

P1 Efficacy of Neuropsychological Multimodal Group Based Treatment (EXAT) on Parenting

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Objective: Neuropsychological multimodal group intervention (EXAT) with children's group, parent training and teacher consultation has been developed to reinforce child's executive functions, attention, and self-control, and to strengthen social skills and positive self-image. The aim of the present study was to examine the changes in parenting and parent's experiences of parenthood and child's problems in self-control during one-year intervention. Mothers and fathers of children with inattention/hyperactivity-impulsivity (group 1) and children with inattention (group 2) were compared.

Participants and methods: The data (n= 15 parents in group 1; 25 in group 2) was collected at the Psychology Clinic at the University of Tampere. Parenting and parent's experiences of parenthood and child's self-control were assessed before and after the intervention by a questionnaire (Tuominen & Katajisto, 2006). Nonparametric tests were used in data analysis.

Results: Although both mothers and fathers enjoyed parenthood, mothers were more exhausted and restrictive, but also more nurturing compared to fathers. Increased parenting stress was associated with child's problems in self-control (e.g. low tolerance of frustration, hyperactivity and poor social skills). Mothers' exhaustion and restrictiveness decreased after intervention, but no changes were found in fathers. Restrictive parenting decreased in group 1 and exhaustion in group 2.

Conclusion: The EXAT intervention may reduce parents' stress and change parenting more positive. However, these changes were found only in mothers and may be related to higher attendance of mothers compared to fathers during the intervention. Effective intervention seems to need motivation and attendance of both parents in the parent training.

Keywords: attention, executive functions, intervention, parenting

P2 Efficacy of Neuropsychological Multimodal Group Intervention (EXAT) on children's executive functions assessed by parents and teachers

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Objective: The aim of this study is to evaluate behavioral aspects of executive functions (EFs) deficits in children attending neuropsychological group intervention for children with attentional and executive function problems (EXAT). EFs are assessed by parents and teachers and compared to children in mainstream schools. The second aim is to evaluate the efficacy of EXAT on executive functions.

Participants and methods: Participants were 44 children aged 7-13, referred to the EXAT at the Psychology Clinic at University of Tampere during 2013-2015. The study group was compared to age and gender matched control children (n=44). EFs were assessed using the Behavior Rating Inventory of Executive Function (BRIEF, Parent and Teacher Forms) – the Finnish version, with subscales for Inhibit, Shift, Emotional control, Initiate, Working memory, Plan/Organize, Organization of Materials and Monitor as well as broader indexes of Behavioral Regulation and Metacognition and an overall score, the Global Executive Composite. Nonparametric tests were used.

Results: Results show that children who attended the EXAT had higher scores in the BRIEF subscales and more clinically ($T > 65$) significant EF deficits were reported by both parents and teachers compared to control children. After one year EXAT intervention, parents and teachers reported decrease in EF deficits. More detailed results will be presented in ESN meeting.

Conclusions: Children with deficits in executive functions seem to benefit EXAT intervention assessed using BRIEF.

P3 Using Tablets to Assess Working Memory Capacity in School Settings

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The assessment of working memory in school children is important, because working memory capacity is strongly related to children's scholastic performance, and because several learning difficulties are accompanied with working memory deficits. Traditionally working memory capacity has been assessed with individually presented computerised span tasks. However, previous studies show that a tablet can be employed in collecting accurate, well-controlled performance data. In this study two working memory span tasks were developed for a touchscreen interface: a Counting span task and a Reading span task. The aim of this study is to examine the feasibility of the tablet-based working memory span tasks by investigating how strongly the working memory performance relates with children's scholastic skills and by assessing the reliability of the scores and the reaction time data. The study is part of the broader TIKAPUU study. About 800 sixth grade student have participated in the study. Children's reading and math skills, as well as nonverbal ability were assessed in autumn 2014. In spring 2015 working memory span measures will be conducted and information about children's memory strategies and grade point average will be collected by a questionnaire. A sub-sample of students will be assessed with WISC-IV digit span. According to the pilot study (N=63) the working memory performance in both tasks correlates with children's self-assessed school grades. The results of this study will reveal detailed information on the validity and reliability of the tablet-based working memory span tasks.

P4 Weak Suppression Surrounding the Focus of Attention in Autism: a Possible Explanation of Visual Objects Overload?

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A large amount of evidence shows that individuals with autism spectrum disorder (ASD) manifest abnormalities in their visual attention. Although the focus of spatial attention has been traditionally represented as a "spotlight", with a profile characterized by a simple spatial gradient that falls off monotonically with increasing distance from the focus center, recent neurophysiological models demonstrate that ecological visual search requiring spatial scrutiny for object recognition produces an area of neural attenuation in the target's immediate surround. We investigated this aspect of the visual attention functioning in twenty-three ASD children and an equal sample of typically developing (TD) peers matched for age and cognitive level. While fixating the center of a screen, they were induced to focus their attention onto a color pop-out target and then probe stimuli were presented at various distances from the target. Our results showed that TD group accuracy in reporting the probe identity was enhanced at the location of the target –where the attention was focused– but then dropped in a narrow area surrounding the target and partially recovered at more distant locations. In contrast, in children with ASD the area of attenuation surrounding the focus of attention was markedly reduced, suggesting an unbalanced relationship between enhancement and suppression neural mechanisms during visual object recognition. These findings are extremely important to understand the nature of visual processing in autism and can help to explain the superior performance often exhibited in the detail-oriented perceptual task as well as the visual overload often experienced by some individuals with ASD.

P5 Motor impairment, a core symptom in developmental troubles

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Objective: Communication -from gestures to language- heavily depends on fine-grained motor skills. Both Autism Spectrum Disorders (ASD) and Developmental Coordination Disorders (DCD) are most of the time associated with sensorimotor impairments, yet their nature and specificity remain unknown.

Participants and methods: We examined motor control in Typically Developing (TD) children aged from 5 to 10 and in DCD and ASD children aged 9-10 years old. All participants had to reach and grasp a bottle (visually identical but either heavy or light) and displace it laterally. We manipulated previous knowledge of the weight: when known, participants could anticipate the consequences of the weight prior to object contact (feedforward control); when unknown, participants had to adapt to the object weight after contact (feedback control). Movement kinematics was recorded with a high-resolution optoelectronic motion tracking system.

Results: Results revealed that TD children as young as 5 used feedforward control, which yet became optimal around 7. In contrast, ASD children were unable to benefit from weight knowledge before they came into contact with the object, showing impaired feedforward control, but their feedback control was spared. Despite an important general sluggishness, DCD children tended to appropriately anticipate their movements as a function of the upcoming object weight (e.g. going faster for a heavy object), whereas their feedback control was affected.

Conclusions: These findings shed light on how specific motor impairments might differently characterize developmental disorders, suggesting possible new avenues for rehabilitation approaches.

P6 Orientation response to direct gaze in young children with autism

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Objective: Reduced use of eye contact is a prominent characteristic of individuals with autism. The objective of this study was to investigate the reasons for the lack of eye contact. Autonomic orienting to direct vs. averted gaze was measured in young children with autism and in their control children. It was hypothesized that the direct gaze would elicit stronger orientation response than averted gaze in children without autism whereas this would not be observed in children with autism.

Participants and methods: 20 children with autism (2-5 years, IQ range 45-79), 20 typically developing control children matched by chronological age, and 16 children with developmental delay matched with developmental age were presented pictures of faces with direct and averted gaze direction. During the stimulus presentation their heart rate and eye movements were measured.

Results: In the control children (both typically developing and with developmental delay) the heart rate deceleration response (i.e., orienting response) was observed to both direct and averted gaze. In typically developing children the response was stronger to direct than averted gaze. No heart rate deceleration was observed in children with autism.

Conclusions: The results indicated that, in contrast to children without autism, children with autism do not show heart rate deceleration to direct or averted gaze. These findings support the assumption that direct gaze, or perhaps faces in overall, do not attract the attention of the children with autism and this leads to reduced initiation of eye contact.

P7 Social attention and reward processing in young children

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Recent research showed that in adults, the allocation of attention is influenced when visual stimuli are associated with a reward (Anderson, 2013). Using a gaze-contingent stimulus display, we investigated whether the association between social cues and reward delivery modulate eye movement of young children.

Twenty-four children (3-4 years old) observed a stimulus display in which videos of two persons were presented on each side of a screen. One person was engaging (smiling and greeting) and one person was not engaging (frowning and moaning). Gazing at one of the two persons triggered the presentation of a reward (animated cartoon). Engaging social cues triggered reward delivery for half the participants, and non-engaging social cues triggered reward delivery for the other half of the participants.

Both groups of children learned to shift their gaze towards the person who triggered the reward delivery more often than towards the other person. This learning happened more quickly when the reward was associated with the engaging person than when the non-engaging person triggered the reward delivery.

These results demonstrated that the association of social cues and reward delivery can influence eye-movements of young children. This highlights the possible need to study the relation between attention and reward processing in individuals in which attention to social cues is reduced such as children with autism.

P8 Does ageing affect inhibitory control in a motion flanker task?

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Objectives: It has been argued that older adults have impaired inhibitory control (e.g., Hasher & Zacks, 1988) as well as impoverished motion detection (e.g., Billino et al., 2008). We assessed whether ageing and conflict levels affect inhibitory control in a motion perception task.

Participants and methods: We tested 20 younger (M age = 21.33) and 20 older (M age = 66.58) adults. Participants were presented with moving dots and had to indicate the motion direction. In the conflict condition, the central target dots were surrounded by two flanker groups that moved in a congruent or incongruent manner. In both conditions, the percentage of flanker dots moving in a coherent direction varied, thus leading to different levels of conflict (i.e., 40%, 60%, 80%, and 100% moving congruently or incongruently).

Results: Reaction times (RTs) were overall slower for incongruent than congruent trials. RTs also increased as conflict level increased. The flanker cost (difference between incongruent and congruent trials) increased with conflict levels, but no age effect on flanker costs was observed. In older adults (but not the young), motion perception baseline RTs correlated negatively with the flanker effect.

Conclusions: Inhibitory control was not affected by age and conflict level affected inhibitory control to the same extent in younger and older adults. Faster motion perception was associated with larger flanker costs in older adults, suggesting that speed of stimulus perception can modulate inhibitory control.

P9 Cognition, white matter integrity and physical activity in a sample of healthy middle aged adults.

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Introduction: Over the life span, cognitive function declines along with a reduction in the cerebral white matter integrity. This decline is not equal for all subjects. Mediators that have been considered in this differential decline include physical fitness.

Objective: to investigate the cognitive and white matter integrity relationship with physical activity in a middle aged healthy population-based sample.

Methods: 71 subjects aged 50 to 65 years were included and underwent a widespread neuropsychological assessment and brain MRI. The sample was divided into two sub-groups: Group 1 = walks < than 5 hours per week; and Group 2 = walks \geq 5 hours per week. Cognitive measures were grouped into 7 cognitive domains: executive function, verbal fluency, attention, verbal memory, visual memory, visual-spatial abilities, and speed/visuomotor coordination. The cross-sectional relation between physical exercise and the microstructural integrity of the white matter was assessed by applying Tract-Based Spatial Statistics to diffusion tensor imaging parameters.

Results: Being more physically active showed a positive relationship with verbal and visual memory and psychomotor speed and it was negatively related to the mean and radial diffusivity in discrete regions of white matter. However, these results were not significant after TFCE correction.

Conclusions: 1) walking more hours per week is related to different cognitive functions and white matter integrity in middle aged healthy subjects; 2) this relationship seems to be stronger for the group that walks \geq 5 hours per week.

P10 OCS-d: a tablet-based cognitive screen for age-related cognitive decline

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Objective: Abnormal cognitive decline is typically diagnosed by the presence of precipitous memory decline. Existing short screens rely heavily on verbal memory, providing a single pass score with little, domain-specific information. However, neural degeneration underlying decline is not limited to structures associated with memory: decline manifests as exacerbated, deficits often across several interacting domains. Furthermore, discrete scores are not sensitive enough for mild impairments in early stages of decline, while administration of current short screens relies heavily on the examiner, who gives instructions, records performance, interprets responses and scores outcome.

We present OCS-d (Oxford Cognitive Screen for decline), a tablet-based, standardized screening battery for mild cognitive impairments that provides multiple continuous measures across a range of cognitive domains.

Methods and participants: OCS-d runs on 10" Windows tablets, takes 25 minutes to administer and comprises 11 tasks testing language, verbal and visual memory, executive function, selective and sustained attention, and visuospatial skills. OCS-d automatically records responses and timing, and derives multiple continuous measures of performance and strategy per domain.

OCS-d is self-paced, displays prompts and instructions, and has real-time automatic scoring, requiring minimal examiner training and input.

OCS-d has been administered to 100 neurologically-healthy participants (age range: 20 to 85).

Results: Data from the current sample show robust variation of derived measures with age, particularly above 50 years of age.

Conclusions: By providing automatic and continuous measures of performance and timing, OCS-d enables assessment of both cognitive strategy and outcome, has refined sensitivity to age-related mild cognitive impairments, as well as superior reliability and time efficiency over existing short screens.

P11 Object function and manipulation priming in young adults and elderly

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Object semantic includes, among others, object function and manipulation knowledge. Function knowledge refers to the goal one can reach by using an object (e.g. the function of a key is to open and close a door). Manipulation knowledge refers to gestures one has to product to appropriately use an object (e.g. a key is hold between the thumb and the index, inserted into the door lock and then turned). According to grounded cognition theories, manipulation knowledge would require motor simulation to a greater extent than function knowledge, an ability that may decrease with ageing.

To explore the influence of ageing on implicit processing of these two types of knowledge, a semantic priming paradigm (190-ms SOA; prime duration: 90 ms) involving line drawing naming was proposed to 24 young adults and 24 elderly. Target objects could be preceded by three priming contexts: related (e.g. knife-scissors for function key-screwdriver for manipulation), unrelated but visually similar (e.g. glasses-scissors, baseball bat-screwdriver), and unrelated visually dissimilar (e.g. die-scissors, tissue-screwdriver,).

Results showed function priming effects independently of age, with faster naming when the target was preceded by a prime sharing the same function than an unrelated visually dissimilar prime. In contrast, manipulation priming effects interacted with age. In young adults, primes sharing the same manipulation led to slower target naming compared to unrelated visually dissimilar primes, whereas no priming effect was observed in the group of elderly.

Results are interpreted according to the neurocognitive modifications due to normal ageing in the grounded cognition approach (Barsalou, 2008).

P12 Cognitive Function Differences between Adolescence and Elderly People with the Indonesian Wechsler Adult Intelligence Scale – Fourth Edition (WAIS-IV-IDN)

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Objective: Cognitive functioning presumably will decline with age. By using the WAIS-IV-IDN, we investigated whether there were differences in adolescents and elderly people in the domains of cognitive functioning; verbal comprehension, perceptual reasoning, working memory, and processing speed.

Participants and methods: We tested 113 adolescents between 16 – 19 years old ($M=18.30$, $SD=.92$), most of them were female (58.4%), and 77.9 % completed senior high school. We also tested 114 elderly people aged between 70 – 90 years old ($M=76.13$, $SD=4.92$), most of them were female (71.9%), and 34.2% completed senior high school. To evaluate the intelligence profile we used Indonesian Wechsler Adult Intelligence Scale – Fourth edition. We used t-test independent samples, U-Mann Whitney's test, and Pearson product-moment correlation.

Results: The results indicated there were significant differences ($p < .01$) between all subtests of the WAIS-IV-IDN except for Arithmetic (AR) and Information (IN). This result was supported by the previous finding that showed no correlation between age with AR and IN. However, adolescence performed better in each subtests. The same results were found for all indexes and full IQ. Adolescence always scored higher except for the perceptual reasoning index. If we compare the same level of education (junior high school), there were significant differences between all subtests of the WAIS-IV-IDN except for AR.

Conclusions: In general, cognitive functioning as measured with the WAIS-IV-IDN declines with age although several abilities remain the same, like arithmetic, information, and perceptual reasoning.

P13 Long-term memory guided attention in healthy ageing

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Objective: The explicit long-term memory (LTM) system declines in healthy ageing, affecting the encoding and retrieval of contextual information. It is well documented that associative LTM also prepares neural activity for guiding visuo-spatial attention in a proactive manner. In the current study we investigated whether explicit memory decline in elderly would compromise this mechanism.

Participants and methods: We compared the behavioural performance of younger and older participants on learning new contextual LTMs, the orienting of visual attention based on these learnt contextual associations, and their explicit recall.

Results: We found that older adults were impaired only in the explicit retrieval task. Importantly, this deficit did not interfere with memory-based orienting of attention, which was highly reliable in both groups. Furthermore, memory-based orienting correlated significantly with explicit contextual LTM in younger adults but not in older adults.

Conclusions: Our results suggested that explicit contextual memories are not necessary to guide memory-based perceptual enhancements in healthy ageing.

P14 OCS-d : mapping cognitive decline across several interacting domains

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Objective: Dementia diagnoses are often based solely on the presence of precipitous memory decline, which fail to detect exacerbated cognitive decline across several interacting domains. We have recently developed the OCS-d (Oxford Cognitive Screen for decline), a tablet-based, standardized screening battery providing continuous performance measures across a range of cognitive domains (see Duta, Demeyere, Humphreys poster). In this study, we assessed associations and dissociations between verbal memory encoding and delayed recall, and measures of executive function (rule finding and task switching) in the ageing population.

Participants and methods: OCS-d was administered to 100 neurologically-healthy participants (age range: 20 to 85). The verbal memory task consists of 5 words encoded over 2 repetitions and recalled after approx. 4 min (non-verbal filler task). The rule finding and trail making tasks both comprise non-verbal stimuli and aim to measure abstract rule derivation and task switching. We compared performance on the executive tasks for participants with perfect vs erroneous memory performance.

Results: The data show robust variation with age for each of the measures. Associations were noted across tasks, where participants scored consistently high or low in all 3 tasks. In addition, dissociations were apparent. Notably there were individuals who scored highly on memory performance but who showed poor performance on executive tasks, confirming the utility of including sensitive measures of executive function within screens for cognitive ageing.

Conclusions: Detecting verbal memory problems alone does not capture the full spectrum of age-related cognitive decline. However the automated OCS-d demonstrates associations and dissociations between executive and memory domains even in normal ageing.

P15 Middle age score based on self-reported education and occupational attainment predicts cognitive functioning in old age

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Objective: By using information on self-reported educational and occupational attainment we aimed to develop protective score that predicts good old age cognitive functioning.

Participants and methods: Cognitive functioning of 2602 twins from a longitudinal population-based Finnish Twin Cohort study was determined via telephone by two validated instruments: TELE, a self-report interview and the Telephone Interview for Cognitive Status (TICS). A total score of TELE and TICS was used as a measure of cognitive functioning in old age (M = 74 y). Protective score ranging from 0 to 11 was calculated by using data on educational and occupational attainment collected via postal questionnaire surveys at the mean age of 48. We performed regression analyses with total score as a dependent variable and protective score as an independent variable (age, follow-up time and sex as covariates; adjusted for clustered family data).

Results: Middle age protective score was a significant ($p < .001$) predictor of old age cognitive functioning in the whole sample; $r = .42$, but also when holding educational level as constant, $r = .21$ in analyses restricted to individuals with six years of education ($N = 1190$).

Conclusions: Protective score based on self-reported educational and occupational attainment in middle age predicts the level of cognitive functioning after 28 years. In addition to well established protective effect of higher education also occupational attainment predicts the cognitive functioning in the old age over and above the effect of education. Thus, both higher educational and occupational attainment are important in building cognitive reserve.

P16 A selective ageing effect on the frontal lobe connections

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Background: With aging the neuronal loss and small vessel alteration lead to progressive white matter damage associated with cognitive decline in the elderly. Cognitive decline affects predominantly executive functions, and brain changes seems to distribute unevenly, concerning predominantly the frontal region. Whether this progressive change affects the whole frontal white matter or specific tracts is unknown.

Methods: Diffusion weighted datasets from 47 healthy volunteers aged 22-70 (M:F 24:23) were dissected with tractography. For each dissection fractional anisotropy (FA) and oriented anisotropy (HMOA) were extracted as indirect measures of the tract integrity and correlated with the age of the participants regressing out the level of education.

Results: Repeated ANOVA revealed a significant interaction between HMOA measures of frontal and non-frontal tracts and the age of the participants ($F(1,44)=6.968$; $p<0.011$). This result demonstrates that microstructural differences related to age are stronger for the tracts emerging from the frontal lobe compared to other tracts.

Partial correlation analyses revealed that aging was significantly associated with a decrease of FA for specific tracts in the frontal lobe but not all.

Conclusion: We confirmed preliminary evidences reporting reduced integrity in the frontal portion of the corpus callosum associated with aging.

Our results also suggest for the first time that aging alters significantly others tracts in the right hemisphere which brings up interesting hypotheses on a pathophysiological explanation for ageing decline in visuospatial and verbal working memory, memory encoding and retrieval, reward-based associative learning that can be tested in the elderly.

P17 Uniform Psychological and Neuropsychological Assessment After Aneurysmal Subarachnoid Hemorrhage: Swiss recommendations

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Background: In a high proportion of patients with favorable outcome after aneurysmal subarachnoid hemorrhage (aSAH), neuropsychological deficits (NPD), depression, anxiety and fatigue are responsible for the inability to return to their regular premorbid life and pursue their professional career. These problems often remain unrecognized, as no recommendations concerning a standardized comprehensive assessment have yet found entry into clinical routine.

Methods: To establish a nationwide standard concerning a comprehensive assessment after aSAH, representatives of all neuropsychological and neurosurgical departments of those eight Swiss centers treating acute aSAH have agreed on a common protocol. In addition, a battery of questionnaires and neuropsychological tests was developed, optimally suited to the deficits found most prevalent in aSAH patients, that was available in different languages and standardized.

Results: We propose a baseline inpatient neuropsychological screening using the Montreal Cognitive Assessment (MoCA) between days 14-28 after aSAH in order to evaluate the need for a stationary rehabilitation. In an outpatient setting, we recommend a detailed assessment capturing anxiety, depression, fatigue, symptoms of frontal lobe affection, and quality of life. In addition, a neuropsychological examination, testing all relevant domains including attention, speed of information processing, executive functions, verbal and visual learning/memory, language, visuo-perceptual abilities, and premorbid intelligence should be performed at 3 and 12 months after the bleeding.

Conclusion: The introduction of a standardized neuropsychological assessment into clinical routine will lead to a more comprehensive assessment of the patient and facilitate the detection and subsequent treatment of previously unrecognized but relevant impairments. The implementation of the neuropsychological data into a nationwide scientific collaboration is of great value to determine the incidence, characteristics, modifiable risk factors and the clinical course of neuropsychological deficits after aSAH.

P18 Cognitive estimation ability in Parkinson's disease: a measure of cognitive reserve?

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Cognitive estimation refers to the ability to apply reasoning strategies in order to answer questions that usually can be solve by acceptable approximation. There is an ongoing debate whether cognitive estimation performance should be considered an executive ability or reflect global cognitive functioning. In the present work we study what cognitive domains are involved in the process of cognitive estimation in Parkinson's patients without dementia, since they generally show a more selective dysfunction of frontal lobe abilities rather than a complete and pure frontal syndrome. The PD patients' performance to a neuropsychological battery - which includes a global measure of executive functions and measures of response inhibition, working memory, verbal intelligence, spatial abstract reasoning, arithmetical abilities and general knowledge - was compared to healthy subject's group. According to the results, even though PD patients without dementia showed difficulties in executive domain, attention, reasoning and calculation abilities, cognitive estimation appeared to be preserved. We hypothesize that assessing cognitive estimation abilities might be considered a reliable strategy for estimate cognitive reserve, meaning the amount of cognitive loss that can be sustained by brain-damaged patients before reaching a threshold at which cognitive impairment becomes evident.

P19 ANDI - Advanced Neuropsychological Diagnostics Infrastructure

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ANDI is a new web-based platform for neuropsychological assessment which uses advanced, multivariate statistical methods and a large database of normative data of healthy control subjects to evaluate clinical neuropsychological test data.

Traditionally, neuropsychological tests are used as stand-alone instruments. By combining a number of tests we evaluate different aspects of a patient's cognition, but we consider each test separately. Using multivariate methods to assess a patient's score profile is a more sensitive way of evaluating multiple test scores and may lead to an improvement in the diagnostic process.

With a consortium of researchers in the Netherlands, who have donated data of their healthy control participants, we have set up a large normative database (20,000+ healthy controls and 150 neuropsychological tests) to make these multivariate normative comparisons (MNC) possible. The online ANDI platform will make it possible to evaluate a patient's entire score profile against the large normative database, indicating whether or not the profile is abnormal. Users can upload their patient data to the ANDI web portal, which will return a detailed report for each patient. ANDI will also allow researchers to more easily locate patients in their samples who, for example, fulfill particular diagnostic criteria or otherwise can be defined as having abnormal test scores.

During this presentation we will give an overview of the ANDI system, its principle, its methods, and its applicability in the neuropsychological diagnostic process.

P20 A measure to remember: reliability and validity of the Dutch version of the Wechsler Memory Scale – Fourth Edition (WMS-IV-NL)

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Objective: The Wechsler Memory Scale (WMS) is one of the most widely used test batteries to assess different memory functions in impaired patients with brain dysfunctions of different etiologies. The latest edition, the WMS-IV, has been thoroughly revised. We examined the reliability and validity of the Dutch version of the WMS-IV in healthy controls and several patient groups.

Participants and methods: The WMS-IV-NL was administered to 1,188 healthy participants and 235 patients with different pathologies including dementia (n = 20), traumatic brain injury (n = 27) and temporal lobe epilepsy (n = 68). Additionally, 74 healthy participants completed both the WMS-IV-NL and other criterion measures (WAIS-IV, RBMT-3, RAVLT and LLT). Also, 138 healthy participants were re-evaluated after a short interval (4-12 weeks) and 109 healthy participants were re-evaluated after a long interval (1-2 years).

Results: The WMS-IV-NL was found to have good reliability with internal consistency estimates above .87 for all index-scores, and test-retest correlations that ranged from .72 to .87. The correlations between the WMS-IV-NL and other measures and demographic variables (age, education and gender) were in the expected direction. Moreover, the confirmatory factor analyses corroborated the presence of three factors consisting of Auditory Memory, Visual Memory and Visual Working Memory. In comparison to healthy controls, various patient groups performed mostly in the low range which indicates that the WMS-IV-NL is capable of detecting memory problems in different patient groups.

Conclusion: These findings provide evidence for the reliability and validity of the WMS-IV-NL, and further support the psychometric integrity of the WMS-IV.

P21 Coin in the Hand Test (CIGHT): sensitivity and specificity in a Portuguese sample

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Objective: To evaluate the sensitivity and the specificity of the Coin in the Hand Test (CIGHT) in the detection of suboptimal effort.

Participants and methods: The CIGHT and the Dementia Rating Scale-2 (DRS-2) were applied to 84 patients without legal or forensic issues observed in the Neuropsychology Clinic (CG) and to 49 normal subjects recruited in the community (21 were asked to simulate malingering, and 28 were asked to provide their full effort - NG) with similar age and education. The explored cutoff score for suboptimal effort was >2 errors on the CIGHT.

Results: The CIGHT had 95% sensitivity in the detection of malingering. The specificity ranged between 81% (CG) and 100% (NG). When CG subjects with DRS-2 total scores below the 1st percentile or above the 18th percentile of age and education norms were excluded, the specificity of the CIGHT was 92%.

Conclusions: The CIGHT showed high levels of sensitivity and specificity, even at low levels of cognitive functioning. These results confirm the utility of the CIGHT as a validity test in a clinical setting.

P22 The Boston Qualitative Scoring System for Rey-Osterrieth Complex Figure Performance in Parkinson's Disease: an useful tool for recognize executive deficits?

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The Boston Qualitative Scoring System (BQSS) for Rey-Osterrieth Complex Figure Performance (ROCF) allows to measure strategic planning and organizing abilities process, while the classical Osterrieth method measures visuoconstruction performance based on the presence and accuracy of details. Since BQSS was suggest to represent a measure of executive functioning, in the present work our aim was to confirm this hypothesis comparing the performance of healthy subjects and Parkinson's Disease patients at the ROCF, scored according both methods, and at neuropsychological measures about cognitive skills in executive domains and global cognitive process. We focused on this kind of population since Parkinson's Disease patients show a selective dysfunction of frontal lobe abilities. According to the results Parkinson's disease patients showed lower score at both BQSS' indexes of visuospatial/constructional accuracy and planning then healthy subject, as at the visuoconstruction index of Osterrieth method; moreover the thee indexes appeared to be significantly related, suggesting that both scoring methods were highly similar in their assessment of the completeness and accuracy of ROCF drawings. Finally, both methods' indexes appeared to significantly related to executive measures and no differences emerged between the two scoring methods in their efficiency for predicting Parkinson's Disease. We suggest that both scoring methods were highly similar in their assessment of the completeness and accuracy of ROCF drawings, opening a debate about when one method would be prefer to the other.

P23 The Errand Choice Task: a new measure of anosognosia

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Background: Anosognosia for hemiplegia is usually assessed through meta-cognition tasks, enquiring the patients to explicitly evaluate their motor abilities. However, patients' explicit reports may not reflect their behaviour and insight. Assessment methods that rely less on meta-cognition processes may allow us to investigate less overt aspects of anosognosia that play a crucial role in hemiplegic patients' behaviour. Moreover, these methods rely less on language skills, and are suitable for patients showing milder hemiparesis.

Methods: We devised a novel test, the Errand Choice Task (ECT), to investigate less explicit aspects of anosognosia by asking patients' to judge tasks difficulty presented in pairs. 73 patients showing either unilateral left- (30 LBD) or right- (43 RBD) brain lesion were asked to choose which task, between one unimanual and one bimanual task, they would find easier to perform. 65 healthy volunteers were presented with the same choices both in their current situation and in a simulated condition, whereby they were asked to pretend to be unable to move one arm.

