



## Scientific communications of 68th Conference of the Catalan Society of Neuropsychology

### Comunicaciones científicas de la 68ª Jornada de la Societat Catalana de Neuropsicología

#### The effects of distractors in unilateral spatial neglect: Evidence from an eye-tracking device

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**Introduction:** Disrupted visual search is a common symptom in unilateral spatial neglect (USN).

**Objective:** To examine the influence of distractors on visual behaviour in patients with USN when confronted with a vertically moving visual stimuli task using the approach of monitoring eye movements with an eye-tracking device.

**Methods:** Thirty-one right hemisphere stroke patients with USN were recruited. They performed a task in which participants were asked to click on the target stimuli that appeared from the top of the screen and moved vertically downwards. The task had two conditions: with and without distractors. We assessed performance in two ways, by scoring correct answers and by the percentage of time spent searching for targets measured over five vertical columns, i.e., (1) leftmost, (2) left, (3) central, (4) right, (5) rightmost.

**Results:** Participants scored a higher number of correct answers when there were no distractors on column 1 [ $t(30)=2.619$ ; 95% CI: 0.003 to 0.029;  $p=0.014$ ; Cohen's  $d=0.3$ ] and column 2 [ $t(30)=3.363$ ; 95% CI: 0.013 to 0.053;  $p=0.002$ ; Cohen's  $d=0.33$ ]. When distractors were present participants scored a higher number of correct answers on column 4 [ $t(30)=-1.430$ ; 95% CI:  $-0.093$  to  $-0.025$ ;  $p=0.001$ ; Cohen's  $d=0.45$ ].

With respect to search time, participants spent more time searching for stimuli on column 1 when there were no distractors [ $t(30)=2.723$ ; 95% CI: 0.006 to 0.042;  $p=0.011$ ; Cohen's  $d=0.23$ ]. When there were distractors more time was spent searching column 4 [ $t(30)=-3.367$ ; 95% CI:  $-0.101$  to  $-0.024$ ;  $p=0.002$ ; Cohen's  $d=0.37$ ].

**Conclusion:** Distractors influence patients' performance and search time, limiting left visual search and reducing the number of correct left answers.

**Keywords:** Stroke; Unilateral spatial neglect; Eye-tracker; Distractors

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## Registering visual search within unilateral spatial neglect using an eye-tracking device

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**Introduction:** Patients with Unilateral Spatial Neglect (USN) display a biased exploratory visual search towards the contralesional hemifield.

**Objective:** To examine eye movements in patients with USN when confronted with a vertically moving stimuli task while monitoring visual search with an eye-tracking device.

**Methods:** Thirty-one right hemisphere stroke patients with USN were recruited. They performed a task in which participants were asked to click on the target stimuli that appeared from the top of the screen and moved vertically downwards. The task had two conditions: with and without distractors. The eye-tracking device registered ocular movements on both conditions. Based on the horizontal (X-axis; range: 0-1) and vertical coordinates (Y-axis; range: 1-0) of the screen we calculated the average gaze-position for each condition.

**Results:** The average gaze-position [X;Y] was [0.54;0.48] in the non-distractors condition and [0.59; 0.44] in the distractors condition. We found significant differences in the average gaze-position in the X-axis between the two conditions [0.54(0.11) vs. 0.59(0.12);  $t(30) = -2.766$ ; 95% CI: -0.085 to -0.012;  $p = 0.010$ ; Cohen's  $d = 0.42$ ]. With respects to average gaze-position for axis Y there were also significant differences [0.48 (0.13) vs. 0.44 (0.14);  $t(30) = 2.446$ ; 95% CI: 0.006 to 0.071;  $p = 0.021$ ; Cohen's  $d = 0.28$ ].

**Conclusion:** Distractors negatively influence visual search. They are able to modify the average gaze-position, both horizontally and vertically.

**Keywords:** Stroke; Unilateral spatial neglect; Eye-tracker; Visual search

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## Cognitive functions, coping strategies and psychological distress in patients with resected cancer receiving chemotherapy

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**Background:** The loss of cognitive functions is a symptom that impairs the quality of life and one of the most feared by cancer patients.

**Objectives:** The aim of this study is to analyze the cognitive functioning in cancer patients initiating chemotherapy and to study the relationship between coping strategies, and psychological distress.

**Methods:** NEOcoping is a prospective, multicenter and observational study. The project involves 23 Spanish hospitals and 34 researchers. The study has a website to collect clinical data and questionnaires for doctors and patients that are filled out before starting adjuvant chemotherapy and at the end of the treatment. The applied tests were: Mini-Mental Adjustment to Cancer (MAC), EORTC QLQ-C30 (cognitive function scale), and Brief Symptom Inventory (BSI-18).

**Results:** One hundred and ninety five patients' data (mean 58 years, and 60% female) were recruited. The primary tumor localization was mainly colon (41%) and breast (34%). The results indicate that patients perceive that their physical condition or treatment interferes with their cognitive functions (concentration, memory, etc.) have coping strategies more anxious characterized by a constant concern for health type, fear of the spread or recurrence of the disease that leads to frequent reaffirmation search ( $t = 2.699$ ,  $p = .008$ ). The cognitive function problems were

negatively related with somatization ( $t=4.344$ ,  $p<.001$ ), depression ( $t=4.280$ ,  $p<.001$ ) and anxiety ( $t=4.777$ ,  $p<.001$ ).

