
Addendum - Part B

2020 Virtual Event

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The following abstracts were accepted but not presented at the 2020 Virtual Event. Due to the COVID-19 pandemic they are included below in their entirety.

S. BESHARATI, A. FOTOPOULOU, P. JENKINSON, V. MORO, M. SOLMS. Paralyzed Only in your Eyes: Preserved 3rd person Motor Awareness.

Objectives: Perspective taking involves the ability to *mentally* adopt another person's perspective and the mental rotation of the *body* in space. A deficit in 1st person perspective taking around one's own body occurs in some patients following right-hemisphere damage who are unaware of their left-sided motor paralysis, called anosognosia for hemiplegia (AHP). Anosognosic patients also present with specific deficits in 3rd person mental perspective taking. However, no study has examined if taking the perspective of a different, 3rd person can directly effect motor awareness irrespective of 1st person anosognosia.

Participants and Methods: Two experiments were conducted to investigate differences in motor awareness when asked from 1st versus 3rd person perspective in a self-referent egocentric condition in real-time (experiment 1) and in an other-referent allocentric condition using videos (experiment 2), in a group of patients with right-hemisphere damage and severe AHP (n=17), compared to a control group with right-hemisphere damage and no AHP (n=17). Voxel-based lesion symptom mapping was used to determine the associated anatomical correlates.

Results: Experiment 1 found AHP patients more aware of their own motor paralysis (self-referent awareness) when asked from a 3rd compared to a 1st verbal perspective. In comparison, anosognosic patients were significantly more unaware of the paralysis of a patient shown in a video (other-referent awareness) compared to hemiplegic controls (experiment 2), but with no difference between 1st versus 3rd perspective. Lesion mapping comparison between experiments and conditions identified brain damaged areas specific to 3rd person and allocentric perspective taking, such as the supramarginal and superior temporal gyri and related white matter tracts.

Conclusions: Behavioural and neuroimaging results demonstrate the intersecting relationship between social-cognitive processes of perspective taking and bodily self-awareness.

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Keywords: mentalizing, self-awareness, anosognosia

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

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

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

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

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

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

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

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

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

Results: We found that, despite the similar demographic characteristics and global cognitive function among the groups, the $\epsilon 4^+/BDNF^{Met}$ group had less accurate egocentric navigation performance ($p \leq .045$). The differences in allocentric and allocentric delayed navigation performance were not significant ($p \geq .651$). The $\epsilon 4^+/BDNF^{Met}$ group had smaller volumes of the left hippocampus and entorhinal cortex compared to the $\epsilon 4^-/BDNF^{Val/Val}$ ($p \leq .019$) and $\epsilon 4^-/BDNF^{Met}$ ($p \leq .020$) groups and smaller volumes of the right hippocampus and entorhinal cortex compared to the $\epsilon 4^-/BDNF^{Met}$ group ($p \leq .038$).

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

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Keywords: Mild cognitive impairment, Gene polymorphism, Spatial navigation

B. GAUTHIER, L. CHAMPAGNE, O. GIRARD-JOYAL, P. LANIEL, M. PICOTTE-LAVOIE.
Categorical perception of letters in children with and without dyslexia: A pilot study.

Objective: Individual letter perception is accepted as one of the first stages in reading (Grainger, 2008) and considered critical to subsequent learning tasks in children (e.g., letter-sound mapping) (Lachmann, 2002). In adults, categorical perception (CP) of written characters seems to occur across writing systems (Yang, & Wang, 2018; Yasuhara, & Kuklinski, 1978), while evidence of a CP deficit for letters has been observed in adults with dyslexia (Pernet et al., 2006). When children start to read, they must work letters into adult-like abstract representations that are fine-tuned with experience (James et al., 2005). A deficit in letter CP, in analogy with the allophonic perception observed in phonological dyslexia (Serniclaes, & Seck, 2018), may hinder the development of the lexical route. In this study we explored the relation between CP of letters and reading abilities in children with and without dyslexia.

