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CONFERENCE ABSTRACTS

Talking with hands: body representation in British Sign Language signers

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While both obeying to compositional rules, Sign (SLs) and spoken languages differ strikingly for the modalities involved: SLs speakers rely on their body rather than on sounds patterns for communication purposes. Here, we explored if this different modality influences the representation of the body. We tested a sample of 15 British SL speakers and of 16 matched controls (all hearing bilingual individuals). Both groups were administered with the Body Esteem Scale (BES) (body image), the Hand Laterality Task (HLT) and the Mental Chronometry Task (MCT) (body schema). Groups do not show differences concerning the BES ($p > .05$). Controls show the classic positive correlation between executing a movement and imagining it in the MCT ($r = .792$, $p < .001$) and the effects of biomechanical constraints in the HLT ($t = 3.266$, $p = .005$). On the other hand, BSL speakers show the use of motor imagery in the MCT only with their dominant hand for signing ($r = .665$, $p = .007$) and do not show the effects of biomechanical constraints in the HLT ($p > .05$). Our findings highlights how action related components of body representation are specifically modulated by the use of the body for language.

Speech-Gesture Integration in Aphasic and Apraxic Patients

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Speech and gestures are both part of face-to-face communication. However, only rarely gestures are considered in language studies and vice versa, language is not considered in studies investigating praxis and pantomimes. Yet, brain imaging suggests that speech and gestures may share a common neural system and it has been shown that healthy individuals automatically integrate the two channels during comprehension. We investigate aphasic and apraxic patients' comprehension of audiovisual speech, gesture and speech/gesture combinations (both congruent and incongruent, e.g., when the word is pulling, but the gesture depicts a sawing action). Patients and matched controls participated in two studies (focusing on speech, and focusing on gesture) in which they had to match a picture to a video showing a person speaking a word and/or gesturing an action. We found that congruent speech-gesture combinations had a facilitatory effect in word or gesture comprehension especially for the patients; while incongruent combinations had an interfering effect for both the patient and control groups. At the individual level, we also found correlations between the magnitude of the effect and performance in verbal semantic tasks for the patients, but not for apraxia scores. We discuss the implications for theories of face-to-face communication and rehabilitation.

Continuous conceptual integration whilst viewing naturalistic events

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Everyday experience requires rapid and automatic integration of conceptual information by the semantic network (SN). The SN includes semantic control structures in lateral temporal, parietal and frontal cortex, as well as medial temporal and posterior midline regions that are more associated with processing spatial contextual information. To tease apart the different contributions of these regions we investigated processing of video clips over time and independently manipulated the availability of contextual information. Whilst in an MRI scanner, participants watched clips taken from situation comedies that had been split into two halves. The second half clips were either straightforward continuations of the first half or were clips from a different episode depicting the same characters in the same location. At the onset of the videos we observed transitory effects in the parahippocampal and retrosplenial cortices which were modulated by the degree of match in contextual information. By contrast, responses in structures associated with the semantic control took longer to peak, were sustained throughout the clips and were also modulated by the availability of contextual information. In middle temporal gyrus, activity for videos which were associated with prior contextual knowledge

peaked sooner, consistent with the rapid activation of semantic concepts that were already primed. The study teases apart some of the contributions of structures within the SN to semantic processing during a naturalistic task.

"Fly me to the Moon" – Exploring semantic contributions to plausible and implausible event construction in semantic dementia

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The capacity to mentally envisage personally-relevant future events represents a sophisticated cognitive endeavour, typically held to rely upon episodic memory integrity. Far less is known, however, regarding the contribution of semantic memory to constructive processes. Here, we investigated the capacity for past and future forms of thinking in semantic dementia (SD), a neurodegenerative disorder characterized by the amodal loss of conceptual knowledge. Fourteen individuals with predominantly left-lateralised SD were contrasted with 18 age- and education-matched healthy Controls on the Past-Future interview. Temporal distance was manipulated across four conditions: Last year, 10 years ago, Next year, 10 years ahead, to differentially tax episodic and semantic contributions to construction. In addition, an implausible condition was included in which participants were required to simulate spending a day on the moon. Relative to Controls, SD patients displayed relatively intact recent retrieval in the context of marked remote memory deficits. Future simulation was compromised irrespective of temporal context, yet disproportionate impairments were observed for implausible event construction. Correlation analyses revealed robust associations between measures of episodic memory and semantic association in response to event novelty. Our findings add to a growing body of evidence emphasising the pivotal role of semantic memory in complex constructive processes.