**Conclusion:** The perceived loss of cognitive abilities, uncertainty and loss of control of the cancer survivor patient may hinder adaptation to their situation, the loss of quality of life and greater emotional distress.

**Keywords:** Cognitive functions; Anxious strategies; Quality of life and psychological distress

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## Social cognition in early phases of psychosis: A case-control study of gender-related differences

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**Background:** Deficits across multiple Social Cognition (SC) domains have been found in schizophrenia (Savla, Vella, Armstrong, Penn, & Twamley, 2012). However, gender-related differences in specific aspects of SC such as Theory of Mind (ToM) (Abu-Akel & Bo, 2013) and Emotional Processing (EP) (Erol, Putgul, Kosger, & Ersoy, 2013; Scholten, Aleman, Montagne, & Kahn, 2005) are almost unexplored.

**Objective:** To study possible gender-related differences in Affective (AToM) and Cognitive ToM (CToM) and EP skills in patients with recent diagnosis of psychosis and healthy subjects.

**Methods:** 39 patients (19 males, 20 females) with schizophrenia/schizoaffective disorder and 39 healthy subjects (19 males, 20 females), matched by age and years of

education, were recruited. The Reading the Mind in the Eyes Test (RMET) was used to evaluate AToM. First and Second-order False-Believe tasks (FB\_1o and FB\_2o) were used to evaluate CToM. The Pictures of Facial Affect (POFA) was used to evaluate EP.

**Results:** Patients' performance was significantly impaired in RMET ( $p<0.001$ ), FB\_2o ( $p=0.002$ ) and POFA ( $p<0.001$ ), but not in FB\_1o. No significant differences were found between male and female patients in any tests. However, significant gender-related differences were observed in RMET ( $p=0.004$ ) and POFA fear ( $p=0.004$ ) in healthy subjects.

**Conclusions:** Gender-related differences were only found in healthy subjects, with females outperforming males in AToM and specific aspects of EP (fear recognition). Thus, these results suggest that SC performance in patients could be attributable to the illness itself, rather than gender. Further studies focused in the identification of the specific illness characteristics related to the SC difficulties in psychosis, and in the relation between EP and AToM in healthy subjects will be discussed.

**Keywords:** Psychosis; Gender differences; Social cognition; Theory of mind; Emotional processing

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## Decision making, obesity and binge eating. Taking the risk toward future interventions in eating disorders

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**Introduction:** Binge eating (BE) is a disrupted eating pattern characterized by an excessive, rapid and compulsive food intake (Danner, Ouwehand, Van Haastert, Hornsveld, & De Ridder, 2012; Voon, 2015). This may lead to overweight and obesity, plus some other psychological and medical conditions (Voon, 2015). Impairment in decision making (DM) was suggested as an underlying factor in disrupted eating behavior in both obesity and BE (Billingsley-Marshall, 2013; Danner et al., 2012; Davis, Patte, Curtis, & Reid, 2010; Manasse et al., 2014, 2015). Despite this, some studies did not find differences in DM between obese with and without BE (Danner et al., 2012; Manasse et al., 2014; Svaldi, Brand, & Tuschen-Caffier, 2010).

**Objective:** The aim of this study is to clarify the role that decision making has over eating behavior in order to suggest new frameworks of intervention.

**Methods:** DM was assessed using the Iowa's Gambling Test (IGT) on a healthy sample of obese adult women with ( $n=16$ ) and without BE ( $n=16$ ). BE group was formed according to BITE symptoms subscale ( $\geq 10$ ). Parametric ( $t$ -test) and non-parametric tests (Mann-Whitney's  $U$ ) were performed using IBM SPSS Statistics (v.21.0). Effect size ( $r$ ) was calculated for every significant difference ( $p < 0.05$ ).

**Results:** There were no significant differences in demographic variables. BE group performed worse in almost every IGT variables. BE group chose bad decks most (A-B) ( $p=.009$ ,  $r=.45$ ) over than good decks (C-D) ( $p=.009$ ,  $r=.45$ ), lost more money ( $p=.022$ ,  $r=.40$ ) and behaved more risky than non-BE group overall ( $p=.012$ ,  $r=.47$ ), showing difficulties in learning from negative feedback and hypersensitivity to positive reinforcement.

**Conclusion:** Impaired decision making may lead to unhealthy choices and disrupted eating behaviors. Besides psychological state and personality traits, executive function training might be a good aim for future interventions in eating disorders.

**Keywords:** Obesity; Binge eating; Decision making; IOWA; Executive functions

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## Estudi sobre el Rendiment Executiu dels pacients amb Trastorn de la Conducta Alimentària

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**Introduction:** Eating disorders (ED) are increasingly affecting teenagers. There are cognitive deficits especially with the executive functions, highlighting the difficulties in central coherence and cognitive flexibility (Duchesne et al., 2004; Fagundo et al., 2012; Roberts, Tchanturia, & Treasure, 2010, 2013; Stuss et al., 2007; Tchanturia, Campbell, Morris, & Treasure, 2005). There is a growing interest in knowing whether they are predisposing factors or consequences of the disease, especially in child and adolescent population.