Participants and Methods: We employed the CP paradigm to examine eight (two dyslexics) 4th and 5th grades French reading learners' perception of a morphing continuum of the letters u-v. The characters were generated by variation along the physical dimension of the curvature flexion point. Word and non-word readings skills were assessed.

Results: Results showed evidence of CP effects on the stimuli in typically developing children. In contrast, the discrimination function of dyslexic children showed an inversed category boundary effect. Moreover, discrimination rates were positively correlated with word reading skills, and age in typically developing children.

Conclusions: This provides preliminary evidence of letter CP in children and compromised CP in dyslexia. The results support the hypothesis that dyslexic children have lower visual discrimination accuracy than typically developing children that may affect orthographic representation development, which in turn may alter the route from orthography to phonology and ultimately the ability to learn to read.

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Keywords: Reading (normal), Learning disabilities, Dyslexia

M. GIL PAGÉS, A. GARCÍA ROSAS, A. ENSEÑAT CANTALLOPS, A. GARCÍA MOLINA.
Cognitive recovery after stroke: Gender matters.

Objective: To establish any potential relationships between demographic factors and the rate of cognitive recovery among a cohort of stroke patients. We aimed to explore how age, gender, education and type of stroke influence cognitive performance throughout two different stages of stroke recovery: post-acute stage (< 6 months after stroke) and chronic stage.

Participants & Methods: This is a retrospective observational study. Medical records of former stroke patients from Neurorehabilitation Hospital Institut Guttmann with a mean time of evolution of 24 months were studied. Patients with aphasia were excluded. Thirty-four adult patients (women= 15) diagnosed with moderate to severe stroke (hemorrhagic=17; ischemic=17) were recruited. All patients underwent neuropsychological assessment at 2 months (admission), 6 months (discharge) and 24 months (recruitment) after stroke. Battery tests included 3 cognitive factors identified by confirmatory factorial analysis: Attention, Memory and Executive Functions. Change in cognitive domains was obtained calculating the difference of grades in cognitive factors between admission and discharge and between discharge and recruitment.

Results: We found significant differences between men and women when comparing their Attention factor ($p=0.03$, $d=0.8$) between admission and discharge. In contrast, this difference was not found between the time points of discharge and recruitment ($p>0.05$). We did not find any other significant differences based on demographics neither in Memory nor in Executive Functions factors.

Conclusions: Our results suggest that gender influences cognitive recovery after stroke. In this cohort, women showed less improvement in attention than men during post-acute stage of evolution. These results should be considered when planning post-acute rehabilitations programs.

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Keywords: stroke recovery, cognitive rehabilitation, treatment outcome

A. R. GIOVAGNOLI, A. PARENTE, G. TALLARITA. The spectrum of social cognition in temporal lobe epilepsy.

Objective: Theory of mind (ToM), the recognition of behaviour in social situations (RBSS), empathy, and sensitivity to moral and conventional rules (SMCR) are major aspects of social cognition (SC). We evaluated adult patients with temporal lobe epilepsy (TLE) aiming to characterize their SC pattern and to explore its determinants.

Participants and Methods: Sixty-two adult patients with TLE were evaluated using neuropsychological tests for ToM, RBSS and SMCR, the Empathy Questionnaire (EQ), and the psychopathology Symptoms Check List 90R (SCL90-R). A series of healthy adults similar to the patients in terms of occupation, income level, age, sex, marital status, and the number of family members constituted the control group.

Results: Multivariate analysis of variance with years of schooling, marital status, type of work and income level as the covariates showed that the patients had lower ToM and RBSS scores than the healthy subjects. Conversely, they had similar SMCR and EQ scores. The patients also had higher scores on the SCL90-R scales. Impaired RBSS was predicted by psychopathological symptoms, income level, schooling, and epilepsy duration; ToM was associated with TLE laterality, seizure frequency and epilepsy duration, and SMCR related to income level and the type of occupation.

Conclusions: In adult patients with TLE, SC shows a non-homogeneous pattern characterized by impaired ToM and RBSS and preserved SMCR and empathy. These aspects seem to depend on the integrity of the temporal lobe, as well as on adequate cultural and socio-economic conditions. This approach may help to clarify the spectrum of SC in patients with TLE and the planning of non-pharmacological interventions.