A systems-level approach to the semantic network

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Semantic processing takes place across a distributed cortical network additionally associated with other highly integrated 'default mode' processes such as social, episodic and nominal cognition. This entwined cognitive landscape presents a challenge to the understanding of the semantic system. Here in a series of experiments we attempt a systems-level approach within the simplified semantic arena of person knowledge. We addressed the relative regional amodality using famous faces and names (Exp 1. N=44), overloaded the system with rapidly presented famous faces to determine regional temporal-tuning (Exp 2, N=34) and mapped out the regional cognitive response profile to 10 tasks drawn from semantic, social, episodic, nominal and physical cognitive domains (Exp 3. N=20). All experiments showed coordination between perceptual OFA and FFA and a frontal patch in the inferior frontal gyrus. These early-tuned responses (200-300 msec) were followed by the remainder of the amodal semantic system that was commonly tuned to events occurring 500-600 msec apart. Experiment 3 reveals that the similar profiles of episodic, semantic and social cognition are distinct from nominal knowledge. Collectively these experiments show that all tasks commonly activate individual regions and it is the relative response and the context across the network that determines regional function.

Dynamic modulation of the semantic network after left or right anterior temporal lobe resection

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Convergent evidence implicates the bilateral anterior temporal lobes (ATLs) as a conceptual region and is based on growing evidence from patients with bilateral ATL atrophy and functional neuroimaging studies. Unilateral ATL atrophy/resection produces a much milder semantic impairment; suggesting that the semantic system is robust to a degree of unilateral damage however the mechanisms underlying this robustness remain to be fully elucidated. Two possible compensatory mechanisms after unilateral damage are that: (1) the contralateral ATL upregulates, or (2) other regions in the semantic network upregulate. To test these possibilities, 33 temporal lobe epilepsy (TLE) patients were scanned using

dual-echo fMRI whilst completing written word and pictorial semantic tasks. Overall, activation in the TLE patients was very similar to control participants across both task modalities. Subtle differences between the groups were also shown, and these interacted with task modality. Written word tasks, which were relatively more lateralized, were less robust after unilateral resection and showed greater differences between patients and control participants. This was particularly striking after resection to the dominant (left) ATL. Pictorial tasks, which produced a greater degree of bilateral activation, were more robust after unilateral resection and showed few differences between patients and control participants.

Multivariate MEG analysis of visual object naming across the lifespan

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Prominent theories of aging postulate that processing speed declines across the lifespan, resulting in declines in performance and increased reaction times[1]. It is not understood how changes in processing speed impact the different cognitive components involved in a task. We performed a visual object naming task using MEG to test if two components involved in object identification -visuoperceptual and semantic processes- become slower with age. Previously, we demonstrated in young volunteers that representational content can be fitted to a visuoperceptual model in an early time window and a semantic model in a later time window[2]. Eighty-one subjects from a population-derived cohort of healthy individuals (Cam-Can.org) (22-87 years) performed a visual object naming task. Accuracy significantly declined with age, with elderly participants producing more semantic errors and slower naming latencies. MEG time courses for each subject were fitted to a visuoperceptual and semantic model. In the later time window, fitting of the visuoperceptual model was significantly better in elderly subjects, and a better fit correlated with higher numbers of semantic errors. There was a poorer fit of the semantic model. Processing of visuoperceptual information is prolonged in elderly subjects. This could result in impaired semantic access leading to an increase in semantic errors.