**Method:** The present study investigates neuropsychological changes associated with weight improvement, the differences between groups evaluated by the Body Mass Index (BMI) and the correlations between cognitive and psychopathological variables. The research includes 51 patients with eating disorders, admitted at the Hospital Sant Joan de Déu, and makes use of a neuropsychological battery, and self-report questionnaires. Subsequently, 13 patients who had achieved the established clinical improvement were included in the study.

**Results:** The results indicate that there are no differences in most cognitive domains in the longitudinal study ( $p > 0.05$ ), although there are significant differences in cognitive flexibility, evaluated by the Trail Making Test B, getting better scores in the retest. There are differences by groups made by BMI in cognitive flexibility and resistance to interference ( $p < 0.05$  and  $p < 0.01$ ) being those who weigh less the ones who perform better. Moreover, there are significant correlations between executive functions and a wide range of psychopathological variables (BMI, Impulse Regulation, Drive for Thinness, Body Dissatisfaction, Depression, Anxiety, etc.).

**Conclusions:** These results suggest that the cognitive difficulties are a predisposing factor and, therefore, do not remit when the weight improves.

**Keywords:** Eating disorders; Neuropsychology; Executive functions; Cognitive flexibility; Central coherence

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## Emotion regulation strategies and frontolimbic functional connectivity

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**Introduction:** Emotion regulation may be thought of as the capacity of prefrontal cortex regions to regulate activity in limbic regions (Ochsner, Silvers, & Buhle, 2012), but this frontolimbic connectivity may differ as a function of the emotion regulation strategy at use. In this study we aimed at differentiate the corticolimbic functional connectivity correlates of two emotion regulation strategies: cognitive reappraisal and suppression (Gross & John, 2003).

**Methods:** 48 healthy controls completed the Emotion Regulation Questionnaire (ERQ) (Gross & John, 2003) and underwent a resting-state functional magnetic resonance imaging acquisition. Functional connectivity (FC) of basolateral and centromedial amygdala (BLA/CMA) (Baur, Hänggi, Langer, & Jäncke, 2013) with a set of regions related to emotion regulation (prefrontal cortex, insula and cingulate cortex) was estimated with a seed-based approach. Scores in the suppression and reappraisal factors of the ERQ were correlated with FC maps.

**Results:** We found that FC between the left BLA and the left insula, and between the right BLA and the dorsomedial prefrontal cortex (dmPFC), was inversely correlated with reappraisal scores. On the other hand, FC between the right ventrolateral prefrontal cortex (vlPFC) and the left BLA correlated inversely with suppression scores, while FC between the dmPFC and the right BLA was directly correlated with suppression capacity. Finally, FC between the left CMA and the dmPFC was inversely correlated with suppression scores.

**Conclusion:** In conclusion, BLA connectivity appears to be more related to emotion regulation strategies than CMA connectivity, with a specific pattern of associations for reappraisal (lower left BLA-left insula and right BLA-dmPFC coupling) and for suppression (lower left BLA-right vlPFC connectivity and higher right BLA-dmPFC coupling) strategies.

**Keywords:** Functional connectivity; Emotion regulation; Amygdala; Cognitive reappraisal; Suppression

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## Neurobiological correlates of electroconvulsive therapy effects in treatment-resistant depression: Longitudinal multimodal neuroimaging approach

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**Background:** Neuroplasticity and neuroinflammation have been proposed as two possible mechanisms of action of electroconvulsive therapy (ECT) (Andrade & Bolwig, 2014; Bouckaert et al., 2014, 2016). Although both hypotheses may be supported by medial temporal volume increases (Abbott et al., 2014; Bouckaert et al., 2016; Dukart et al., 2014; Joshi et al., 2016; Nordanskog et al., 2010; Nordanskog, Larsson, Larsson, & Johanson, 2014; Ota et al., 2015; Sartorius et al., 2016; Tendolkar et al., 2013) the specific mechanisms of action still remain unclear.

**Objective:** To assess changes in (1) regional gray matter (GM) volumes, (2) hippocampal subfields volumes, and (3) hippocampal metabolite concentrations during a bilateral ECT course, and to explore the putative differences between bilateral (BL) ECT vs. right unilateral (RUL) ECT.

**Methods:** Longitudinal structural magnetic resonance and spectroscopy study. We assessed 12 patients with treatment-resistant depression (TRD) throughout the entire course of a BL ECT protocol and 10 healthy participants at two neuroimaging examinations.

**Results:** Patients with TRD showed limbic complex and perigenual anterior cingulate cortex volume increases. Hippocampal subfield segmentation revealed volume increases of hippocampal CA2/3, subiculum and CA4/dentate gyrus regions. The limbic complex volume increase was associated with an hippocampal *N*-acetylaspartate concentration decrease and an hippocampal Glutamate+Glutamine concentration increase. Patients with TRD who underwent a RUL ECT protocol, showed a GM volume increase limited to the right hippocampal complex.

