOSER. An Examination of Parental Knowledge of Concussion Across Cultures.

Objective: Parents play a critical role in the care of youth athletes who have sustained concussions. Accurate parental knowledge and education is key to advocating for proper treatment and management of their children. However, the level of parents' knowledge may vary depending on variables such as educational exposure, income level, geographic location, and other factors.

Background: In the United States, over the past 15 years, there has been a concerted effort to educate all those individuals involved with youth sports to be aware of the risks of concussion. All 50 states and the District of Columbia have passed laws requiring proper identification, removal from play, and treatment of young athletes who are suspected of having sustained a concussion. These laws include educating and informing athletic personnel, athletes and parents about concussion. The need for concussion education is also growing on an international level with other countries following suit with national initiatives for sports concussion awareness.

Participants and Method: This presentation will examine and review the current status of research literature regarding the concussion knowledge of parents and adults. Variables and cultural factors that may affect the acquisition of accurate knowledge will be discussed.

Conclusions: The literature regarding parental knowledge of concussion across the world is lacking. Nevertheless, an examination of the existing literature supports the need to identify specific populations and specific variables so as to create, guide, and target concussion education programs and support outreach efforts.

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M. TOEPPER, E. FROESE, P. SCHULZ, J. STIEFEL, I. SCHMEHL, A. EIDENMÜLLER, J. MOOCK, F. SIEBÖRGER, G. MÜLLER, A. GONSCHOREK. German VBG concussion study – new algorithms of long-term concussion management in different contact sports.

Objective: Extensive research in the last decade has revealed that concussions can have a negative impact on cognitive, physical and mental health of contact sport athletes, particularly if the treatment is not adequate. Nevertheless, short- and long-term consequences of concussions are still underestimated in German professional sports. For this reason, the VBG, a German social accident insurance institution, recently developed a new algorithm of concussion management including baseline assessment and return-to-play protocol. In this multi-center study, we evaluated this algorithm in different soccer, football, handball, ice hockey, and basketball clubs in Germany.

Participants and Methods: Data collection included neuropsychological assessment, neuropsychiatric symptom evaluation, concussion history, and the collection of other sport-related information in about 500 athletes. Moreover, relevance and practicability of our concussion management were examined using an online questionnaire for athletes, coaches, sports physicians, physical therapists, and club managers.

Results: Results revealed that athletes with three or more concussions in the past showed lower cognitive performance in specific cognitive domains as well as increased neuropsychiatric symptom severity compared to athletes with two or less concussions in the past. All parties rated relevance and practicability of our concussion management as high.

Conclusion: Our results suggest that three or more concussions in the past are associated with reduced cognitive performance and increased symptom severity years later, confirming previous evidence on the

possible long-term consequences of repeated concussions. An early detection and adequate treatment of concussions as implemented in the VBG algorithm may help to lower the risk for future health restrictions. Importantly, the clubs appear to consider this algorithm highly relevant but still practicable.

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R. J. ECHEMENDIA, S. RUPPEN, J. M. BRUCE. Examining baseline data across cultures in professional soccer: A case for language-specific normative data.

Objective: Baseline neuropsychological testing has become increasingly popular internationally across many contact/collision sports and all levels of play. A central challenge that exists in the assessment of athletes across countries is whether omnibus normative data can be used to interpret test scores or whether performance variability across languages necessitate language-based norms. In this paper baseline differences that have been found among linguistically and culturally diverse groups within professional soccer in North America are presented.

Participants and Methods: Baseline data, including symptom reporting, self-reported concussion history and neuropsychological test performance were obtained from 4,426 professional soccer players using a computerized neuropsychological test battery (ImPACT).

Results: Normative data will be presented for the major language groups within the league: English, French, Spanish, German, Italian, and Portuguese. It was found that symptom reporting, the number of concussions sustained, and neuropsychological test results vary significantly based on a players' language of origin. This variability was also present when players were tested in their language of origin.

Conclusions: This study brings to light significant differences in neurocognitive test scores, symptom reporting and self-reported concussion history across the language groups in North American professional soccer. The findings have implications for the evaluation and management of professional soccer players who sustain concussion and more generally in the context of neuropsychological assessment in cross-cultural settings. These data underscore the importance of examining neuropsychological functioning using language and culturally specific norms.