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Functional compensation in the semantic control system revealed by brain stimulation and stroke aphasia neuroimaging studies

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Damage to left inferior prefrontal cortex in stroke aphasia is associated with poor control over retrieval. However, little is known about subsequent compensatory changes within the semantic network. Our recent study (Hallam et al., 2016) investigated potential sites for compensation. Following inhibitory rTMS to left IFG, healthy participants performed a semantic relatedness judgment task in fMRI. LIFG stimulation increased the effect of semantic control demands in pMTG and pre-SMA, with reduced recruitment of the stimulated region (LIFG) and right IFG. We also describe results of an fMRI study of semantic aphasia patients listening to semantically ambiguous sentences. Patients recruited the undamaged vATL and pMTG more than aged-matched controls. Resting-state data also showed that, in control participants, recruitment of pMTG to ambiguous sentences was inversely related to functional coupling with vATL at rest; however patients showed the opposite pattern with greater recruitment during ambiguous sentences being associated with greater functional connectivity at rest. Stronger connectivity between pMTG and ATL was associated with better performance on semantic association tasks, suggesting connectivity within the temporal lobe supports functional compensation. Patients with executive-semantic deficits show compensatory changes in undamaged parts of the network and increased connectivity between vATL and posterior elements of the network.

Attention and visuo-spatial function in children aged 6-8 years without cerebral palsy, who were cooled for neonatal encephalopathy; preliminary evidence of dorsal stream vulnerability

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Neonatal encephalopathy (NE) after asphyxia affects 1-3/1000 live births in the UK. Previous research attests to the vulnerability of the dorsal cortical stream after such events. Measures of visuo-spatial function, and attention-control index the integrity of the dorsal stream. Therapeutic hypothermia (TH), significantly cooling infants with NE within 6 hours of birth for three days, reportedly improves outcome and reduces incidence of cerebral palsy (CP) in survivors. As such it is now standard-care for infants with NE. We wanted to investigate whether visuospatial and attention abilities remain affected in children after this novel treatment. 27 children without CP aged 6-8 years previously cooled for NE were assessed on visuospatial and attention measures compared to matched controls (n=18). We also investigated the relation between attention abilities and Full scale IQ. Children with HIE had significantly reduced abilities in sustaining attention, slower reaction-times and greater inconsistency in response speed. Significantly reduced visuo-spatial processing performance was also evident. Response times <50th percentile were found to have 100% specificity and predictive value in predicting FSIQ<85. We report preliminary evidence to support dorsal stream vulnerability in children with NE after cooling, and discuss negative early neuro-cognitive effects as potentially predictive of later executive function difficulties.

Temporal information in mild cognitive impairment

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Items learned at the beginning (primacy) of a list are usually remembered better than items in the middle. Older adults with cognitive impairment present a primacy deficit. We posit that by examining the order in which items are recalled, it is possible to understand the nature of this memory deficit. Bruno et al. (2016) showed that healthy elders tend to recall words by preserving the temporal order of the study list. Our aim was to determine whether individuals with Mild Cognitive Impairment (MCI) showed poorer usage of the temporal order information compared to healthy peers; and whether usage rate was associated with general and specific cognitive abilities in both groups. Our sample comprised 82 individuals with MCI and 383 controls, aged 50+. Global cognitive functioning was estimated with a composite score including performance on immediate/delayed memory, visual learning, and speed and flexibility. Memory performance was measured with the AVLT. The ANOVA and regression analyses show that individuals with MCI employ temporal information less than controls, and that their lower usage is linked with poorer speed and flexibility functioning. These findings suggest that executive functions may play a decisive role in the acquisition and retrieval of temporal information in MCI.

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The Brixton test in frontotemporal dementia

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The Brixton spatial anticipation test is a widely used executive test that evaluates rule acquisition and switching. There is, however, surprisingly little published data relating to degenerative brain disease. The study aimed i) to compare Brixton test performance in behavioural variant frontotemporal dementia (bvFTD) and semantic dementia (SD), disorders respectively of the frontal and temporal lobes and ii) to

evaluate their error profiles. We carried out a retrospective analysis of Brixton data from 64 patients with bvFTD and 34 with SD. Data were examined blind to clinical diagnosis. Qualitative as well as quantitative analysis of errors was carried out, using an operationally defined coding system. The bvFTD and SD groups did not differ in age at onset or duration of illness at the time of testing. However, there were highly significant group differences in Brixton performance (p=0.001). Most SD patients performed within the normal range whereas bvFTD patients performed abnormally. Error analysis showed more persistent perseverations of previous rules in bvFTD and also more idiosyncratic, albeit non-random, responses. The range of errors extended beyond those reported in focal frontal lesions. The Brixton test shows both sensitivity and specificity. The variety of error types suggests distinct factors underlying performance breakdown in bvFTD.