**Conclusions:** Our findings suggest that both forms of neuroplasticity and neuroinflammatory changes may be mechanisms of action of ECT. In this sense, our findings may also suggest the existence of a common neurobiological mechanism accounting for ECT-induced clinical improvement and cognitive side-effects (e.g., memory and executive function impairment (Scott, 2010; Semkowska, Keane, Babalola, & McLoughlin, 2011)).

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**Keywords:** Treatment-resistant depression; Electroconvulsive therapy; Hippocampus; *N*-acetylaspartate; Glutamate+Glutamine

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## Cognitive changes in Parkinson's disease: A 4 year follow-up study

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**Introduction:** Although Parkinson's disease (PD) is a degenerative illness, changes over time in cognition are mild. Longitudinal studies have reported impairment in speed of

processing, memory and verbal fluency (Broeders et al., 2013; Muslimovic, Post, Speelman, De Haan, & Schmand, 2009). Cortical changes related to cognitive decline have been poorly investigated.

**Objective:** The aim of the study was to investigate differences in the progression of cognitive decline in PD patients compared to healthy controls (HC) and its neuroanatomical correlations.

**Method:** Forty-four PD patients and 22 HC underwent neuropsychological and magnetic resonance imaging assessment (scan interval  $\mu = 45.7$  months). Repeated measures ANOVA were performed from adjusted z-scores (Aarsland, Brønnick, Larsen, Tysnes, & Alves, 2009). Patients were classified as having mild cognitive impairment (MCI) according to recent diagnostic criteria (Litvan et al., 2012). Subcortical segmentations and parcellations were extracted using FreeSurfer software and correlated with neuropsychological percentage of change.

**Results:** There were significant interactions group per time in semantic fluency ( $F = 4.23$ ;  $p = 0.044$ ), total recall ( $F = 4.99$ ;  $p = 0.029$ ) and delayed recognition from Rey's Auditory-Verbal Learning Test (RAVLT) ( $F = 9.33$ ;  $p = 0.003$ ), Trail Making Test Part A ( $F = 5.29$ ;  $p = 0.025$ ) and B ( $F = 5.69$ ;  $p = 0.020$ ), Symbol Digit Modalities Test ( $F = 12.27$ ;  $p < 0.0001$ ) and Stroop Word-Color ( $F = 5.84$ ;  $p = 0.019$ ). Over 4 years, 29 (66%) patients had PD-MCI from which 16 (36%) were cognitively preserved at baseline and 2 (5%) PD-MCI patients converted to PD dementia. Hippocampal volume correlated with percentage of change in RAVLT total recall ( $r = 0.413$ ;  $p = 0.011$ ).

**Conclusions:** PD patients had significant decline of speed processing, memory and semantic fluency and an increased rate of MCIs over time. Progressive hippocampal degeneration is related to verbal learning memory changes.

**Keywords:** Parkinson's disease; Mild cognitive impairment; Neuropsychological tests; Cortical atrophy

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## Metamemory impairment is related to cortical thinning patterns in Parkinson's disease

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**Introduction:** Fronto-subcortical alterations have been widely described in Parkinson's disease (PD). Furthermore, frontal dysfunction has been related to metamemory impairment (Janowsky, Shimamura, & Squire, 1989; Smith, Souchay, & Moulin, 2011) which is still poorly investigated in PD.

**Objective:** The aim of the current study was to investigate metamemory in PD patients with different patterns of cortical thinning. We hypothesized that patients with frontal atrophy will lose the normal correlation between real performance and its estimation due to the loss of feedback mechanism.

**Method:** Rey Auditory-verbal learning test and self-appraisal of the test performance were assessed in a sample of 41 non-demented PD patients and 22 healthy controls (HC). PD patients were classified in three different groups according to cortical thickness patterns identified by cluster analysis (Uribe et al., 2016). There was a first pattern with parietal-temporal atrophy; a second with frontal and occipital atrophy and a third without atrophy. Spearman's correlations were computed with SPSS software.

**Results:** There were significant correlations between RAVLT delayed recall and subjective performance in HC ( $\rho=0.628$ ;  $p=0.002$ ), all PD sample ( $\rho=0.598$ ;  $p<0.0001$ ) and PD-MCI patients ( $\rho=0.699$ ;  $p<0.0001$ ). Regarding PD subgroups, we obtained significant correlations in non-atrophic subgroup ( $\rho=0.595$ ;  $p=0.004$ ) and frontal and occipital atrophy subgroup ( $\rho=0.661$ ;  $p=0.007$ ). No significant correlations were found in patients with parietal-temporal atrophy ( $\rho=0.289$ ;  $p=0.637$ ).

**Conclusions:** The impairment of metamemory in PD is associated with the presence of parietal-temporal atrophy.

**Keywords:** Parkinson's disease, metamemory, magnetic resonance imaging, cortical thickness.

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## Toxoplasmosis' coinfection and HIV+. Neuropsychological and neuroimaging study

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**Introduction:** Combination antiretroviral therapy (cART) has notably reduced HIV-associated dementia. However, the CHARTER study (Heaton, 2010) found a 47% prevalence of HIV-associated neurocognitive disorders (HAND) in patients under treatment.

HAND are associated with deficits in motor skills, processing speed and executive functions (Woods, Moore, Weber & Grant, 2009). Individuals with HIV+ and coinfections are most impaired on cognitive and psychomotor speed (Levine et al., 2008). Latent toxoplasmosis has been related to memory deterioration in seniors (Mendy, Vieira, Albatineh, & Gasana, 2014).