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Symposium 4: Examining the validity of a transnational lifespan ecologically-valid approach to the assessment of executive functions

Presenter: Ashok Jansari

3:00 PM - 5:00 PM

J. EVANS, A. JANSARI. Examining the validity of a transnational lifespan ecologically-valid approach to the assessment of executive functions.

Clinical assessment has reached a point where a neuropsychologist has a range of reliable tools for looking at the impacts of brain dysfunction on the primary cognitive abilities such as visuo-spatial perception, language processing and memory. By contrast, many assessments of executive functions have been shown to either be insensitive or lack ecological-validity. For example, Eslinger & Damasio's (1985) patient EVR is severely impaired in everyday life following removal of an orbitofrontal brain tumour but performs flawlessly on one of the 'gold standard' executive tasks, the Wisconsin Card Sorting Task (WCST). This

symposium will review a number of studies using the Jansari assessment of Executive Functions (JEF[®]) which has been developed to address this clinical need, presenting findings from the three different versions developed for adults, adolescents and children. Perniske et al's paper compares JEF[®] to a range of standard tasks currently used by clinicians and demonstrates greater discriminative ability; further, they show that the correlations between JEF[®] and everyday measures of functioning are significantly stronger than the same correlations with the standard measures. Using a group of neuropsychiatric patients in Amsterdam, Jonker et al demonstrate the greater discriminative ability of a Dutch translation of JEF[®] compared to the WCST as well as significant correlations with Frontal Systems Behavior Scale (FrSBs). Lepak et al show how the assessment can be developed specifically for use with adolescents; JEF-A[®] discriminates between younger and older adolescents, is able to show that executive functions have different developmental trajectories and that it shows good concurrent validity with the DKEFS. Finally, Skandari et al show that the task can be culturally adapted to a non-European context. They translated the children's version, JEF-C[®] into Farsi to show that it can track development of executive functions in Tehran from the age of eight.

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E. PERNISKIE, N. WARD, J. DALRYMPLE, A. PICKERING, A. JANSARI. Cognitive correlates of everyday function after acute brain injury: Comparison of the Jansari assessment of Executive Functions with standard tests of executive functions.

Objective: Impairments in executive function are believed to underpin difficulties in everyday function in people with brain injury. We aimed assess the association between everyday function and the virtual-reality based 'Jansari assessment of Executive Functions' (JEF[®]).

Participants and Methods: JEF[®] and 19 subscales from 4 traditional tests of executive functions (the DKEFS, BADS, MIST and WCST) were administered to a New Zealand sample of 21 traumatic brain injury and 6 stroke participants (58% with severe brain injury) and to 28 non brain-injured participants matched for age, gender and education.

Results: JEF[®] total percent scores exhibited robust correlations with the levels of participants everyday functioning reported by independent raters using the Dysexecutive Questionnaire: Independent-Rater (DEX-IR) and Patient Competency Rating Scale-Relative (PCRS-R) (both $r = 0.61$, $p < 0.001$). Bootstrapping analysis estimated the mean correlation between standard executive function tests and these two everyday function measures (bootstrapped mean correlation=0.34, confidence interval (CI) = [0.18 0.48] , and mean=0.35, CI = [0.19,0.49] , respectively).

Conclusions: These results suggest, at least for individuals with acute brain injury, that executive function measured using JEF[®] showed associations with everyday function measures that were significantly stronger than those shown by almost all of the standard executive function tests included in the study. Only the BADS MSET total profile score achieved comparable performance to that of JEF[®]. Our findings are consistent with other work suggesting virtual-reality methods may enhance the assessment of executive function in brain-injured persons.

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Keywords: assessment, executive functions, ecological validity

F. JONKER, S. HAGE, L. BRONZWAER, A. JANSARI, E. SCHERDER. A virtual reality paradigm; the next step in understanding the neurobehavioural problems following prefrontal lobe lesions?

Objective: There were two main goals of the current study: 1) To evaluate the sensitivity of a Dutch version of the Jansari assessment of Executive Functions (JEF[®]); 2) Based on a correlation plot analysis to compare

the explained variance of the JEF[©] constructs on the Frontal Systems Behavior Scale (FrSBe) with the explained variance of executive functioning on the FrSBe with linear regression models.