Results: 28% LBD and 33% RBD patients showed anosognosia, no significant effect of hemispheric site of lesion. Aware patients' performance was significantly different from those of anosognosics and controls, and controls' performance during simulated condition did not differ from aware patients' performance.

Conclusions: The ECT proved able to assess anosognosia also in patients with milder hemiparesis. Our findings do not confirm a clear hemispheric asymmetry for anosognosia, and suggest that less explicit aspects of anosognosia could be an interesting way for diagnosing and assessing it.

P24 VATA-ADL: A new scale for assessing awareness of functional disability

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Objective: Activities of Daily Living (ADL) scales assess a person's ability to undertake activities of independent living, from washing and dressing to household management. For some stroke patients, unawareness of weakness or paralysis may lead to engagement in such activities inappropriately, which could increase the risk of falls or injury. We devised the Visual-Analogue Test of Anosognosia for Activities of Daily living (VATA-ADL), for patients and their caregivers, to assess the patients' ability to perform ADL activities and their awareness of this.

Participants and methods: 18 ADL activities were selected by examining current validated ADL scales. Each activity was depicted verbally and pictorially, with a four-point visual analogue response scale. The verbal-pictorial format was designed to make the scale accessible to patients with perceptual problems, and patients with aphasia; the latter group are often under-represented in anosognosia research. The images were piloted with 90 undergraduate students, to check for clarity of meaning. The resultant scales were administered to 40 stroke patients (> 3 months post-stroke) and their caregivers, and to 60 healthy age-matched controls and a close family member.

Results: Relative to healthy controls, stroke patients showed a range of impairments in their ability to carry out daily activities, and around one quarter of the patient group showed limited awareness of this.

Conclusions: Piloting of the VATA-ADL is now complete, and this scale is available for clinical and research use.

P25 www.howtotest.be: development of a free access online platform to enhance the Flemish (Belgian) neuropsychological assessment practice

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Neuropsychological tests are used in a wide variety of psychological settings (clinical, educational and revalidation settings). In Flanders (Belgium) however, research has shown that the quality of much psychological assessment instruments and practices is lamentably poor (Germeijs et al., 2003; Grietens et al., 2004; Paulussen & Vereycken, 2013; Schittekatte, 2003, 2013). Most problems are due to a lack of recent and local norms, to restricted knowledge of recent tests, to high costs of new tests, and to lack of time to fulfill standardization guidelines.

To encounter these problems, a website was developed with an overview of all neuropsychological tests and their characteristics (such as a test description, psychometric qualities and norms). Second, the website contains simple scoring tools that can facilitate the scoring of several widely used and copyright free neuropsychological tests (such as the automatic calculation of reaction times by using an online chronometer). Third, at the Department of Applied Psychology at Howest (in Bruges, Flanders, Belgium), students collect new Flemish norms for several copyright free neuropsychological tests which are presented on the website. Fourth, because professionals use the scoring tools, we automatically gather data for new Flemish norms. Fifth, the forum on the website enables the test users exchange personal experiences with the tests. The website is free but can only be used by certified and registered (applied) psychologists.

P26 The practice effects of longitudinal studies on TBI

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Introduction: Repeated administration of neuropsychological tests in longitudinal studies produce practice effects. Failure to take into account practice effects can compromise and bias the interpretation of the observed changes. Few studies on recovery after traumatic brain injury (TBI) control this effect. Recently, Calamia et al. [(2012) Scoring higher the second time around: meta-analyses of practice effects in neuropsychological assessment. *The Clinical Neuropsychologist*, 26 (4), 543-70] provided indices to calculate the practice effects in terms of standard deviations depending on various factors, such as age of patients and time since first assessment. Alternatively, simple reaction time (RT) tasks have shown no practice effects, but provide limited information about cognitive performance. The aim of this study was to determine the influence of practice effects, calculated from linear regression coefficients, on classical neuropsychological tests after TBI.

Participants and methods: 22 TBI patients were assessed in the acute stage and 6 months after trauma using neuropsychological tests and RT tasks. Performance changes in neuropsychological tests were compared before and after controlling the effect of practice.

Results: Differences between the two assessments on all neuropsychological measures were found before controlling for practice effects. Once controlled, the results showed that changes in test performance occurred only in the most complex tasks and complex information processing speed (IPS), but not in simple IPS (perceptual-motor), which are consistent with the results obtained in RT tasks.

Conclusions: The present study shows the importance of control practice effects in longitudinal studies to avoid incorrect conclusions about patient's change in cognitive functioning over time.

P27 Modified Wisconsin Card Sorting Test: Normative Data for the Colombian Adult Population

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Objective: To generate the first and most comprehensive demographic-adjusted norms for the Modified Wisconsin Card Sorting Test (M-WCST) in the Colombian adult population.

Method: The sample consisted of 1425 healthy adult participants from 6 cities in Colombia representing the demographic distribution of the population. Inclusion criteria was to be between the ages of 18 and 90, be born in and reside in Colombia, have Spanish as his/her mother tongue, know how to read and write, have a Mini-Mental State Examination (MMSE) score of ≥ 23 , have a Patient Health Questionnaire – 9 (depression) score of ≤ 4 , and have a Barthel Index of ≥ 90 . Most participants were women (57.2%) and the average age was 58.1 ± 19.5 years (range 18 to 90). The average years of education was 9.6 ± 5.2 years. Participants completed the M-WCST.

Results: Pearson product-moment correlation coefficient and coefficient of determination showed a significant effect between M-WCST scores and MMSE, age, and education (r -squared > 0.087 ; p 's $< .001$). Multinomial logistic regression yielded main effects for age and education groups on the M-WCST scores (r -square *Cox & Snell* $> .107$, $p < .001$). Consequently, a correction table was created in order to adjust the raw scores based on age and education. The percentiles tables were calculated based on the distribution of adjusted scores and will be displayed on the poster.

Conclusions: This study is the first to create norms for the M-WCST in the Colombian adult population and include appropriate adjustments for age and education. These data represent a critical advancement in the assessment of executive functioning in Colombian adults.

P28 Trail Making Test: Normative Data for the Colombian Adult Population

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Objective: To generate the first and most comprehensive demographic-adjusted norms for the Trail Making Test (TMT A & B) in the Colombian adult population.

Method: The sample consisted of 1425 healthy adult participants from 6 cities in Colombia representing the demographic distribution of the population. Inclusion criteria was to be between 18 to 90 years old, be born and reside in Colombia, have Spanish as his/her mother tongue, know how to read and write, have a Mini-Mental State Examination (MMSE) score of ≥ 23 , have a Patient Health Questionnaire – 9 (depression) score of ≤ 4 , and have a Barthel Index of ≥ 90 . 52.7% were women, the average age was 58.1 ± 19.5 years (range 18-90), and the average education was 9.6 ± 5.2 years. Participants completed the TMT A & B.

Results: Pearson product-moment correlation coefficient and coefficient of determination showed significant effect between TMT A & B scores and MMSE, age, and education (r -squared > 0.141 ; p 's $< .001$). Multinomial logistic regression yielded main effects for age and education groups on the TMT A & B scores (r -square *Cox & Snell* $> .426$, p 's $< .001$). Consequently, correction tables were created in order to adjust the raw scores based on age and education. The percentiles tables were calculated based on the distribution of adjusted scores and will be displayed on the poster.

Conclusions: This study is the first to create TMT A & B norms in the Colombian adult population and include appropriate adjustments for age and education. These data represent a critical advancement in the assessment of attention in Colombian adults.

P29 The Hopkins Verbal Learning Test-Revised: Normative Data for the Colombian Adult Population

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Objective: To generate the first and most comprehensive demographic-adjusted norms for the Hopkins Verbal Learning Test-Revised (HVLTR) in the Colombian adult population.

Method: The sample consisted of 1425 healthy adult participants from 6 cities in Colombia representing the demographic distribution of the population. Inclusion criteria was to be between 18 to 90 years old, be born and reside in Colombia, have Spanish as his/her mother tongue, know how to read and write, have a Mini-Mental State Examination (MMSE) score of ≥ 23 , have a Patient Health Questionnaire – 9 (depression) score of ≤ 4 , and have a Barthel Index of ≥ 90 . The majority of participants were women (57.2%), and the average age was 58.1 ± 19.5 years (range 18 to 90). The average years of education was 9.6 ± 5.2 years. Participants completed the HVLTR.

Results: Pearson product-moment correlation coefficient and coefficient of determination showed significant effect between HVLTR scores and MMSE, age, and education ($r^2 > 0.191$; $p < .001$). Multinomial logistic regression yielded main effects for age and education groups on the HVLTR scores ($r^2 \text{ Cox \& Snell} > .242$, $p < .001$). Consequently, a correction table was created in order to adjust the raw scores based on age and education. The percentiles table was calculated based on the distribution of adjusted scores and will be displayed on the poster.

Conclusions: This study is the first to create norms for the HVLTR in Colombian adult population and include appropriate adjustments for age and education. These data represent a critical advancement in the assessment of verbal learning in Colombian adults.

P30 Validation study of the Czech Reading Test and WAIS-III

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Objective: Reading of irregular words represents one of the most often used methods for estimation of premorbid intellect performance in neuropsychology. The National Adult Reading Test (NART; Nelson & Willison, 1991) is a test developed to estimate premorbid or prior ability. The aim of this study was to examine validity of the Czech Reading Test (Kramska, 2014, 2009).

Methods: The proposal of the CRT was discussed in a view of previously published works as well as linguistic possibilities of the Czech language. Healthy subjects (52) were tested by the CRT and complete WAIS-III. Performance in the CRT was correlated with demographic variables and all subtests and quotients in WAIS-III.

Results: The CRT has favorable psychometric characteristics: internal consistency, high correlation with the education and intellect performance in healthy subjects, as seen in its other international versions. New regression formulae for the CRT were developed based on the WAIS-III FSIQ, VIQ and PIQ. We obtained a significant model for prediction of premorbid IQ using the CRT based on WAIS-III.

Conclusions: The CRT is an important diagnostic tool for assessment of premorbid intellect in Czech neuropsychology. This standardization study could be a good solution for future scientific research in different diagnostic groups of patients with brain impairment.

P31 Assessment of executive functions in elderly stroke patients: Long-term predictive value on functional disability

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Objective: Executive dysfunction has an important role in poststroke disability. The Hayling test, Design fluency and Questioning task are some of the less common measurements of executive functions. The aim of the present study was to assess the feasibility of these tests in elderly patients 3 months after ischemic stroke. Performances on these tests were compared to conventional assessment methods of executive functions, and their predictive value on functional disability in follow-up was examined.

Participants and methods: 62 stroke patients and 39 control subjects, aged 55-85, underwent comprehensive neurological and neuropsychological examinations. Executive functions were studied with the Trail Making test, Stroop test, WCST and Verbal fluency test as well as with the Hayling test, Design fluency and Questioning task. The modified Rankin scale (mRS) and the Lawton IADL scale were used to assess functional abilities at 3 months, and the mRS after 15 months follow-up.

Results: The Hayling test, Questioning task and the four conventional tests of executive functions differentiated stroke patients from healthy controls. The Hayling test most consistently predicted functional disability as evaluated with mRS and IADL at baseline and with mRS after 15 months.

Conclusions: Of all executive functions tests, the Hayling test proved to be the most constant predictor of functional abilities in elderly stroke patients. The present study confirms the importance of assessing executive functions in clinical populations, when predicting functional disability even in the long-term.

P32 A new scoring method for Clock Drawing Test in Neglect assessment

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Clock Drawing Test is a widely used task for assessment of multiple-domain impairments (e.g. dementia) or Unilateral Spatial Neglect (USN). Scoring modality usually focuses on qualitative mistakes and number of errors or spatial organization of numbers. In this work we propose a new scoring method aimed to differentiate exploration and use of space between left and right halves of clock quadrants.

244 right-handed subjects were included: 48 right brain damaged (RBD) patients without neglect (Group 1-G1), 52 RBD with mild neglect (G2), 56 RBD with severe neglect (G3), 45 with Alzheimer dementia (G4) and 43 age-matched healthy subjects (G5).

Each clock was analysed considering Explored and Used-Space either for right and left halves, within an angular space between 0° and 180°.

We observed main effects for Explored-Space, Used-Space, Number Positioning, Groups and multiple interactions between those variables. We found significant differences ($p < .001$) between Explored Space and Used Space and between left and right halves for patients with USN (G2 and G3). No differences between left and right halves for G1, G4 and G5 were observed.

Our results are in line with the characteristic contralesional space-exploration deficit observed in USN patients and we can therefore consider this new method as an interesting tool to evaluate and support the USN screening with a more detailed measurement in terms of scanning degrees.

P33 Cognitive markers for Alzheimer's disease: what are they really phenotyping?

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Objective: Memory is commonly assessed in support to the diagnosis of Alzheimer's disease (AD). However, not all memory functions currently assessed for such a purpose appear to be informing on the same underlying processes. Two examples are free recall as assessed by the Free and Cued Selective Reminding Task with Immediate Recall (FCSRT-IR, Grober and Buschke, 1987) and visual short term memory binding (VSTMB, Parra et al., 2009). To indicate the presence of AD early, cognitive markers should ideally be resilient to the effect of healthy cognitive ageing. The objective of this study was to directly compare the effect of age on these two markers in a healthy control population.

Participants and methods: A group of 24 young ($M = 20.5$ years) and a group of 24 healthy older adults ($M = 70.6$ years) were assessed with the FCSRT-IR and a VSTMB task. Free recall and the cost of holding bound information in visual memory were compared between these age groups.

Results: An effect of age was observed on free recall ($t(32.67) = -3.67, p = 0.001$), but there was no significant difference between young ($M = 12.58, SD = 8.11$) and old ($M = 15.13, SD = 9.92$) participants' cost of binding.

Conclusions: The VSTMB task seems to unveil a memory phenotype of AD which is independent of age. However, although sensitive to AD, the FCSRT-IR is significantly affected by age and this may hinder the early distinction of normal and abnormal ageing trajectories.

P34 A novel cognitive marker for Alzheimer's disease: delivering alternative forms of assessment

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Introduction: Cognitive assessment tools with high sensitivity and specificity for Alzheimer's disease (AD) are needed. Such tools should also be easy to administer in clinical setting. The visual short-term memory binding test proved to be a good cognitive marker for AD. However, currently it is only available as a computer-based test. Alternative forms of this test would facilitate its widespread use.

Aims: This study was aimed at developing and comparing an alternative form of the Memory Binding test. We developed a flash-card version of the test and investigated whether this clinically friendly form keeps the same cognitive properties previously reported.

Methods: A group of younger and a group of healthy older adults performed the traditional computer-based task and the flash-card task. In both versions of the task, people were asked to detect changes across two sequential arrays which showed only shapes or colored shapes. The only difference across these tasks is how these arrays were presented (PC screen vs flash cards).

Results: The form used to assess Memory Binding had no impact on performance. During the debriefing session younger volunteers stated that they felt more comfortable with the computer-based task whereas older participants found the flash-card version friendlier.

Discussion: Alternative forms of assessing Memory Binding achieve the same outcome. This provides alternative forms of the task which can accommodate clinical needs.

P35 Estonian normative data and clinical validation of the CERAD test battery

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Objective: The Consortium to Establish a Registry for Alzheimer's Disease (CERAD) neuropsychological test battery is a widely used screening measure for dementia evaluation. This test is translated and adapted to many languages, therefore proper use of it in clinical assessment requires local norms. This study reports normative data of CERAD test battery in Estonian population.

Participants and methods: The normative sample includes 214 healthy elderly individuals (118 women, 96 men; age M=68.5 years, range 50-95; education M=12.4 school years, range 5.5-22). For clinical comparison we used a sample of 54 patients with Alzheimer's disease (37 women, 17 men; age M=74.8, range 62-86; education M=12.4, range 6-19). All subjects were tested with the Estonian version of CERAD test battery.

Results: The normative group obtained very high results or ceiling effect in many subtests (Picture naming, MMSE, Constructional praxis, Word list recognition, Constructional praxis recall, Clock drawing). Age had most consistent effect to subtest scores (except Word list savings %, Word list recognition and recognition %). The effect of education and sex were of lesser consequence (Verbal fluency, Picture naming, Word list learning, Word list recognition and recognition %, Clock drawing). Clinical comparison group obtained significantly poorer results in all subtests. The biggest effects were observed in all memory measures and MMSE scores.

Conclusions: CERAD test battery is a sensitive tool when detecting early changes in testing subjects with cognitive complaints suggestive of dementia. This study provides Estonian normative data and optimal cut-off scores for the test based on specificity and sensitivity indices.

P36 Validation of the Dutch version of the Wechsler Memory Scale – Fourth Edition in patients with Temporal Lobe Epilepsy

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Purpose: The Wechsler Memory Scale (WMS) is one of the most widely used test batteries to assess different memory functions in impaired patients with brain dysfunctions of different etiologies. This study investigates the clinical validation of the Dutch version of the Wechsler Memory Scale – Fourth Edition (WMS-IV-NL) in patients with Temporal Lobe Epilepsy (TLE).

Method: A group of 139 patients with TLE (mostly surgical candidates) enrolled the study. Besides neuropsychological assessment including the WMS-IV-NL, patients underwent a thorough interview and extensive medical investigations. Patients with a clearly identified and localized epileptic focus based on video EEG monitoring and MRI were divided into two groups according to the lateralization of the abnormalities (84 left TLE and 53 right TLE). 230 matched healthy controls were also examined with the WMS-IV-NL.

Results: Results showed significantly poorer memory performance of patients compared to controls ($p < .05$). Moreover, patients with left or right temporal focus performed equally on the auditory memory index and the visual memory index ($p > .05$).

Conclusion: The WMS-IV-NL is capable of detecting memory problems in patients with TLE, indicating sufficient validity of this memory battery. Moreover, the findings support previous research, showing that the WMS-IV-NL has limited value in identifying material specific memory deficits for either left or right TLE patients.

P37 Evaluation of Scoring Systems for Tower of London task

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Objective: Tower of London (TOL) is an executive function task utilized to assess planning ability. The original TOL was created by Shallice (1982). Four scoring systems have been proposed by different researchers. These systems have not yet been compared with respect to their utility and diagnostic accuracy.

Participants and methods: Three groups were compared on four TOL scores. A normal control group (NC; n=298), patients with Parkinson disease mild cognitive impairment (PD-MCI; n=52) and patients with schizophrenia (SCH, n=29). PD-MCI groups were differentiated according to the Level I Litvan et al. (2012) criteria. TOL scores were obtained according to the: i) and ii) original Shallice (1982) study (system1, SH1; and system2, SH2); iii) Anderson et al. (AN; 1996) study; iv) Krikorian et al. (KR; 1994) study. All scoring systems assign points according to the time needed for completion of the task and / or number of trials needed for completion. Area under ROC curve (AUC) was calculated to compare these scoring systems.

Results: AUC comparing NC with SCH/PD-MCI was 0.64/0.67 for SH1; 0.70/0.77 for SH2; 0.76/0.80 for AN; 0.69/0.74 for KR. All differences were significant ($p < 0.05$).

Conclusions: The best discriminant potential is given by the AN system combining scoring of both the time and number of trials needed for completion of the task.

P38 Czech version of semantic fluency Animals and Vegetables, normative data and clinical utility

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Objective: The aim of our study was to report normative data and clinical utility on semantic fluency (SF; categories animals and vegetables).

Introduction: SF is one of the most frequently used neuropsychological methods for the assessment of cognitive performance in clinical and experimental neuropsychology. However, a representative normative data for the Czech population of older and very old adults are so far lacking as well as validation on patients with Mild Cognitive Impairment.

Methods: We administered SF as a part of neuropsychological battery to 540 (292 women, 248 men) healthy older adults (HA) (60–96 years of age) and 106 patients with amnesic Mild Cognitive Impairment (aMCI). We evaluated the performance in categories animals and vegetables. Results: Age was significantly ($p < 0,001$) related to animals ($r = -0,359$) and vegetables ($r = -0,264$). Education was also moderately related ($p < 0,001$) to animals ($r = 0,357$). However, we did not find a significant relationship between education and vegetables ($r = 0,028$; $p = 0,523$). Vegetables were also the only measure that showed highly significant sex differences ($p < 0,001$). We present normative Czech data for 60–75, 70–85 and 80–96 age groups. In the clinical sample the scores of SF significantly differed among the groups and both discriminated well among subjects with aMCI and HA ($p < 0,001$).

Conclusion: The results of our study confirm a significant moderate influence of age and education in SF animals. In vegetables there are highly significant sex differences. Both measures can discriminate between patients with aMCI and HA.

P39 Clinical validation of WAIS-III in persons with mental retardation

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Objective: Historically the tests of intelligence have been introduced to differentiate subjects with lower and higher ability levels. This is important to consider in persons with mental retardation (MR). The aim of this study was to evaluate the clinical validity of WAIS-III (Wechsler Adult Intelligence Scale, Third Edition) Estonian version in persons with MR, and to observe their performance profile.

Method: The participants were 27 subjects with diagnosis of mild (N=18) and moderate (N=13) MR (14 male, 13 female; mean age=36.2, SD=14.64) and 26 healthy age, gender and education matched subjects as a control group. All subjects performed the WAIS-III Estonian version in full.

Results: The MR-group had significantly lower results ($p < 0.01$) compared to control group in all the subtests and in all the IQ/index scores that can be calculated for the adapted version of WAIS-III in Estonia (standardization still ongoing). Within the IQ/index scores PIQ (*performance IQ*, $F=96,872$) had higher and VCI (*verbal comprehension index*, $F=81,092$; $p < 0.01$) had lower differential value than the others in comparison of two groups. Within the subtests *Digit Symbol-Coding* ($F=101,960$) had higher and *Digit Span* ($F=31,259$; $p < 0.01$) had lower differential value than the other subtests.

Conclusion: WAIS-III adapted version in Estonia is capable of distinguishing the mental retardation from healthy controls and could be used as a diagnostic tool. The study provides an interesting account how the profile of the MR group differs from the normative control group. This should be considered when working with people with MR in the diagnostic and rehabilitation context.

P40 The Rey Osterrieth Complex Figure (ROCF) Qualitative Strength Revisited in both nonclinical (n=1591) and clinical (neurological n=100) examinees.

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The qualitative aspects of the copying the ROCF were considered as meaningful as the accuracy of the drawing if you would ask Rey and Osterrieth, and the ROCF has become one of the most well-known and widely used neuropsychological tasks. Most focus has been on the copying process and various classifications have been proposed to systematically assess performances. Moreover, it is the copying performance that turned out to be the only specific predictor for performance on the incidental drawing from memory. However, classification systems are diverse and a model to predict the (incidental) recall performance and its relationship to neurological disorders is still lacking. We systematically studied the various copying strategies on the ROCF-copy and their relation to accuracy (direct and delayed), drawing strategies on recall, and the relation to time taken to copy in a large nonclinical group (n=1591; (mean age 19.1 [18-21] years) using an 8-category systematic scoring system based Corwyn and Bylsma (1993). Based on these data we built a predictive model in which structured organisation (category 1 and 2) and time-taken were the most strong predictors. This model is used in a neurological outclinic patient population (n=100) and its use in diagnostics in clinical practise will be discussed in the light of executive functioning and visuoperceptive abilities.

P41 Perceived Barriers Hindering the Advancement of Neuropsychology: A Comparison of Neuropsychology Professionals Working in Latin America, United States of America, and Spain

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Objective: To describe and compare the main barriers affecting the advancement of neuropsychology in Latin America (L.A.), United States of America (U.S.A.), and Spain.

Method: 1573 self-identified neuropsychology professionals working in L.A., U.S.A., and Spain completed an online survey between July 2013 and December of 2014. Participants had an average age of 38.7 (DS=11.6) years; 20.4% had a post-Doctorate; 24.8% a Doctorate, 30.8% a Master's degree, and 9.3% a bachelor's degree only. The survey consisted of 66 questions that included a list of barriers influencing the field of neuropsychology.

Results: Chi-square analyses showed significant differences between L.A., U.S.A., and Spain ($p<.001$), indicating that the most frequent barriers for the development of the neuropsychology reported by the professionals from L.A. were the lack of academic training programs (46.9%), absence of professional leaders in the field (30.9%), and poor access to neuropsychological instruments (35.0%). For Spanish professionals, the lack of clinical training opportunities (47.5%), and unwillingness to collaborate between professionals (46.0%) were the two barriers more frequently reported. Finally, 36.2% of professionals from U.S.A. do not perceive any barriers hindering the advancement of neuropsychology, and 27.0% reported lack of clinical training opportunities as barrier.

Conclusions: Various global regions face different barriers in the advancement of neuropsychology as a profession. Identification of such perceived barriers is the first step towards their remediation and advancement of neuropsychology worldwide.

P42 Perceived Limitations of Neuropsychological Tests in Latin America, United States of America, and Spain

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Objective: To describe and compare the limitations of neuropsychological tests used in Latin-America (L.A.), United States of America (U.S.A.), and Spain.

Method: The sample consisted of 1340 self-identified professionals in neuropsychology working in L.A., U.S.A., and Spain (70.4% women, average age was 38.7 years) who performed neuropsychological assessments in the past year. Participants completed an online survey between July 2013 and December of 2014. The survey consisted of 66 questions that included items related to the use and limitations of neuropsychological tests.

Results: A chi-square test showed significant differences between L.A., U.S.A., and Spain regarding the source of neuropsychology instruments ($p's < .001$). Professionals in the U.S.A. purchased from the publisher (87.8%) and requested from the author (11.1%), while professionals in Spain obtained them by making photocopies/reproductions (39.3%) and downloading from internet (28.7%). The professionals in L.A. reported getting them loaned from colleagues (34.7%) or made photocopies/reproductions (24.6%). L.A. participants reported key problems with the use of neuropsychological tests to be: the lack of normative data (61.8%), tests not culturally relevant (56.4%), and lack of instruments for people with low levels of education (24.9%). Spanish participants reported the costliness (58.0%) and the lack of normative data (48.7%). Participants in the U.S.A. reported the costliness/expensive (52.1%), and long administration times (27.7%).

Conclusions: Significant percentages of respondents from certain countries/regions reported photocopying and downloading from the internet, which has important legal implications. Additionally, L.A. is the country with the most problems with tests that were endorsed by at least 20% of the respondents.

P43 The goal attainment scaling in neuropsychological rehabilitation in multiple sclerosis

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Objective: The overall objective was to apply the goal attainment scaling (GAS) in neuropsychological rehabilitation in multiple sclerosis (MS). The specific aims were to evaluate whether (1) GAS-rated goals are attained; (2) attaining goals is related to standardized rehabilitation outcome measures; and (3) GAS-rated goals can be mapped to the International Classification of Functioning, Disability, and Health (ICF).

Participants and methods: 56 relapsing-remitting MS patients received individually tailored strategy-oriented outpatient neuropsychological rehabilitation conducted once a week during 13 consecutive weeks. The attainment of GAS-rated personal goals and the association between achievement of goals and standardized rehabilitation outcome were evaluated. Moreover, GAS-rated goals were mapped to the ICF.

Results: Median (interquartile range) GAS attainment T-score was 56.0 (50.0-62.0). 88.8% of personal goals set were fully achieved. The attainment of goals was not significantly associated with the outcome in majority of the standardized measures. Of the 182 meaningful concepts identified in the goals, 181 could be mapped to the ICF.

Conclusions: GAS seems to be an appropriate method to set personal goals and to evaluate the attainment of goals in neuropsychological rehabilitation in MS. GAS-rated personal goals were well achieved. GAS covers areas of change that are not evaluated with standardized measures related to cognition, mood, fatigue and quality of life typically used in neuropsychological rehabilitation in MS. GAS seems to offer a possibility to take into account the specific needs of each individual patient. The ICF can be used to classify goals in neuropsychological rehabilitation in MS.

P44 Effect of a memory strategy training in older adults with subjective memory complaints

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Objective: Older adults with subjective memory complaints (SMC) often present with mild memory decrements and have an increased risk for future severe cognitive decline. Early interventions in this population may be relevant to optimize memory functions. This study examines the efficacy of a memory strategy training on memory functioning in daily life.

Participants and methods: In this ongoing study, 32 older adults (aged 50-85 years) with SMC have been recruited through memory clinics where they received a full neuropsychological and medical work-up for their SMC, yet did not fulfill the criteria for MCI or any other disorder. Participants were randomly assigned to either the strategy training group (N=15) or a restorative training control group (N=17). Both interventions consisted of seven group sessions (3-5 participants per group). Memory functioning was measured with the RBMT-3, Location Learning Test-Revised and Rey Auditory Verbal Learning Test, and ratings of personal goals and subjective memory complaints were collected. The tests and questionnaires were administered at baseline, immediately after the training and after a 6-months follow-up.

Results: Both groups improved on the ratings of personal goals. In addition, the strategy group improved more on their personal goal ratings than the restorative training. Furthermore, performance on the RBMT-3 increased slightly more after strategy training than after restorative training.

Conclusions: These preliminary findings suggest that memory strategy training in older adults with SMC improves memory functioning in daily life. A larger group will be recruited to confirm whether strategy training is more effective than restorative training.

P45 Chronic agrammatic aphasia: very long-term effects of intensive rehabilitation

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Objective: Recovery from aphasia has been extensively studied, yet issues concerning quantity, duration and long-term outcome of treatment remain unsettled. We studied the very long-term course of aphasia in a small group of selected patients who had undergone prolonged and intensive treatment at our Rehabilitation Unit.