Different studies suggest an additive and synergistic effect of combined HIV and coinfections in the pathogenesis of cognitive impairment (Ciccarelli et al., 2013).

**Objective:** Describe the neuropsychological and neuroimaging profile of a VIH+ patient with toxoplasmosis.

**Methods:** A 73 years old woman, Independent for Basic and Instrumental ADL. VIH+, cART treatment until 2008. Treatment discontinuation until 2012. Jiroveci pneumonia (November 2011), cerebral toxoplasmosis (December 2011). Longitudinal neuropsychological study (February 2015, 2016): WAIS-IV, BNT, Verbal Fluency Test, RAVLT, WMS-III, RCFT, JLO, TMT, BADS, WCST, Stroop.

**Results:** The neuropsychological profile suggests a deep subcortical and frontal dysfunction with some progression during the last year.

**Conclusions:** Given the variability in the evolution of HAND, the worst evolution in older individuals and in coinfecting patients, it is recommended to carry out a neuropsychological assessment to study the evolution of patients' state, since often there is not a functional translation of the brain lesions.

A neuropsychological evaluation is compulsory in order to establish an early and specific cognitive rehabilitation.

**Keywords:** HIV; Toxoplasmosis; Coinfections; Neuropsychological profile

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## Brain structural correlates of subclinical obsessive-compulsive symptoms in healthy children

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**Background:** Subclinical obsessive-compulsive (OC) symptoms are frequent in healthy individuals and their presence at infancy may predict an adult diagnosis of obsessive-compulsive disorder (OCD). In this study we aimed to study the brain structural correlates of subclinical OC symptoms in healthy children.

**Methods:** Two hundred and fifty-five children (mean age =  $9.7 \pm 0.8$  years, 49% females) were assessed with the Obsessive-Compulsive Inventory-Child Version (OCI-CV) and underwent a brain structural magnetic resonance imaging examination. Total severity and the scores on the different symptom domains (doubting/checking, hoarding, ordering, obsessing, washing and neutralizing) were correlated with regional gray and white matter volumes following a voxel-based morphometry protocol. Statistical significance was set at  $p < 0.05$ , corrected for multiple comparisons.

**Results:** Mean total score on the OCI-CV was  $9.17 \pm 4.18$ . Mean scores greater than 1 were observed in the doubting/checking (mean =  $2.3 \pm 1.5$ ), hoarding (mean =  $2.1 \pm 1.3$ ) ordering (mean =  $2.3 \pm 1.6$ ) and obsessing (mean =  $1.5 \pm 1.4$ ) dimensions. Total severity was associated with less gray and white matter in the left hippocampus, although at an uncorrected threshold. Doubt/checking symptoms correlated with less gray matter in the left middle frontal gyrus and more white matter in the right insula. Hoarding symptoms correlated with more gray and white matter in the left inferior frontal gyrus, and ordering symptoms correlated with less gray matter in the ventral caudate. Obsessing symptoms correlated with less white matter in the right temporal pole.

**Conclusions:** Subclinical dimension-specific OC symptoms are associated with distinct alterations in prefrontal, striatal and limbic/paralimbic areas. Such results may shed light on the neurobiological bases of clinical heterogeneity in OCD.

**Keywords:** Subclinical obsessive-compulsive symptoms; Symptom heterogeneity; Brain morphometry

## The Spanish version of constraint-induced aphasia therapy improves aphasia severity, discourse effectiveness, and visual attention: Evidence from a case of acquired childhood conduction aphasia

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**Introduction:** Evidence-based childhood aphasia (CA) treatments are strongly needed. REGIA-Plus (Rehabilitación

Grupul Intensiva de la Afasia-Plus) (Berthier et al., 2014), the Spanish version of Constraint-Induced Aphasia Therapy, has not been used in CA so far.

**Objectives:** To report beneficial effects of REGIA-Plus in an adolescent with chronic conduction aphasia.

**Method:** A 14-year-old right-handed boy become aphasic after the cerebral bleeding of an AVM in the left hemisphere that required decompressive craniotomy and radiosurgery. Multiple baseline evaluations (2month apart) in the chronic period 9 months post-onset and 1 post-treatment testing were performed. The patient received REGIA-Plus (30h/10 semi-consecutive days) complemented with a set of expressive and written naming home tasks. The Primary outcome measures were Aphasia Severity (Aphasia Quotient-Western Aphasia Battery; AQ-WAB), Discourse Effectiveness (Words per Minute – WpM, Content Information Units-per minute (CIUpM) and % CIU) and Visual attention (CalCAP T-Scores; SART version). Background cognitive assessment was also performed at baseline.

**Results:** Two weeks of REGIA-Plus induced significant benefits in comparison to baselines in AQ-WAB (baselines: 81.2 and 81.3; REGIA-PLUS: 87.46), WpM (baselines: 69.76 and 69.47; REGIA-Plus: 84), CIUpM (baselines: 67.80 and 65.05; REGIA-Plus: 80.45) and CIU% (baselines: 65.47% and 70%; REGIA-PLUS: 83.74%), and Visual Attention (SART-CalCAP Choice RT; baseline T-Scores: 15 and 19; REGIA-Plus T-Score: 35).