Participants and Methods: Eighteen patients from a neuropsychiatric unit who had prefrontal lobe damage confirmed by neuroimaging data and demonstrated behavioural or emotional changes problems were compared with a group of healthy matched controls on JEF[©] and the FrSBe.

Results: We found a significant difference ($p < 0.0001$) between our PFC group and the control sample on JEF[©]-total score. JEF[©] was able to discriminate the patients with prefrontal damage from the healthy control sample with 96% accuracy. The JEF[©]-Average score significantly predicted the FrSBe EF-Proxy scores, ($p = 0.007$, adjusted R squared= .36). The Wisconsin Card Sorting Task only explained 2% of the variance in FrSBe EF-Proxy scores.

Conclusions: JEF[©] discriminates between a PFC brain-damaged patients group and healthy controls. While the JEF[©] constructs do not correlate with the subscales of the FrSBe, there was a significant relationship with Proxy ratings. Our findings underlie the ecological validity of JEF[©] in relationship to subjective ratings by significant others. The findings therefore demonstrate that proxy ratings are necessary for a more realistic evaluation of behavior.

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Keywords: assessment, executive functions, ecological validity

C. LEPAK, D. PAFFETT, A. LYON-LEES, R. CHARLTON, A. JANSARI. It's my party! A new ecologically-valid virtual reality assessment of executive functions in adolescents.

Objectives: Childhood and particularly adolescence are times of enormous neural development so Acquired Brain Injury (ABI) during this period can have severe impacts on everyday life. Particular difficulties can be found in Executive Functions (EFs) but current assessments are limited in their sensitivity. We evaluated the feasibility of a new ecologically-valid test, the Jansari assessment of Executive Functions for Adolescents (JEF-A[®]) comparing a two groups of adolescent children.

Methods: JEF-A[®] uses non-immersive virtual reality and resembles a computer game in which the participant has to organise and run their own party multitasking a number of competing concurrent demands. It mimics aspects of the Multiple Errands Task and performance is evaluated on eight subtasks designed to test constructs central to EFs: Planning, Prioritisation, Selective-Thinking, Creative-Thinking, Adaptive-Thinking, Action-Based Prospective Memory (PM), Event-Based PM and Time-Based PM. Twenty-nine younger children (11-13yrs) were compared to 56 WISC-IQ matched older adolescents (16-18yrs) on JEF-A[®] as well as the FAS and Trails subtests of the DKEFS.

Results: We found significant differences between the groups for both age ($F(1,79)=3.9$, $p<.001$; $h_p^2=.28$) and gender ($F(1,79)=1.99$, $p=0.058$, $h_p^2=.17$). Further, there were differences between the two age groups for six of the eight constructs (Planning, Prioritisation, Selective-Thinking, Adaptive-Thinking, EBPM and TBPM: all $ps<0.05$). Finally, results demonstrated that only three out of eight of the DKEFS measures discriminated between the age groups.

Conclusion: Our findings demonstrate that JEF-A[®] is a feasible and playful complex task, allowing a thorough assessment of adolescents' performance in a multitasking situation. It has good discriminant validity and good construct validity relative to the DKEFS. Further research is needed to establish whether JEF-A[®] can be used as a standard tool for assessing EFs during adolescence.

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Keywords: assessment, executive functions, ecological validity

E. SKANDARI, A. JANSARI, H. POURETEMAD, M. BAGHERI, M. HABIBI. Validation of a Persian version of an English language ecologically-valid assessment of executive functions to track development through childhood and adolescence.

Objectives: Cognitive development occurs mainly throughout childhood and adolescence. Executive functions are crucial to efficient cognitive functioning, so accurate assessment is of great importance; however, clinical research has demonstrated that well-used neuropsychological tests of these functions have suffered from a lack of ecological validity. A virtual reality performance task, the Jansari assessment of Executive Functions for Children (JEF-C[®]) has been developed to address this issue. The current study aimed at translating and validating JEF-C[®] into Persian, and at investigating whether Persian JEF-C[®] can identify stages of development of executive function in typically developing children from 8 to 16 years old.

Method: 146 Iranian school children and adolescents participated in this study three age groups: 8-10, 11-13, 14-16 year olds. They completed Persian JEF-C[®] and the computer-based form of the Wisconsin Card Sorting Test (WCST).