Methods: Out of a continuous series of aphasics treated from 1995 to 2005, we selected five subjects who suffered from agrammatic aphasia due to stroke and had undergone intensive treatment (more than 5 hours/week) for more than 36 months (range 39 – 58 months). Follow-up assessment was performed more than 9 years after discharge (range 9 – 16.5 years), during which none of the subjects received further treatment. Basic language assessment was carried out by means of the Aachen Aphasia Test (AAT, Italian version) at different points during treatment (6-8 examinations) and at follow-up, with particular emphasis on spontaneous speech evaluation. An *ad hoc* designed questionnaire investigated use of language, social life and occupational status.

Results: Spontaneous speech showed a significant improvement in two subjects, was unchanged in two other cases and was significantly worse in the remaining subject. AAT scores were overall unchanged in two cases and significantly better in one; the remaining two subjects showed significant changes in single subtests (better naming in one, worse written language in the other).

Conclusions: In these aphasics the very long-term effects of rehabilitation cannot be unequivocally interpreted, however questionnaire data suggest that use of language and engagement in social and occupational activities might play some role.

P46 Effects of a multifaceted intervention program for fatigue after acquired brain injury: a pilot study

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Objective: Fatigue is one of the most frequent sequelae of acquired brain injury (ABI). However, effective treatment is not well established for post-ABI fatigue (PABIF). The purpose of this pilot study was to assess feasibility and efficacy of a group-based multifaceted intervention for patients with PABIF, particularly emphasizing training in metacognitive strategies for improving attention and problem solving, and the use of adaptive coping responses. We hypothesized post-intervention changes in scores to reflect reduced fatigue.

Participants and methods: Eight subjects with traumatic brain injury (n=3) and cerebrovascular insults (n=5) (5 females and 3 males, age 42 ± 8 years) were included a mean of 40 months post-injury ($SD=20$). Inclusion was based upon the presence of fatigue complaints (Fatigue Severity Scale [FSS] mean score >5). The subjects received 36 hours of intervention. Assessment of changes related to fatigue at pre- and post-intervention included two self-rating measures; FSS and Fatigue Questionnaire (FQ). Treatment compliance was monitored in order to determine feasibility.

Results: All subjects completed the intervention. Comparisons pre- and post-intervention (Wilcoxon Signed Ranked Test) showed significant improvement on two self-rating measures pertaining to fatigue; FSS ($p=0.035$), with the total score reduced from 53.3 to 47.8, and FQ ($p=0.018$), with the total score reduced from 19.6 to 15.3.

Conclusions: Training in metacognitive strategies, and the use of adaptive coping responses in alleviating PABIF is theoretically driven and feasible in a research setting. Furthermore, pilot results suggest that this type of intervention may be effective in alleviating PABIF. Further research with a larger sample size and stronger design is warranted.

P47 Goal Management Training and Mindfulness meditation improve daily activities performance in abstinent polysubstance abusers

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Objective: The aim was to investigate the efficacy of a neuropsychological rehabilitation program including Goal Management Training and Mindfulness, to deal with daily activities in a group of polysubstance users in community treatment.

Participants and methods: Thirty two polysubstance users were randomized into two intervention groups (GMT+Mindfulness vs Standard Treatment). The GMT+Mindfulness group received a 8 week program, 2 sessions of 2 hours each week. The behavioral changes related to daily activities were assessed pre- and post-intervention with a new version of Multiple Errands Test (MET-CV).

Results: Repeated-measures ANOVAs showed an interaction effect "Time x Treatment", the GMT+Mindfulness group decreases significantly the total amount of task failures in the MET-CV ($F=8.485$, $p=0.007$), but not the Standard Treatment group. In other hand, interaction effects were far to significance for the total amount of inefficiencies done in MET-CV ($F=0.367$, $p=0.550$), showing similar results in pre- and post- assessment in both groups.

Conclusions: GMT+Mindfulness can improve execution in daily activities in polysubstance users, reducing the amount of task failures, but can't reduce significantly the inefficiencies behaviors. From our point of view, the use of strategies with a better use of working memory trained in GMT program, and the increased awareness trained with Mindfulness can maintain goals in mind, reducing the failures. However, these programs help achieve goals but not to reduce the inefficiencies done during the process.

P48 Rehabilitation after TBI with comorbid psychiatric disorders

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Objective: The objective is to underline the need to address comorbid psychiatric conditions as an integrated part of rehabilitation after traumatic brain injury (TBI) through a single case presentation.

Participants and methods: We report of a 20-year-old male inpatient admitted to a specialized rehabilitation unit after severe TBI, with a Glasgow Coma Scale score of 5 at time of injury. Preinjury, the patient had received treatment for psychiatric disorders in the anxiety spectrum (F.40-48), but was being assessed for a possible schizophrenia spectrum disorder (F.20-29). Following the TBI, the patient demonstrated pronounced executive dysfunction encompassing both cognitive and emotional dysregulation. The comorbidity posed challenges in providing adequate cognitive rehabilitation, including choice of pharmacological interventions. A comprehensive understanding of the patients' functioning was established through recording of anamnestic information, neuropsychological assessment, clinical observations, and collaboration with mental health care facilities.

Results: A long-term rehabilitation process consisting of extensive collaboration between the brain injury unit, outpatient rehabilitation facilities and mental health care services was necessary in order to gain a thorough understanding and adequate treatment of the patient's problems. The patient proved more available for cognitive rehabilitation when his psychiatric condition had been properly addressed. Providing pharmacological treatment with minimalized exacerbation of cognitive symptoms was essential.

Conclusion: Psychiatric comorbidity is common and may have a significant impact on the rehabilitation process after TBI, creating challenges for the patient and the rehabilitation system. Addressing both conditions during rehabilitation in a systematic manner and in collaboration with the mental health care system is necessary and may improve long-term outcome.

P49 Comparison of faster and slower responders to early intervention in reading: Are there specific neurocognitive predictors?

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Objective: This study focused on the rehabilitation of children who were at risk for dyslexia. In the study the neurocognitive profiles of faster and slower responders to the interventions were compared.

Participants and methods: The literacy skills of 370 Finnish children were followed from school entry until the end of the second school year. The children whose performance was low in the school entrance screening were selected to the at-risk group (n = 72). During the first fall term they received regular special education, and additionally half of them played the phonics-based GraphoGame. The at-risk children whose performance in the literacy tasks was low in the follow-up at the beginning of the spring term, were chosen for individualized interventions (n = 20). According to the RTI-model, the most vulnerable children (n = 10) were assigned to individualized rehabilitation during the spring term of the first school year, while the others (n = 10) had individualized interventions during the fall term of the second school year.

Results: It was found that strengths in phonological processing and short-term memory predicted the rate at which the children benefited from the interventions. Slow naming rate, on the other hand, was related to slow progress despite the given support.

Conclusions: The results of the study demonstrate that most of the at-risk children benefit from early evidence-based interventions. The present study suggests that the most vulnerable at-risk children need individualized, long-lasting rehabilitation in order to achieve adequate literacy skills.

P50 The use of computer games in rehabilitation of cognitive flexibility in adolescents with Autistic Spectrum Disorder

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Objective: Deficits in cognitive flexibility are related to restricted, repetitive and stereotyped behaviors observed in Autistic Spectrum Disorder (ASD). The present study aimed to investigate how computer games could be used as tools for rehabilitation of cognitive flexibility in adolescents with autism.

Participants and methods: Six teenagers (4 males) with ASD, mean age of 14,33 (SD=2,42) and education mean of 6 years (SD=3,06) participated. The group mean IQ was 104 (SD=18,87). A total of 5 games downloaded from www.ojogos.com.br were selected by the ratings of a panel of experts. The 15 rehabilitation sessions were videotaped and each session followed a standard structure, one computer game was presented three times consecutively during the intervention program following the sequence: Bubble Shooter, Turn fruit, Tetris, Fast-Food Restaurant, Traffic Trouble. Parameters of reaction time, numbers of errors and game score were used to analyze performance during the intervention. Parents and professionals answered a questionnaire which estimated the frequency of behaviors related to cognitive flexibility before and after the intervention.

Results: The group means and standard deviations for the parameters were calculated for each trial and differences between initial and final trial analyzed. Reaction time consistently diminished for the games. Numbers of errors showed a significant decrease only for the Tetris game comparing initial and final trials. Game scores for Tetris and Fast-Food Restaurant showed a significant improvement.

Conclusions: Computer games can be motivating, age appropriate and related to cognitive flexibility but further research is still necessary to establish which characteristics should be considered.

P51 The Impact of Cognitive activity during life (CADL) on Brain Functional Connectivity in Down syndrome (DS)

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The mechanism by which environmental enrichment during live interacts with DS brain is an issue that still needs to be understood.

Objective: This study aims to understand how CADL interacts with brain functional connectivity in a DS young adult population using resting-state functional MRI.

Methods: Previous studies suggest a distinctive functional organization in DS showing decreased connectivity in dorsal networks and increased connectivity in ventral brain areas. Here, brain maps were generated in 20DS patients to explore the CADL correlation with anomalies observed in DS. The dorsal and ventral anterior cingulate cortices (ACC) served as representatives of the networks showing anomalous connectivity. CADL was obtained from a parental-reported interview in a variety of cognitive activities during their life-span. It was measured as an average of the following 7 items that puntuate 0 to 5: schooling years, training to work, courses done, cognitive stimulation, writing, reading and sports frequency.

Results: Higher CADL scores were associated with increased connectivity in both dorsal and ventral networks. Specifically, in the dACC map, higher CADL correlated with increased connectivity with the left posterior insula, whereas in the vACC map, higher CADL correlated with increased connectivity with bilateral anterior insulae.

Conclusions: Results indicate that CADL is associated with functional connectivity changes in DS. The direction of the association suggests that increasing CADL may offer a potential target to reduce cognitive impairment in DS by improving connectivity in dorsal “executive” networks. Additionally, results indicate that increasing CADL is associated with a worsening in the already “excessive” connectivity in ventral brain regions, suggesting a compensatory mechanism.

P52 To move or not to move, that is the question. Body schema and non-action oriented body representations: an fMRI meta-analytic study

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Objective: Since the first effort of Head and Holmes (1911-1912), many studies attempted to identify the different cognitive components of body representation (BR) and how the brain integrates them. Nevertheless, due to methodological issues, the data reported in these studies are often confusing. The aim of the present study is to summarize the fMRI data on how the brain processes the body in healthy subjects through a meta-analytic approach. We also explore the possibility of a neural segregation between BR supporting actions (body schema, BS) or not (non-oriented to action body representation, NARB).

Methods: We performed a general activation likelihood estimation (ALE) meta-analysis of 59 fMRI experiments to identify the neural substrates underpinning general aspects of BR. Moreover, two individual ALE analyses were performed to identify the neural substrates of different BR (i.e., BS and NARB).

Results: Body processing involves a wide network of areas in occipital, parietal, frontal and temporal lobes. NARB selectively activates the somatosensory primary cortex and the supramarginal gyrus. Instead, BS involves the primary motor area and the right extrastriate body area (EBA).

Conclusion: Our meta-analysis confirms that different neural substrates are involved in different BR. In particular our data suggest that motor information and recognition of body parts are fundamental to build up the BR guiding action. Instead, sensory information and the processing of the space in an egocentric perspective are more important for the non-action oriented BR. In conclusion, our results strongly support the functional distinction between BR supporting actions or not.

P53 Spatial cognition shows quantitative rather than qualitative deficit in aMCI compared to healthy elderly

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Objective: Spatial navigation, that is the ability to retain the spatial layout of an environment, find a shortcut between two locations or create an interconnected network among different paths, is one of the cognitive functions subjected to decline in both normal and pathological aging. In the present study we aimed to assess the neuro-functional correlates of decline of topographical memory in amnesic Mild Cognitive Impairment (aMCI) patients.

Participants and methods: Eight aMCI and eight age-matched controls were engaged in an intensive learning paradigm, lasting for five days, during which they had to encode one path from a route perspective and the other from a survey perspective. After the learning period, they were asked to retrieve each of these paths using a survey (ST) or route (RT) frame of reference while undergoing an fMRI scan.

Results and discussion: We found that aMCI patients showed a general decline in topographical memory, regardless the nature of the representation required to solve the spatial task (i.e., RT or ST). Imaging data suggest that this general decline is correlated with the hypoactivation of brain areas generally involved in spatial navigation. These data suggest the existence of a general decline in forming topographical memory in these patients, which is not affected by the learning or retrieval strategies (i.e., from a Route or Survey perspective).

P54 Lower self-esteem is related with higher amygdala volume in adolescents with obesity

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In western societies, obesity often causes stigmatization and teasing, specially in childhood and adolescence (1). Therefore, obese adolescents might suffer from lower self-esteem (2). Here, we investigate the correlates between brain structure and self-esteem in obese adolescents.

Eighteen obese and fifteen controls aged 12-18 years participated in the study. Self-esteem was evaluated by the Rosenberg Self-esteem Scale (RSE; 3). We acquired a T1-weighted MPRAGE structural image. We conducted whole-brain analysis with FSL-VBM. Groups were compared with voxelwise general linear model using permutation-based non-parametric testing, corrected for multiple comparisons across space.

There were no differences in demographic variables. No significant differences were found in the RSE. Obese adolescents showed lower volume in the fusiform gyrus, and higher gray matter volume in the amygdala, the cingulate gyrus and the middle temporal gyrus.

A negative correlation between the volume in the amygdala and the RSE was found in the obese group.

Results suggest a role of the amygdala, a region with a central role in emotion processing and regulation, in lower self-esteem in obese adolescents. This may act as a risk factor for suffering affective disorders since lower self esteem (4) and abnormal size of the amygdala (5) are associated with depressive symptoms.

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P55 Long-Term Potentiation-like cortical plasticity is associated with cortisol level.

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Objective: Learning and memory processes are influenced by stress, in a proposed inverted U-shape relationship, an effect most likely mediated by cortisol's action on basic mechanisms of learning, such as long-term potentiation (LTP). Here, we explore relationships between measures of saliva cortisol and degree of stimulus-specific response plasticity (SRP) of visual evoked potentials (VEP), a non-invasive index of LTP-like cortical plasticity.

Participants and Methods: Thirty-eight healthy participants (23 females; mean age 26.9 ± 5.32) engaged in a VEP-plasticity paradigm using vertical oriented black and white sine wave grating reversals with two 20 sec baseline recordings, a 10 minute stimulation period, followed by 6 post-stimulation recordings (20 sec) at different time intervals. Five samples of saliva cortisol were collected; immediately before and after VEP recording, and 3 samples the following day at waking up, 30 min. after waking, and at noon.

Results: VEP components P1 and P1-N1 peak-to-peak amplitudes increased significantly from baseline to post-stimulation, replicating previous studies of the SRP effect. Increases in N1 and P1-N1 peak-to-peak amplitudes were significantly correlated to next day saliva cortisol level (p-values from 0.012 to 0.024). This association was stronger when analyzed in males only.

Conclusions: Higher level of saliva cortisol is associated with increased SRP in normal controls. This effect could represent the rising part of the inverted U-curve indexing stress – performance relationship. As no subjects had pathologically increased cortisol levels, further studies using pharmacological manipulation or subjects with pathologically heightened cortisol levels could provide further evidence of the cortical plasticity and stress relationship.

P56 Employees with job burnout perform well but have reduced resources for attention allocation: evidence from an event-related potential study

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Objective: Job burnout is associated with decreased mental and physical working capacity, and burned out employees often report difficulties in concentration and memory. At work, the ability to flexibly switch back and forth between cognitive tasks is often required.

Participants and methods: Here, we studied the impact of job burnout on task switching by recording event-related potentials (ERPs) during a modified number-letter task-switching task. Participants (N=66) were working people with (N=40), or without (N=26) burnout symptoms, matched on age, gender, education, and working experience.

Results: Performance on the task-switching task was substantially slower immediately after a task switch as compared with task repetition, but this switch cost was comparable between the groups. Moreover, a switch in the task elicited two large positive deflections between 200 and 400 ms, indicating allocation of attention to the task switch. Interestingly, the responses were smaller for the burnout group.

Conclusions: The results suggest that even though behavioural performance can be comparable between burned out and their control participants, job burnout may be associated with deficits in mechanisms underlying allocation of attentional resources according to task demands. Further, this discrepancy between the reductions on the electrophysiological level and intact performance can be experienced as burdening. The present results are of assistance in characterizing this subject group with various work-related burnout symptoms.

P57 Clinical utility of neurophysiological assessment of residual cognition in disorders of consciousness

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Objective: Event Related Potentials (ERP) have shown promise in detecting residual cognitive capacity without behavioral requirements in patients with disorders of consciousness. However, not enough is known about what constitutes robust designs, and clinical utility at an individual level remains to be established.

Participants and methods: Twenty patients in a minimally conscious state (MCS; mean age = 40, 11 males, 13 traumatic brain injury, injury onset range= 3,6-117 months), either showing (9 MCS+) or lacking (11 MCS-) behavioural response to command, were compared to 20 healthy controls (mean age = 38, 10 males). Level of consciousness was established with the Coma Recovery Scale-Revised. The ERP-paradigms included: (1) passive listening to the subjects own name (50 SON) randomly interspersed between an unfamiliar name (50 UN; SOA: 2 sec) and (2) active counting of SON (50 SON/ 50 UN). EEG-data was epoched from -200-1500 ms post stimulus-onset and analysed with custom MATLAB scripts in EEGLAB.

Results: The control group showed significantly enhanced P300 amplitudes in the active counting of SON compared to passive listening condition. At an individual level, all controls displayed enhanced P300 in the counting task, while 9 of 20 patients (4 MCS+/5 MCS-) showed higher P3 amplitudes in the active counting condition.

Conclusions: Active counting of SON constitutes a robust ERP paradigm in healthy individuals, and may reveal covert command following in some MCS- patients who lack behavioral responses. However, some MCS+ patients with unequivocal behavioral responses did not display enhanced P300 in the active task. Behavioral and neurophysiological methods should thus be used in combination.

P58 Clinical and therapeutic applications of repeated transcranial magnetic stimulation (rTMS) of the dorsolateral prefrontal cortex (DLPFC) in patients with Parkinson's disease

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Objective: The most common cognitive deficit in Parkinson's disease (PD)-affected individuals is executive dysfunction. Frequent mood difficulties in PD are depression, apathy and anxiety. Antidepressant medication often fails to give the patients the desired beneficial effect. Recent studies confirmed that high-frequency rTMS (5-20 Hz) delivered to the left DLPFC for 2-4 weeks was able to produce potent antidepressant, anxiolytic and cognitive effects in PD patients while being functionally equivalent to fluoxetine. The mechanisms and long-term consequences of the described effect are yet to be fully elucidated.

Participants and methods: The study will recruit patients with a dual diagnosis of PD and moderate to severe depression with at least 2 non-effective AD trials in the recent past. Patients are randomized and assembled into one of two groups: Group A will receive TMS for two stimulation blocks, Group B has a Sham condition instead of the first stimulation sequence. Behavioral domains to be assessed include cognition, mood, motor function, activities of daily living (ADL) and quality of life (QoL). Behavioral assessments shall be performed at baseline, during the stimulation period (3rd, 6th) as well as the 12th and the 18th week. Ethical approvals have recently been received.

Results: We hypothesize that the beneficial effects of rTMS on cognition, mood and motor function (in the short- and long-term) and subsequently ADL and QoL (in the long term) shall be significantly greater in the TMS group compared to the Sham group.

Conclusions: There is substantial clinical basis to apply rTMS via DLPFC in PD patients with treatment-resistant depression.

P59 Contributions of TMS to neuropsychological rehabilitation

Elena M. Marron, Ph.D.

For many years clinical research has been conducted to develop new and effective rehabilitation strategies for neglect, repetitive transcranial stimulation being an important tool in this regard.

The rivalry model of neglect holds that neglect is caused by a pathological hyperactivity in the intact hemisphere in conjunction with hypoactivity in the damaged hemisphere. With this model as a theoretical background, the most employed TMS protocol consists of the application of an inhibitory protocol aimed at reducing the pathological hyperactivity of the healthy hemisphere.

Among inhibitory protocols, one of the most promising therapeutic approaches is continuous theta-burst stimulation (cTBS). With extremely short stimulation periods (40 or 44 seconds) very durable benefits are achieved owing to the great capacity of TBS to modulate cortical excitability and the possibility of multiple sessions in one day.

The positive outcomes in the treatment of neglect based on TMS inhibitory protocols applied over the healthy hemisphere started at the beginning of the 21st century and still continue. Moreover, recovery from neglect symptoms correlates with the restoration of interhemispheric balance, particularly in the parietal cortex.

Further research is essential to find the optimal therapeutic protocols in terms of frequency, intensity, localization and duration, and, thus, to realize the full potential of TMS in the rehabilitation of neglect.

The main objective of this presentation is to highlight the effectiveness of TMS as a therapeutic tool in the rehabilitation of neglect.

P60 Cognitive enhancement by means of TMS: memory and executive functions

Marc Palaus Gallego, Cognitive Neuro-Lab (IN3), Open University of Catalonia

The main brain region that supports working memory and executive functions is the dorsolateral prefrontal cortex (DLPFC), so it can be expected that brain stimulation in this area will improve the functioning of these cognitive functions. This is the logical reasoning on which different authors have based their research.

Different authors have studied the performance of healthy volunteers in logical reasoning tasks applying repetitive TMS (rTMS) over the left DLPFC. They have observed an improvement in performance in terms of information processing speed (reaction times decreased), but accuracy was not affected.

In relation to the inhibition processes, evaluated by go/no-go tasks, it has been found that low frequency rTMS ($\leq 1\text{Hz}$) applied on the left DLPFC improves accuracy of execution, whereas high frequency rTMS ($> 1\text{Hz}$) applied on the right DLPFC has a negative effect on task performance. The performance of subjects has also been assessed in Stroop tasks after the administration of rTMS over the left DLPFC, showing improved performance in some studies but not in others.

Finally, regarding working memory, some researchers have found that decreasing the excitability of the left DLPFC with paired-pulse TMS worsened this type of memory. Similarly, the performance in n-back tasks after single pulse TMS and low frequency rTMS on left DLPFC increased the number of errors in the mentioned working memory task.

P61 Contributions of non-invasive brain stimulation for the understanding of the decision making process

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Making good decisions is crucial to functioning social behaviour. Unfortunately, decision-making (DM) is frequently impaired after suffering brain damage or clinical conditions such as major depression, schizophrenia, substance dependence, etc. All these conditions can hinder DM in different ways because it is composed of many sub-processes, and the aetiology of DM impairment plays a role in the type and severity of DM deficits.

Traditionally, lesion and neuroimaging studies have helped to understand which areas are involved in the decision-making process. But recently, non-invasive brain stimulation has provided a new source of information about the crucial role of some cortical areas in each stage of decision making; specifically their implication in the evaluation and assessment of different options, risk taking, cognitive or emotional considerations, outcome processing etc. In the clinical context, non-invasive brain stimulation can be used to induce changes in attentional processes, perception and evaluation of stimuli, because of its capacity to modulate the activity of the cortical and subcortical regions relevant to DM. Thus, it can be useful in DM rehabilitation.

The main point of this presentation is to highlight the contribution of non-invasive brain stimulation to the understanding of decision-making and new possibilities for rehabilitation.

P1 MapCog Spectra - A new neuropsychological test of attention: Application possibilities in neuropsychological practice

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Persson, Bengt Linnéus university

Gunnarsson, Helena Linnéus university

Carlsson, Roger Linnéus university

Recent scientific evidence of the brain's attentional systems has provided new foundations for our understanding of attentional processes. This development should serve as an impetus for the development of new objective methods to assess attentional deviations in clinical practice. The current neuropsychological practice relies heavily on reaction time measures, omissions and commissions, and measures of presumed hyperactivity. Other tests provide only means and standard deviations as outcome measures, thereby precluding the detection of moment-to-moment fluctuations in attention characteristic of many with AD/HD. As attention is a basic prerequisite for most cognitive and perceptual abilities, modern scientific insights can lead us to improve our ability to detect attentional dysfunction. In line with the scientific knowledge, the MapCog Spectra has recently been developed to measure moment-to-moment attentional fluctuations. This is achieved by measuring silent epochs, which occur naturally while a subject is continuously naming a series of visual stimuli. Well-characterized deviations of these epochs define attentional lapses which can be used to illustrate the degree of perceptual fragmentation in attentional disorders. Here we provide for the first time empirical evidence from studies performed by our research group based on this new technology.

P2 MapCog Spectra® in clinical practice with adults

Persson, B.A. Linnaeus University/SNPF

Warkentin (Symposium organizer), S. Linnaeus University

Objective: I have tried MapCog Spectra® in clinical evaluations for adhd and/or autism in adults in order to evaluate its clinical utility.

Method: I have added MapCog Spectra® to the tests in clinical evaluations of suspected adhd and/or autism (DSM-5).

Results: The results show that the instrument works fine in differentiating adults with these neurodevelopmental disorders from “neurotypical”; in our material we have a sensitivity of 100 % and a specificity of 94.59 %. The instrument seems to be valuable especially to show attention deficits in persons with autism, which can be difficult with reactive instruments such as Continuous Performance Tests, CTP:s. Other important aspects is the amount of time consumed for the tests, and the fact that an ordinary CPT is perceived as extremely dull and difficult to cope with by many of the persons that are evaluated/assessed – at the same time some of the evaluated persons have reported that it was astonishingly difficult to maintain concentration even during the short minutes of administration of MapCog Spectra®.

In the presentation, I will show clinical examples including test results including MapCog Spectra®.

P3 Different pain states influence cognitive function in humans.

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Persson, Bengt Linnéus university

Carlsson, Roger Linnéus university

Aim: To evaluate the influence from different pain states on cognitive function in adults.

Method: Adult patients suffering from acute (n=33), regularly recurrent (n=56) or persistent pain (n=54) from the musculoskeletal system seeking primary care conducted four cognitive tests: MapCog Spectra, Color Word Test, Grooved Pegboard and MMSE (Mini Mental State Examination). A reference group of healthy persons (n=31) were tested with the same tests.

Results: In independent t-test group comparison, patients with persistent pain showed significant poorer performance on MapCog Spectra ($p<0,01$), Color Word Test ($p<0,01$) and Grooved Pegboard ($p<0,0001$) compared to healthy persons. Patients with regularly recurrent pain showed significantly poorer performance on MapCog Spectra ($p<0,001$) and Grooved Pegboard ($p<0,0001$) compared to healthy persons. Patients with acute pain showed significant poorer performance on Grooved Pegboard ($p=0,003$) compared to healthy persons.

Conclusion: In this study, persons with persistent pain show impairment in cognitive function in more cognitive tests compared to persons with acute and regularly recurrent pain.

P4 Validation of MapCog Spectra with CANTAB tests of attention in an elderly population

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Assessment of attention in older adults (+ 65 years) by means of MapCog Spectra (MCS) is compared to the results of the computerized Cambridge Neuropsychological Test Automated Battery (CANTAB). The MCS is a new short test (5 min), aimed to measure ultrashort fluctuations in attention by means of pause time fluctuations during naming of visual stimuli. Previous tests of attention focus on various measures of reaction time and omissions and commissions in the attentional process, and also imply relatively longer time of assessment. New knowledge pinpoints the importance of understanding the deviations of the regulatory processes of attention in patients with attentional deficits.

In the ongoing study SAGE (Successful aging and enrichment in persons over 65) an experimental design was developed to study the effects of four types of exercises, in relation to the release of the protein BDNF in blood and various measures of health. Cognitive testing was conducted at baseline and at five weeks follow-up. We were able collect data from 50 experimental persons on the MCS. The results of the MCS are compared to the results of CANTAB tests on attention and this presentation aims to report data of this validation of assessment in older adults.

P5 The loss of implicit self-voice recognition following right hemispheric damage

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In the debate about the notion of “self” a facilitation in processing pictures representing our body as compared with other people’s body emerges when an implicit, but not an explicit, recognition is required. Moreover, this facilitation in recognizing one’s own body can be lost following a right hemisphere lesion. Recently, a dissociation between implicit and explicit access to self-voice recognition was also found in healthy subjects. However, the neural bases of implicit and explicit self-voice recognition are yet unclear.

Objective: Here, we assess whether implicit and explicit self-voice recognition are mediated by different cerebral networks and can be selectively impaired after a right brain lesion (RBD).

Participants and methods: A group of RBD patients and age-matched controls were recruited. Stimuli were pairs of words or pseudowords pronounced by the participant or by a familiar or unfamiliar person. In the Implicit task participants had to judge whether the two voices were same or different and in the Explicit task whether their own voice was present or not.

Results: In the Implicit task we did not observe any facilitation in discriminating self versus other people’s voice, whereas in the Explicit task a self-disadvantage effect was present. Furthermore, double dissociations between implicit and explicit self-voice recognition were described in RBD patients.

Conclusions: The present study shows that the right hemisphere is involved in one’s own voice recognition, that might be accessed by two ways: one leading to an implicit, but not to an explicit self-voice recognition, and the other one leading to an explicit self-voice recognition.

P6 Inefficient medial-lateral dissociation of rostral pre-frontal cortex (rPFC) leading to stimulus dependent Vs stimulus independent cognitive dysfunction in schizophrenia: Evidence from an fMRI based 'endogenous-cue' prospective memory study

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Background: Examination of the brain regions that show aberrant activations and/or deactivations during endogenous-cue prospective memory could pave the way for a better understanding of the rostral pre- frontal cortex (rPFC/ BA 10) mediated cognitive dysfunction in schizophrenia. We aimed to examine the pattern of functional magnetic resonance imaging blood oxygen level dependent activations and deactivations during a prospective memory paradigm.

Method: Functional magnetic resonance imaging was performed on 15 participants with schizophrenia and 24 matched healthy controls during the performance of a prospective memory task (Halahalli et al, 2014) where the delayed intention was triggered by an endogenous cue generated by incremental updating of working memory.