**Conclusions:** This preliminary evidence indicates that REGIA-Plus can be used to improve aphasia, discourse effectiveness, and visual attention in acquired CA.

**Keywords:** Acquired childhood aphasia; Treatment; Constraint-induced aphasia therapy; Spanish-speaking

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## Is the MoCA a more valid cognitive screening tool to detect Alzheimer's disease and Mild Cognitive Impairment compared to the MMSE?: A bibliographic review

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**Introduction:** MMSE is the most widely used cognitive screening tool but its applicability, specificity and sensitivity compared to MoCA has been recently discussed.

**Objectives:** To review the results of existing studies which compared MoCA and MMSE for the detection of mild cognitive impairment and Alzheimer's disease.

**Methods:** Pubmed database was searched using the keywords "mmse, moca, Alzheimer" as a first screening. A second screening was made adding "mild cognitive impairment" keyword to the previous list. A total of 40 articles were obtained, being only 17 able to analyse after applying the exclusion criterion (other languages than English, other systematic reviews or studies not focused on MCI-AD).

**Results:** Compared to the MMSE, most of these 17 articles analysed agree that the MoCA has psychometric superiority in detecting MCI-AD, AD-nonAD and, specially, HC-MCI. Thanks to the greater difficulty of some items, the incorporation of executive functions and the more complex measures in all neurocognitive aspects, it seems to be more sensitive to detect MCI and early AD.

Highly variable cut-offs were reported for the MMSE and MoCA. There is a general agreement that MoCA is more sensitive, but at the recommended threshold MoCA favours sensitivity at the expense of specificity.

**Conclusions:** Compared to the MMSE, the MoCA is the most valid and clinically feasible screening tool to identify MCI. It allows a better prevision of the evolution, different levels of severity and determine MCI-AD subtypes. However, the optimal cut off score is open to debate and it would be convenient to do more investigation.

**Keywords:** Mini Mental State Examination (MMSE); Montreal Cognitive Assessment (MoCA); Alzheimer's disease (AD); Mild Cognitive Impairment (MCI)

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### Neural correlates of moral sensitivity as an endophenotype in obsessive-compulsive disorder

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**Introduction:** OCD patients show a high moral sensitivity, which could be conceptualized in the cognitive biases that underpin OCD symptoms (Salkovskis, 1985). Moral judgments are related with the hyperresponsibility feelings and the

thought-action cognitive process, for which the mere occurrence of intrusions is perceived as the moral equivalent of deliberately acting on them (Rachman, 1997). The aim of this study was to compare the brain activation and connectivity maps obtained from a functional magnetic resonance study (fMRI) during a moral dilemma task between OCD patients, first-degree healthy relatives and healthy controls (HC).

**Methods:** 18 OCD patients, 19 first-degree healthy relatives and 19 HC were included in the study. The participants underwent an fMRI moral dilemma task and changes in BOLD signal were analyzed among the three groups. Analyses were focused on three predefined regions, previously related with this task in OCD (Harrison et al., 2012): the ventromedial prefrontal cortex (vmPFC), the dorsolateral prefrontal cortex (dlPFC) and the lateral temporal cortex. When significant differences in activation were found, we also performed psychophysiological interaction (PPI) analyses.

**Results:** OCD patients and healthy relatives showed a hyperactivation in the dlPFC in comparison to HC, while OCD patients alone showed a hyperactivation in the vmPFC. Regarding PPI analyses, OCD patients and healthy relatives showed a diminished vmPFC-neostriatum connectivity in comparison to HC, while OCD patients alone showed a diminished connectivity between the vmPFC and dopaminergic midbrain regions.

**Conclusions:** Results obtained from our study suggest the hyperactivation in the dlPFC during situations with high moral content as a candidate to an endophenotype in OCD.

**Keywords:** Moral sensitivity; OCD; Endophenotype; vmPFC; dlPFC

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## Additional effect of early neurocognitive rehabilitation on executive cognitive function in subacute stroke patients, in the context of intensive rehabilitation program

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**Objective:** To explore the additional effect of early neurocognitive rehabilitation on executive functions (EEFF), processing speed (SP) and functional status in subacute stroke patients included in an intensive rehabilitation program.

**Subjects and methods:** Sixteen subacute stroke patients included in an intensive 3-week intensive rehabilitation program were randomized into two groups. Both groups received intensive general rehabilitation, including physical, occupational and speech therapy. The training group additionally received neurocognitive rehabilitation during 50 min/day, 5 times/week. Neurocognitive rehabilitation was based on paper-pencil tasks and was carried out by a neuropsychologist during the 3 weeks. Phonetic fluency (FAS) was used to assess EEFF, Symbol Search WAIS-IV-subtest for SP and the Barthel index for functional status.

**Results:** A significant time effect was observed in all cognitive (FAS:  $F=20.36$ ;  $p<0.001$ /Symbol Search:  $F=8.78$ ;  $p=0.01$ ) and functional (Barthel:  $F=75.23$ ;  $p<0.001$ ) measures. Moreover, a significant time by group effect ( $F=6.54$ ;  $p=0.023$ ) was observed in the FAS, favoring the training group. No other significant time by group effects were observed (Symbol Search:  $F=1.59$ ;  $p=0.23$ /Barthel:  $F=0.08$ ;  $p=0.78$ ).