Results: There were relatively high Cronbach's alpha coefficients for Persian JEF-C[®] total score ($\alpha = .72$) and for each of its eight subtasks (between 0.68 and 0.72), showing an acceptable internal consistency. Multivariate analysis of variance revealed a significant effect of age groups on JEF-C[®] performance. Further analysis of the eight sub-components of JEF-C[®], Planning, Prioritization, Selective-Thinking, Creative Thinking, Adaptive Thinking, Action Based Prospective Memory, Event Based Prospective Memory and Time Based Prospective Memory, revealed significant effects of age on the first four. There was a significant correlation only between the number of categories on WCST and the prioritization subtask of Persian JEF-C[®].

Conclusions: Persian JEF-C[®] is an ecologically valid executive function assessment which is sensitive to age during late childhood and early/middle adolescence and could be useful for both researchers and clinicians working with children.

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Keywords: assessment, paediatric, executive functions

Symposium 5: Understanding and treating progressive hippocampal and behavioural deterioration in at risk populations

Presenters: Robin E. A. Green, Bhanu Sharma, Brenda Colella, Zorry Belchev

3:00 PM - 5:00 PM

R.E.A. GREEN, B. COLELLA, M. BAYLEY, A. CHANGOOR, M. DABEK, D. MIKULIS, C. TILL, G. MONETTE, A. GILBOA, Z. BELCHEV. Hippocampal and Cognitive Deterioration in Moderate-Severe Traumatic Brain Injury: Progressive Declines from 2 to 5 to 12 to 30+ Months Post-Injury.

Objective: To present our most recent longitudinal findings from the Toronto TBI Recovery Study on: (1) progressive hippocampal and fornix integrity loss across time; (2) declines in learning and memory across time; (3) the relationship between hippocampal decline and memory decline.

Participants and methods: N=81 patients with moderate-severe TBI aged 18–65 underwent quantitative MRI employing both manual segmentation and automated segmentation (MALP-EM), and along with cognitive assessments at 5, 12 and 30+ months following injury. We used growth curve modelling to quantify hippocampal volume losses, reliable change index (RCI) to measure cognitive decline, and binomial

regression to examine associations between hippocampal volume loss and subsequent learning and memory decline.

Results: Significant atrophy was observed from 5 to 12 to 30+ months post-injury, with significantly steeper slopes for the right than left hippocampus. The head, body and tail atrophied significantly 5 to 12 months post-injury bilaterally; from 12 to 30+ months post-injury, there continued to be significant atrophy in the total left and right hippocampi, the left body, and the right head and body. Reliable Change Index findings replicated our previous study, with 27% of patients showing cognitive decline from 12 to 30+ months post-TBI. Tests on which decline was predominant were measures of verbal learning and retrieval (i.e., Rey Auditory Verbal Learning Test, Controlled Oral Word Reading Test). Hippocampal loss significantly predicted cognitive decline, with left hippocampal volume loss from 5 to 12 months post-injury predictive of the proportion of decliners from 12 to 30.

Conclusions: Clinically significant atrophy and cognitive declines, were observed, with a significant association between early left-sided hippocampal atrophy and subsequent declines in verbal retrieval. The findings underscore the need for neuroprotection of the hippocampi in the chronic stages of TBI.

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Keywords: neurodegeneration, hippocampi, cognitive decline

B. SHARMA, A. CHANGOOR, L. MONTEIRO, B. COLELLA, A. TERPSTRA, L. MILLER, R. E. A. GREEN. Identifying Modifiable Predictors of Decline in Moderate-Severe Traumatic Brain Injury, and Implications for Treatment.

Objectives: Despite growing evidence demonstrating neurodegeneration in the chronic phases of moderate-to-severe traumatic brain injury (TBI), our understanding of the prognostic factors for decline is very limited. Identifying *pre* -injury and time-of-injury predictors of decline, (e.g., demographics; mechanism/severity of injury) is needed to identify those most vulnerable to decline. Identifying *post* -injury factors (e.g., post-injury psychological status; level of cognitive/physical activity) opens avenues to modifiable treatment targets. The goal of this study was to undertake a systematic review to synthesize literature predictors of neurodegeneration in moderate-to-severe TBI.

Methods: Our published protocol was conducted in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analysis Protocols guidelines, and 6 databases were searched. Two team members screened retrieved studies and reviewed full texts. Included studies reported on longitudinal or cross-sectional neuroimaging and potential prognostic factors for neurodegeneration.