Results: The performance of patients with schizophrenia was significantly inferior to that of healthy control subjects in the PM condition. Group comparison between patients with schizophrenia and matched healthy samples controlling for performance related covariates revealed more extensive activations in schizophrenia subjects for the PM vs OT condition contrast.

Conclusion: More extensive brain activations despite inferior performance, reflects an inefficient task performance in schizophrenia subjects by the recruitment of greater number of brain regions. These findings are in agreement with previously published work from our laboratory (John et al., 2011). The region of interest also gives evidence that the inefficient cognitive performance in schizophrenia patients may be secondary the network dysfunction that mediate various cognitive processes, BA10 mediated switching between stimulus-dependent cognition and stimulus-independent cognition.

P7 Balancing of tonic and phasic excitation by default mode network to cope with diverse sensory stimuli

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So-called “default mode network (DMN)” shows high level activity at rest. Although the role of such intrinsic DMN activity in perceptual information processing is largely unknown, a hypothesis has been proposed: DMN activity has a role in facilitating neural responses to sensory input. Our previous study showed that the intrinsic DMN activity accelerated reaction speed of a sensory network (Nsen) by modulating its ongoing-spontaneous activity, for which tonic excitation of the Nsen by decreasing ambient (extracellular) GABA levels was crucial. Phasic excitation of the Nsen by the DMN was advantageous if externally distracting information prevailed, minimizing perceptual error: detection of a sensory stimulus. It remained to be seen how the brain coordinates the tonic and phasic excitation. Here we investigated how the brain balances the intracortical tonic and phasic excitation. A speed-accuracy trade-off measure was employed. The measure indicates an optimal balance of tonic and phasic excitation, by which the Nsen can respond, with the fastest speed and minimal error, to a sensory stimulus. We found that the phasic excitatory mechanism worked well if externally generated distracting sensory information prevailed, where the tonic excitatory mechanism had to be restricted. On the other hand, the tonic excitatory mechanism worked well when the distracting information less prevailed, where the phasic excitatory mechanism had to be restricted. We suggest that the brain may coordinate GABAergic gliotransmission-mediated tonic excitation and glutamatergic neurotransmission-mediated phasic excitation by changing their balance in order to achieve optimal (high speed and less error) responses to diverse sensory stimuli.

P8 Ambient GABA improving neuronal gain and tuning in primary sensory cortices

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For early sensory cortices to respond reliably to feature stimuli, neural excitation and inhibition is crucial. In general, phasic excitation within cell assemblies (populations of neurons such as orientation columns in primary visual cortex) controls the gain of neuronal responses, and phasic inhibition between cell assemblies controls the tuning of neuronal responses. A change in ambient (extracellular) GABA concentration might affect the dynamic behavior of neurons in a tonic manner; namely, GABA molecules act on extrasynaptic receptors and provide neurons with tonic inhibitory current. Simulating a neural network model, we investigated how ambient GABA affects sensory information processing. The network consists of cell assemblies. Each cell assembly, comprising principal cells, GABAergic interneurons and glial cells, responds to one particular feature stimulus. GABA transporters, embedded in glial plasma membranes, regulate ambient GABA levels. Hypothetical neuron-glia signaling via inhibitory and excitatory synaptic contacts was assumed. When the network was presented with a stimulus, the inhibitory contact contributed to letting glial membrane transporters import (remove) GABA molecules from the extracellular space and excited stimulus-relevant principal cells, and the excitatory contact to letting them export GABA into the extracellular space and inhibited stimulus-irrelevant principal cells. The decrease of ambient GABA levels improved the neuronal gain, and the increase of ambient GABA levels improved the neuronal tuning. We suggest that the regulation of ambient GABA levels, possibly mediated by GABAergic gliotransmission, may improve neuronal gain and tuning that are ensured by the conventional, phasic, recurrent excitatory and lateral inhibitory schemes in the primary sensory cortex.

P9 Intentional motor processes: behavioral and fMRI observations

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Conscious aspects of motor control and intentionality have been object of interest for many disciplines. However, even the most articulated models of motor control, remain underspecified when it comes to intentionality and its neural underpinnings. Brass and Haggard (2008), proposed the so called \"What, When and Whether\" model. In the model, it is postulated that the content (what), the timing (when) and the possibility (whether) to generate an action can be partially independent both at the cognitive level and at the neurofunctional level. However, the model has not been tested yet.

We studied with fMRI 24 healthy subjects: they acted following a conditional cue or following their intentions. The nature of the action, its timing or its very occurrence were the variables under investigation and their specific interactions with intentionality. We performed a 3x2 ANOVA, to characterize the neural activity associated with the decision phase.

We found a main effect of the factor \"Intentionality\", with the prefrontal areas associated with intentional decisions and the posterior regions specifically activated during the execution entailed by the conditional cue.

We also found a rostro-caudal gradient within the frontal cortex, with the anterior regions involved in abstract decisions (whether to execute an action) and the posterior ones recruited in crucial parameters of an action (the content and the timing).

Our study demonstrates that intentionality, in the domain of motor control for simple asemantic action, can't be considered as an unitary concept rather it can be fractionated in discrete components at the cognitive and at the neurofunctional level.

P10 Relation between leptin and task-switching ability in obese individuals

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Objective: High levels of leptin are related to obesity, which is associated with cognitive deficits. Recent works suggest that leptin may be associated with cognition. Our aim was to define the relationship between leptin and task-switching ability.

Participants and methods: Serum leptin levels and Trail Making Test-B (TMT-B) performance were measured in 155 adolescents and adults: 81 obese people (58% women; mean age 24 (SD 10.3); mean BMI 35.1 (SD 6.7)) and 74 normal-weight people (62.2% women; mean age 24 (SD 9.0); mean BMI 21.2 (SD 2.3)). The relationship between leptin levels and TMT-B was analysed separately for both groups by an analysis of covariance (ANCOVA) adjusted for estimated premorbid intelligence (WAIS-III Vocabulary Subtest), age and sex.

Results: According to the ANCOVA, higher levels of leptin significantly predicted faster TMT-B performance in obese patients ($B = -0.33$; $F = 9.5$, $df = 1$; $p = 0.003$). Regarding normal-weight individuals, higher levels of leptin tended to be related to slower TMT-B performance ($B = 0.44$; $F = 3.4$, $df = 1$; $p = 0.069$). The results were unchanged after adjustment for covariates.

Conclusions: Our findings suggest that leptin levels are associated with better task-switching performance in people with obesity. However, this association tends to be reversed in normal-weight people, where higher leptin levels tend to correlate with worse set-shifting. Our results agree with the literature regarding the protective role of leptin in cognition, but suggest that this role may be specific to people with obesity. More research is needed to determine the specific role of leptin on cognition in lean people, and its possible association with BMI.

P11 Dopamine drd2/ankk1 taq1a polymorphisms is associated with cognitive flexibility and binge-eating in obesity.

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Objective: Investigate the association between the DRD2/ANKK1 Taq1A polymorphism (DRD2-p) with cognitive flexibility and its possible modulator role of obesity and compulsive intake.

Participants and methods: A sample of 93 participants consecutively selected in primary care services of CST: 44 obese (66% women, BMI 38 (7.33), mean age 32 (5.73)); and 49 normal-weight (67% women; BMI 22 (2.01); mean age 29 (6.94)). Exclusion criteria: neurological or psychiatric disorder, metabolic disease or cognitive impairment. Neuropsychological assessment: TMT (Trail Making Test) and WCST (Wisconsin Card Sorting Test); Eating behaviour traits: BITE (Bulimic Investigatory Test, Edinburgh). Lineal regression was used to establish the relationship between DRD2-p and flexibility based on the presence of obesity (BMI \geq 30) and binge-eating traits (BITE symptoms \geq 10). A contingency table was made to prove if there was a higher prevalence of DRD2-p in the binge-eating sample. PASW22 was used for statistical analysis.

Results: In the overall sample, DRD2-p A1 carriers made more perseverative responses on WCST than non-carriers (B= 5.58; p=0.032) and performed worse on TMT-B (B= -16.48; p=0.012). In obesity sample, prevalence of DRD2-p A1 carriers was higher in the binge-eating subgroup ($\chi^2=4.49$; p=0.034). Moreover, binge-eating DR2-p A1 carriers gave more preservative responses on WCST (B=12.9; p=0.001) with a worse performance on TMT B (B= -24.9; p= 0.021) than non carriers.

Conclusions: We suggest that obese people with this DRD2/ANKK1 Taq1A polymorphism are at a higher risk of presenting difficulties in cognitive flexibility. They might be less able to adjust their behaviour and consequently might have frequent binge episodes.

P12 Does obstructive sleep apnea syndrome affect information processing speed?

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Objective: In our recent systematic review information processing speed of obstructive sleep apnea syndrome (OSAS) patients was reduced in 50% of the studies reviewed when compared to healthy controls. The methods used to assess information processing speed were very few and our aim is to clarify different aspects of information processing speed of OSAS patients in more detail.

Participants and methods: A full-night polysomnography and a neuropsychological assessment were conducted in 45 newly-diagnosed OSAS patients and 20 healthy controls. All participants were right-handed male at working age. Information processing speed was measured using Digit Symbol, Trails A, Stockings of Cambridge and Rapid Visual Information Processing from CANTAB.

Results: 13% of the patients had mild OSAS, 22% had moderate OSAS and 65% had severe OSAS. The patients and healthy controls did not differ statistically significantly in terms of age or education. OSAS patients did not differ from healthy controls in tasks measuring visuomotor speed or in tasks requiring time-pressured information processing speed but showed slowing in initial planning time in tasks requiring systematical problem solving.

Conclusions: OSAS patients' information processing speed seem to be mainly comparable to that of healthy controls. Some slowing of the information processing speed may be associated only with more demanding executive tasks.

P13 Episodic-like memory in human and its changes related to healthy aging

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Episodic memory represents memory of specific events and temporal-spatial relations among these events. It involves our conscious recall and mental time travel. Episodic-like memory, memory for time and location of a certain event in the past, was proposed as its analogy that can be tested in animals. Our study will focus on episodic-like memory changes during aging in healthy population. We will use a comparison of standard psychological tests of episodic memory and nonverbal computer test of episodic-like memory (EMT, developed in the Institute of Physiology Academy of Science of the Czech Republic). This EMT offers several versions of varying difficulty that allow us to differentiate memory for pictures, their sequence and location. The aim of our study is to prove that the episodic-like memory “what-where-when” is a valid model for testing episodic memory in human subjects. If we confirm that hypothesis we can say that concept WWW is a right model for testing episodic memory in basic research on animal models. The second aim is to investigate changes in episodic memory during aging. EMT test is not based on verbal content so it seems interesting to compare the results from the EMT test with other verbal episodic memory tests. Standardization of the EMT test allows its use in neuropsychological assessment, especially in the early detection of neurodegenerative diseases. EMT test could enrich neuropsychological battery just for its unique nonverbal episodic memory test type.

P14 Semantic N400 effects dependent on language-variety specific neural processing in pre-school children

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Worldwide, a great number of dialects are spoken that differ in vocabulary and speech sounds from the standard written language variety. Event-related potential research has illustrated that neural responses to language-specific speech sounds may vary depending on one's mother tongue. However, the question of how such differences are manipulated on the cortical level for different varieties of the same language remains widely unanswered.

To investigate language-variety specific processing skills at the neural level we examined 35 normally developing native Swiss German (CHG) and 18 native Standard German (StG) speaking pre-school children (6-year olds) using a word-picture matching paradigm encompassing 3 different subtests (semantic, vocabulary-specific or vowel-duration-specific). While an EEG was recorded, simple (black-and-white) drawings were presented on a computer screen either matching or mismatching the simultaneously presented auditory word stimuli. In the semantic subtest, stimuli named alike in StG and CHG were employed. In the vocabulary- and vowel-duration-specific subtests, words were presented either in the CHG or StG language variety.

While the ERP analysis (RAGU-TANOVA) revealed significant ($p < 0.05$, corrected) incongruity main effects irrespective of group in the time range of the N400 and LPC (late positive component) for the semantic subtest, incongruity-by-group interactions were found for the vocabulary-specific condition in similar time ranges. Regarding vowel-duration-specific effects, incongruity-by-group interactions were only found in the LPC, but not in the N400.

Results indicate that words non-existent in one's native language variety elicit similar N400 effects as found for semantic incongruity, while phonological pronunciation differences predominantly trigger higher order revisal processes.

P15 The role of ventrolateral prefrontal cortex in emotional interference on working memory

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Objective: Emotional information benefits long term episodic memory, however, hinders the maintenance of information in working memory (WM). Impairing effects of emotional distraction on WM has been linked to different patterns of activity in brain regions associated with a dorsal executive neural system and a ventral emotional system. In this sense, emotional distraction enhances activity in ventral regions, such as the amygdala and the ventrolateral prefrontal cortex (vlPFC), and reduces activity in dorsal regions, such as the dorsolateral prefrontal cortex (dlPFC).

Participants and methods: Twenty four women participated in the study. Theta burst stimulation (TBS) over right vlPFC was applied before participants performed a delayed-response WM task with emotional distracters. Continuous TBS (cTBS) was used to induce a long term depression like effect and intermittent TBS (iTBS) to induce a long term potentiation like effect.

Results: The presentation of emotional distracters during the delay interval impaired WM performance ($F(1, 21)=43.85$; $p<0.001$). This effect was more pronounced in the iTBS group. Additionally, cTBS cancelled the detrimental effect of the emotional distracters interference on WM.

Conclusions: Impaired WM performance in the presence of emotional distraction is associated with activity in vlPFC. The pattern of activation observed in dlPFC has been strongly associated with WM maintenance. Our results support the notion that the impact of emotional distraction on goal relevant information processing depends on dynamic interactions between neural system involving the dlPFC and the vlPFC. While the dlPFC, allows to stay focused on task relevant information, the vlPFC, is involved in the processing of emotional information that may compete with the available processing resources.

P16 Executive coaching meets cognitive neuroscience: a resting state MRI study

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Objective: Despite limited empirical/scientific evidence, executive coaching is coming to the forefront of business routines. Here we aim at examining the anatomo-functional nature of an executive coaching path.

Participants: Four executives were put through a one year controlled coaching program. At T0, we gained baseline behavioral measures by means of three tests known to cover areas crucial for an executive (the scale of occupational stress, Leadership archetypes, and Time Management Self-Assessment Questionnaire), as well as by ad hoc interviews. Besides, measures of brain activity were collected through functional magnetic resonance imaging (fMRI) using a resting state paradigm. The same behavioral and brain measures were achieved at T1, when the coaching program finished.

Results: We found that the coaching path was underpinned by reorganization of brain functional connectivity within some specific structures.

Conclusions: We showed that long-term psychological and behavioral attitudes promoting leadership and management abilities are subserved by plastic changes in the brain.

P17 Empathy or Ownership? Evidence of corticospinal modulation during pain observation

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Objective: Recent studies showed that motor responses similar to those present in one's own pain (freezing-effect) occur as a result of pain observation in others. This finding has been interpreted as the physiological basis of empathy. Alternatively, it can represent the physiological counterpart of an embodiment phenomenon, related to the sense of body-ownership. We know that simply looking at a fake hand, whenever positioned in a body-congruent egocentric perspective, can lead the subjects to experience it as part of their own body. In the present study, we compared the empathy and the ownership hypothesis, by manipulating, during observation-conditions, the perspective of the view of a hand model receiving pain. Similar results in both the egocentric and the allocentric perspective would confirm the empathy hypothesis; a different result in the egocentric perspective (where the embodiment occurs) would confirm the body-ownership hypothesis.

Participants and methods: We used transcranial magnetic stimulation to record changes in corticospinal motor representations of the hand, while subjects (n=24) observed videos showing a) a needle penetrating or b) a q-tip touching a hand model, presented either in egocentric or in allocentric perspective. Motor evoked potentials (MEPs) were recorded from the right first dorsal interosseus.

Results: Compared to the allocentric perspective, a significantly greater reduction of the mean MEPs amplitude (freezing-effect) was found when the hand model receiving pain (needle-penetration) was presented in an egocentric perspective.

Conclusions: This finding suggests that the freezing effect during pain observation can be better explained by the body-ownership than by the empathy hypothesis.

P18 Cortical activation during counting in school-aged children

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Objective: Fluency in basic mathematics is of great importance in early educational years. Early counting and verbal skills are strong predictors of later mathematical achievement. Previous brain imaging studies have indicated that parietal cortical regions are actively involved in mathematical processing, but the functional division between hemispheres has remained unsettled. We investigated the magnetic brain responses and their hemispheric differences during an enumeration task in children, and the effect of counting fluency in the dynamics of the two hemispheres.

Participants and methods: The participants were twelve 8-9 year old children (six girls) that had not experienced difficulties in learning mathematics at school. During magnetoencephalography (MEG) recordings the participants indicated with a button press when they had counted the number of dots in a display (1-6 dots); the response latencies were recorded. The active cortical source areas were localized from the averaged data using Minimum Current Estimates.

Results: Behavioural results showed the classical dichotomy between small and large number enumeration, as well as heterogeneity in individual counting speeds. MEG-results indicated stronger activation over the right parieto-temporal areas when counting larger numbers compared with small numbers. In addition, we found a correlation between counting speed and left parieto-temporal activation.

Conclusions: Based on our results, particularly the left parietal activation is correlated with the fluency of basic mathematical processing. The present results further strengthen the suggested link between verbal skills and developing mathematical skills.

P19 Longitudinal memory circuit integrity in AD and FTD

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Objective: Patients diagnosed with Alzheimer's disease (AD) and frontotemporal dementia (FTD) show varying degrees of episodic memory impairment, which may be reflected by different patterns of atrophy to structures along the Papez memory circuit. The current study longitudinally assessed the integrity of Papez structures to characterize the pattern of atrophy and determine whether changes predict the rate of decline in episodic memory in these patients.

Participants and methods: Whole-brain structural and diffusion 3T MRI scans were obtained from 33 AD, 29 behavioural FTD (bvFTD), 19 semantic FTD (SD), and 30 healthy control participants during their initial assessment and a 12 month follow-up. Participants' memory function was assessed across a battery of cognitive measures of memory. Grey matter volume and white matter integrity of Papez structures were assessed using voxel-based morphometry and tract-based spatial statistics, respectively.

Results: bvFTD and AD patients showed significant decline ($p < .05$) for verbal measures of episodic memory at followup, with bvFTD showing the greatest rate of decline. Imaging analyses indicated dissociation in atrophy along the Papez circuit between patient groups. Notably significant hippocampal atrophy was not observed in bvFTD patients compared to controls at baseline. Longitudinal analyses, indicated bvFTD patients showed reduced hippocampal volume with disease progression and greatest overall change in Papez structures among the patient groups.

Conclusions: Regions of the Papez circuit are differentially affected with disease progression in AD and FTD patient groups. The integrity of the circuit as a whole is a better predictor of memory deficits than individual Papez structures.

P20 Semantic memory evolution in childhood vs its involution in Alzheimer's disease Patients

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Objective: According to the retrogenesis hypothesis (Reisberg et al., 2002), the comparison of some dimensions of the cognitive functioning between children and Alzheimer's disease patients (AD) shows an inverse evolution pattern. The purpose of this research is to contribute to a better comprehension of semantic memory. We particularly focus on thematic and taxonomic links because they are predominant in the development of concepts in children and always play an important role in the lexico-semantic processing in adults.

Participants and methods: In the first study, the performances of 40 AD and 20 healthy elderly controls in two 1-minute fluency task and a 24 picture-naming task are analysed. Globally, AD produced fewer words and more errors than controls. They generated more frequent and earlier acquired words in the fluency tasks. In the picture-naming task, errors of the AD were on the late acquired and non-frequent words.

In the second study, we create a unique experimental paradigm adapted to children and AD patients with a semantic knowledge questionnaire and a naming priming paradigm in a thematic and taxonomic condition. The first results conducted in 45 AD patients at 3 different semantic deterioration stages show an interaction effect between the groups and the condition indicating that semantic deterioration does not follow the same pattern for taxonomic and thematic conditions.

Conclusion: AD show a specific lexico-semantic deterioration with an inverse pattern evolution in free lexical production. Priming experiences also suggest a taxonomic and thematic specific deterioration.

The first two authors contribute equally to this work.

P21 Assessing quality of life in people with moderate to advanced dementia living at home. A longitudinal preliminar study.

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Quality of life (QoL) is a multidimensional concept that includes the perception of physical, psychosocial and material dimensions. People with dementia are sensitive to the change of their QoL as disease progresses, but little is known about what factors are associated with change. Our aim is to identify what factors are related with changes in QoL over a period of 6 month-follow-up, in a sample of persons with moderate to severe dementia living at home.

Method: Study design: We designed a prospective study of repeated measures in a 6 month follow-up period, conducted in a community Day Care Centre of Vilanova i la Geltrú (Barcelona). Sample: Twelve persons that accomplished the inclusion criteria: *Diagnosis of moderate to advanced dementia (GDS Reisberg 4 to 6), *Informant consent of participation, *Three or more months of attending the Day Care centre. Variables: We assessed QoL by using the Spanish validated scale GENCAT (Verdugo et al, 2009). Mood was assessed by the Cornell Scale for depression in dementia (Alexopoulos et al, 1988), and the emotionalburden in caregivers was controlled using the Zarit Care Burden Interview (Zarit et al, 1980).

Results: There was no significant correlation between sociodemographic variables and QoL. Mood at baseline significantly correlated with QoL at follow-up ($r=0.65$; $p<0.05$). No other significant correlations between clinical or psychosocial variables were found.

Conclusions: In our sample, changes in mood seem to be related to changes in QoL scores, as other authors have noticed before. Psychosocial interventions should be addressed in this way.

P22 Non-verbal episodic memory deficits in primary progressive aphasia are predictive of underlying amyloid pathology

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Objective: Current neuropsychological assessments cannot differentiate primary progressive aphasia (PPA) from each other, as language symptoms can be very subtle. However, there is increasing evidence that the underlying beta-amyloid brain pathology in logopenic aphasia (LPA), causes also memory and orientation deficits akin to Alzheimer's disease (AD). The current study examines modality effects (verbal vs. non-verbal) of episodic memory performance to distinguish LPA and AD from non-amyloid based progressive non-fluent aphasia (PNFA) at diagnosis.

Participants and methods: Verbal and nonverbal recall and recognition tests (Rey Complex Figure, RAVLT, Doors & People) were administered to 113 patients (LPA ($n=25$), PNFA ($n=29$) and AD ($n=59$)). Forty-five patients (17 LPA, 13 PNFA, 15 AD) also underwent Pittsburgh component B (PiB) positron emission tomography scans to confirm underlying amyloid pathology.

Results: Analysis of covariance and post-hoc tests revealed that there is a clear dissociation between verbal and non-verbal episodic memory tests across diseases with non-verbal tests being consistently impaired in LPA but not in PNFA. Non-verbal episodic recall (Rey Complex Figure delayed recall) emerged as the most powerful predictor, distinguishing 81% of these patients at clinic presentation, and 84% of those with PiB scans. Importantly, groups with underlying amyloid pathology (LPA and AD) also performed comparably on this measure.

Conclusions: The findings suggest that a nonverbal episodic recall measure a) can successfully discriminate LPA from PNFA, b) can distinguish an underlying amyloid from a non-amyloid based PPA syndrome, and c) can serve as a useful proxy measure aiding clinicians in discriminating these conditions.

P23 How to measure (I)ADL task performance in patients with dementia in daily life?

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Objective: Errorless Learning (EL) is an instructional procedure that involves the reduction of errors during learning activities and skills. Compared to trial-and-error learning, EL has been shown to be more effective in teaching persons with dementia Instrumental Activities of Daily Living (IADL). Here, two methods to measure the performance of (I)ADL are compared and the inter-rater reliability of each of these methods is calculated. Secondly the Interview of Deterioration in Daily living Activities in Dementia (IDDD) as a measure of (I)ADL was correlated with the performance on the trained tasks.

Methods: Four independent raters were selected that rated task performance of the patients using the Core Element Method (CEM) or the Task Performance Scale method (TPS). CEM rates the performance on essential components of a task, while TPS quantifies the performance on each individual task step. Task performance of 34 patients with AD who participated in the REDALI-DEM study was assessed six weeks after the last training session (t_2). Patients were taught 68 (I)ADL with EL.

Results: Data collection has been completed and results of the comparison of CEM and TPS will be presented, including the inter-reliability using Blant-Altman analyses and Intra-Class Correlations. Also, we will present the correlations between the IDDD and the CEM and TPS respectively.

Conclusion: Based on the results it will be determined which assessment method is most reliable and feasible for assessing task performance of (I)ADL in patients with AD in an EL condition. Limitations and strengths will be discussed.

P24 The CERAD Neuropsychological test battery subtests and the progression of Alzheimer's Disease during a three-year follow-up

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Objective: In recent years, the emphasis of study concerning the Alzheimer's disease (AD) have been on early detection. However, measuring the progression of AD-related symptoms is also needed. The commonly used MMSE test is largely criticized. The CERAD Neuropsychological battery, which is developed for screening purposes, may be too time-consuming and stressful for persons with AD. Thus, the aim of this study was to find out which tasks from the CERAD Neuropsychological test battery could be used in a follow-up of cognitive performance of persons with mild AD.

Participants and methods: The three-year follow-up data of 236 persons with recently diagnosed very mild or mild AD was analyzed. Subjects participated in the prospective, randomized rehabilitation study ALSOVA, and follow-up visits were arranged annually. 131 subjects participated in the last follow-up visit. Generalized Estimating Equations were used to analyze which tasks from the Finnish CERAD Neuropsychological test battery were best related to the disease severity (Clinical dementia rating, CDR).

Results: The combination of the MMSE, verbal fluency, constructional praxis, and the clock drawing test, with commonly used covariates age, gender, and education, were best related to the CDR during a three-year follow-up. Verbal fluency and the clock drawing test, both of measures of executive functions, were also the only subtests that did not correlate with education.

Conclusions: The combination of the MMSE, verbal fluency, constructional praxis, and the clock drawing test may be a good alternative as a follow-up method of cognitive symptoms in AD.

P25 Neuropsychological profiles of patients with different neurodegenerative diseases on short neuropsychological battery

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Background and aims: Clinical neuropsychological examination can be very detailed and extensive; however, in everyday practice, the conditions are often restrained. It is therefore useful to employ shorter batteries and use them effectively. Aim of this work is to present cognitive profiles of different neurodegenerative diseases in such short battery.

Methods: We evaluated 650 neuropsychological examinations of patients presenting at neurology clinic, mostly with memory complaints. Mean age was 75.5 years (SD 9.2), mean education 13.8 years (SD 3.3). Patients underwent neurological examination, CT or MR and other diagnostic methods which allowed to diagnose them according to current criteria. The sample includes patients with Alzheimer's disease, frontotemporal lobar degeneration, Lewy body disease, vascular cognitive impairment and other neurological conditions. Neuropsychological battery used included screening methods (MMSE, MoCA, FAB), a standard short battery (RBANS), additional tests of attention and executive functions, and questionnaires of depressive and other neuropsychiatric symptoms and of everyday activities.

Results: We present the results of different diagnostic groups on the tests used and describe their cognitive profiles. We also evaluate sensitivity and specificity of methods in differential diagnosis of dementia.

P26 A preliminary study investigating Theory of Mind abilities through discourse production in Alzheimer's disease

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ToM abilities assessment in population with Alzheimer disease (AD) has been criticized: current ToM tasks could be failed due to primary cognitive deficits, rather than specific ToM impairment (Sandoz et al., 2014). According to models of reference production (Ariel, 2004), a specific use of referential markers, based on referent accessibility, could mark speakers' sensitivity to their addressee's knowledge. Therefore, the present study aims to assess AD participants' abilities to attribute knowledge to others in an ecological setting, through their referential choices during verbal interactions.

12 adults with AD (M= 74.3) and 12 control adults (M=74.2) participated in a referential communication paradigm with the Storytelling in Sequence task (Fossard et al., in prep), composed of nine cartoons. The task is manipulated across three levels of referential complexity (one character or two of same vs. different sex) and three stages of discourse referential construction (introduction, maintain and shift of the character in focus) have been built to elicit three specific referential markers (respectively indefinite markers, pronouns and definite markers).

Although no differences in the referential choices were observed for the introduction stage, chi-square analyses revealed that for maintain and shift stages, AD participants used significantly less of each of expected referential marker at all complexity levels.

Compared to control participants, AD participants adapted less their referential marker use to their addressee's knowledge. These results highlight the possibility to assess ToM through discourse production. Further analyses, such as the relationships between referential patterns and measures of cognitive abilities will complete the results of the present study.

P27 Regional brain atrophy and cognitive deficits in Mild Cognitive Impairment, Alzheimer's Disease and Frontotemporal Dementia.

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Objective: Explore the association between neuroimaging and cognitive measures in patients with Alzheimer's disease (AD), frontotemporal dementia (FTD), and mild cognitive impairment (MCI).

Participants and methods: The clinical records of 131 patients (54 AD, 29 FTD and 48 MCI) with contemporary MRI scans and Dementia Rating Scale-2 (DRS-2) scores were retrospectively revised. Medial temporal lobe atrophy (MTA) and the posterior atrophy (PA) visual scales were applied blinded to diagnosis and cognitive assessment. Chi-square and Mann-Whitney tests were used for analysis.

Results: As expected, deficits on DRS-2 Total score differentiated MCI patients from AD ($p < 0.001$) and FTD ($p = 0.001$) groups. AD and FTD were only statistically different on the Memory subscale ($p = 0.028$). Among MCI patients, deficits on DRS-2 Total score ($p = 0.021$) and IP subscale ($p = 0.012$) were associated to larger MTA scores. AD patients' deficits on DRS-2 were not related to MTA. FTD patients with deficits on DRS-2 Total score ($p < 0.001$), IP ($p = 0.008$), Concept ($p = 0.009$), and Memory ($p < 0.001$) had larger MTA scores than those without deficits. PA scores were not related to MCI's and FTD's DRS-2 performance. In comparison to MCI patients, AD ($p < 0.001$) and FTD ($p = 0.021$) patients had higher MTA scores. AD patients had higher PA ratings than FTD ($p = 0.004$) and MCI ($p = 0.001$) patients.