Investigating the development of executive functions in adolescence

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The development of executive functions (EFs) has mainly been researched in younger children up to early adolescence, despite indications that particular aspects of EFs continue to develop throughout adolescence and into adulthood. This study examined whether EFs develop during the latter part of adolescence. Secondary school pupils (N=317, mean age=15.61 years, range=13.83 to 17.75 years) were assessed on a Stroop task, a Sorting task and a Backwards Digit recall task measuring inhibition, shifting and monitoring respectively. Pupils' scores were examined in relation to their age and other control variables. Pupils' age was significantly related with their inhibition, r=.15, p<.01, but not with their shifting or monitoring scores (r=-.05 and r=.10 respectively, all ps>.05). Age also significantly correlated with colour-naming ability, r=.13, p<.05 and working memory capacity, r=.18, p<.01; non-executive processes measured by control conditions of the inhibition and monitoring tasks respectively. Inhibition and monitoring were further analysed using regression and were best predicted by the school year pupils were in, their families' socioeconomic status and the respective control conditions' scores (R2=.50, p<.001 and R2=.36, p<.001). Overall, within this large sample of older adolescents, there appears to be little development of EFs. It is noteworthy that pupils' school year- when inserted in the regression models instead of age- was a better predictor of inhibition and monitoring, indicating that school-related within-year factors, such as curriculum level, may affect EFs.

Executive functioning in non-fluent aphasia

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Measuring executive functioning (EF) in individuals with aphasia is difficult. Many executive tasks place substantial demands on language processing, thus poor performance in those with aphasia may be a consequence of language difficulties and not EF impairment. The aim of this study was to establish a profile of EF in chronic non-fluent aphasia. We also examined differences between verbal and non-verbal EF tasks. Eleven participants with aphasia –with homogenous lesion site left inferior frontal gyrus—and control participants completed a battery of EF tasks (tapping into inhibiting, updating, switching). Tasks were well matched and suitable for use in aphasia. We created tasks that used verbal and non-verbal stimuli to explore the role of language in EF. Group analyses revealed that participants with aphasia demonstrated impairments of updating and inhibition. Additionally, there were no significant group (aphasia, control) by task type (verbal, non-verbal) interactions—suggesting aphasic participants performed equally on verbal and non-verbal tasks. Our results show that individuals with chronic non-fluent aphasia may have EF deficits, even when the verbal content of tasks is reduced. Further analyses will evaluate the association of EF with lesion and language profile (e.g., word retrieval measures).

The frontal paradox demonstrated in patients with focal neurosurgical prefrontal lesions using virtual reality measurement of multi-tasking

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Background: The 'frontal paradox' is often observed in patients with prefrontal lesions, in which there is normal performance on tests of executive functioning but behavioural disorganisation in everyday life. Virtual reality (VR) has the potential to demonstrate this paradox, but using laboratory based procedures to mimic everyday activity. **Aims**: The Jansari assessment of Executive Functions, (JEF, Jansari et al., 2014), a VR multi-tasking procedure which simulates clerical office business work, was used to explore the multitasking performance of individuals with neurosurgical prefrontal lobe lesions, comparing this approach to 'pen and pencil' executive functioning tests. **Method**: Nineteen individuals with neurosurgical prefrontal lobe lesions were compared with 19 healthy matched controls on the JEF versus other non-VR measures of neuropsychological functioning, including tests and questionnaires concerning executive functioning. **Results**: The JEF procedure demonstrated impairment relating to planning and adaptive and creative thinking as well as on event and time based prospective memory. There were no differences between groups on the non-Virtual Reality EF measures. Within the prefrontal lobe lesion group, impairments were not related to lesion location and laterality. **Conclusions**: The frontal paradox can be shown using virtual reality, irrespective of prefrontal brain location, suggesting a 'mass action' effect regarding impairment. The findings support the use of laboratory based VR in detecting impairments in EF in individuals with prefrontal lobe lesions and also potentially for simulating everyday impairment when developing new rehabilitation approaches.