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Keywords: social cognition, temporal lobe epilepsy, theory of mind

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

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

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

Results: Analysis of variance showed significant between-group differences in the number of correct designs, and post-hoc test revealed that the FLE patients produced less designs in comparison with the TLE

patients and controls. No differences were found between the left and the right hemisphere patients. DF was predicted by the site of the epileptic zone, but it had no relation to attention, executive functions, constructive abilities or abstract reasoning.

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

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Keywords: frontal lobe, epilepsy, creativity

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

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

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

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

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

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

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Keywords: Executive functions, frontal lobes, inhibitory control

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

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

Participants and Methods: The sample consisted of 358 healthy adults without cognitive impairment from Zimbabwe. Inclusion criteria were a Mini-Mental State Examination (MMSE) score of ≥ 23 , a Patient Health Questionnaire (PHQ-9) score of ≤ 9 , and a Barthel Index score of ≥ 90 . Sixty percent of the participants were women, the mean age was 36.9 ± 12.1 , ranging from 18-72 years, and the average number of years of education was 12.5 ± 3.0 . Participants completed the TMT-A and TMT-B as part of a large comprehensive neuropsychological battery. Two regression models; age, age², education, education², sex, and all two-way

interactions between these variables and the score of TMT-A and TMT-B as single dependent variable in each model were run. To generate adjusted norms, four steps were undertaken, 1) predictive values were obtained using the b-values of each regression model, 2) the residual values were obtained, 3) the residual values were standardized, and 4) tables of percentiles were calculated.

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

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

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Keywords: neurocognition, neuropsychological assessment, information processing speed

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

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

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

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

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

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Keywords: neurocognitive assessment, neurocognition, attention

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

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

Participants and Methods: The sample consisted of 358 healthy adults from Zimbabwe. Inclusion criteria were a Mini-Mental State Examination (MMSE) score of ≥ 23 , a Patient Health Questionnaire (PHQ-9) score of ≤ 9 , and a Barthel Index of ≥ 90 . Sixty percent of participants were women, the average age was 36.9 ± 12.1 (range 18-72), and the average years of education was 12.5 ± 3.0 . Participants completed the SDMT as part of a comprehensive neuropsychological battery. A regression model including age, age², education, education²,

sex, and all two-way interactions between these variables as predictor variables, and the SDMT score as single dependent variable in each model was run. To generate adjusted norms four steps were followed, 1) predictive values were obtained using b-values of each regression model, 2) the residual values were obtained, 3) the residual values were standardized, and 4) tables of percentiles were calculated.

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

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

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Keywords: assessment, neurocognitive, cognition

L. OLABARRIETA-LANDA, D. MACHANDO, S. NÚÑEZ-FERNÁNDEZ, K. NYAKUSENDWA, V. DZORO, P. NJOMBORO, D. RIVERA, J. C. ARANGO-LASPRILLA. Verbal Fluency Test: Normative Data for an Adult Population from Zimbabwe.

Objective: To develop sociodemographic-adjusted norms for the phonological and semantic verbal fluency test in a group of adults from Zimbabwe.

Participants and Methods: The sample consisted of 358 healthy adults from Zimbabwe. Inclusion criteria were a Mini-Mental State Examination (MMSE) score of ≥ 23 , a Patient Health Questionnaire (PHQ-9) score of ≤ 9 , and a Barthel Index of ≥ 90 . Sixty percent of participants were women, the average age was 36.9 ± 12.1 (range 18-72), and the average years of education was 12.5 ± 3.0 . Participants completed the phonological (letters F, A, and S), and semantic (Animals, Fruits, and Occupations) verbal fluency test. Six linear regression analyses included age, age², education, education², sex, and all two-way interactions between these variables as predictor variables, and the score of each of letter/semantic category as single dependent variable in each model were run. To generate adjusted norms four steps were done, 1) predictive values were obtained using b-values of each regression model, 2) the residual values were obtained, 3) the residual values were standardized, and 4) tables of percentiles were calculated.