Conclusions: MCI patients' MTA scores are related to their level of cognitive functioning, reflecting the known association between MTA ratings and conversion to AD. Contrary to expected no association was found between MTA and cognition among AD patients (probably explained by sample size). Interestingly, MTA is closely related to cognitive functioning in FTD, including memory.

P28 Divergent thinking and artistic creativity in Parkinson's disease and healthy subjects

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Artistic creativity is strongly dependent on divergent thinking that appears to be linked to frontal lobe functions. Since Parkinson's disease (PD) depends on dopamine deficit and a dysfunction of the frontal lobe, we investigated if there was a change in the divergent thinking in different groups of PD patients (with dopaminergic therapy or de novo) and healthy subjects (HC). Moreover, we considered if there was a correlation between divergent thinking and executive functions.

A battery of neuropsychological tests and mood evaluation was submitted to four groups: 10 patients with idiopathic PD and a professional creative work; 10 patients with not creative PD ; 10 PD patients, newly diagnosed and drug naïve; 20 normal subjects (10 with a creative work and 10 without a creative activity). To examine divergent thinking we used the Abbreviated Torrance Tests of Creative Thinking for Adults (ATTA), a known test evaluating creativity along the dimensions of fluency, flexibility, originality and elaboration.

We found that ATTA total score is correlated with some test scores that assess frontal functions (FAB; WEIGL). In fact, the group of non creative PD patients obtained lower scores at ATTA and FAB and WEIGL (although not pathological) than the other groups. Another interesting difference was observed between PD artists group and HC artists group: despite the same (normal) cognitive level, ATTA total scores in HC group obtained higher scores.

Our data support the link between divergent thinking/artistic creativity (assessed by means of ATTA) and frontal lobe functions in normal subjects and PD patients.

P29 Free and Cued recall in Alzheimer's Disease, Vascular and Frontotemporal Dementia Patients: an evaluation with a new version of Grober and Buschke test

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Objective: We compared the memory performance in patients with a diagnosis of Alzheimer's disease, Vascular or Frontotemporal dementia by means a new version of the Grober-Buschke test with 24-item (Costa et al., 2014) in order to verify whether this tool can differentiate the three types of dementia.

Participants and methods: Thirty-four (15 AD, 10 VaD, 9 FTD) patients and 20 healthy subjects, matched for age and educational level, took part in the study. After a standard neuropsychological evaluation, for both immediate and delayed, free and cued recall were analyzed and an Index of Sensivity of Cueing (ISC) was computed, according to formula $(\text{free recall score} + \text{total recall score}) / (\text{free recall score} - \text{total items})$.

Results: The AD memory performance was significantly worse than VaD and FTD both in immediate (free: $p = .046$, $p = .002$; cued: $p < .001$, $p < .001$, respectively) and in delayed (free: $p = .009$, $p < .001$; cued: $p < .001$, $p < .001$, respectively) recall. ISC values for AD patients were lower than for VaD ($p = .001$) and FTD ($p = .003$). A linear regression showed that the cued recall trials were a good predictor of subsequent free recall trials ($\beta = .334$; $p = .001$; $\beta = .165$; $p = .011$, respectively) for all groups.

Conclusion: VaD and FTD show a similar verbal memory performance and cannot be differentiated. Conversely, AD patients recalled less items in each trial. Then, encoding deficit and forgetting could be the real distinctive feature of AD and even if the semantic support improves the subsequent free recall, it is not sufficient by itself to allow long-term storage

P30 Ecological subtests of memory and executive function detect MCI and prodromic AD

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Objective: We investigate the mnemonic and executive functions profile in MCI patients assessed by the ecological batteries The Rivermead Behavioural memory Test (RBMT) and The Behavioural Assessment of the Dysexecutive Syndrome (BADS). The aim of this study is to assess which subtests differentiate patients with MCI compared to controls and which subtest allows us to distinguish MCI subjects from those with prodromal AD.

Participants and methods: 34 mild probable Alzheimer's disease (NINCDS-ADRDA), 27 amnesic mild cognitive impairment (Petersen, 2004) and 30 normal controls were assessed. The MMSE, RBMT, and Rule Shift Cards Test, Action Program Test, Key Search Test and Temporal Judgement of the BADS were administered twice, basal and a year follow-up. We analysed baseline raw scores of each subtest and performed intergroup cross-sectional comparisons using ANOVA, Mann-Whitney test, chi-square test or Fisher's exact test.

Results: Five patients with MCI diagnosis at baseline converted to AD (MCIad group) upon follow-up. Picture recognition and Orientation show significant differences between control and MCI ($p < 0,007$ and $p < 0,042$), MCI and MCIad ($p < 0,010$ and $p < 0,019$) and control and MCIad ($p < 0,000$ and $p < 0,000$, respectively). Rule Shift Cards Test (RSCT) shows significant differences between MCI and MCIad ($p < 0,05$), MCI and AD ($p < 0,026$) and control and MCIad ($p < 0,019$). The first group shows significantly higher values in all comparisons except in RSCT.

Conclusions: MCI who remained stable show impairment only in Picture Recognition and Orientation and they perform normally in executive function. Inhibitory control is impaired in MCI who converted to AD. Rule Shift Cards Test helps detect prodromal AD and distinguish to MCI.

P31 The relationship between Cognitive Impairment, Neuropsychiatric Symptoms and Emotion Recognition Deficit in patients with Mild Cognitive Impairment and early Dementia

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Objective: Mild Cognitive Impairment (MCI) and Dementia are characterized by Cognitive Impairment and Neuropsychiatric Symptoms (Dillon et al., 2013). Furthermore, the ability to recognize emotions is often impaired in MCI and Dementia (Spoletini et al., 2008). However, the relationship between Cognitive Impairment, Neuropsychiatric Symptoms and Emotion Recognition Deficit has not been investigated thoroughly. Therefore, the aim of the present study was to investigate this relationship in patients with MCI and Dementia.

Participants and methods: Thirty patients with early Dementia, and twenty-eight MCI patients were included. Cognitive Impairment was assessed with the Mini Mental Status Examination (Folstein, Folstein & McHugh, 1975). Neuropsychiatric Symptoms were assessed with the Neuropsychiatric Inventory (Cummings, 1994), a twelve domain caregiver-interview. Emotion Recognition was assessed with the Ekman 60 Faces Test (Young et al, 2002).

Results: After controlling for age and education, no significant differences were found between MCI and Dementia patients in MMSE, NPI Total score, or the twelve NPI domains. However, Dementia patients had significant lower EFT Total score than MCI patients ($p=.03$), as well as lower scores on EFT Disgust ($p<.01$), and EFT Happiness ($p=.02$). Furthermore, in Dementia patients, significant positive correlations were found between EFT Total and NPI Euphoria and NPI Disinhibition, whereas in MCI patients, no significant correlations were found between NPI domains and EFT Total.

Conclusions: Emotion Recognition Deficit differentiated better between MCI and Dementia, than Cognitive Impairment and Neuropsychiatric Symptoms. For Dementia, but not MCI, a relationship was found between Emotion Recognition and Neuropsychiatric Symptoms.

P32 Primary progressive aphasia: dysprosody and semantic impairment in a case of fronto-temporal degeneration

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Objective: Diagnostic criteria for Primary Progressive Aphasia (PPA) include clinical features, psychometric profile of language deficits and neuroimaging correlates. However, in clinical practice the occurrence of single cases that do not fully satisfy consensus diagnostic criteria is far from exceptional. We report the study of a PPA case showing an unusual presentation due to fronto-temporal degeneration (FTD).

Methods and results: BR, a 77-year-old man, was referred for evaluation of 2-year-long progressive dysprosody, characterized by a strikingly slow, halting, flat and “scanned” speech. Neuropsychological assessment did not show any evidence of agrammatism, but revealed severe anomic difficulties, with prevalent semantic errors. The deficit has gone unnoticed by BR’s relatives and also was trivial on informal clinical examination. The semantic nature of anomia was supported by impaired performance on single word comprehension, Pyramid and Palms test and reality decision tasks. Performance was significantly worse for “living” categories. A F18-FDG PET study demonstrated hypometabolism in the basal and anterior temporal cortex and in the mesial frontal cortex, more marked on the left.

Conclusions: BR’s clinical and neuropsychological picture does not fully satisfy criteria for either agrammatic or semantic PPA, yet it combines features suggestive of both variants. Clinical data and PET findings point to FTD, in which dysprosody and semantic impairment may be attributed to fronto-mesial and temporal pathology, respectively.

P33 Visual Hallucinations and Cognitive Functioning in Parkinson's disease

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Objective: To explore the association between Visual Hallucinations (VH) and cognitive functioning in early to moderate stages of Parkinson's disease (PD)

Methods: The Unified Parkinson's Disease Rating Scale-III (UPDRS-III), the Non-Motor Symptoms Assessment Scale for Parkinson's Disease, and the Dementia Rating Scale-2 (DRS-2) were applied to 230 consecutive PD patients at Hoehn & Yahr stages 1-3 (53% men; age=67±11; education=6years±4; disease duration=7years±5; UPDRS-III-Off=29,7±9; levodopa equivalent dose=774mg±488). The 5th percentile of age and education adjusted scores (based on normative data) was used to identify deficit on DRS-2. Logistic Regressions were used for data analyses.

Results: Thirteen patients (6%) had VH in the past month and 62 (27%) had impaired overall cognitive functioning (DRS-2 total score). The odds of having VH increased with severity of motor symptom (UPDRS-III: odds=1.068; p=0.033) and with cognitive deficits (DRS-2 total: odds=3.436, p=0.033; Initiation/Perseveration: odds=4.170, p=0.015; Conceptualization: odds=4.219, p=0.017; Memory: odds=3.250, p=0.049). No significant associations were found with sex (p=0.299), age (p=0.126), education (p=0.145), age at disease onset (p=0.517), disease duration (p=0.078), current levodopa equivalent dose (p=0.287), dopamine agonist (p=0.148) or deficit on DRS-2 subscales Attention (p=0.998) and Construction (p=0.108).

Conclusion: This study confirmed that severity of motor symptoms and cognitive deficits are associated with increased risk of VH in PD, even in early to moderate stages of the disease. Multiple cognitive domains have been linked to VH in PD. However, the results suggest that PD patients with impaired verbal reasoning, concept formation, and verbal response generation may be particularly vulnerable to VH.

P34 The Detection of Mild Cognitive Impairment in Parkinson's Disease with Movement Disorders Society Neuropsychological Battery

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Objective: Mild cognitive impairment (MCI) is common in non-demented Parkinson's disease (PD) patients and may be a harbinger of dementia. We wanted to determine the discriminative validity of Movement Disorders Society Level II neuropsychological battery (MDS-NB) Czech version for the detection of Parkinson's disease mild cognitive impairment (PD-MCI).

Participants and methods: We compared the cognitive performance in the MDS-NB in two education-matched groups: 167 healthy controls (HC) and 69 PD-MCI. PD-MCI diagnosis was determined on the basis of previously validated cutoff ≤ 139 in the Czech Mattis Dementia Rating Scale, Second Edition (DRS-II).

Results: The cognitive performance between PD-MCI and HC was significantly lower in following MDS-NB measures: all p 's $< .0005$. in Attention and working memory (Trail Making test-A and Digit Span backward); Executive function (Trail Making Test B and Stroop Interference); Memory (Rey Auditory Verbal Learning Test and WMS-III Family Pictures Delayed Recall); Language (Boston Naming Test). However, in others were the results significant only at $\alpha \leq .05$: Visuospatial function (Clox, $p = .002$) or non-significant in Visuospatial function (Benton Judgment of Line Orientation, $p = .064$) and Language (WAIS-III Similarities, $p = .190$).

Conclusions: These preliminary results show that MDS-NB Czech version is very sensitive in differentiating PD-MCI from HC, however not all tests in the battery contribute equally to the differentiation.

P35 Dementia Rating Scale–2 and motor symptom progression in Huntington’s disease

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Objective: The aim of the study was to explore the association between Huntington’s disease (HD) patients’ cognitive performance on the Dementia Rating Scale-2 (DRS-2) and patients’ demographic and clinical characteristics.

Participants and methods: Fifty-five consecutive symptomatic HD patients were selected from the Movement Disorders’ outpatient clinic (25 women; mean age=53±13; mean education=6±3; mean age at onset=46±11; mean disease duration=7.5±5; CAG repeat [37-61]). The Unified Huntington Disease Rating Scale (UHDRS) was used to assess motor, behavioral and functional indicators and DRS-2 was used to assess patients’ cognitive status. The estimated 5th percentile of the demographically adjusted scores was used to identify deficit on DRS-2. Logistic Regressions were used for data analysis.

Results: Thirty-four patients (62%) had deficit on DRS-2 Total score. The distribution of deficit per subscale was: 38% for Attention, 51% for Initiation/Perseveration, 44% for Construction, 26% for Conceptualization, and 53% for Memory. Deficit on DRS-2 Total score was associated with lower education (odds=0.809, p=0.032), longer disease duration (odds=1.146, p=0.046), higher scores on UHDRS-Motor subscale (odds=1.090, p=0.001), and with lower scores on UHDRS-functional subscale (odds=0.845, p=0.010). UHDRS-Motor subscale remained statistically associated with DRS-total score (p=0.032), even when education, disease duration, and UHDRS-functional subscale were taken into account. No significant association was found between deficit on DRS-2 Total score and the following variables: sex, age, age at onset, CAG repeat, and UHDRS-Behavior.

Conclusions: DRS-2 Total score is more sensitive to cognitive impairment in HD patients than its subscales. Cognitive impairment in HD is closely related to motor symptom progression.

P36 Cerebrovascular disease burden severity and cognitive function in elderly

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Objective: To establish a comprehensive Cerebrovascular Disease (CeVD) burden severity index, and to associate CeVD burden scores with global and domain-specific cognitive performance.

Methods: Participants recruited from both clinics and the community from Singapore underwent extensive neuropsychological assessments and Magnetic resonance imaging (MRI) scans. Small vessel disease markers, comprising presence of multiple lacunes, multiple cerebral microbleeds, and white matter hyperintensities (WMH) as defined by Fazekas scores, and large vessel disease markers, comprising presence of cortical stroke and intracranial stenosis, were included in the analysis to assess their independent strength with cognitive performance. Subsequently, weighted burden scores were assigned to all CeVD markers according to their independent association with cognition. CeVD burden was classified into 4 levels: 0-none/very mild; 1-mild; 2-moderate; 3-severe. General linear model was employed to relate different CeVD severity level with global and domain-based cognitive performance.

Results: A total of 399 subjects were included in the analysis. After controlling for demographic variables and vascular risk factors, mild CeVD was associated with poor performance of executive function tests (Beta[se]=-0.14[0.30]). Moderate CeVD was associated with both global and domain-specific cognitive performance. In addition, severe CeVD revealed stronger effect on cognitive performance in language (Beta[se]=-0.16[0.40]) and visuoconstruction (Beta[se]=-0.19[0.20]) domains.

Conclusions: Different levels of CeVD burden severity are associated with distinctive patterns of cognitive impairment.

P37 The Utility of the NINDS-CSN Harmonization Neurocognitive Battery in Detecting VCI in Singaporean Patients with Ischemic Stroke and TIA

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Objective: We report findings of Singaporean contribution to National Institute of Neurological Disease and Stroke – Canadian Stroke Network (NINDS-CSN) harmonization study by examining performance of 3 neuropsychological protocols (60 Minute (M), 30M and 5M) in patients with stroke and TIA at baseline and at 1 year follow up.

Participants and methods: Patients (≥ 50 years old) with stroke/TIA received NINDS-CSN battery. VCI was defined by global clinical dementia rating (CDR) score of ≥ 0.5 , while no cognitive impairment (NCI) was defined with CDR of 0. ANCOVA was conducted to compare performance between VCI and NCI. ROC analyses were employed to examine ability of 3 protocols in discriminating patients with VCI from NCI. Paired t-tests were conducted to compare mean within group difference from baseline to 1 year.

Results: 127 stroke patients were recruited with a majority had VCI and a minority had NCI (74.8%, $n=95$ vs. 25.2%, $n=32$, respectively). Using age, education and GDS as covariates, ANCOVA showed that performance of VCI group was significantly poorer than NCI on 3 protocols (F statistics range from 24.2 to 48.9, $p < .001$). ROC analyses showed adequate discriminatory abilities of 3 protocols (AUCs range from 0.83 to 0.88). Change scores of the 60M protocol from baseline to 1 year showed a trend of significance in differentiating patients with VCI ($n=68$) from those with NCI ($n=29$) (-0.18 ± 0.6 vs 0.09 ± 0.5 , F statistics = 3.3, $p=0.07$).

Conclusion: These results demonstrated preliminary evidence of discriminant validity of NINDS-CSN battery and its ability to track cognitive changes in Stroke/TIA patients over 1 year.

P38 Evaluating Executive Functions in Mesial Temporal Sclerosis

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Objective: Impaired performances on the Trail Making Test (TMT) are frequent in patients with Mesial Temporal Sclerosis (MTS). However, these abnormal scores may not be reflective of executive dysfunction. The aim of this study was to use TMT to detect executive deficits in patients with MTS.

Participants and methods: Forty-seven MTS patients (72% women; age=40±12; education=10±4 years; age at onset=16±11 years; disease duration=24±14 years; 43% with right and 57% with left MTS; number of anti-epileptic drugs: 2.6±0.9; 15% had surgical treatment) performed the TMT. TMT raw scores were adjusted for sex, age, and education according to normative data (Cavaco et al., 2015). The 5th percentile of the adjusted scores was used as cutoff for deficit. Chi-square and Mann-Whitney test were used for statistical analysis.

Results: The frequencies of deficit on TMT were: 28% on part A, 45% on part B, and 19% on the ratio. No significant associations were found ($p>0.05$) between deficit on part B or the ratio and the following variables: gender, age, education, laterality of MTS, number of anti-epileptic drugs, and surgical treatment. TMT part A was significantly related with age at onset ($p=0.037$) and disease duration ($p=0.006$).

Conclusions: TMT part B may overestimate the presence of executive dysfunction in MTS patients, due to their slow psychomotor speed. TMT's ratio index is a more appropriate measure of executive dysfunction in cases of MTS than TMT part B, because it controls for difficulties in psychomotor speed.

P39 Effects of laterality of mesial temporal lobe epilepsy in verbal memory

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Objective: The Auditory Verbal Learning Test (AVLT) was used to differentiate right from left mesial temporal lobe sclerosis (MTS).

Methods: Thirty-seven unilateral MTS patients (70% women; age=42±12; education=10±5 years; age at onset=17±13 years; disease duration=25±15 years; 43% right MTS and 57% left MTS; number of anti-epileptic drugs: 2.6±1; 7 with surgical treatment) performed the AVLT. AVLT scores were adjusted for sex, age, and education according to normative data (Cavaco et al., 2015). The 5th percentile of the adjusted scores was used as cutoff for deficit. Chi-square, Mann-Whitney, and Multiple Logistic Regression were used for statistical analysis.

Results: The frequencies of deficit on AVLT for right and left MTS were: trial 1 (25% vs. 24%), trial 2 (13% vs. 24%), trial 3 (13% vs. 24%), trial 4 (19% vs. 29%), trial 5 (6% vs. 33%), total learning (6% vs. 43%), learning over trials (0% vs. 19%), delayed recall (13% vs. 67%), long-term percent retention (13% vs. 43%), and delayed recognition (44% vs. 52%). The right and left MTS groups were statistically different on the total learning ($p=0.013$) and the delayed recall trial ($p=0.001$). Patients with impaired total learning ($p=0.070$) and delayed recall ($p=0.061$) tended to have longer disease duration. Side of MTS remained statistically associated with impaired total learning (adj odds=10.280; $p=0.042$) and delayed recall (adj odds=14.350; $p=0.005$), when disease duration was considered as covariate.

Conclusions: The results confirm the ability of the AVLT to identify patients with left MTS. The total learning and delayed recall had the best criterion validity.

P40 The experiences of children with Landau - Kleffner syndrome

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Landau - Kleffner syndrome is a rare form of childhood epilepsy. The illness is characterized by increasing aphasia, initially leading to severe disturbances in understanding, and in the further course of the disease, introduces difficulty in speech. Symptoms temporarily may mellow or withdraw and then reoccur. The syndrome can be difficult to recognize, especially when the occurrence of aphasia was not preceded by a history of seizures (such course of the disease is observed in approximately 30% of patients). The disease disappears in adolescence.

The question is how aphasia in the earlier period affects further language functioning. An important issue is the impact of communication disorders on the emotional and social development of the child.

Two cases of patients with Landau - Kleffner will be presented: 1. a sixteen-year-old boy with whom aphasia symptoms disappeared in 14 years, but there are still deficits in language. 2. a five-year-old boy in the course of the disease, with increasing problems in social functioning.

For the development of children with Landau - Kleffner are particularly important experience with communication difficulties, the interpretations given to the patient's behavior, and the impact of the child's environment.

P41 A Longitudinal Assessment of the Effect of Introduction or Withdrawal of Symptomatic Medication for Epilepsy on Cognition and Mood in Patients with Primary Brain Tumours.

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Objectives: The aim of this longitudinal study is to address whether changing symptomatic medication for epilepsy in patients with a diagnosis of a primary brain tumour (glioma or meningioma) results in changes in measures of cognition, mood, and fatigue over a 3 month period.

Participants and methods: Recruitment was conducted within the Edinburgh Centre for Neuro-Oncology (ECNO) at the Western General Hospital in Edinburgh for a total of 40 weeks. A total of 37 patients were recruited. Patients were assessed twice at baseline where possible, with a further follow-up assessment at 12 weeks. A comprehensive battery of validated cognitive assessments and questionnaires were administered at each assessment.

Results: The results found that all patients, regardless of whether they changed their anti-epileptic medication or not, showed a decline in some cognitive domains. Patients who underwent a change in their anti-epileptic medication during the course of the study showed a greater change in some measures of cognition than patients who did not change their medication.

Conclusions: The results demonstrated that there was no evidence of a significant difference in performance between the two baseline tests for most of the cognitive assessments, which is suggestive of a consistency of impairment at baseline. The study also found that all patients showed an increase in self-reported depression over the course of the study, and patients who changed their medication showed a greater increase in self-reported fatigue between the first and final assessments than patients who did not change their medication.

P42 Impact of epilepsy on cognitive performance and quality of life in cerebral palsy

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Objective: Cerebral palsy (CP) is the most common disabling condition in childhood, causing a significant potential impact on quality of life (QOL). Compared to other CP types, dyskinetic CP is associated with greater motor severity and higher comorbidity rates; epilepsy is present in 51% of the cases. The aim is to study the effect of epilepsy on cognitive performance and QOL in adolescents and adults with dyskinetic CP, controlling for motor severity.

Participants and methods: Thirty-six subjects diagnosed with dyskinetic CP were included in the study and classified into two groups (with and without epilepsy) following the International League Against Epilepsy criteria. Both groups (n=18) were equivalent in terms of age, gender, gestational age and motor severity. Neuropsychological tests were administered to assess general cognitive performance and specific cognitive domains (language, visuospatial function, memory and executive functions). QOL was assessed by means of a questionnaire specific for CP.

Results: T-Student test showed significant differences for general cognitive performance (T=2.285; p=.030), delayed verbal declarative memory (T=2.774; p=.010) and visuospatial function (T=21.500; p<.001). These results were not related to age at onset of seizures, seizure frequency and number of years with seizures. No differences were observed in QOL.

Conclusions: Dyskinetic CP with epilepsy is associated with poorer performance in general cognitive performance, verbal declarative memory and visuospatial function. Unlike evidence that have been observed in studies of children with CP, QOL of adolescents and adults seems not to be affected by epilepsy, maybe because at these ages most participants have the epilepsy pharmacologically controlled.

P43 Working memory and behavior in pediatric frontal epilepsy

vanden Berg, L. SEIN

Studies on working memory in pediatric frontal lobe epilepsy are sparse. Fortunately, there are some studies on patients with frontal lobe epilepsy that take working memory into account while investigating other functions. In summary it seems that working memory is affected in many children, but also adults, with frontal lobe epilepsy. However, working memory problems don't seem specific for frontal lobe epilepsy, but are also seen in temporal lobe epilepsy, which can lead to the conclusion that most working memory tasks recruit a network of the prefrontal cortex and parietal areas.

Due to the vulnerability of the young brain, epilepsy as a neurological disorder can at early-onset have great impact on working memory, leading to learning disabilities and behavioral problems.

This study focusses on the working memory and behavioral problems in children with frontal lobe epilepsy. 32 Children are enrolled in the study. Subdivisions on age at onset, age at seizure, drug load and seizure focus are made to explore the effect of epilepsy variables on the neuropsychological findings and findings on questionnaires. At the moment data is being analyzed.

P44 Assessing emotional interoception in conversion disorder: Implicit and explicit measures of awareness

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Conversion disorder is characterized by an emotional dysfunction expressed through the body. Even though patients are quite heterogeneous in their impairments, emotional processing is rarely assessed in all its components and at different levels (i.e. implicit versus explicit). We explored various components of emotional processing in a female patient with a diagnosis of conversion disorder, motor variant. We measured both "*cognitive explicit interoception*", asking our patient to fill in self-report questionnaires. Secondly, the patient has been administered with a disgust rating task, which is a measure of "*perceptual implicit interoception*". To control for exteroceptive impairments, we also administered a facial and body postures emotion recognition task.

Our patient showed intact *cognitive explicit interoception*: normal levels of anxiety and depression symptoms as well as no signs of modified psychological well-being and distress. On the other hand, the patient reaction times at the disgust rating task indicate an impaired *perceptual implicit interoception*. Finally, the patient correctly recognizes displays of emotions, both when presented as faces and body postures (*exteroceptive component*), excluding a global compromising of emotional processing.

In summary, our study shows that in conversion disorder not only exteroceptive components can be disentangled from interoceptive ones, but also within interoceptive components a distinction can be made between implicit and explicit processes. Neuropsychological tests, tackling different level of expression, could contribute in assessing emotional processing in conversion disorder, in order to tailor treatment options on the patient's awareness.

P45 Daily tiredness - the interactive effects of personality traits and experienced states of pain, sadness and fear

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Daily tiredness is a common problem that accompanies many diseases, and can have adverse effect on one's life. Based on previous research, the feeling of pain can be linked to tiredness, together with fear and sadness at the state level. On the other side, age and personality traits, especially extraversion and neuroticism can be expected to influence tiredness at the trait level. The aim of the current study is to examine the tiredness in daily situations, and the predictive value of state level (momentary feeling of pain, sadness, and fear) and trait level (age, personality traits of neuroticism, extraversion, openness to experience, conscientiousness and agreeableness) predictors. The study was conducted by using the experience sampling method in a group of 110 participants during 14 consecutive days on 7 randomly determined occasions per day. The results suggest that interactions of personality traits and age with state level emotions provide good explanation model for daily tiredness. Older people and people with higher agreeableness feel less tiredness. Fear itself does not influence the feeling of tiredness, but fear and pain felt together make one to feel more tired. If more neurotic people feel pain and sadness simultaneously, they also tend to feel tiredness. Interestingly, age and agreeableness separately are related to lower levels of tiredness, but higher agreeableness at higher age makes one more suggestible to tiredness. Taken together, the current study suggest personality traits and together with experienced states of sadness and fear, to be taken into account in etiology of tiredness.

P46 A possible role of reward sensitivity and impulsivity in weight gain after deep brain stimulation.

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Objective: Deep brain stimulation of the subthalamic nucleus (STN-DBS) has acquired a relevant role in the treatment of Parkinson's disease (PD). Despite positive motor outcomes, it may expose patients to weight gain. In this study we aimed at evaluating the role of reward sensitivity and impulsivity in weight gain after DBS.

Participants and methods: Patients with PD scheduled for undergoing STN-DBS were recruited. They were tested before surgery in an on medication condition and after surgery in an on medication/on stimulation condition, in a satiated state. All participants were asked to perform a self-report questionnaire about impulsiveness, a go-no-go experiment measuring the response inhibition to food items and finally, a task that evaluates both hedonic and motivational aspects of food processing (liking and wanting, respectively). Food stimuli varied across two dimensions: taste (sweet vs. non-sweet) and calorie density (high vs. low). The preoperative and postoperative body weights were recorded.

Results: The mean body weight of patients increased postoperatively. The weight changes correlated positively with attentional impulsiveness pre and after surgery. Moreover, weight changes correlated with false alarms for food items and liking and wanting towards sweet food item in the on medication/on stimulation condition whether no correlations were found with tastiness ratings of food.

Conclusions: Our results confirm that STN-DBS may expose patients to the risk of weight gain. They also suggest that both impulsivity and higher sensitivity to reward may play a significant role in the regulation of food intake and weight after surgery.

P47 Do morbid obese control themselves towards high calorie food? Results from a food-related task

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Obesity is a multifactorial disease due to an imbalance between energy intake and expenditure (Berthoud & Morrison, 2008). It is well known that in obesity structural changes has place in prefrontal cortex and subcortical regions such as bilateral ventral diencephalon and brainstem (Marqués-Iturria et al., 2013). These areas support functions as cognitive flexibility or inhibitory control among others. It is unclear whether the performance of these functions worsens depending on the level of obesity. The aim of this study was to assess if these functions are worsen in morbid obesity (BMI > 40) in a Go/NoGo task.