Results: There were 20 observational studies on neurodegeneration in TBI with whole-brain and/or regional analyses, with the hippocampi studied in approximately 40% of studies. Typical sample sizes were <35, average age approximately 40, and with an expected 2:1 ratio of males:females. Greater injury severity and level of cognitive impairment post-injury was associated with more neurodegeneration. In two studies, by our group, post-injury cognitive disuse and higher anxiety were both associated with later hippocampal neurodegeneration.

Conclusions: To our knowledge, this is the first systematic review on prognostic factors of neurodegeneration in human chronic moderate-to-severe TBI, and thus an important first step towards filling knowledge gaps and informing intervention research. To date, there has been limited research on this topic, but importantly, modifiable factors have been revealed.

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Keywords: traumatic brain injury, neurodegeneration, predictors of outcome

B. COLELLA, L.A. MEUSEL, L. MIGUEL-JAIMES, M. DABEK, L. RUTTAN, M. BOULOS, M. PANOZO, N. BOU-CHAMOUN, E. JEFFAY, R. E. A. GREEN. Scalable Treatments for Mood and Anxiety in Chronic Brain Injury.

Objectives: Depression and stress have been associated with loss of hippocampal integrity, and our group has found that elevated anxiety following moderate-severe traumatic brain injury is predictive of chronic hippocampal volume loss. The study sought to examine the feasibility and efficacy of treatments for depression and anxiety using a scaleable treatment approach – remotely delivered and group-based – to neurological patients in their own home, employing cognitive behaviour therapy (CBT) and relaxation and mindfulness skills training (RMS).

Methods: This study included 113 patients aged 18-70 (TBI and non-traumatic brain injury) who were referred for treatment in our telerehab program, and met eligibility criteria for CBT and/or RMS. Inclusion criteria: history of an acquired brain injury; > 6 months post-injury; no aphasia, dysarthria, or other communication disorder; good insight (clinically evaluated); no active psychosis or current mania; English fluency and basic computer literacy. Participants attended weekly, 2-hour, group therapy sessions from their home via videoconference along with 5-6 other patients. The therapist was located at Toronto Rehabilitation Institute. The CBT and RMS modules were 12 weeks and 10 weeks, respectively. Pre- and post- outcome measures were completed including the Depression, Anxiety and Stress Scale (DASS-21) and the Quality of Life Enjoyment and Satisfaction Questionnaire – Short Form (Q-LES-Q-SF).

Results: 55 participants were assigned to CBT and 58 were assigned to RMS. Mean therapy retention and weekly therapy adherence were 80% and 74% for both groups combined. Patients significantly improved in each group pre- to post- intervention on the DASS21 and Q-LES-Q-SF; over 95% of all patients showed absolute score increases on the Q-LES-Q-SF.

Conclusions: There was promising feasibility and efficacy of remotely delivered, group-based CBT and RMS, with notable benefits to quality of life.

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Keywords: CBT, relaxation-based mindfulness, brain injury

Z. BELCHEV, A. GILBOA, E. JEFFAY, J. RYBKINA, K. JOHNS, B. COLELLA, M. BOULOS, N. DI GENOVA, R. E. A. GREEN. Development of an Allocentric Spatial Navigation Brain Game for Memory and Hippocampal Neuroprotection: Pilot Findings.

Objective: Hippocampal volume loss is associated with memory impairment and increased risk of dementia. Two lines of treatment research show evidence of hippocampal neuroprotection and improved memory: cognitive environmental enrichment (i.e., continuously intensive, engaging, complex, challenging and novel stimulation) and allocentric spatial navigation (i.e., navigating from a bird’s eye point of view). We will present preliminary feasibility and efficacy of a new online treatment that harnesses both lines of research.

Methods: N= 20 participants (people with hippocampal degeneration risk: TBI, older adults, multiple sclerosis) and N= 26 waitlist control participants. Inclusion: 18–55 years; no comorbid neurological diagnosis; mild-severe cognitive impairment. All underwent 16 weeks of a self-administered treatment entailing allocentric spatial navigation of different cities with Google Streetview. Before and after treatment (or waitlist period), all underwent testing on clinical and experimental memory measures, including a “medium transfer” task (Cognitive Map Formation Test; CMFT) and “far-transfer” tasks (Mnemonic Similarities Task [MST]; Memory Imaging Completion [MIC]), all with demonstrated sensitivity to hippocampal structure and function. (A subset also underwent pre/post MRI – findings not presented).