Results: The final regression models showed significant effects for education (p 's $< .001$) on F ($b = .338$), A ($b = .480$, S ($b = .385$), Animals ($b = .435$), Fruits ($b = .369$), and Occupations ($b = .449$). A significant effect for age was also found on F ($b = -.171$; $p = .002$), S ($b = -.200$; $p < .001$), Animals ($b = -.171$; $p = .001$), and Occupations ($b = -.166$; $p = .004$). Age² was also significantly regressed to Occupations ($b = .141$; $p = .004$). Neither age² (except for Occupation), education², sex nor two-way interactions were significant.

Conclusions: To date, this is the first study to create verbal fluency norms in Zimbabwe with an adult population and to include appropriate adjustments for sociodemographic variables. These data represent a critical advancement in the area of neuropsychological assessment in Zimbabwe.

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Keywords: Neuropsychological assessment, Verbal Fluency, Normative data

L. OLABARRIETA-LANDA, D. RAMOS USUGA, I. BENITO SÁNCHEZ, B. AZKUNAGA SANTIBÁÑEZ, J. BENITO FERNÁNDEZ, S. NÚÑEZ-FERNÁNDEZ, J. C. ARANGO-LASPRILLA. Cluster and switching strategies associated with semantic verbal fluency performance in a group of children with mild TBI at one month post injury.

Objective: To examined sociodemographic characteristics associated with verbal fluency strategies that have higher impact on verbal fluency performance in a sample of children with traumatic brain injury (TBI).

Participants and Methods: Fifty children from the Basque Country in Spain participated in the study. The majority were boys (68%), with an average age of 9.14 ± 2.25 . All patients have mild TBI (Glasgow Coma Scale of 14.88 ± 3.33). Inclusion criteria were: mild TBI according to the American Congress of Rehabilitation Medicine criteria, and 6-14 years of age. Children with history of neurologic/psychiatric disorders, and previous TBI were excluded. Participants completed the semantic (animals and fruits) and phonological (M, R, and P) verbal fluency test, and three scores were obtained: total score, cluster size (CS), and number of switches (NS).

Results: Total scores were positively correlated with children's age, NC, CS, and NS ($p < .001$). Hierarchical regression analyses were run, introducing age as predictor into the first model, and including CS and NS into the second model. In semantic verbal fluency, analyses suggested that although age was significantly related to total scores ($p < .001$) in the first model, when CS and NS were entered in the second model, only CS and NS were significantly related to total scores. Thus, higher total scores in animals and fruits' categories were related to longer CS and more NS ($p < .001$). Regarding phonological verbal fluency, higher total scores in each phoneme were related to older age ($p < .001$). CS and NC were not related to each phoneme total score.

Conclusions: Children with mild TBI increased their total scores in phonological verbal fluency while they get older, but in semantic verbal fluency cluster and switching strategies are even more relevant than age; diminish its impact on the performance. It seems that verbal fluency strategies are very important to improve semantic verbal fluency in these patients.

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Keywords: Verbal fluency, Traumatic brain injury

D. RAMOS-USUGA. To compare the cognitive functioning of children with mild TBI at one-month post injury with a healthy control group in a sample from Spain.

Objective: To compare the cognitive functioning of children with mild TBI at one-month post injury with a healthy control group in a sample from Spain.

Participants and Methods: 50 children diagnosed with mild TBI were recruited from Cruces University Hospital in Bilbao, Spain at one month post injury. The average age was 9.14 ± 2.25 and the 68% were males. Participants received a comprehensive neuropsychological evaluation that included: Rey-Osterrieth Complex Figure Test (ROCF), The Stroop Color & Word Test (Stroop Test), d2 Test, Modified-Wisconsin Card Sorting Test (M-WCST), Trail Making test (TMT), Symbol Digit Modalities Test (SDMT), Token Test, Verbal Fluency Test (VFT), Peabody Picture Vocabulary Test (PPVT-III), and Learning & Verbal Memory Test (TAMV-I). Then, 50 healthy control participants matched by age and sex were obtained from a database of a multicenter study carried out in Spain. T-tests for independent samples were used to compare group differences.