Obese (n=21; 67% women; BMI from 30 to 40) and morbid obese participants (n=13; 62% women) aged from 19 to 39 years old performed a Go/NoGo task that included low calorie (LC), high calorie (HC) and neutral stimuli (NS). Group comparisons were analyzed with non-parametric measures (Mann-Whitney's U-test). Alpha-level 0.05 defined statistical significance. IBM SPSS Statistics v.21 was used as statistical package.

There were no differences in demographic variables except for age (p=.015). All significant differences were covariated by age. In the Go/NoGo task morbid obese subjects made more omissions when HC food (p=.002) and food (LC+HC) (p=.026) were presented.

Results suggest that morbid obese participants vacillated more and not responded to food stimuli when it was required, which may be due to a slightly difference in cognitive flexibility and/or cognitive restraint towards food, mostly for HC kind.

1. Berthoud HR, Morrison C. 2008. *Annu Rev Psychol.* 59, 55-92.
2. Marqués-Iturria I. et al. 2013. *Psychiatry Res.* 214, 109-115.

P48 Working Memory and High-level Cognition in Children: Strategic factors and the effect of temporal constraints.

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Research indicates that working memory (WM) increases with age and, in turn, explains the continued development of high-level cognition (HLC) throughout childhood. However, children's HLC develops at varying rates and it is unclear how individual differences in WM can account for such discrepant ability. Previous studies demonstrate that generic temporal constraints placed on WM span tasks yield more predictive measures of HLC and, therefore, call into question the importance of maintenance strategies in the WM-HLC relationship. The current study administered unique WM span tasks that accounted for individual differences in processing speed and, thereby, further reduced opportunities for strategy use. Ninety-two primary school children (seven to eight years) completed tasks across verbal, visuo-spatial and numerical domains in two conditions; participant-led and time-restricted computer-paced. Although task performance was comparable across both conditions, the participant-led tasks in the verbal and visuo-spatial domains reduced correlations with measures of IQ and mathematics. Conversely, the numerical domain showed stronger correlations in the participant-led condition. However, the computer-paced numerical span task strengthened correlations with reading whereas both conditions in the verbal and visuo-spatial domain were analogous. Furthermore, performance on participant-led span tasks in the numerical domain predicted unique variance in IQ and mathematics, whilst performance on the computer-paced verbal span task predicted unique variance in reading. Findings demonstrate that, when individual differences in processing speed are accounted for, the greater predictive power of computer-paced span tasks to HLC is domain specific. Hence theories arguing against strategic factors as components of the WM-HLC relationship are incomplete.

P49 Examining the effects of active versus passive bilingualism on executive control in a non-immigrant population sample

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Objectives: Bilinguals have been argued to have a cognitive advantage over monolinguals (e.g., Bialystok et al., 2004). In many of these studies, however, bilingualism is confounded with immigration status. We examined whether bilingualism affects executive control when language groups are matched on background variables. Furthermore, we assessed the potential effects of *using* versus *knowing* two languages.

Participants and methods: We tested 76 active bilinguals, passive bilinguals, and monolinguals (M age = 70.91). Both active and passive bilinguals acquired English and Gaelic during their childhood, but only active bilinguals used both languages after childhood. Participants completed various background measurements and language tasks as well as executive control tasks, including a Simon arrow task and task-switching paradigm. In the Simon arrow task, participants responded to left- and right-pointing arrows that were presented on the congruent or incongruent side of the screen. In the task-switching paradigm, they switched between colour and shape decisions.

Results: In the Simon task, no effect of bilingualism was observed on overall reaction times (RTs) or the Simon effect (difference between incongruent and congruent trials). In the task-switching paradigm, language groups also did not differ on overall RTs or proportional switching and mixing costs.

Conclusions: Our findings suggest that bilinguals have no cognitive advantage compared to monolinguals when groups are matched on background variables including immigrant status. Although we did not find executive control differences between active and passive bilinguals, language tasks showed the need to define language use and proficiency in bilinguals.

P50 Digit ratio (2D/4D), psychopathy, and crimes of violence in a prison sample

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High testosterone exposure during prenatal development, mirrored in a low second-to-fourth hand digit ratio (2D/4D), has been associated with various traits that are either sexually differentiated or influenced by the sex hormones (different types of aggression, lack of inhibitions etc.).

In this context, we investigated the potential link between psychopathy levels assessed with Hare Self-Report Psychopathy Scale (Paulhus et al. 2007), violent crimes (showed in criminal records), and 2D/4D digit ratios (measured through scans of both hands) in a prison sample of 225 inmates (135 men and 90 women). We expected that men would have lower digit ratios than women, and that lower (more masculinized) digit ratios would be linked to violent crimes and to high levels of psychopathy.

The main assumption was partially confirmed only in respect of the left hand: a lower digit ratio was found in men, but the link between violent crimes and low digit ratios was found only in women inmates. In regards to the link between psychopathy and the digit ratios, no significant relationship was found.

Present results suggest that prenatal exposure to testosterone might be linked to violence only in women and the right to left superiority of the D2/D4 ratio is not always the rule, as previously assumed.

A better understanding of the association between criminal aggression and a biomarker of prenatal androgen exposure could contribute to the improvement of the assessment process in both clinical and forensic settings as well as to the intervention strategies for convicts' rehabilitation and relapse prevention.

P51 Long-term exposure to aluminium welding fumes may cause permanent cognitive impairment - a case report of 20 year neuropsychological follow-up

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Objective: Aluminium (Al) is a neurotoxic metal commonly used in industry. The biological monitoring of occupational Al exposure has showed increased body burden of Al among welders. In epidemiological studies long term occupational exposure to Al has shown to be associated with slower visuomotor and motor performance. However, knowledge of stability and individual trajectory of neurocognitive consequences of Al is limited. We describe an Al welder with 20 years neuropsychological follow-up.

Participants and methods: A 57-year-old welder was referred to Finnish Institute of Occupational Health for suspected occupational disease after exposed to Al fumes for nearly 40 years. Comprehensive medical examinations and brain MRI did not reveal any neurological or psychiatric disorder explaining his cognitive complaints. Exposure to Al had stopped 10 months ago, however, Al concentration in urea remained high. Clinical neuropsychological assessment revealed average cognitive capacity and normal verbal and visual cognitive skills. Memory test results were mainly on average range. However, compared with normative data, a moderate working memory deficit and severe slowness of visuomotor processing were evident. The same welder had participated 20 years earlier in a toxicopsychological study of asymptomatic Al welders, which enabled us to perform a detailed re-testing with identical cognitive battery.

Results: Significant impairment on several neuropsychological scores was verified in identical test battery after 20 years follow-up. Clinically Significant Change was most prominent on parameters assessing processing speed.

Conclusion: Long-term exposure to Al welding fumes may result permanent and clinically significant cognitive processing speed impairment that exceeds age-related performance decline.

P52 A dissociation between phonemic and figural fluency in opioid-dependent patients

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Objective: Phonemic and figural fluency tasks are both sensitive though not specific measures of frontal lobe functioning. Functional neuroimaging and lesion studies have shown that phonemic fluency is mainly dependent on the left brain hemisphere activation. Figural fluency, on the other hand, shows typically bilateral or right hemisphere activation.

Participants and methods: In this study we compared phonemic (letter) and figural fluency (The Ruff Figural Fluency Test) performance of 15 opioid-dependent patients treated with buprenorphine or buprenorphine/naloxone (BN), 13 opioid-dependent patients treated with methadone (METH), and 13 healthy controls (HC). Both patient groups had stable drug regimen. The groups were similar to each other in demographic variables and estimated IQ. However, the HC group had attained more education than patient groups due to high education drop-out rate among the patient groups. The fluency test results were analyzed with analysis of variance (ANOVA) and, when appropriate, this was followed by group-wise comparisons.

Results: The number of correct figures in the figural fluency test was significantly lower in the patient groups than in the HC group (BN vs. HC, $p = 0.0006$ and METH vs. HC, $p = 0.0003$). In phonemic fluency no significant differences emerged.

Conclusions: Low figural fluency performance combined with normal phonemic fluency could be a neuropsychological indication of increased left brain hemisphere activation in opioid-dependent patients. Also, the results are in line with the idea of no executive function differences between buprenorphine and methadone treated opioid-dependent patients.

P53 Neuropsychological consequences of opioids use in chronic nonmalignant pain patients

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Objective: It is widely assumed that neuropsychological function is commonly impaired as a consequence of chronic opioid use. The aim was to find differences in assessment between patients with chronic nonmalignant pain on opioids treatment and a healthy control group.

Participants and methods: We included 52 patients, with a mean age 56, FIQ=96, mean time of opioids use of 6years (fentanyl-17, oxycodon-16, buprenorphin-8, hydromorphon-6, tapentadol-5) and 33 healthy volunteers, with a mean age 42, mean FIQ=105. All 85 subjects were examined with standard neuropsychological battery (WAIS-III, VF, RAVLT, ROFT, EFTT, GPT), measurement of pain intensity (VAS), fear of pain (FPQ-III), reaction time (Compact SR), life satisfaction (DŽS), depression (BDI-II) and emotional lability (EPQ-R).

Results: In the group of patients we found an impairment in cognitive flexibility (verbal fluency), reaction to auditive stimuli, finger-tapping of non dominant arm (NDA) and manual dexterity bilaterally with higher number of errors. We found higher number of depression, emotional lability, low life satisfaction and above average fear of minor pain. In a group of patients with a higher intensity of pain (n=28, VAS 7-10) we found even more higher susceptibility to suicidal thoughts. In the control healthy group impairment was very low for assessed neuropsychological domains.

Conclusions: We found overall neuropsychological differences between patients and healthy control group as multifactorial consequences of complex interaction among intensity of pain, opioids, emotions and cognition. We cannot determine which factors influenced the test results, but pain itself seemed to have an arousal effect on neuropsychological domains.

P54 A specific free recall deficit in down syndrome arises when the difficulty in the memory task is controlled

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Introduction: Episodic memory is globally impaired in Down Syndrome (DS). The specific contribution of different memory processes to this deficit is still not well understood.

Objective: To compare the pattern of episodic memory performance of DS and euploid subjects by means a difficulty-adjusted paradigm.

Participants and methods: The Cued Recall Test (CRT), an adaptation of the Free and Cued Selective Reminding Test (FCSRT) devised to be applied in intellectually disabled population, was administered to 74 individuals with DS (mean age:23.5, sd:4.2 years; mean IQ:45.8, sd:8.7). Fifty-seven euploid subjects (mean age:25.8, sd:5.1 years) completed the FCSRT. The Item-Specific Deficit Approach (ISDA) analysis was applied, and ratios between free and cued recall were calculated.

Results: No differences were found in the indices that account for encoding, consolidating or retaining the information. The global performance of both groups, defined as percent of the maximum items recalled either in free or cued recall, was similar (34.7/36=96%; 45.14/48=94%). In contrast, DS shows a worse free recall performance in both immediate (54%vs.71%; p-value<0.001) and delayed (60%vs.81%; p-value<0.001) trials. Furthermore, in the free delayed trial DS subjects lost the 29.3% of the items that had been consistently freely recalled during learning trials (vs.16.7%; p-value<0.001).

Conclusions: The adaptation of the memory paradigm of the FCSRT, the CRT allows the characterization of DS memory pattern by controlling the difficulty of the task. A detailed analysis reveals that DS subjects exhibit less ability to recall without cues information that was successfully learned, suggesting impairment in the executive components of memory.

P55 Exploring the relationship among cognitive skills, mental health and metabolic parameters in early-treated adults with phenylketonuria (PKU)

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Objectives: To explore the association among cognitive functions, mental health and Phe concentrations and fluctuations in early-treated adult with PKU (AwPKU).

Method: 37 AwPKU (18-41 years) and 30 age and education matched controls were given an extensive neuropsychological battery, providing 7 composite scores (speed of processing in language, visuo-spatial attention and visuo-motor coordination; accuracy in language, visuo-spatial attention and memory, and executive functions) as well questionnaires about mental health (depression and empathy scales). Phe levels during the life span were available for correlation.

Results: AwPKU had IQ scores in the normal range but lower than controls and were impaired in our composite measures (overall .5 Z scores below average; rate of tasks impaired =13.0%, vs controls=4.1%; $p<.01$). Instead, they did not differ from controls in measures of depression and personal distress, and had even higher scores in empathic concern. Mean Phe levels and Phe fluctuations showed strong associations with cognitive performance. AwPKU with good dietary control during the life span performed significantly better and adult/concurrent Phe levels showed correlations with a number of cognitive measures even when adolescent levels were partialled out. Instead, there were no associations between mental health measures and Phe levels with the exception of one out of four of the empathy subscales. There were no correlations between mental health measures and cognitive measures including speed of processing.

Conclusions: There is no indication that mental health is an issue in early treated AwPKU. Instead, cognitive measures can be taken as a good indication of dietary control and treatment success.

P56 Early-treated adults with PKU: An in depth analysis of language processing

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Objective: To provide an in depth analysis of language functions in a group of early-treated PKU adults (AwPKU) and, thus, go beyond traditional assessments in terms of speed of processing and executive functions.

Method: Groups of AwPKU (N=12-30) and age- and education-matched controls (N=15-30) were tested on a number of language tasks tapping : 1. narrative production (retelling the story of Cinderella), 2. understanding language pragmatics (e.g. Humour, Metaphor); 3. Understanding prosody and 4. lexical selection (Healing task, verbal fluency). Verbal narratives were analysed with a number of measures proven sensitive to detect impairments in other populations, such as: rate of Correct Information Units (CIU), mean length of utterance (MUL), speech rate in terms of number of words per minute, rate of errors and coherence of narrative.

Results: Overall, AwPKU performed well, but some impairments were detected. In narrative production, rate of CIU was significantly lower than the controls. In understanding of humour and metaphorical language, they took significantly longer to answer. They produced fewer 'animals' in the semantic fluency task.

Conclusions: In line with the results of a wider neuropsychological battery on the same patients, preliminary results show that AwPKU have difficulties in strategic planning (reduced rate of informative words or CIU, impaired lexical search strategies) and in deriving inferences (understanding of pragmatics and metaphorical language) which are not accountable simply in terms of speed of processing because some impaired measures do not involve speed, while performance in some simple speed tasks is normal (e.g., normal simple reaction times).

P57 Neurocognitive performance and anxiety level in younger and elderly HIV seropositive men who have sex with men. Preliminary results

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Objective: Due to the progress in antiretroviral treatment (ART) patients with HIV infection live longer and there is a need to investigate the impact of aging. The study aimed at investigating the effects of age on neurocognitive and emotional functioning in 48 HIV infected men who have sex with men (MSM).

Participants and methods: Neuropsychological test battery and State-Trait Anxiety Inventory (STAI) were administered in two HIV(+) groups aged respectively 25-40 years (N=29) and 41-64 years (N=19). All participants had at least secondary education, have been subjected to ART since at least 1 year, had actual undetectable viral load, were free of opportunistic infections, and were not diagnosed dementia. The groups did not differ in CD4+ nadir (M=286 cells/mL; SD=147).

Results: When compared to the younger group, the older MSM had significantly lower results in the tests: Corsi Block Tapping Backward, CVLT trials 1-5, CVLT free recall long delay, Color Trails Test-1 and Test-2, Grooved Pegboard Test. No differences in anxiety level were observed between the groups, however partial correlations after controlling for age-group effects showed that higher level of STAI-State correlated with slower CTT-2 performance, slower GPT dominant hand input, and lower learning to learn in WCST.

Conclusions: Despite effective ART decline in motor speed, verbal learning, visual attention, and task switching may be observed in older HIV(+) MSM when compared to the younger. Independently of age slower test performance may be associated with higher level of anxiety state. Comprehensive care of HIV-infected patients should incorporate medical, neuropsychological, and psychological care.

P58 Minor psycho-social stress and the reactivation of latent Herpes simplex virus infection

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Some anecdotal data, as well as data derived from several animal but also human studies suggest the role of major stress events in the evolution of latent herpetic infection. However, the relationship between the more relevant minor stress (hassles) and the reactivations of this infection has been less explored by now.

Seventeen adult men with recurrent labial episodes of latent infection with *Herpes simplex* virus have been asked to accurately record for more than one year the frequency and severity of stressful events in their lives, using a specific hassles scale; in parallel, they have been required to record the onset and duration of each herpetic reactivation.

The data analysis could not develop any statistically significant relationship between raised levels of self-reported stress and the onset or duration of reactivations of herpetic infection. The lengths of monitoring allowed the recording of an important number of infectious reactivations in each subject, compensating we believe the relatively small number of the subjects.

The results of the present study raise doubt on the presumption of a significant association between minor psycho-social stress and the reactivation of latent infection with *Herpes simplex* virus. Some possible explanations and implications of such results are reviewed in the end.

P59 Adult with middle interhemispheric variant of holoprosencephaly: neuropsychological, clinical and radiological findings

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Holoprosencephaly is a spectrum of complex brain malformations that result from an incomplete cleavage of the prosencephalon into the hemispheres. The severity of developmental disability correlates with the severity of the brain malformation. The middle interhemispheric variant of holoprosencephaly (MIHV) is a mild, rare variant of holoprosencephaly. Few cases of children with MIHV have been reported but no detailed adult cases. Here we report clinical, neuropsychological and neuroradiological data of an adult with MIHV. The patient is a female in her thirties. She has graduated from high school and worked for several years. Neuroradiologically, the patient had absence of the central corpus callosum and union of posterior frontal and anterior parietal gyri in the midline. In detailed neuropsychological examination, the patient had normal or above performance on verbal comprehension, naming, reading and writing, and below normal in perceptual reasoning, visuospatial abilities, processing speed, auditory, verbal and working memory, and also dyscalculia, dyspraxia and some executive dysfunctions. These findings are very mild compared to some other reported cases and demonstrate the broad spectrum of cognitive abnormalities in MIHV.

P60 Cognitive correlates of lipreading in children with and without specific language impairment (SLI)

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Objective: Lipreading is an integral part of speech processing and it contributes to the development of language skills. Understanding the process of lipreading and its cognitive correlates can shed a light on the process of speech understanding in individuals with delayed language development. Lipreading has been usually studied with typically developing (TD) children, but studies of lipreading in children with specific language impairment (SLI), are almost non-existing. The aim of this study was to investigate cognitive correlates of lipreading in Finnish-speaking children with specific language impairment (SLI) and in children with typical language development.

Participants and methods: Forty-two TD children (mean age 8;3) and twenty children with SLI diagnosis (mean age 8;11) were tested using a computer-assisted lipreading test and a large battery of standardized linguistic and cognitive tests, including measures of phonological abilities, working memory, language comprehension and production, attention and general cognitive abilities.

Results: Children with SLI were poorer lipreaders than TD children. In children with SLI, capacious working memory predicted skilled lipreading. In TD children, good phonological skills predicted good lipreading ability. Furthermore, significant correlations were found between working memory and lipreading in TD children, while verbal motor skills correlated with lipreading in children with SLI.

Conclusions: Differences in lipreading ability in TD children and children with SLI may be explained by differences in cognitive skills. Capacious working memory may be a prerequisite for skilled lipreading, because it allows efficient interplay between the visual speech signal and phonological knowledge.

P61 A Follow-up Study of Executive Functions in Children with Specific Language Impairment from Age 8 to 12 years

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Objective: Executive impairments are relative common among children with developmental disorders, also in children with specific language impairment (SLI). However, evidence of executive functions (EFs) in children with SLI is limited and partly contradictory. The aim of the study was to follow the development of EFs and intelligence in children with SLI and compare them to the development of typically developing children.

Participants and methods: *Study group* consisted of 22 children with SLI from Tampere University Hospital. *Controls* (n = 22) were age and gender matched healthy children. EFs were assessed at age eight and again four years later using ecologically valid measure the Behavior Rating Inventory of Executive Function (BRIEF, Parent and Teacher Forms). Intellectual capacity was controlled with WISC III. Statistical analyses were carried out using non-parametric tests.

Results: Differences between the study and the control group in EFs at age eight assessed by parents were statistically significant (min. $p < .05$) in four subscales of the BRIEF (Shift, Emotional Control, Working Memory, Plan/Organize) and at age twelve still in three subscales (Shift, Emotional Control, Working Memory). Teachers rated EFs of the study group statistically significantly weaker in six subscales at age eight and in one subscale at age twelve (Emotional Control). Also differences between the groups were statistically significant in verbal, performance and total IQ.

Conclusions: Children with SLI have more problems than healthy controls in EFs at age eight assessed by parents and teachers. They have weaker skills in some EFs still at age twelve, specially in emotional control.

P62 Processing differences in sentence comprehension in aphasia – an eye tracking study

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Aphasic patients often have difficulties in understanding non-canonical sentence structures, such as Passive or Object-Verb-Subject sentences. The reasons for these difficulties are still a matter of debate. Some accounts propose that these difficulties can be attributed to impaired cue recognition, and to problems in integrating competing interpretations. We aimed at further elucidating these processes. A sentence-picture matching task with concurrent eye tracking was performed. Subjects heard a sentence and simultaneously saw four different versions of a picture, among which they had to choose the correct one. The sentences differed regarding their syntactic complexity. Behavioral and fixation data of 50 healthy subjects and 12 aphasic patients were analyzed. Patients showed increased latencies and error rates, as well as a delayed fixation preference for target pictures in non-canonical sentences. In particular, patients' fixation data differed from healthy controls in correctly solved Object-Verb-Subject sentences, where deficits in recognizing and immediately integrating morphosyntactic cues became apparent. Our study corroborates the notion that difficulties in understanding syntactically complex sentences can be best attributed to a processing deficit. The findings fit with an impaired integration or increased competition account.

P63 Subjective memory failures are not strongly associated with neuropsychological performance in adults with developmental dyslexia

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Objective: The working memory problems associated with dyslexia are well documented. Yet little research has been made on subjective memory failures of adults with developmental dyslexia. This study focuses on the relationship between subjective everyday memory failures and cognitive functioning measured by neuropsychological examination.

Subjects and methods: Neuropsychologically examined 80 young adults aged 18-35 filled out Everyday Memory Questionnaire (EMQ) as a part of a larger study of neuropsychological rehabilitation for developmental dyslexia. EMQ subscale scores were transformed into z-scores to ensure that all the subscales had the same influence on the questionnaire's total score. Linear regression models were created to predict z-transformed EMQ subscales and the weighted total score.

Results: Only two neuropsychological measures significantly predicted the results of the entire EMQ: the Trail Making Test part B ($p=0.025$) and a nonword spelling task ($p=0.001$). Only six out of 29 neuropsychological measures predicted any of the EMQ's subscales ($p\leq 0.05$). Further, Logical Memory I and Digits Backward of the WMS-III were the only memory measures out of the four that were used in the battery with a statistically significant connection with any of the analyzed subscales. Logical Memory I ($p=0.023$) was connected to the Reading and Writing subscale. Digits Backward ($p=0.051$) was connected to the Speech subscale, but the connection was weaker than between other neuropsychological measures and EMQ subscales.

Conclusions: The results show that only few neuropsychological measures predict subjective everyday memory failures of adults with developmental dyslexia. Thus, other factors seem to affect subjective experience of memory failures.

P64 The Severity of developmental dyslexia in adults relates especially to anamnestic aspects of the learning difficulty rather than current symptoms

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Objective: Interviewing and using questionnaires is a common part of evaluating learning difficulties such as developmental dyslexia. The purpose of this study was to find out how two different questionnaires measuring subjective aspects of reading history and dyslexia relate to its severity.

Participants and methods: The 118 participants aged 18-35 were from a randomized, controlled study evaluating the effectiveness of neuropsychological rehabilitation for dyslexia. Their dyslexia was carefully diagnosed using an interview, a neuropsychological examination and a physician's assessment. Five tests of reading and writing were used to measure the severity of dyslexia (range 3-10). The participants filled out the Adult Reading History Questionnaire (ARHQ) and a Finnish version of the Revised Adult Dyslexia Check List before entering rehabilitation.

Results: The ARHQ as a whole significantly correlated with the severity of dyslexia ($p < 0.01$) whereas the Dyslexia checklist focusing mainly on the current symptoms did not show significant correlation. Of the six individual questions correlating with the severity level of dyslexia three concerned the participants' learning history and two concerned the amount of time currently spent on reading. Only one question expressed a current symptom i.e. slowness of reading ($p < 0.05$).

Conclusions: The anamnestic dyslexia symptoms seem to relate more strongly to the severity of dyslexia than the currently experienced symptoms. Additionally, the time spend on reading seems to be a relevant question when evaluating severity of dyslexia. A thorough anamnestic inquiry is an essential part of the diagnostic examination of developmental dyslexia in adults.

P65 Naming and attentional deficits in pre-school age – do they make a difference two years later?

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Objective: The goal of the Naming and Executive functions (Namex) follow-up study was to investigate how deficits in naming or attention in pre-school age affect performance and behavior in school two years later.

Participants and methods: The clinical sample (n=40) was recruited from the Neuropsychological Rehabilitation Center Nekku, which is a private clinic in a city in southern Finland. Children were referred to a neuropsychological evaluation for school-readiness at the age of 6. The sample of typically developing children (n=32) was recruited from two preschools in the same city.

At the age of six the children were evaluated by the Wechsler Intelligence Scale for Children and the Boston Naming Test. The NEPSY-battery was used at the ages of six and eight. At second grade the Attention and Executive Function Rating Inventory ATTEX -questionnaire was used to evaluate the executive problems of the children at behavioral level. Their literacy skills were evaluated by using the Lukilasse-test. The data were analyzed using the General Linear Model.

Results: The early problems in attention were still observable in a school setting two years later. Especially inhibitory problems remained stable. Also, it was found out that a deficit in both picture naming and naming speed predicted more marked difficulties in later reading ability than a deficit in only one of them.

Conclusions: The results of the study provide support for the use of different measures of inhibition, and the evaluation of various naming skills in neuropsychological assessment at preschool-age.

P1 Cognitive Assessment at Five Years of Age Predicts School Age Outcome in Preterm Children

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Objective: To assess the stability of cognitive outcome and the predictive value of psychological assessment at five years of age in preterm children, known to be at risk for developmental impairments.

Participants and methods: The development of 83 preterm very low birth weight (≤ 1500 g) children born 2001-2003 in the Turku University Hospital, Finland, was followed. At five years of age the children were assessed with a short form of Wechsler Preschool and Primary Scale of Intelligence – Revised (subtests Information, Sentences, Arithmetic, Block Design, Geometric Design and Picture Completion included) and Full Scale Intelligence Quotient (FSIQ), Verbal Intelligence Quotient (VIQ) and Performance Intelligence Quotient (PIQ) were estimated. At eleven years of age FSIQ, Verbal Comprehension Index (VCI) and Perceptual Reasoning Index (PRI) were assessed with Wechsler Intelligence Scale for Children - Fourth Edition.

Results: Mean FSIQ was 100 at five and 90 at eleven years of age and the correlation was 0.68 ($p < .0001$). Mean VIQ was 102, mean VCI 91 and the correlation 0.55 ($p < .0001$). Mean PIQ was 99, mean PRI 94 and the correlation 0.70 ($p < .0001$).

Conclusions: Despite differently constructed assessment tools, the stability of cognitive outcome between five and eleven years of age was good. Psychological assessment at five years of age should be a part of the regular follow-up of preterm children, as it enables early detection of those children who need additional developmental support and efforts to prevent or alleviate learning difficulties.

P2 Learning Difficulties, Psychosocial Functioning and Diabetes Management in Children with Type 1 Diabetes

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Objective: Type 1 Diabetes (T1D) is associated with higher risk for learning difficulties and psychosocial problems in children. However, it is not clear, whether those problems co-occur and are related to diabetes management. This study assessed psychosocial functioning and diabetes management in children with T1D with and without learning difficulties.

Participants and methods: The study included 63 children with T1D. The children were 9 to 10 years of age and at the 3rd grade at school. Learning difficulties were determined by achievement < 10th percentile in the tests of reading fluency and accuracy, spelling and mathematics. Psychosocial functioning (adaptive skills, internalizing and externalizing symptoms, behavioral symptoms) was assessed with the BASC. Diabetes management was measured with glycemic control (current HbA1c level). Children with and without learning difficulties were compared with t tests in psychosocial functioning and glycemic control.

Results: In children with T1D, 11% had difficulties in reading fluency, 14% in reading accuracy, 37% in spelling and 24% in mathematics. Children with mathematical difficulties had poorer adaptive skills ($p=.028$), and children with spelling difficulties had more behavioral symptoms ($p=.035$) than those without learning problems. Children with and without learning difficulties did not differ in glycemic control.

Conclusions: Although children with T1D have a high prevalence of learning difficulties, diabetes management is not related to learning problems in middle childhood. Children with mathematical and spelling difficulties are vulnerable to psychosocial problems. Children's learning difficulties and psychosocial wellbeing should be acknowledged in diabetes care.

P3 Relations between neonatal structural and volumetric brain MRI and neuropsychological functioning in preterm born children at school age

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Objective: To study the predictive value of neonatal brain magnetic resonance imaging (MRI) findings including volume measurement on neuropsychological functioning at 11 years of age in preterm children.

Participants and methods: The group of 87 very low birth weight (≤ 1500 g) children born between 2001 and 2003 in the Turku University Hospital, Finland, was followed up. Brain MRI (0.23T) was performed at term. The structural findings were categorized into normal findings, minor pathologies and major pathologies. The volume measurement was performed manually. Neuropsychological domains were assessed at the age of 11 years with sum scores of NEPSY-II (language, memory, visuomotor skills) and with Global Executive Composites (GEC) of parent and teacher form of Behavior Rating Inventory of Executive Function (BRIEF).