**Conclusion:** Neurocognitive rehabilitation may add a beneficial impact, due to the specific improvement of the executive functions, in subacute stroke patients that received an intensive rehabilitation therapy. Neurocognitive rehabilitation had no specific effect on the functional status of the participants. However, further studies should be carried out to explore the impact of early neurocognitive rehabilitation on other cognitive domains and its relationship with other functional and quality of life outcomes.

**Keywords:** Neurocognitive rehabilitation; Rehabilitation therapy; Stroke; Cognitive functions

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### High-resolution neuromelanin sensitive magnetic resonance as an early marker in Alzheimer's disease

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**Introduction:** Alzheimer's disease (AD) is the first cause of dementia and supposes a very incapacitating illness with a high prevalence in elderly.

Nowadays, we have some diagnostic biomarkers that point to lesions, such neurofibrillary tangles, on brainstem regions in the early stages of the AD (Ferrer, 2012).

Specifically, we focus on locus coeruleus (LC), which is a noradrenergic nucleus situated at the dorsal pons that exhibits extensive cortical and subcortical projections and

has been implicated in modulation of attention (Aston-Jones & Cohen, 2005; Bouret & Sara, 2005).

**Objectives:** Studying selected patients at risk for developing AD with neuropsychological and neuroimaging techniques, focusing on involvement of LC and its connections.

**Methods:** Mild cognitive impairment, late-onset depression patients and healthy controls ( $n = 30$  per group) will be assessed through clinical, neuropsychological and neuroimaging techniques.

Neuroimaging protocol will include a high-resolution neuromelanin sensitive magnetic resonance. Neuromelanin is a pigment, present on LC and other nuclei, which allow examine the signal intensity of LC and identify and quantify its volume in early stages of the AD.

LC will be functionally assessed through pupil response and an oddball task, which will supply an arousal measure.

**Results:** It is an underway project, but we expect to find between-group differences on volume and function of LC.

**Conclusions:** Identifying LC dysfunction could be therefore considered an early marker of AD. Neuroimaging techniques could in this way be used as a helpful tool for prevention, enabling us an advance and more effective intervention in these patients.

**Keywords:** Neuromelanin, Alzheimer's disease, neuroimaging, locus coeruleus

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## Alzheimer demented confabulators: More confabulations in episodic memory than in semantic memory

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**Introduction:** In classical view, confabulations are distortions of memory that appear when the subject is raised by specific questions that require retrieval of episodic or semantic memories. It is still controversial whether

confabulation is specific of a type of information, thus it would appear more often in episodic memory questions than in semantic memory questions.

**Objectives:** The aim of this study is to define how often confabulations appear in episodic and semantic memory questions and to provide more empirical evidence in a group of mild Alzheimer's dementia confabulators.

**Method:** Thirty-three subjects with mild Alzheimer's dementia and 37 elderlies without dementia between 65 and 85 years old have participated in this study. We used the Spanish version of Dalla-Barba's confabulation questionnaire and other neuropsychological tests. We divided the patients into two groups, which are "provoked confabulators" and "non-confabulators", using a statistical criterion. Sixty-four percent of the patients were considered "provoked confabulators".

**Results:** This group produces more confabulations in episodic memory questions than in semantic memory questions ( $Z$  de Wilcoxon =  $-3.60$ ,  $p = .00$ ), and 2.80 times more than "non-confabulators" group ( $U$  de Mann-Whitney =  $14$ ,  $p < .01$ ). However, in this last group, no statistically significant differences were found between episodic memory questions and semantic memory questions ( $Z$  de Wilcoxon =  $1.02$ ,  $p = .31$ ).

**Conclusions:** In conclusion, in mild Alzheimer's dementia, provoked confabulators patients produce more confabulations in episodic memory questions than semantic memory questions. It seems that the confabulations are more specific to episodic memory. These results could invalidate some of the explanatory hypothesis of confabulation.

**Keywords:** Confabulation; Episodic and semantic memory; Dementia; Neuropsychological assessment

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## Exploring the neural bases of cognitive reserve in Huntington's disease

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**Introduction:** Although age at onset of Huntington's disease (HD) is mainly determined by the size of the CAG repeat expansion, other factors may play a role. One potential factor is Cognitive Reserve (CR), as it has been shown in other neurodegenerative disorders and aging.

**Objectives:** The objective of this study is to investigate the effect of CR in age of onset in HD and to examine the neural bases underlying the individual differences in executive dysfunction (ED) that could be due to the effects of CR in HD.

**Method:** 31 HD patients completed a CR questionnaire and were scanned using functional magnetic resonance imaging. We analyzed the Resting State Executive Control Network (RS-ECN), a novel approach to study the brain areas underlying ED. The strength of connectivity within this network was calculated voxel-wise. The difference between the estimated and the real age of onset (26 symptomatic-HD) was calculated for each patient.