Results: Compared to healthy controls, children with mild TBI had significant lower scores in the PPVT-III ($p < .005$), TAMV-I Delayed Recall ($p < .005$), and TAMV-I Learning Index ($p < .05$), with a medium effect size ($d > .50$). Moreover, composite scores were created to group the subtests scores on 3 cognitive functions: Attention & executive functioning (Stroop Test, d2 Test, TMT, SDMT, & M-WCST), Learning & memory (ROCF & TAMV-I), and Language (Token Test, VFT, & PPVT-III). Results shown that children with mild TBI scored significantly lower than healthy controls in the domain of Learning & memory ($p = .001$). There were not differences between groups in the other two domains.

Conclusions: Learning and memory problems are common in children with mild TBI at one-month post injury. Future studies should investigate long term trajectories of these deficits and develop intervention programs to mitigate the possible consequences that these problems could have in the personal, social, and family life of this children.

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Keywords: Mild traumatic brain injury, Child brain injury, Memory complaints

D. RAMOS-USUGA. Neuropsychological and psychosocial characterization of a patient with late-onset combined Cobalamin D disease.

Objective: To describe the cognitive and psychosocial characteristics of a patient diagnosed with late-onset combined Cobalamin D disease (cbLD).

Participants and Methods: A case study of a patient with cbLD and his healthy twin sister. Both children, 11 years and 9 months old, underwent a comprehensive evaluation including tests of visuospatial and visuoconstructional skills (Rey-Osterrieth Complex Figure Test; ROCF), attention (The Stroop Color and Word Test (Stroop Test) & d2 Test of Attention), executive functioning (Modified-Wisconsin Card Sorting Test (M-WCST) & Trail Making test (TMT)), information processing speed (Symbol Digit Modalities Test; SDMT), language (Token Test, Verbal Fluency Test (VFT), & Peabody Picture Vocabulary Test (PPVT-III)), and memory (Learning and Verbal Memory Test; TAMV-I). The psychosocial assessment included measures of depression (Children Depression Inventory; CDI), anxiety (Revised Children's Manifest Anxiety Scale; CMAS-R), Quality of Life (QoL) (Pediatric Quality of Life Inventory; PedsQL), and adaptive behavior (Adaptive Behavior Assessment System; ABAS-II).

Results: Differences in Z-score were used to assess the discrepancies between the children's performance. The patient Z-score values were <-3 on seven of ten tests completed, with major differences in D2 Test of Attention (difference of 6.7), M-WCST (difference of 5.7), Stroop test (difference of 5.7), and TMT (difference of 5.6). Similar differences were found in psychosocial functioning, with the patient scoring lower than his sister in adaptive behaviour (difference of 3.6), anxiety (difference of 3.1), depression (difference of 2.9), and QoL (difference of 2.0).

Conclusions: As compared with his twin sister the patient showed lower performance on test of cognitive and psychosocial functioning. So, it is important to perform a neuropsychological evaluation of these patients and implement appropriate intervention programs to reduce these problems and improve their QoL.

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Keywords: genetic disorders, cognitive functioning

A. SAMPEDRO, J. PEÑA, N. IBARRETXE-BILBAO, P. SÁNCHEZ, N. IRIARTE-YOLLER, C. PAVÓN, I. HERVELLA, M. TOUS-ESPELOSIN, S. MALDONADO-MARTÍN, N. OJEDA. Explaining creativity in schizophrenia: cognitive and clinical correlates.

Objective: The association between creativity and schizophrenia has been a research topic for decades. Literature has shown that impairment in working memory, cognitive flexibility, and theory of mind could lead to lower creativity in schizophrenia. In addition, other neurocognitive and social cognitive domains, as well as clinical symptoms could influence this relationship. Nevertheless, the extent to which each of these domains influences creativity in this pathology is unknown. Therefore, the aim of this study was to simultaneously analyze the predictive role of neurocognitive, social cognitive, and clinical symptoms on creative performance in schizophrenia.