Results: Major structural pathology was associated with lower scores in neuropsychological domains tapping language ($p < 0.001$), memory ($p < 0.05$), and visuomotor skills ($p < 0.0001$). Normal brain structure, as well as minor pathology were not significant for neuropsychological functioning. Smaller volumes of cerebrum ($p < 0.05$) and total brain tissue ($p < 0.05$) were associated with poorer language domain. Smaller volumes of cerebrum ($p < 0.05$), basal ganglia and thalami ($p < 0.05$), and total brain tissue ($p < 0.05$) were associated with problems in executive functions rated by teacher. In addition, larger volume of the ventricles was associated with lower scores in visuomotor domain ($p < 0.05$). Associations to cerebellum and frontal lobes were not found.

Conclusions: This work is the first to show the predictive value of neonatal structural and volumetric brain MRI on neuropsychological functioning of preterm children at 11 years of age.

P4 Executive functions in children born very preterm at the age of 11 years in relation to brain volumes

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Objective: To examine executive functions (EF) of very low birth weight (VLBW; <1,501 g) children at the age of 11 years, and to determine whether brain volumes measured manually at term age are related to later EF.

Participants and methods: The study sample consisted of 85 VLBW children and a control group of 113 full-term born healthy children. In both groups EFs were assessed using parent and teacher form of Behavior Rating Inventory of Executive Function (BRIEF). BRIEF consists of indexes to measure Behavioral regulation (BRI; including subscales of Inhibit, Shift, Emotional control, and Initiate) and Metacognition (MI; Working memory, Plan/Organize, Organization of materials, and Monitor). In addition, VLBW infants were imaged with volumetric brain MRI (0.23 T) at term age.

Results: VLBW children had more problems in EFs in comparison to control children in BRI and MI in both parent and teacher ratings (all comparisons $p < 0.05$). In VLBW children, BRI was not related to any brain volumes. However, lower MI (indicating less problems) rated by parents, correlated significantly with larger total brain tissue ($r = 0.22$, $p = 0.0499$). In teacher's reports, lower MI correlated significantly with larger cerebrum ($r = -0.30$, $p = 0.0092$), larger total brain tissue ($r = -0.30$, $p = 0.0079$), and smaller ventricles ($r = 0.29$, $p = 0.0109$).

Conclusions: VLBW children are at risk for problems in EF. Metacognition index of BRIEF at the age of 11 years was related with several volumetric measures in neonatal brain MRI. More information is needed to understand the developmental and neural processes behind EF problems of this population.

P5 Working memory in preterm born children at the age of 11 years

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Objective: To investigate working memory (WM) in children born with very low birth weight (VLBW, <1501g) with Baddeley's WM model. Both WM structure and performance were compared to normative data and to the degree of brain pathology in VLBW group.

Participants and methods: The study sample consisted of 92 VLBW children born in 2001-2003. Domains of Baddeley's WM model (central executive, visuospatial sketchpad, and phonological loop) were assessed using tasks from Working Memory Test Battery for Children (WMTB-C) and WISC-IV. Performance was compared to the test norms in WISC-IV tasks, and to the control group of 68 children in WMTB-C tasks. The structure of WM was investigated with correlations between domains. VLBW children were categorized into three groups according to the degree of brain pathology (normal, minor, and major) in neonatal brain MRI (0.23 T), and groups were compared.

Results: The structure of WM of the VLBW children followed Baddeley's model when children with FSIQ<85 were excluded. VLBW children performed significantly poorer compared to their peers ($p<0.05$) in all other measures of WM, except in phonological loop. Among VLBW group, children with major brain pathology differed significantly from other groups in phonological loop and visuospatial sketchpad ($p>.0001$), but not in central executive domain.

Conclusions: Preterm born children are at risk for deficits in WM, especially in domains of visuospatial sketchpad and central executive. Children with major brain pathology and cognitive delay are vulnerable. Taking into consideration the importance of WM processes in children's later academic achievements, assessment of WM should be part of follow-up of VLBW children.

P6 Children's' Everyday Executive Function Deficits and Parental Distress in Families attending the Holistic Pediatric Rehabilitation Programme for Brain-Injured Children

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Objective: A bi-directional influence exists between brain-injured child's behaviour and parental distress level. EF deficits affect everyday functioning of the child and thereby may increase parental distress.

The Holistic Pediatric Rehabilitation Programme for Brain-injured Children (HOPE) is a post-acute rehabilitation model for brain-injured children and their families.

Participants and methods: The study aim was to examine everyday EF deficits of the brain-injured children and parental distress within the families (n=29) attending the HOPE programme during years 2005-2009.

Childrens' ages varied between 7 and 17 years. The baseline assessment included the Behavior Rating Inventory of Executive Function (BRIEF), the Head Injury Behavior Scale (HIBS) and the Wechsler Intelligence Scale for Children III. Classroom performance was evaluated by the child's teacher. The follow-up occurred one year later.

Results: Parents reported brain-injured children having clinically relevant EF problems. Positive correlations were found between the child's EF problems and parental distress level ($p < .01$). Longer time since injury, younger age at injury and child's female gender were statistically significant predictors of child's EF problems reported by the parents. Significant predictors for parental distress were not found. Higher baseline IQ was related to positive change in EF during the rehabilitation ($p > .05$).

Conclusions: A high number of everyday EF problems indicated a high parental distress score and vice versa. The result of the parents of the children with higher IQ reporting more positive change in EF during the rehabilitation process should be further analyzed and considered in planning rehabilitation interventions for brain-injured children and their families.

P7 Predictors of post-concussive symptoms in young children: Injury versus non-injury related factors

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Objective: Identification of factors predicting outcome following mild Traumatic Brain Injury (mTBI), or concussion, in children are essential for early intervention. In addition to injury severity, the family environment may influence recovery, particularly in younger children. This study investigated the influence of injury and non-injury related factors on outcome following mTBI in preschool and school-aged children.

Participants and method: The sample comprised parents of children aged 2-12 presenting to a hospital Emergency Department(ED), with either concussion or other minor bodily injury (control). Post-concussive symptoms were assessed at time of injury, 1 week, and 1, 2, and 3 months post-injury. Levels of parental stress were assessed using the Parental Stress Index-Short Form at time of injury (premorbid) and 3 months post-injury.

Results: mTBI was associated with more post-concussive symptoms at each follow up time point, with symptoms at 1 week most strongly predicting ongoing symptoms at 3 months. Pre-morbid parental stress levels were a predictor of post-concussive symptoms at 1 and 2 months post-injury, but not 3 months. There was, however a strong associations between concurrent parental stress and post-concussive symptoms at 3 months, $r(87)=.39, p<.01$. Neither age, gender, education level nor previous concussion contributed significantly to variance in post-concussive symptoms.

Conclusions: Children at risk of persistent post-concussive symptoms can be identified by higher levels of post-concussive symptoms 1-week post injury and pre-injury parental stress. Follow-up for 'at risk' children which also addresses family stress may minimise longer-term complications for both children and their parents.

P8 Quality and Speed of Visual Information Processing in Patients with Psychosis

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Objective: Psychotic disorders can be regarded as neurobiological disturbances entailing structural and functional brain abnormalities. Neural networks processing visual information are located in various cerebral areas. Schizophrenic patients have been found to have disruptions in the magnocellular and parvocellular pathways. Studies on these patients show weakened processing of object attributes, problems with visuospatial working memory and integrating visual information, and a tendency to attend towards left hemisphere. This study examines the quality and speed of visual information processing in patients with psychosis.

Participants and methods: The patient sample (n=33) consists of 18-30-year-old patients with various psychoses. The patients participated in neuropsychological rehabilitation for outpatients with psychoses. Before the intervention their cognitive performance was evaluated. Visually-based working memory and learning were evaluated with Paired Associated Learning and Spatial Working Memory tasks of the Cambridge Neuropsychological Test Automated Battery (CANTAB), visually-based deduction and executive function with Stockings of Cambridge, and attention by visually-based information with Visual Information Processing.

Results: Preliminary results were obtained by comparing results of the patient data with the normative data of the CANTAB. Patients with psychosis made more mistakes in learning, deduction and attention tasks demanding visually-based processing in working memory. The performance of patients with psychosis was slower than in the normative data.

Conclusions: Compared to the normative data patients with psychosis process visual information more poorly and slowly. In further studies the patients' performance should be compared with a control group matched by age, gender, and education.

P9 Cognitive functions in adolescents having depression

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Objective: It has been found that there might be different kind of cognitive decline in depression but the results are conflicting. The aim of this study was to find out if there is decline in young adults' cognitive skills due to mild, moderate or severe depression.

Participants and methods: The study group consists of five depressed and five healthy adolescents (aged 16-20) matched with age, sex and education. Their reasoning abilities, memory functions and visuomotor processing speed were measured twice: at the baseline and at one-year follow-up. Severity of depression was evaluated with BDI-13-questionnaire and DSM-IV-criteria by two physicians.

Results: Any decline in depressed adolescents' reasoning, memory functions or visuomotor processing speed compared to the healthy peers was not found. On the contrary, depressed adolescents succeeded even better, although not statistically significantly, in verbal and visual reasoning and memory tasks compared to controls in the first measure. In addition, the depressed adolescents learned visual abstract patterns faster than healthy controls. At the one-year follow-up there was no difference in visual learning times between the groups. The depressed adolescents performed similarly as in the first measure, but the healthy controls performed faster than in the first time-point.

Conclusion: Preliminary findings suggest that depressed adolescents are cognitively at least as competent as their same-aged healthy peers despite the severity of depression. So far, we have not found any decline in their cognitive skills, on the contrary, they might perform cognitively even better than adolescents without depression.

P10 Verbal memory deficits predict psychosis in adolescent psychiatric patients

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Objective: Psychosis is associated with cognitive deficits especially in visuospatial performance, processing speed, and verbal memory already in the prodromal phase of the illness. We wanted to see if these findings identified in highly selected psychosis risk studies could be validated in a general sample of adolescent patients not preselected for psychosis risk suspicion.

Participants and methods: 157 adolescents aged 15–18 seeking psychiatric help for the first time were interviewed with the Structured Interview for Prodromal Syndromes (SIPS) and tested with a cognitive test battery in the beginning of their psychiatric treatment. We explored whether cognitive performance predicts psychosis or psychiatric hospitalizations during a follow-up of 3–9 years.

Results: Deficits in verbal memory uniquely predicted psychotic disorders during follow-up ($N=7$, $HR=1.1$ per California Verbal Learning Test (CVLT) immediate recall point decrease) beyond attenuated positive symptoms when the effect of general verbal ability was controlled for. Those who developed psychosis during follow-up performed worse on CVLT immediate recall (Mann-Whitney $U=118.0$, $n_1=7$, $n_2=141$, $p=.001$), CVLT delayed recall ($U=246.5$, $p=.024$), and CVLT recognition discriminability ($U=276.5$, $p=.043$), but not on Logical memory, compared to those who were not hospitalized for psychosis.

General psychosis risk symptoms containing symptoms such as dysphoric mood, avolition, and sleep disturbance were significant predictors of psychiatric hospitalizations ($n=26$). Cognitive factors of processing speed, verbal performance, and visuospatial performance did not contribute to the prediction of either outcome.

Conclusions: Verbal memory deficits were predictors of psychosis in this unselected sample of first-admission adolescent patients in general psychiatric care, replicating similar results of other studies in more selected populations.

P11 Psychophysiological responses to eye contact in adolescents with social anxiety disorder

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Objective: We investigated whether eye contact is aversive and negatively arousing for adolescents with social anxiety disorder (SAD).

Participants and methods: Participants were 17 adolescents with clinically diagnosed SAD and 17 age- and sex-matched controls. While participants viewed the stimuli, a real person with either direct gaze (eye contact), averted gaze, or closed eyes, we measured autonomic arousal (skin conductance responses) and electroencephalographic indices of approach–avoidance motivation. Additionally, preferred viewing times, self-assessed arousal, valence, and situational self-awareness were measured.

Results: We found indications of enhanced autonomic and self-evaluated arousal, attenuated relative left-sided frontal cortical activity (associated with approach motivation), and more negatively valenced self-evaluated feelings in adolescents with SAD compared to controls when viewing a face making eye contact. The behavioral measures and self-assessments were consistent with the physiological results.

Conclusions: The results provide multifaceted evidence that eye contact with another person is an aversive and highly arousing situation for adolescents with SAD.

P12 The pathological embodiment of someone else's' arm: an anatomical account

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Objective: Here we aim at examining the anatomo-functional nature of recently discovered monothematic delusion of body ownership due to stroke-induced brain damages: the "embodiment" of someone else's body part within one's own somatosensory/motor system.

Participants: Two groups of neuropsychological patients affected by focal right hemisphere lesions, but differing (only) for the presence of such delusional belief of body ownership. The lesional cluster specifically associated to the delusion was obtained by means of a voxelwise statistical analysis.

Results: The subtraction analysis revealed a pattern involving different brain structures, particularly within white matter tracts of the brain.

Conclusions: According to the current anatomical evidence on the neural basis of body ownership, we discussed such kind of body ownership impairment in terms of the relationship between preexisting body representation and actual incoming sensory inputs.

P13 Visual attention in posterior stroke.

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Objective: Impaired visual attention is common following strokes in the territory of the middle cerebral artery, particularly in the right hemisphere. However, attentional effects of more posterior lesions are less clear. The aim of this study was to characterize visual processing speed and apprehension span following posterior cerebral artery (PCA) stroke. We also relate these attentional parameters to visual word recognition, as previous studies have suggested that reduced visual speed and span may explain pure alexia.

Methods: Nine patients with MR-verified focal lesions in the PCA-territory (four left PCA; four right PCA; one bilateral, all >1 year post stroke) were compared to 25 controls using single case statistics. Visual attention was characterized by a whole report paradigm allowing for hemifield-specific speed and span measurements. We also characterized visual field defects and reading performance.

Results: Four patients showed bilateral reductions in visual span despite unilateral lesions (2L; 2R). Five patients showed selective deficits in visual span, with speed unaffected in the same field (ipsi- or contralesionally). Only patients with right hemifield reductions in visual span were impaired in reading, and this could follow either right or left lateralized stroke.

Conclusion: Visual span may be affected bilaterally by unilateral PCA-lesions. Reductions in visual span may also be confined to one hemifield, and may be affected in spite of preserved visual processing speed. Furthermore, reduced span in the right visual field seems to be related to reading impairment in this group, regardless of lesion lateralization.

P14 Spontaneous recovery of working memory after stroke: a follow-up study

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Spontaneous recovery of working memory after stroke: a follow-up study

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The objective of this study was to examine the occurrence and spontaneous recovery of auditory or spatial working memory after stroke.

The patient group consisted of 33 left hemisphere (LH) and 42 right hemisphere (RH) stroke patients. Neuropsychological assessment was carried out in the acute phase and at six- and 12-month follow-ups. The WAIS-III Digit Span (DS) subtest was conducted to assess auditory short term memory (DS forward) and auditory working memory (DS backward). Spatial short term and working memory were measured by the Spatial Span (SSP) and Spatial Working Memory (SWM) CANTAB subtests, respectively.

Performance in DS-forward was mostly within the normal range in all three examinations. Impairment in DS-backward was seen in 27 % of the patients in the acute phase and in 7 % at 12 months poststroke. Spontaneous recovery was observed in LH patients only. Impairment in SSP was observed in 35 % of the patients and impairment in SWM in 31 % of the patients six months after stroke, while no recovery was seen at 12-month follow-up.

Auditory short term memory was not affected, but spatial and auditory working memory were vulnerable to stroke in either hemisphere. Spontaneous recovery was only observed in auditory working memory in LH patients. Therefore, stroke seems to have a longstanding negative impact on stroke patients' working memory.

P15 Depression a deux following stroke or traumatic brain injury: early development of depressive symptoms in primary-support persons

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Having a stroke is a demanding burden for the family and might be the trigger of affective pathology especially among elderly primary support persons.

The frequency and severity of symptoms of depression and anxiety have been evaluated using self-rating scales in spouses of patients who suffered a mild to moderate stroke (n=73) or traumatic brain injury (n=67) as well as spouses of subjects with hip fracture (n=41) or no physically limiting pathology (n=54).

The results show that both kinds of symptoms are significantly more frequent and more severe in the spouses of the two categories of neurologic patients as compared with the other two groups, despite the fact that they reach the intensity of clinically reported symptomatology in less than half of them. Only in the groups of spouses of neurological patients and only the levels of depression proved significantly correlated with the levels of daily functioning of the patients.

Living with a partner who has suffered a stroke or a traumatic brain injury proves to be a source of depressive symptomatology, whose evolution needs further investigation.

P16 Predictors of verbal and visual memory trajectories during the first year after stroke in colombian patients

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Objective: To investigate whether verbal and visual memory recovery trajectories after stroke are predicted by patient demographic and clinical characteristics

Participants and methods: 50 individuals diagnosed with stroke participated in a longitudinal study. They underwent a comprehensive neuropsychological evaluation at 3, 6, and 12 months post-stroke diagnosis. The battery included a Verbal Learning Test (VMT; verbal memory) and Rey-Osterrieth Figure Test (ROFT; visual memory).

Results: Various hierarchical linear modeling (HLM) were used to determine whether linear trajectories of neuropsychological scores over the three time points could be predicted by time, gender, age, education, National Institute of Health Stroke Scale score at 3 months, and socio-economic status. The HLM for VMT indicated decreased trials over time ($p < .001$) and increased trials with age ($p < .01$). When time and age, and their interactions were entered into a second HLM for VMT, only time and age were significant (p 's $< .05$). The HLM for the ROFT total score indicated an increase over time ($p < .001$) and a decrease with age ($p < .01$). When time, age and their interactions were entered into a second HLM for ROFT, time, age, and time X age were significant (p 's $< .05$). Those < 50 years increased ROFT scores more rapidly than those > 50 ($p < .05$).

Conclusions: Stroke patients' verbal and visual memory improve over time, but socio-demographic factors such as younger age also positively influence these improvements.

P17 Repairing heterotopagnosia through body-related multisensory stimulation: a case report

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Objective: Heterotopagnosia, without Autotopagnosia (HwA), is the acquired inability to localize body parts on another person or on pictures, beside preserved capacities to indicate one's own body parts. This deficit is interpreted as an impaired visual bodily representation, with intact somatosensory body representation. It is still unclear if (i) HwA concerns also one's own body visual representation when somatosensory information is not available, (ii) it can be improved by the integration between body-related visual and somatosensory inputs. We tested these hypotheses in a stroke patient (PPF) with HwA by manipulating visual and somatosensory body-related information through virtual reality.

Methods: We evaluated PPF's ability in indicating body parts on virtual projections of his own or another person's body showed in front of him before and after visuo-tactile stimulation. To prompt integration of visual and somatosensory bodily inputs, in line with the full-body-illusion-paradigm, a tactile stroking stimulus was applied to PPF's back during the observation of a synchronous stroking on a virtual projection of his own body. In a control condition, an asynchronous stimulation was used.

Results: At baseline, PPF was impaired in indicating body parts on the virtual projection of both his own or another person's body. After synchronous, but not asynchronous visuo-tactile stimulation, these errors disappeared only on the virtual projection of his own body.

Conclusions: Our findings suggest that HwA can affect also ones' own body representation, probably depending on altered mechanism of visuo-somatosensory integration. Multisensory stimulation trainings can be used to treat HwA and other body-related deficits.

P18 Tracking Posttraumatic Stress Reactions after Aneurysmal Subarachnoid Haemorrhage

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Objective: Posttraumatic stress disorder (PTSD) has been identified in a substantial proportion of aneurysmal subarachnoid haemorrhage (aSAH) survivors, even at several years post-aSAH. The present study aimed to examine posttraumatic stress reactions among aSAH patients over the first year after aSAH, and explore determinants of the course of PTSD symptoms over time.

Participants and methods: A prospective cohort of aSAH patients ($N = 102$) was assessed with the Impact of Event Scale (IES) 3, 6, and 12 months post-SAH. We distinguished five trajectories of PTSD symptoms: resilience, delayed distress, recovery, chronic distress and vacillate. Multilevel modelling was used to explore determinants of posttraumatic stress levels over time.

Results: At each measurement (3, 6 and 12 months post-aSAH) about one third of the sample reported symptoms indicative for PTSD. Over the course of all measurements, 48.9% of the sample showed resilience, 13,3% recovery, 13,3% delayed distress, 13,3% chronic distress and 11,1% a vacillate trajectory of PTSD symptoms. Lower levels of cognitive functioning were related to an increasing trend of PTSD symptoms.

Conclusions: Although some aSAH patients recovered from PTSD symptoms within the first 12 months after aSAH, delayed distress and chronic distress trajectories of PTSD symptoms were also found. Cognitive functioning was a determinant of change in the level of PTSD symptoms over time. In order to detect and treat PTSD after aSAH in clinical practice, symptoms of PTSD should be monitored over the first year after SAH. Cognitive rehabilitation might help to reduce PTSD symptoms post-aSAH.

P19 Spontaneous recovery from visual neglect after right hemisphere stroke during a 6-month follow-up

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Objective: The aim of this study was to assess the spontaneous recovery of visual neglect (VN) after right hemisphere (RH) stroke. The study was set out to examine how RH stroke patients with and without neglect and healthy controls differ in the laterality and number of omissions. Furthermore, we examined whether neglect-related laterality of omissions changes towards generalized inattention.

Participants and methods: The study sample consisted of 42 patients with first-ever RH stroke and 33 healthy controls. Presence of VN was assessed with the six conventional subtests of the Behavioral Inattention Test within 10 days of stroke onset and after 6 months. The laterality of omissions in the three cancellation tasks was measured with the Center of Cancellation index.

Results: In the acute phase, 33,3 % of all patients had VN, and after 6 months, 72,7 % had recovered. In the acute phase, patients with VN made more omissions than patients without VN and healthy controls, but in all three groups the omissions were located evenly. After 6 months, no differences were found between the three groups. Patients with VN made more omissions in the acute phase than after 6 months, but the change in the laterality of omissions was non-significant.

Conclusions: Majority of the patients with VN recovered during the 6-month follow-up. Unexpectedly, the RH stroke patients did not show typical left-sided neglect even in the acute phase. Their symptoms reflected general visual inattention, which is a common residual symptom of VN.

P20 Right hemispheric contributions derived from lesion inferences in a visual search task

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Visual search tasks such as letter and bells cancellation are very often used in clinical practice in order to assess visuo-spatial impairments observed in neglect. The role of frontal areas in performances obtained in the bells task has been repeatedly emphasized, whereas anatomical correlates of letter cancellation performances remain poorly characterized. In the current study, we aimed at exploring the anatomical correlates of this latter task by using a game-theoretical analysis.

A laterality behavioural score was calculated in the letter cancellation task in 19 neglect patients at more than two months post-stroke. Four right-hemisphere regions of interest (ROIs) important in visuo-spatial attention were used in the anatomical analysis: frontal eye field (FEF), intraparietal sulcus (IPS), inferior frontal gyrus (IFG), temporo-parietal junction (TPJ) and one region representing the "rest of the brain". These ROIs were used to infer causal regional contributions from behavioural performance, by using a Multi-perturbation Shapley value Analysis (MSA) (Keinan et al. 2004), that treats brain regions as players in a coalition game.

Contributions computed with MSA were significantly different from zero for all the ROIs considered. Highest contributions were observed for the IPS. Functional interactions derived from MSA revealed synergisms between revealed synergisms between IPS and TPJ and between IPS and IFG.

By using a game-theory-based method, we could infer the causal contributions of areas such as IPS, TPJ and IFG to attentional orienting in a letter cancellation task. This finding has important implications for the rehabilitation programmes proposed to neglect patients.

P21 Direct gaze effect on spatial attention: a study in hemispatial neglect patients

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Objective: Hemispatial neglect is a common neurological syndrome characterized by contralesional spatial defects, alongside with non-spatial defects in the absence of a primary sensorial or motor defect. It has been shown in several visual search tasks that there is a preferential orienting to faces perceived as looking toward us. Nonetheless, previous research in unilateral neglect patients using a paradigm of visual extinction has failed to replicate any effects of direct gaze in attention modulation. The present study analysed the putative modulation of spatial attention by direct gaze in unilateral neglect patients using a visual search task.

Participants and methods: Eight right hemisphere stroke patients with neglect were asked to find faces with open eyes amidst faces with closed eyes in a task that resembled a typical target cancellation paradigm. Each participant performed this task in its two versions, one with all open eyed faces in direct gaze and another in averted gaze.

Results: There was a positive correlation between the extent of neglect and the score in the direct gaze task and averted gaze task, as expected. The subjects performed significantly better at the direct gaze task than at the averted gaze task ($p=0,021$).

Conclusions: This suggests that direct gaze can be processed pre-attentively, shifting attention to parts of the visual field that would be otherwise unattended.

P22 Self-reported Cognitive Complaints, PTSD symptoms and Neuropsychological Test Performance in Danish Veterans with mTBI

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Objective: The relationship between cognitive complaints (CC), posttraumatic stress disorder (PTSD), and neuropsychological test performance (NP) in combat related mild traumatic brain injury (mTBI) is complex. In this first study of Danish veterans with mTBI it was hypothesized that CC correlate positively with PTSD and negatively with NP.

Participants and methods: Sixteen veterans (age $M=26.4$ years, $SD=4.0$, months since mTBI $M=13.5$, $SD=5.0$, education $M=11.9$ years, $SD=2.1$) with mTBI incurred during service in the International Security Assistance Force in Afghanistan were evaluated with a comprehensive standardized battery of neuropsychological tests, estimation of intelligence, and questionnaires assessing CC, PTSD symptoms, and emotional symptoms (Cognitive Failures Questionnaire (CFQ), PTSD Check List (PCL), Symptom Checklist; subscales anxiety, depression and negative affect (SCL-ANX, SCL-DEP, SCL-8), and Perceived Stress Scale (PSS)).

Results: Results showed, in addition to high PCL- and CFQ-scores ($M=37.2$, $SD=16.5$ and $M=48.3$, $SD=19.1$), a strong and significant positive correlation between CFQ and PCL ($r_s=.77$, $p<.001$). Similar correlations were seen between CFQ and SCL-ANX ($r_s=.80$, $p<.001$), SCL-DEP ($r_s=.90$, $p<.0001$), SCL-8 ($r_s=.79$, $p<.001$), and PSS ($r_s=.79$, $p<.001$). There were no significant correlations between CFQ and 18 NP variables when adjusting for multiple testing. In addition, there were no significant correlations between CFQ and intelligence nor time since mTBI.

Conclusions: Results suggest that cognitive complaints in veterans with a history of mTBI are primarily associated with PTSD symptoms and emotional symptoms and not cognitive dysfunction as measured with neuropsychological tests.

Results from this study have been presented at the 41st annual meeting of INS

P23 Effectiveness of Cognitive Behaviour Therapy for improving fatigue and sleep disturbance following acquired brain injury: a pilot controlled trial

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Objective: Fatigue and sleep disturbance are common complaints following an acquired brain injury (ABI). Pharmacotherapy has not provided long-term solutions and to date there is a paucity of controlled trials of non-pharmacological interventions. Cognitive Behaviour Therapy (CBT) is a psychological treatment with proven effectiveness across a range of health conditions including chronic fatigue syndrome and insomnia in the non-injured population. This pilot controlled trial aimed to evaluate the efficacy of a structured CBT program in alleviating fatigue and sleep disturbance following ABI.

Participants and Methods: Participants who had experienced traumatic brain injury or stroke with clinically significant fatigue and/or sleep disturbance completed pre-intervention measures of fatigue, sleep and psychological functioning. Participants were then allocated to receive an eight-week course of CBT (n=7) or the waitlist control group (n=3). Follow-up assessments were conducted at two and four months after baseline assessment.

Results: Relative to controls, the intervention group demonstrated significantly greater improvement in fatigue on the Brief Fatigue Inventory ($p<.05$) at two months and in sleep on the Pittsburgh Sleep Quality Index ($p<.01$) at four months. Depression symptoms were also reduced at both time-points post-treatment ($p<.05$). Large effect sizes in differences were obtained between the treatment and control groups.

Conclusions: Preliminary results suggests that CBT is efficacious for fatigue and sleep disturbance following ABI with secondary improvements in depression. Recruitment is ongoing and further data will be presented.

P24 “Local capture” in a Balint's syndrome patient

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Objectives: Balint's syndrome is a rare neuropsychological disorder consequential of bilateral damage of the parietal cortex. This disorder is characterized by a triad of symptoms including: difficulty in reaching for objects under visual guidance (i.e. optic ataxia), difficulty with organizing eye movements (i.e. oculomotor apraxia) and difficulty in perceiving more than one object at a time and establishing relationships between them (i.e. simultagnosia). Here we present a single case study (TR) who, following an episode of pneumococcal meningoencephalitis, developed the triad of symptoms mentioned above.

Methods: We explored TR's perceptual and attentional ability, verbal descriptions and eye movements during observation of single, overlapping and amodal completion figures and complex scenes. TR's performance was compared with those of six healthy controls. *Results &*

Conclusions: TR's preliminary data seems to support the notion of a predominantly local perceptual processing and attentional focus. TR's eye movement strategies were significantly different from the control participants in that his fixations were stuck to local features. We propose that this “sticky vision” combined with meaningfulness of details may prevent TR from exploring other aspects of the environment, which may account for his failure in perceiving global features.

P25 Subjective cognitive function, mood state, and fatigue in the chronic stage after traumatic brain injury

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Introduction: Cognitive impairment, fatigue and emotional symptoms are common in the chronic stage of traumatic brain injury (TBI). Subjective fatigue has been related to depressive symptoms but not to objective cognitive disabilities in TBI. The purpose of this study was to evaluate the association between subjective fatigue, mood state and cognitive functions in TBI.