POSTERS

Behavioural patterns and lesion correlates of noun and verb processing in post-stroke aphasia

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The behavioural status and neural representation of noun and verb processing has been a field of interest in neuropsychology and psycholinguistic research; findings, however, have been widely variable. The variability in the previous results might be due to uncontrolled psycholinguistic factors related to nouns and verbs. In this study, we developed and collected normative data for a set of neuropsychological tasks to assess production (picture naming) and comprehension (picture-to-word matching) of nouns and verbs using matched materials. We then used these novel tasks to explore the behavioural patterns and neural correlates of noun and verb processing, in a large cohort of 48 individuals with chronic post-stroke aphasia. Results revealed no behavioural differences between the production and comprehension of nouns and verbs once controlled on multiple psycholinguistic factors including word imageability, frequency, familiarity, age-of-acquisition, length and visual complexity. Moreover, lesion-symptom correlational analyses revealed large overlapping areas spanning the left temporal and parietal lobes extending from posterior supramarginal gyrus and angular gyrus along inferior and middle temporal gyri for both noun and verb naming and comprehension. These results support the view suggesting that the neural representation of noun and verb processing are jointly-supported within the cortex.

Mutations in the KCNJ11 gene cause a range of neurodevelopmental phenotypes as well as neonatal diabetes

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Background/Aims: KCNJ11 encodes the Kir6.2 subunit of the ATP-dependent potassium (KATP) channel present in the pancreas and brain. Activating KCNJ11 mutations cause permanent neonatal diabetes; neurological features are also seen in 20% patients. While sulphonyurea treatment greatly improves glycaemic control, children have ongoing neurodevelopmental sequelae that are poorly

understood. We aimed to explore the neurodevelopmental impact of KCNJ11 mutations. **Methods**: Ten children with KCNJ11 mutations (4xV59M,2xR201C,1xR201H,1xK170N,1xK170R,1xI182V) completed a battery of neuropsychological tests. Psychopathology was assessed via parent and teacher-report Developmental and Wellbeing Assessment (DAWBA). Results were compared with normative data. **Results**: Four children with the V59M mutation were untestable or obtained Z-scores ≥-3 on neuropsychological assessment; all had ≥1 neurodevelopmental disorder (autism/ADHD) diagnosed using the DAWBA. In the remaining 6 children, only 1 met diagnostic criteria for neurodevelopmental disorder. However, median Z-scores in all neuropsychological tests were below school-age population average, with lowest scores (median Z-score ≤-1) in the domains of executive function, verbal comprehension, and visuomotor performance. **Conclusions:** KCNJ11 mutations cause a range of neurodevelopmental problems. This is mutation-specific; V59M patients show the most severe phenotype but even those without severe functional impairment have neuropsychological deficits. Early clinical assessment is important for affected patients to facilitate individualised education/treatment plans.

Reality monitoring in stroke patients unaware of their memory deficits

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Patients with memory deficits following stroke can be unaware of their deficits. Difficulty in retrieving previous information about forgetful episodes has been proposed as a possible cause for lack of awareness, but attempts to demonstrate a causal relationship between these constructs have yielded conflicting results. This inconsistency raises the question of the role of specific mnemonic mechanisms in unawareness. This study aimed to examine the association of reality monitoring deficits in discriminating between information arising from internal versus external sources, and awareness of memory deficits. A sample of 32 individuals suffering from memory deficits following stroke underwent assessment of general cognitive functioning, episodic memory and awareness of memory difficulties. Patients also completed a reality monitoring paradigm in which they had to discriminate between information that was either previously seen or imagined. Dependent variables from this paradigm included discrimination accuracy, response bias, source proportion and internal, external errors. Responses were analysed within the Two-High-Threshold Theory. Results showed impaired reality monitoring for patients unaware of their memory deficits regardless of their memory and executive deficits.