Participants and Methods: One hundred and one patients with schizophrenia from the Mental Health Network from Álava (Spain) were assessed in terms of sociodemographic, clinical, neurocognitive, social

cognitive, and creativity variables. Stepwise Multiple Regression analyses were performed to determine which variables predict creative performance, using IBM SPSS version 26.0.

Results: Regression analyses showed that higher theory of mind ($\beta = .256, p = .009$) and working memory ($\beta = .210, p = .033$) predicted creativity total score. Higher social perception ($\beta = .240, p = .017$) and processing speed ($\beta = .226, p = .026$) explained figural creativity. Higher theory of mind ($\beta = .242, p = .012$) and working memory ($\beta = .250, p = .011$) predicted figural strengths. Finally, higher social perception ($\beta = .243, p = .012$) and lower negative symptoms ($\beta = -.275, p = .004$) explained verbal creativity.

Conclusions: Results indicate that neurocognitive, social cognitive, and clinical symptoms play a role in creativity of people with schizophrenia. Furthermore, results suggest that social cognition is essential for creative thinking. Considering that creativity is a key factor for daily life problem solving, the understanding of which domains underlie this capacity has relevant implications for the treatment of schizophrenia.

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Keywords: creativity, cognition, schizophrenia

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

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

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

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

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

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Keywords: Family caregivers, Psychoeducation, Parkinson´s Disease

B. STAROVASNIK ŽAGAVEC, V. MLINARIČ LEŠNIK. Relationship between information processing speed, attention capacity and verbal learning – pilot study on stroke patients.

Objective: The consequences after stroke often include impaired processing speed, which is compromised in almost half of the cases during the first year after the first stroke. Information processing speed and attention capacity represent the baseline of efficient encoding and further memory processes, that are

crucial for learning during rehabilitation. The main purpose of this pilot study was to explore the relationship between information processing speed and verbal memory deficits in subacute patients after stroke.

Participants and Methods: The pilot study included 27 patients referred to neuropsychological assessment after stroke while being treated at the Stroke Rehabilitation Unit during the first year after stroke onset. Each assessment included results measuring attention (simple reaction times (TAP), coding task (RBANS), attention capacity (RBANS)) and verbal memory (RBANS subtest).

Results: Results show prominent deficits of processing speed (52% on the simple reaction time task, 40% on the coding task). Processing speed alone was not correlated with the verbal learning variables. On the contrary attention capacity was independently moderately correlated with immediate recall. Time of stroke onset was also relevant for immediate recall efficiency. The delayed story recall was different in regard to lateralization and type of stroke.

Conclusions: The capacity of learning new information after stroke is important for different reasons, especially for the favorable cognitive and motor outcome. The pilot study showed correlations between information processing capacity and verbal memory. The study confirms the role of attention capacity in learning, but failed to obtain significant relations with information processing speed, which can result from the limited number of the pilot study.

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Keywords: information processing speed, attention capacity, verbal learning

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

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

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

Parents signed informed consent before the children's assessment.

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

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

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

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Keywords: academic skills, child development disorders, executive abilities

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

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

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

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

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

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Keywords: dementia, financial exploitation, social cognition

N. S. VAN DEN BERG, E. H. F. DE HAAN, R. B. HUITEMA, J. M. SPIKMAN. The Neural Underpinnings of Facial Emotion Recognition in Ischemic Stroke Patients.

Objective: Impairments in facial emotion recognition occur frequently after stroke, with adverse socio-behavioral consequences. However, there can be many inter-individual differences. The aim of this study was to investigate the neural underpinnings of overall emotion recognition and of the distinct basic emotions (anger, disgust, fear, happiness, sadness and surprise), in a large group of ischemic stroke patients.

Participants and Methods: A group of 118 ischemic stroke patients and 162 matched healthy controls (HC's) were included. Emotion recognition was assessed with the Ekman 60 Faces Test of the Facial Expressions of Emotions – Stimuli and Test (FEEST) and whole brain voxel-based lesion symptom mapping (VLSM) on 3-Tesla MRI-images of all patients was performed.