Methods: 71 patients, 18-60 years of age with at least moderate TBI filled in the Centre of Epidemiological Studies – Depression (CES-D) evaluating mood state, the Fatigue Scale for Motor and Cognitive Functions (FSMC) evaluating subjective cognitive and motor fatigue and Perceived Deficits Questionnaire (PDQ) evaluating subjective cognitive deficits. The PDQ includes subscales of prospective memory, retrospective memory, attention and planning. Patients were asked how often they experienced such symptoms during the previous 4 weeks, with higher scores indicating greater cognitive impairment.

Results: There was a significant correlation between PDQ total score ($r_s = .757, p \leq .001$) and FSMC total score as well as between PDQ total score and CES-D total score ($r_s = .708, p \leq .001$). As expected, there was also a significant correlation between FSMC total score and CES-D total score ($r_s = .702, p \leq .001$).

Conclusion: The degree of self-perceived cognitive impairment was associated with degree of subjective fatigue and presence of depressive symptoms in patients with chronic state of TBI. Patients' perception of cognitive performance, fatigue and mood state seem to be interrelated in TBI which should be taken into account in the evaluation and treatment of these symptoms.

P26 Rehabilitation after TBI and an undiagnosed psychotic condition

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Objective: The objective is to describe challenges in early assessment and rehabilitation after traumatic brain injury (TBI) when a psychotic condition is a suspected but undiagnosed comorbidity. This will be done on a case study presentation.

Participants and methods: The patient is a middle aged male inpatient admitted for rehabilitation following verified TBI. The patient presented symptoms commonly seen in the post traumatic confusion state (PTC) during early recovery after TBI, including memory impairment, disorientation and a distorted sense of reality and delusions. As these thought disturbances were of a bizarre nature uncommon following TBI, an undiagnosed premorbid psychotic disorder was suspected. The issue was explored through neuropsychological tests, clinical observations and thorough recording of anamnestic information.

Results: The symptoms were in accord with most criteria for F05, *Organic delirium*, which is part of the post-traumatic confusion condition, as well as F06.2, *Organic delusional [schizophrenia-like] disorder*. However, the lack of significant improvement over time, the bizarre and paranoid content of his delusions, as well as signs of prolonged malfunctioning prior to the TBI, pointed towards an undiagnosed disorder in the F20. *Schizophrenia* spectrum.

Conclusions: Patients with TBI will often present a complex pattern of cognitive and behavioral disturbances. This case study points to the necessity of thorough anamnestic recordings, and analysis of the presenting symptoms. A correct differential diagnosis is crucial for successful rehabilitation. Rehabilitation in cases of severe psychiatric illness combined with TBI warrants close collaboration between different branches of the health service system.

P27 Prevalence and predictors of personality change after severe brain injury

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Objective: To investigate the prevalence of personality change after severe brain injury, to identify predictors of personality change, and to investigate whether personality change is associated with distress in family members.

Participants: Twenty-two pairs of patients with traumatic brain injury or non traumatic brain injury and their significant others (SO) comprised the study sample. All participants had received intensive rehabilitation at a public sub-acute rehabilitation unit in Copenhagen, Denmark.

Methods: An SO completed the observer version of the NEO-Five Factor Inventory rating the patient at discharge from hospital and one year after the injury. The SOs were also asked to complete the anxiety and depression scales of the Symptom Checklist-90-Revised, rating their own emotional condition and health-related quality of life (HRQoL) as assessed by the four mental scales of the Medical Outcomes Study 36-Item Short-Form Health Survey.

Results: Of the sample 59.1% experienced personality change following acquired brain injury, and the most dominant changes were observed on the personality traits of Neuroticism, Extraversion and Conscientiousness. Changes in Neuroticism were most often observed in patients with frontal or temporal lesions. Generally, personality change in patients was not associated with more distress and lower HRQoL in family members but change in patient Agreeableness was associated with lower HRQoL on the Role Emotional scale.

Conclusions: Personality change was observed in the majority of patients with severe brain injury. Change in Neuroticism was associated with frontal and temporal lesions. Generally, personality change was not associated with more distress and lower HRQoL in SOs.

P28 Reduced Integrity of the Medial Forebrain Bundle and the Association with Attention and Working Memory Outcomes following Traumatic Brain Injury

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Objective: The medial forebrain bundle (MFB) contains ascending catecholamine fibres that project to the prefrontal cortex (PFC). Damage to these fibres following traumatic brain injury (TBI) may alter extracellular catecholamine levels in the PFC and impede attention and working memory ability. This study was the first to investigate the integrity of the white matter within the MFB and its association with performance on attention and working memory tasks following TBI.

Participants and methods: Fractional anisotropy (FA) and mean diffusivity (MD) of the left and right MFB was acquired for 14 controls and 17 participants with moderate-severe TBI (mean days PTA = 40.31, mean days since injury = 530.81). Whole brain DTI was acquired using a Siemens 3 Tesla Skyra scanner using a spin echo EPI sequence (64 noncollinear diffusion encoding directions, 2mm³ isotropic voxels, b = 5, 2000 s/mm²). Participants also underwent neuropsychological assessment.

Results: When compared to controls, participants with TBI were found to have significantly lower FA ($p < 0.001$) and higher MD ($p < 0.001$) values in both the left and right MFB, they were slower to complete tasks ($p < 0.001$), and made more executive errors ($p = 0.001$). In addition, reduced white matter integrity was found to be correlated with attention outcomes ($p < .05$).

Conclusion: This study is the first to demonstrate that the MFB is damaged in TBI and associated with attention performance, possibly mediated by alterations to extracellular catecholamine levels in the PFC.

P29 Measuring fatigue after brain injury: different profiles in patients with Traumatic Brain Injury and Cervical Dystonia

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Objective: The Dutch Multifactor Fatigue Scale measures five factors of fatigue after acquired brain injury. To validate the scale and to gain more insight into the profile of fatigue after traumatic brain injury (TBI), fatigue in patients with TBI is compared to fatigue in patients with Cervical Dystonia (CD).

Participants and method: Patient with TBI (n=34), at least 6 months after injury and patients with CD (n= 25) were assessed on fatigue (DMFS) and mood (HADS). Patient groups did not differ significantly in educational level or distribution of gender, but patients with CD were significantly older than patients with TBI.

Results: Patients with TBI reported significantly greater Mental fatigue, Signs and direct consequences of fatigue and Impact of fatigue than patients with CD. Within their profiles, physical fatigue was highest in patients with CD, while mental fatigue was highest in patients with TBI. Mental fatigue after TBI differed significantly from fatigue in CD as it evolves after mental information processing, can be experienced as a sudden inability to think, and can last till the next day. Patients groups did not differ significantly in mood, but anxious and depressive mood were differently related to fatigue subscales in patients with TBI and CD.

Conclusions: Fatigue in the chronic phase after TBI is mainly characterized by mental fatigue and has different features than fatigue in patients with CD. This validates the DMFS and stresses the necessity to measure fatigue after brain injury with a scale specifically developed for this patient group.

P30 Predictors of one year functional outcome in elderly with severe traumatic brain injury

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Background: The aim of the present study was to assess whether demographic factors, injury mechanisms and outcome after one year differed in elderly and very old subjects.

Material and methods: Prospective, national multicentre study including Norwegian residents above 64 years with severe traumatic brain injury (TBI) (Glasgow Coma Scale (GCS) score 3-8), admitted to the trauma centres in Norway, from January 2009 to January 2012.

Results: A total of 97 patients, mean age 75 (SD 7) years, 64% men were included. The dominating mechanism of injury was fall (84%). Two subjects were lost to follow up. Of the remaining 95 subjects, 45 died in the trauma hospitals and additionally 18 subjects died before 12 months follow up. The mortality was twice as high in the very old group (≥ 75 y) compared to the elderly (65-74 y) ($p < 0.001$) with only eight surviving subjects ≥ 75 years. Among the survivors functioning at 12 month follow up as evaluated by Glasgow Outcome Scale Extended was higher in the very old group with a median of 8 (IQR 2) compared to 6 (IQR 2) in the elderly ($p = 0.03$).

Conclusion: In the very old age falls and female gender dominate among severe TBI victims. The mortality is high in the elderly and extremely high in the very old age. It is however worth to note that very old survivors of TBI have a very good functional outcome at one year follow up.

P31 Spared route learning in Korsakoff amnesia

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Objective: Korsakoff amnesia is characterized by severe declarative amnesia, but relatively spared nondeclarative memory. The objective of this study was to assess to what extent Korsakoff patients can acquire information while performing a spatial navigation task. Spatial navigation requires declarative and nondeclarative memory. Also, we examined whether residual spatial acquisition in Korsakoff amnesia was based on automatic or effortful coding processes.

Participants and methods: Twenty patients diagnosed with Korsakoff amnesia and twenty matched control participants performed six tasks on spatial navigation after they navigated through a residential area. Ten participants per group were instructed to pay close attention, while ten received mock instructions.

Results: Patients with Korsakoff amnesia showed performance superior to chance level on a route time and distance estimation task, a map drawing task and a route walking task. Their performance was hampered compared to healthy control participants on the majority of the tasks, but was spared on the route distance estimation task. Acquisition in Korsakoff amnesia was automatic rather than effortful, since no significant differences were obtained between the task performance of patients that were instructed to pay close attention and patients that received mock instructions. For healthy control participants, the intention to learn was beneficial for the map drawing task and the route walking task.

Conclusions: Patients with Korsakoff amnesia are still able to acquire spatial information during navigation on multiple domains despite the presence of severe declarative amnesia. Residual acquisition in Korsakoff amnesia is likely to be based on automatic coding processes.

P32 Personal Semantic and Episodic Autobiographical Memories in Korsakoff's Syndrome: The Temporal Gradient Revisited

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Objective: Temporal gradients in autobiographical memory have been observed in various patient groups. Several theories have been proposed to explain retrograde amnesia, predicting different patterns of episodic and semantic retrograde amnesia. The standard consolidation theory predicts a temporal gradient in semantic and episodic memory, whereas the multiple trace theory predicts a steep temporal gradient for semantic facts, and 'flatter' gradient for episodic memories. It was recently demonstrated that methodological details have a significant influence on whether a temporal gradient was found in patients with Alzheimer's dementia.

Participants and method: Twenty Korsakoff patients and 27 healthy controls were included in this study. We compared two procedures – the autobiographical memory interview (AMI) and autobiographical interview (AI).

Results: The AMI and the AI, scored by two independent raters, both showed a temporally graded retrograde amnesia for personal semantic and episodic autobiographical memory in patients with Korsakoff's syndrome. The steepness of the gradients was comparable for semantic and episodic memory, indicating that our results are most fitting with the assumptions of the standard consolidation theory. We did not find an episodic-to-semantic shift in either group. In contrast to patients with Alzheimer's dementia, the pattern of amnesia in patients with Korsakoff's syndrome was not affected by methodological differences, such as providing more general probes or asking for just one memory per life period.

Conclusions: A temporal gradient for semantic and episodic information is present in Korsakoff's syndrome, with the AMI and the AI resulting in a similar pattern.

P33 Forgetting the new locations of one's keys: Interference in spatial memory in Korsakov patients

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Memory interference refers to situations where different memory traces compete with each other, leading to the loss of strength or stability. It might be one of the most critical causes for memory failure. In how far neuropsychological patients are sensitive to interference factors needs further investigation. In the present paper distinct forms of interference were examined in a group of Korsakov patients. A spatial memory paradigm was employed in which participants studied a number of objects on different locations after which they had to relocate the objects. This was followed by a trial in which the same objects had to be learned but now associated with new locations (proactive interference/ negative transfer). Retrieval of the original object locations was also tested (retroactive interference). Results show poor overall spatial memory in patients accompanied by distinct patterns of interference. The role of memory interference in neuropsychological patients is further discussed.

P34 One week restricted sleep has minimal effects on memory functions in young adults with high cognitive capacity

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Objective: Sleep benefits memory consolidation and daytime cognitive functioning. However, the findings regarding the effects of sleep loss on memory performance have been inconsistent. Our aim was to study how a simulated work week with restricted sleep and the following three recovery nights affect declarative, procedural and working memory.

Participants and methods: Total of 21 healthy male volunteers, aged 19 to 29 years, participated in the experimental study. The sleep restriction group (n=14) had first two baseline days (8 h time in bed), five sleep restriction days (4 h time in bed), and three recovery days (8 h time in bed). Seven participants had the same protocol but were allowed 8 h sleep each night. Participants' general cognitive level was assessed prior to the study. Procedural and declarative memory was assessed using finger-tapping and word-list learning tasks with training sessions in the five evenings. Recall was tested in the next mornings. Performance on working memory, consisting of extremely demanding numerical and spatial updating tasks, was assessed three times during the study.

Results: Procedural or declarative learning did not impair across the restricted sleep days. The general performance level of the procedural learning was improved in the control group only. Extremely complex working memory tasks performance was improved in both groups during the experiment.

Conclusions: The young healthy adults with high cognitive capacity may be able to preserve memory functions under sleep restriction better than previously believed.

P35 Interoceptive awareness and body ownership in patients with right insular cortex resection

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The insular cortex has been implicated in a wide range of functions. These include interoceptive awareness and the experience of ownership over your body, for example as assessed by the rubber hand illusion. Moreover, interoceptive awareness and body ownership appear to be functionally linked as shown by recent studies with healthy participants (Suzuki et al., 2013; Tsakiris, et al., 2011). In the current study we investigated whether patients with right insular cortex resection for treatment of low grade glioma's were impaired on measures of interoceptive perception and of body ownership.

Three patients and a group of 21 healthy controls were tested on a heartbeat perception task to measure interoceptive awareness. In addition, they performed the rubber hand illusion for the contralesional left hand. Body ownership questionnaires as well as proprioceptive drift were taken as outcome measures.

The results showed that heartbeat perception was not affected in the insula resection patients. Proprioceptive drift during the rubber hand illusion was similar or larger in comparison to that of the healthy controls. However, ownership questionnaire revealed a lower subjective ownership over the rubber hand in the insula patients.

The results reveal a dissociation between interoceptive perception and objective measures of the rubber hand illusion on one hand, and subjective body ownership experience on the other hand.

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P36 Brain tumors are associated with diffuse cognitive impairment

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Introduction: Brain tumors cause brain dysfunction, which manifests often as cognitive deficits. Based on study findings of other patient groups (e.g. stroke patients), it is assumed that lesions of left hemisphere cause verbal deficits, while right-sided tumors are more related to visuospatial difficulties. This study clarifies whether the cognitive deficits due to brain tumor are similarly location-based.

Methods and material: Neuropsychological data was gathered preoperatively from 101 consecutive patients. Patients were divided into two groups based on the tumor laterality. Control group (n=29) consisted of healthy controls at the same age and gender distribution. Verbal skills were assessed with WAIS Similarities, Verbal Learning Test from Luria-Nebraska Battery and The Babcock Story Recall Test. Visuospatial functions were assessed with WAIS Block Design, Greek Cross Test and the Symmetry Test.

Results: Any association between the location of the tumor and visuospatial or verbal deficits was not found. Compared to the controls, patients with right hemisphere tumor performed lower in both visual and verbal tests (all p-values <.05). Patients with left-sided tumor had lower scores in all other tests (p-values <.05) except for the Similarities subtest (p=.379).

Conclusions: The results indicate that cognitive impairment caused by brain tumors is more diffuse than location-based. Our future study focuses on neurological and neurosurgical factors which are associated with the neuropsychological findings.

P37 Memory complaints in breast cancer patients undergoing chemotherapy with Fluorouracil, Epirubicin and Cyclophosphamide (FEC): A longitudinal study

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Objective: To examine memory complaints during FEC treatment in women with breast carcinoma, controlling for anxiety and depression and neuropsychological functioning.

Participants and methods: A sample of 43 women with breast cancer were treated with adjuvant FEC completed three assessments: before starting treatment (T1), at completion of chemotherapy (T2) and 6 months after T2 (T3). The assessment included: a memory complaints scale (MFE), a short- and long-term memory evaluation (letters and numbers, WMS-III faces delayed recall) and assessment of anxiety (STAI-S) and depressive symptoms (BDI). Repeated ANOVA measures were conducted to determine differences in MFE in the three moments of evaluation. Pearson's correlation was performed to measure the association between variables. Data analysis for neurocognitive cognitive measures was performed using a practice-effect adjusted reliable change index. SPSS version 20.0 was used for statistical analyses.

Results: Differences were observed in MFE between T1 and T3 ($p=0.026$), not associated with objective cognitive performance. However, there was a correlation between MFE and STAI-E at T1 $r(42)=.41$, $p=.007$, T2 $r(42)=.45$, $p=.003$ and T3 $r(42)=.50$, $p=.001$ and between MFE and BDI at T1 $r(43)=.40$, $p=.007$, T2 $r(43)=.48$, $p=.001$ and T3 $r(43)=.58$, $p<.0001$.

Conclusions: Memory complaints increased in women with breast cancer during treatment with FEC chemotherapy. No relation between these complaints and the objective performance on memory tests were found. Memory complaints were related with the presence of anxiety and depressive symptomatology. These results are similar to those reported in most studies about chemotherapy in women with breast cancer.

P38 Cognitive function in breast cancer patients receiving adjuvant chemotherapy with or without Taxanes

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The aim of this study was to assess women treated with a combination of Fluorouracil, Epirubicin and Cyclophosphamide (FEC) and compare cognitive changes after chemotherapy between patients who were treated with taxanes and those who were not.

A total of 57 women with breast cancer were studied: 29 were treated with FEC and 28 with a combination of FEC and Paclitaxel. All patients were assessed before (T1) and after chemotherapy (T2). Neuropsychological battery with attention, memory and executive tests and scales was used to assess. Moreover, we evaluated anxiety (STAI-S) and depressive symptoms (Beck Depression Inventory; BDI). Mixed analyses of variance were conducted. Factors in the model were medication type, time, medication by time interaction. Adjustment variables were: age, premorbid intelligence and emotional state. The Statistical Package for Social Sciences (SPSS) Windows 20.0 software was used for statistical analysis.

We turned to the possibility that taxane and taxane-free regimens had a differential impact on cognitive function over time, as would be indicated by medication group by treatment time interaction. No such interactions were observed of any neuropsychological variables. After controlling for anxiety and depression, there were no medication differences (FEC alone versus FEC + Taxanes) in changes over time in any of the cognitive scores.

In this study, women who were treated with taxanes did not perform differently after chemotherapy from those who do not receive it. In conclusion, taxanes do not behave as a risk factor for cognition in breast cancer patients after receiving standard doses of chemotherapy.

P39 Does baseline cognition predict memory performance 6 months after chemotherapy in breast cancer patients?

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The identification of breast cancer patients who have worse performance after receiving chemotherapy treatment is of great interest. We investigated baseline cognitive abilities as predictors of longitudinal post-treatment side-effects for cognition.

A total of 39 women, mean age 51 (8.3) years with breast cancer were cognitively assessed. Episodic memory test from subtest of Wechsler Memory Scale were administered at baseline (before chemotherapy) and 6 months after receiving standard doses of chemotherapy (4-6 cycles of FEC). We examined multiple predictor variables and defined worse memory as a decreased memory performance from post-treatment to baseline. Baseline variables examined as predictors of response included: demographics (age) and cognition (premorbid intelligence and episodic memory). Data analysis for objective cognitive measures was performed using a practice effect adjusted reliable change index. SPSS version 20.0 was used for statistical analyses.

Seventeen of the 39 participants obtained a score of worse memory performance after chemotherapy. None of the baseline cognitive measures emerged as predictors of response. The logistic model offered a moderate sensitivity (72%) but poor specificity (59%) for detecting the effects of chemotherapy on memory. The area under the roc curve was 0.70, confirming the low predictive capacity of the predictors used.

In conclusion, this study found that 44% of breast cancer women have a poor memory performance 6 months post-chemotherapy. However, we did not find that a poorer cognitive baseline performance in terms of cognitive reserve and previous episodic memory capacity might predict worse memory performance 6 months after chemotherapy treatment.

P40 Self-reported Cognitive Impairment 7-9 years after Adjuvant Systemic Treatment for Primary Breast Cancer

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Objective: The aim was to investigate possible long-term effects of standard systemic adjuvant therapy (SAT) on self-reported cognitive impairment (SCI) in breast cancer survivors 7-9 years after surgery. Women allocated to SAT were hypothesized to report higher levels of SCI compared with women who had not received SAT.

Methods: Participants were recruited from the nationwide Psychosocial Factors and Breast cancer inception cohort of 4917 Danish women treated for primary breast cancer. At a 7-9 years follow-up, 3304 women from the original cohort were alive with no recurrence or secondary cancer. Of these, 2289 (69%) had responded to questionnaires 3-4 months post-surgery, and were invited to the follow-up. SCI was assessed with the Cognitive Failures Questionnaire and women allocated to SAT were compared with women who had not received any systemic treatments.

Results: A total of 1889 (83%) women were eligible for analysis. No difference in SCI was found between survivors across treatment protocols in neither univariate nor multivariate analyses stratified by menopausal status and adjusted (ANCOVA) for possible socio-demographic and treatment-related confounders. The proportion of survivors with significant SCI was approximately 7%.

Conclusions: Women allocated to SAT did not experience greater long-term SCI than those who had not received adjuvant treatment. Furthermore, the observed proportion of survivors with significant SCI in both groups was low. These results are relevant to the ongoing discussion about cognitive impairment following systemic therapies.

Results from this study have previously been presented at the IPOS 16th World Congress

P41 Aortic surgery using deep hypothermic circulatory arrest: are there subtle cognitive deficits despite good clinical recovery?

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Objective: Use of deep hypothermic circulatory arrest (DHCA) is currently a standard practice in surgery for acute dissections of ascending aorta or aortic arch. Aortic surgery using DHCA is associated with a risk of neurological complications but most DHCA patients are considered to make good clinical recovery. However, prevalence of more subtle cognitive deficits following DHCA is still unclear. The aim of this study was to assess the neuropsychological function in clinically well recovered DHCA patients.

Participants and methods: Twenty clinically well recovered DHCA patients, 21 coronary artery bypass surgery (CABG) controls and 10 healthy controls were included in the study. All subjects underwent an extensive neuropsychological examination covering cognitive domains of reasoning, memory, attention, executive functions, language and visual skills. For the cardiac surgery groups, neuropsychological assessment was conducted approximately 7 months after the operation.

Results: Compared to healthy controls DHCA patients scored lower in several cognitive domains, especially in the areas of memory and executive function. There were no significant differences between DHCA and CABG groups in terms of neuropsychological test performance.

Conclusions: These preliminary results suggest that cardiac surgery patients irrespective of the operation type might show mild neuropsychological deficits despite good clinical recovery. Whether there are additional, not cardiac surgery related, factors contributing to these findings, will be further analyzed.

P42 Preparing someone to an awake craniotomy: anxiety in the preoperative phase and factors related to it

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Objective: In patients with a brain tumor in an eloquent area an awake craniotomy is frequently performed. Patients can be anxious and this may influence cognitive performances and consequently the course of the surgery. In this study we analyzed how often patients report anxieties in the pre-operative phase and what demographic and medical factors are related to this anxiety.

Participants and methods: 45 patients who were all candidate for a first ever awake craniotomy had a neuropsychological pre-operative work-up. The Hospital Anxiety and Depression Scale (HADS) was administrated to investigate anxiety complaints.

Results: Mean score of the HADS Anxiety scale was 6.6 and 36% of the patients scored >7, which indicate anxiety complaints. Women reported higher anxiety levels than male patients ($p < .05$). No significant differences were observed between high and low educated patients and no relation between age and anxiety was found. There were no differences between patients with a tumor in the left ($n=31$) or right hemisphere ($n=14$). Furthermore, also no differences were found between patients with a frontal, temporal, parietal or central tumor, or a suspected high or low-grade tumor. Likewise, time between diagnosis and craniotomy had no effect on reported anxiety levels.

Conclusions: Over a third of the patients reported anxiety complaints in the pre-operative phase. Surprisingly, besides sexe, no other demographic or medical factors were significantly related to the level of anxiety. The results underline the importance of personalized care. Individual anxieties should receive attention so that valid cognitive measurements during the operation can be established.

P43 Perceptions of Ethical Misconduct by Neuropsychologists: Comparison between Professionals from the U.S. and Spain

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Objective: To compare the frequency of perceptions of ethical misconduct among neuropsychology professionals from the United States of America and Spain.

Participants and methods: 424 neuropsychologists from the U.S. and 339 from Spain completed an online survey about training and practice of neuropsychology. Ethics component of the survey consisted of questions which asked participants to indicate whether they knew other neuropsychologists in their country who engaged in ethical misconduct in various areas of neuropsychology practice.

Results: Chi-square analysis revealed statistically significant differences between the professionals of the two countries. The vast majority of U.S. participants indicated having received formal training on the topic of professional ethics, compared to less than half of Spaniards (98% and 44%, respectively; $p < 0.0001$). U.S. participants indicated higher perceptions of ethical misconduct by their colleagues in the areas of possessing adequate skills to work with multicultural patients, provision of potentially harmful interventions (p 's < 0.0001), having inadequate training and experience to be working as neuropsychologists, basing diagnostic conclusions on inadequate data, and being disrespectful towards their students (p 's < 0.05). Spanish neuropsychologists indicated greater perceptions of unethical behavior in terms of research activities: granting honorary authorships ($p < 0.0001$), presenting as own work done by their students ($p < 0.01$), and fabricating data/ misrepresenting research results ($p < 0.05$).

Conclusions: There is a need to regulate the neuropsychology profession and increase ethics training among neuropsychologists in Spain. Higher perception of unethical conduct among U.S. participants could be due to their high sensitivity to such issues.

P44 Exploring the relationships between quality of life and family dynamics in Parkinson's disease caregivers from Mexico

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Objective: To determine the system of connections between quality of life (QOL) and family dynamics in caregivers of individuals with Parkinson's disease (PD) from Mexico City, Mexico.

Participants and methods: 85 family caregivers (average age 50 years old; 79% female; 54% spouses/partners) of patients with PD completed measures of QOL [The Short Form Health Survey (SF-36) with eight sub-scales: vitality, physical functioning, bodily pain, general health perceptions, role limitation-physical, role-limitation emotional, social role functioning, mental health] and family dynamics [Family Adaptability and Cohesion Evaluation Scale-IV (FACES-IV) and Index of Family Functioning and Change (SCORE15)].

Results: Quality of life and family dynamics were significantly related in caregivers: canonical correlation was .575 ($\chi^2(40)=57.4$, $p<0.05$, 33% overlapping variance). Standardized canonical coefficients for the QOL variables on family dynamics showed that SF-36 mental health sub-scale scores (-0.767) loaded most highly, followed by SF-36 role limitation-physical sub-scale scores (0.566) and SF-36 general health sub-scale scores (-0.401). For the family dynamics variables on QOL, FACES-IV family satisfaction sub-scale scores (-0.547), SCORE15 overall family functioning score (0.526) and FACES-IV family flexibility sub-scale scores (-0.410) loaded most highly.

Conclusions: This pattern of findings suggests that those caregivers who indicated that they experienced lower QOL in terms of physical and mental health, as well as more limitations in functioning due to physical problems, also tended to have more dysfunctional family dynamics in regards to decision-making/flexibility, satisfaction, and overall family functioning. Additional research is needed to understand the cause and effect relationships among these important caregiver outcomes.

P45 Exploring the relationships between mental health and family dynamics in Parkinson's disease caregivers from Mexico

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Objective: To determine the system of connections between mental health and family dynamics functioning in caregivers of individuals with Parkinson's disease (PD) from Mexico City, Mexico.

Participants and methods: 85 family caregivers (average age 50 years old; 79% female; 54% spouses/partners) of patients with PD completed measures of mental health [Zarit Burden Inventory (ZBI), Patient Health Questionnaire-9 (PHQ-9), Generalized Anxiety Disorder-7 (GAD-7), Perceived Stress Scale-10 (PSS-10), and Satisfaction with Life Scale (SWLS)], and family dynamics [Family Adaptability and Cohesion Evaluation Scale-IV (FACES-IV) and Index of Family Functioning and Change (SCORE15)].

Results: 29% of caregivers indicated experiencing high stress ($PSS > 20$), 18% moderate-severe burden ($ZBI > 41$), 17% dissatisfaction with life ($SWLS < 20$), 7% moderate-severe anxiety ($GAD-7 > 16$), and 6% moderate-severe depression ($PHQ-9 > 16$). Mental health and family dynamics were significantly related in caregivers: canonical correlation was .65 ($\chi^2(25) = 76.1, p < 0.001, 42\%$ overlapping variance). Standardized canonical coefficients for the caregiver mental health variables revealed that SWLS scores (0.771) loaded most highly on family dynamics, followed by PSS-10 scores (-0.515). For the family dynamics variables, family satisfaction sub-scale scores loaded most highly (.499) on mental health and was the only variable above the conventional cutoff of 0.40.

Conclusions: This pattern of findings suggests that those caregivers who are less satisfied with their family functioning also tended to experience higher levels of perceived stress and lower satisfaction with life. Longitudinal research is needed to elucidate causal relationships among these critical caregiver outcomes.

P46 Cognitive Reserve in Diabetes Mellitus

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The aim of this research project was to assess possible increase in cognitive performance (“cognitive reserve”, CR) in subjects with diabetes mellitus (type 1, DT1 and type 2, DT2), to gain a better calculation of the activation of their cognitive capacity in challenging conditions. CR was assessed with a testing-the-limits paradigm (DSST). Seventy patients with diabetes mellitus (DT1: $n = 43$, DT2: $n = 27$), who were assessed with a comprehensive set of neuropsychological tests and questionnaires. Regarding their basic cognitive performance, patients with DT1 and DT2 differed in processing speed and problem solving. However, the two groups did not significantly differ in their CR, but subjects showed different CR at an individual basis. CR did not depend on glycemic control or personality traits, but showed a significant negative correlation with mood. In conclusion, it appears important to assess CR in addition to basic cognitive performance in subjects with DT1 and DT2, because CR allows a better characterization of hidden cognitive resources.