**Results:** High levels of CR significantly delayed the appearance of the clinical symptoms. Functional connectivity analysis showed that higher CR was associated with lower connectivity strength in the anterior cingulate cortex and with an increase of connectivity in the superior parietal cortex (SPC). Furthermore, higher strength of connectivity in the left SPC was related to better performance in cognitive flexibility (TMT (b-a)) and working memory (backward digits) tasks.

**Conclusions:** These findings provide converging evidence that CR might act as a protective mechanism for the progression of the disease in the RS-ECN by delaying the onset of symptoms and improving the performance in executive functions.

**Keywords:** Cognitive reserve; Huntington's disease; Executive function; Individual differences

## Decision making impairment: A shared vulnerability in obesity, gambling and substance use disorders?

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**Introduction:** Addictions and behavioural addictions have been associated with decision making impairments. The present study explores decision making profiles of Substance use disorder (SUD), Gambling Disorder (GD) and Obesity (OB) when assessed by the Iowa Gambling Test (IGT) and compares them with a healthy control group (HC).

**Methods:** For the aims of this study, 591 participants (51.7% females) that were distributed as follow 194 HC, 178 GD, 113 OB, 106 SUD were assessed according to DSM-V criteria, completed a sociodemographic interview and conducted the Iowa Gambling Task.

**Results:** SUD, GD and OB present impaired decision making when compared with the HC in both the overall task and learning across the task parameters, however no differences are found for the overall performance in the IGT among the clinical groups. Finally, results reveal some specific learning across the task patterns within the three clinical groups: OB individuals maintain negative scores until the third set were learning starts but with a less extend to healthy controls, SUD seems to present an early learning than OB followed by a progressive although slow improvement and GD presents more random choices displaying very few or no learning.

**Conclusions:** Decision making impairments are present in SUD, GD and OB. Some specific patterns of learning across the task are identified for each of the here studied clinical samples which to some extent show differences in learning patterns of decision making task. These results can help understanding the underlying mechanisms of obesity and addiction behaviors as well as improve current clinical treatments.

**Keywords:** Obesity; Gambling disorder; Substance use disorder; Addiction; Decision making

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## Enduring changes in neuropsychological functioning in anorexia nervosa patients in full remission

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**Introduction and objectives:** Deficits in neuropsychological functioning have been repeatedly identified in patients with anorexia nervosa (AN). However, little is known on how cognitive functioning in AN patients evolves in response to treatment.

**Method:** AN patients ( $n = 42$ ) completed a comprehensive set of neurocognitive (decision-making and selective attention) measures before admission (T0) to a 3-month day-hospital treatment program and at a 1-year follow-up (T1), and were compared to healthy controls ( $n = 52$ ). BMI and eating disorder symptomatology were used as outcome variables.

**Results:** AN patients presented poorer performance on the Iowa Gambling Task (IGT) and the Stroop test at T0, compared to healthy controls ( $p < .001$ ). AN patients in full remission ( $n = 31$ ; 73.9%) at T1 significantly improved performance on the IGT ( $p = 0.019$ ), and scores were not statistically different from HC scores ( $p > 0.05$ ). Non-recovered patients and patients with partial remission ( $n = 11$ ; 26.1%) did not improve IGT scores ( $p > 0.05$ ). No changes were found in Stroop test scores in AN patients at T1 ( $p > 0.05$ ).

**Conclusions:** AN patients in full remission showed marked improvements in decision making one year after beginning treatment, although significant impairments in other cognitive domains were still present.

**Keywords:** Neuropsychology; Eating and feeding disorders; Cognitive impairments; Longitudinal studies; Cognitive behavioral therapy; Choice behavior

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## Clinical and cognitive profiles in children with autism spectrum disorders: The experience of an specific educational center

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**Introduction:** Cognitive abilities in children with autism spectrum disorders (ASD) is one of the key factors related to school achievement, severity of clinical symptoms and adaptative level (Goldberg et al., 2006).

**Objective:** To investigate the clinical and medical profile of children with ASD according to their performance on cognitive tests.

**Methods:** 39 children with diagnosis of ASD attending C.E.E. Carrilet (Barcelona) were included. Cognitive performance was measured using both the WISC-IV or Weschler non-verbal (WNV) scales based on children's verbal abilities. Autism symptoms were assessed using the Autism Diagnostic Observation Schedule (ADOS-2). Medical comorbid pathologies and actual drug use were collected from their clinical history. Children were divided into groups based on the cognitive tests administrated and their clinical profiles were compared.

**Results:** Cognitive performance in children with ASD attending a specific educational center is heterogeneous, ranging from intellectual disability to talent. Three ASD profiles with different clinical characteristics were derived: (a) children assessed by WISC-IV: severe ASD symptoms, fluent language and no medical comorbidities nor medication; (b) children assessed with WNV: low-moderate ASD symptoms, no fluent language and no medical comorbidities; (c) children not assessed: moderate ASD symptoms, no language, and medical comorbidities and psychiatric medication.

**Conclusion:** Global and multi-disciplinary assessment in specific educational centers attending children with ASD is essential for planning individualized educative and therapeutic programs (Carrilet C.E.E, 2013; Viloca et al., 2012). Evaluations should include clinical, cognitive and medical aspects.

**Keywords:** Autism spectrum disorders; Cognitive assessment; Medical comorbidities; Clinical symptoms

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