Results: Patients were significantly worse than HC's on the overall recognition of emotional expressions, particularly of disgust, fear and sadness. VLSM showed significant lesion-behavior associations for FEEST-total in mainly the right fronto-temporal region (insula, caudate nucleus, the lenticular nucleus, putamen, middle frontal gyrus, inferior frontal gyrus, rolandic operculum and the middle and superior temporal gyrus). Additionally, VLSM for the distinct emotions showed, apart from overlapping brain regions (rolandic operculum, insula and caudate nucleus) separable regions, uniquely related to a specific emotion, i.e. Anger: middle and superior temporal gyrus, heschl gyrus and middle occipital gyrus; Disgust: putamen; Happiness: superior corona radiate white matter tract and middle frontal gyrus.

Conclusions: Our results provide insight in the neural underpinnings of emotion recognition in ischemic stroke patients. Emotion recognition as such was depending on a general network in fronto-temporal regions, while distinct locations were related to specific emotions. These findings help in understanding how deficits in specific basic emotions can be related to particular behavioral disturbances.

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Keywords: Emotion Recognition, Stroke, Voxel-based Lesion Symptom Mapping

A. YLIRANTA, M. JEKONEN. Apraxia profiles differ between the clinical variants of frontotemporal dementia.

Objective: To describe previous findings on limb and face apraxias in the four clinical variants of frontotemporal dementia (FTD) in comparison to Alzheimer's disease.

Methods: A systematic literature search was conducted in OvidMedline, PsycINFO and Scopus for studies that addressed the behavioural variant (bvFTD) and/or the nonfluent, semantic, and logopenic variants of primary progressive aphasia (PPA). Studies conforming to the modern clinical criteria and reporting results for limb or face apraxia assessments were included. We analysed data on sample characteristics, apraxia prevalences and group comparison results.

Results: The search resulted in 497 nonduplicate records and 33 articles were included in the final analysis. The data revealed distinct profiles of apraxic features for each of the variants within four years from disease onset. BvFTD and nonfluent PPA exhibited pronounced face apraxia for oral functions and imitation. Impairment in limb imitation was evident in both variants although more severe in nonfluent PPA. Speech apraxia as a co-occurring symptom was specific to nonfluent PPA. Patients with semantic PPA frequently failed to produce actions on verbal command while imitating those actions was relatively spared. Understanding tool function and action semantics degraded earlier in semantic PPA and Alzheimer's disease than in other variants. Logopenic PPA resembled Alzheimer's disease in showing intact face praxis but severely defective limb praxis combined with parietal dysfunction.

Conclusions: We present a visualisation of the praxis profiles for the clinical variants FTD in comparison to Alzheimer's disease. Apraxia assessment may support early clinical differentiation between these dementias. However, the assessment methods developed for stroke populations seem inadequate for the diffuse degenerative aetiology, and we should prefer tests that are validated for dementia populations and cover the diverse facets of degenerative apraxias.

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Keywords: apraxia, dementia – other cortical

The following symposium was accepted but not presented at the 2020 Virtual Event.

Due to the COVID-19 pandemic it is included below in its entirety.

M. H. BEAUCHAMP, E. VERA, M. GARON, G. DUSCHESNE. Socio-moral reasoning in youth with acquired and neurodevelopmental conditions.