Results: Of the 20 treatment patients recruited to date, there was 80% retention; for completers, compliance was 95% for minutes of therapy per week. The most sensitive measures were experimental: the MST (bias score), MIC (d') and the CMFT, where memory significantly improved in the intervention, but not wait-list control group.

Conclusions: Promising preliminary findings support a larger scale RCT of this novel remotely delivered intervention. The self-administered format offers scalability, low costs and low barriers to access. If successful, the intervention stands to not only improve memory, but reduce risk of dementia by offsetting hippocampal degeneration.

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Keywords: neurodegeneration, memory, cognitive rehabilitation

THURSDAY, JULY 2, 2020

Day 2 Stream

Moderators: Jonathan Evans, Laura Hokkanen, Sandra Lettner, Martine van Zandvoort, Georg Kranz, Glenn Smith, Jill Winegardner, Miriam Beauchamp, Lucette Cysique, Emilia Łojek

11:00 AM - 3:15 PM

Keynote 4: Don't Judge a Book by its Cover – Transgender Brains, and the Impact of Hormone Replacement

Presenter: Georg Kranz

11:00 AM – 12:00 PM

G. KRANZ. Don't Judge a Book by its Cover – Transgender Brains, and the Impact of Hormone Replacement.

The distinction between sex and gender not only highlights the difference between biology and social convention but also points to the separation of our female or male biological appearance and our innermost sense of belonging to a gender. The latter distinction is crucial because gender identity and assigned sex at birth may be incongruent. Gender dysphoria (DSM-5) and gender incongruence of adolescence or adulthood (ICD-11) are terms referring to this mismatch. Persons whose gender identity is opposite to their birth assigned sex often define themselves as transgender and typically desire a transition towards the experienced gender. The investigation of gender identity from a neuroscientific point of view has gained increased attention in recent years. In this talk I will provide an overview of studies with the purpose of elucidating the neural correlates of gender identity and the effects of sex hormones on human brain structure and function.

Cognitive Remediation: A Dynamic Conversation

Presenter: Glenn Smith, Jill Winegardner

12:00 PM – 1:00 PM

Keynote 5: Traumatic Brain Injury in Tiny Tots: How Studying Early Injuries Can Inform Testing, Treatment and Theory

Presenter: Miriam Beauchamp

1:00 PM – 2:00 PM

COVID-19 Associated Challenges for Neuropsychology: *A work in Progress by the NeuroCOVID-19 INS SIG*

Introduction by: Anouk Smits

Moderator: Laura Hokkanen

Presenters: Lucette Cysique, Emilia Łojek

Discussion by: Lucette Cysique, Emilia Łojek, and Igor Koralnik

2:00 PM – 3:00 PM

L. CYSIQUE, E. ŁOJEK, I. KORALNIK. COVID-19 Associated Challenges for Neuropsychology: *A work in Progress by the NeuroCOVID-19 INS SIG.*

The panel session is organized by the NeuroCOVID-19 INS Special Interest Group (SIG) co-chairs, INS Vienna chairs, INS president, and the INS student's liaison committee. The panel will present a background, rationale, and role of neuropsychologists, about the need to rigorously investigate COVID-19 potential neurocognitive and sensation deficits, in addition to psycho-social health, in order to determine the nature, prevalence, incidence and persistence of a potential new condition: NeuroCOVID-19. We will, then, present a brief historic, working process, preliminary achievements and research harmonization goals of the NeuroCOVID-19 INS Special Interest Group (SIG), which was formed in April 2020. Briefly, goals include the development of recommendations for clinical and research practice, fostering international collaborations and the development of cross-culturally valid assessment tools, and the creation of a dataset for international data comparisons. The group is composed of neuropsychologists and related disciplines researchers/clinicians from all over the world. The SIG continues to be open to new INS members. We will then open the panel to pre-prepared questions from the student liaison group covering four themes: NeuroCOVID-19, the SIG, COVID-19 implications for clinical practice and research, COVID-19 implications for student's training and future professional contexts. Lastly the panel will be open to questions from the audience via online chat.