Social cognition, defined as the ability to recognize, manipulate and behave with respect to socially relevant information (Adolphs, 2001), is underpinned by the functioning of a distributed network of brain regions known as the social brain. Thus, structural or functional disturbance to these networks could affect the way children reason and respond in social interactions and contexts. As such, there is increasing evidence that conditions affecting the development and integrity of the brain result in socio-cognitive deficits (Beauchamp, 2017). Among socio-cognitive abilities, moral reasoning (MR) is a uniquely human socio-cognitive ability based on the conventions that govern social interactions and the ability to generate social judgments and choose between right and wrong. It is a critical aspect of the way in which youth make judgements and decisions when faced with socio-moral conflicts. This presentation will showcase the results of a series of studies in which socio-moral reasoning abilities were investigated in children and adolescents with acquired and neurodevelopmental conditions such as Traumatic Brain Injury (n=43), Tourette's Syndrome (n=30),

Attention Deficit Hyperactivity Disorder (n=30), and Autism Spectrum Disorder (n=30). The findings indicate that while there is evidence that socio-moral reasoning may be affected by disruptions to the brain, this is not universal across conditions, and a range of underlying clinical, cognitive, social and behavioral contributors need to be considered in accurately predicting outcome and identifying those at-risk for socio-cognitive impairments.

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Keywords: Moral reasoning, Neurodevelopment, Traumatic Brain Injury

V. ANDERSON, J. DOOLEY, S. DARLING, L. CROSSLEY, M. GREENHAM, S. MCDONALD, D. DARBY, S. HEARPS, L. TURKSTRA, M. BEAUCHAMP. Evaluating social competency using PEERS: differential social profiles in paediatric clinical populations.

Background: Mature social skills are important for developing and sustaining rewarding relationships and quality of life. However, there are currently no comprehensive, ecologically valid assessment tools of children's social skills, thus limiting the accurate assessment of the social domain. The Paediatric Evaluation of Emotions Relationships and Socialization (PEERS) is an app-delivered assessment tool designed to address these gaps in paediatric social skills assessment.

Methods: Typically developing children (TDC, n=529), 5-15 years old were compared with children with attention deficit hyperactivity disorder (ADHD, n=56), autistic Spectrum Disorder (ASD, n=46) or Anxiety Disorder (AD, n=35) on PEERS. Cognitive, social and behavioural questionnaires were completed by parents.

Results: Compared to TDC, the ADHD group demonstrated lower cognitive efficiency, with more errors and faster completion times, while the ASD group showed poorer emotion recognition and lower moral maturity and decision-making. Children with AD had elevated internalising behaviors and emotional symptoms, but intact social skills.

Conclusions: Findings suggest that PEERS is able to identify social profiles in children with neurodevelopmental and psychiatric diagnoses. Such 'precision-based' approaches represent a crucial addition to the current diagnostic labels and provide a nuanced profile of abilities that adds important information to more accurately guide intervention and treatment.

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Keywords: Social Cognition, paediatric neuropsychology

S. E. MACPHERSON, R. ASAAD BAKSH, B. AUYEUNG, S. ABRAHAMS. Assessing Social Cognition in People with Dementia: The Edinburgh Social Cognition Test (ESCoT).

Background: Few tests of social cognition examine more than one or two social cognitive abilities within the same test, limiting their representation of our social abilities. We developed the Edinburgh Social Cognition Test (ESCoT) as a new test of social cognition that assesses affective and cognitive theory of mind (ToM) as well as inter- and intrapersonal understanding of social norms using animated interactions (Baksh et al., 2018). In the current study, we examine whether the ESCoT has the potential to be useful in examining social cognitive impairments in people with dementia.

Methods: Twenty-five people with dementia aged 53 to 78 years and 25 age- and educated-matched controls aged 48 to 78 years were administered the ESCoT, the Reading the Mind in the Eyes (Baron-Cohen et al., 2001), and the Social Norm Understanding Questionnaire (Rankin, 2008).

Results: People with dementia performed significantly more poorly than healthy controls on affective ToM, inter- and intra-personal understanding from the ESCoT and the Social Norm Understanding Questionnaire. Using a ROC curve analysis, we demonstrated that the ESCoT total score and interpersonal understanding of

social norms were most effective at differentiating people with dementia from healthy controls compared to existing tests.

Conclusions: The ESCoT was sensitive to social cognition impairments in people with dementia compared to controls. The ESCoT may have clinical value as a test of social cognition in dementia and future work should examine ESCoT performance in different dementia subgroups.

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Keywords: social cognition, dementia – Alzheimer's disease, neuropsychological assessment