'Morphemic' intrusion errors during administration of Chinese verbal learning task in patients with Alzheimer's disease

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Intrusions are recognized findings during verbal serial list learning tasks in patients with Alzheimer's disease (AD). Chinese-speaking patients commit morphemic intrusions (MIs) - errors sharing one morpheme with a target word. We hypothesize that MIs are correlated with executive and visual cognitive dysfunction. Neuropsychological tasks were administered to 73 Chinese-speaking AD patients: a frontal assessment battery (FAB), picture recall, visual reproduction, block design, and verbal list learning task of ten double morpheme Chinese words to measure MIs during immediate recall. Mann-Whitney U test indicated immediate picture recall (U = 383, p = .008) was significantly higher but delayed visual reproduction (U = 150, p = .002) was significantly lower in participants with MIs compared to those without. Spearman rank-order correlation indicated significant positive correlation between MI frequency (rs (72) = .324, p = .006) as well as number of unique MIs (rs (72) = 268. p = .023), and immediate picture recall score. No correlation was found between MI frequency and FAB or block design score. Executive function and visual construction do not contribute to commission of MIs, but a combination of relatively intact visual registration capability in conjunction with an impaired visual storage process may contribute to it instead.

Establishing Effective Neuropsychological Measures in Assessment of Normal Pressure Hydrocephalus

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Normal Pressure Hydrocephalus (NPH) is a neurological disorder characterised by cognitive impairment, gait disturbance, and urinary incontinence. Patients with NPH respond to high volume lumbar drainage and more permanent ventriculo-peritoneal shunt procedures which treat their impaired cerebrospinal fluid circulation. There is consensus that the Neuropsychological profile of NPH patients is dominated by deficits in executive function, but the most effective diagnostic measures have not been agreed. Cognitive assessment seeks to, (1) predict benefit from Ventricular Peritoneal Shunting, (2) differentiate between NPH and other degenerative conditions. We have now seen more than 40 patients with suspected NPH before and after high volume lumbar drainage. Cognitive Measures that were sensitive to the effects of lumbar drainage and those useful for differentiating NPH from Alzheimer's and other dementias are discussed. The implications of the results are considered, alongside confounding variables such as co-morbid neurological disorders.

Systematic review of the impact of cognitive impairment on health-related quality of life in people with multiple sclerosis

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Objective: This study aims to investigate the impact of cognitive impairment on the health-related quality of life (HRQoL) in people with multiple sclerosis (pwMS). The following electronic bibliographic databases were interrogated: MEDLINE, PsychINFO and MIT Cognet. Following screening, reference lists of relevant articles were hand-searched and included in final analysis. Details of the protocol for this review can be accessed on PROSPERO at www.crd.york.ac.uk/PROSPEROFILES/54350_STRATEGY_20170011.pdf. Studies published between January 1990 and December 2016 were reviewed. Risk of bias was independently assessed by both authors using the Cochrane Collaboration Risk of Bias tool. A narrative synthesis of the findings from the included studies has been structured around the type of cognitive assessment, target population characteristics (MS subtype and, where appropriate, disease duration), and type of outcome measurement. **Implications**: Although cognitive impairment affects around 50% of pwMS, its impact on HRQoL is currently unknown. This systematic review will identify and inform directions for future research as well as highlight potential new targets for rehabilitation to improve the HRQoL of pwMS.

Predicting the pattern and severity of chronic post-stroke language deficits from functionally-partitioned structural lesions

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Predicting language deficits (aphasia) may improve clinical management for disorders like stroke. Previous studies have used neuroimaging to discriminate between aphasia dichotomies but not on predicting individual assessment scores. Here, core language areas were mapped using principal component analysis (PCA) in combination with voxel-based correlational mapping (VBCM) and the resultant 'functionally-partitioned' lesion maps were used to predict 21 individual test scores as well as aphasia subtype for 70 patients with chronic post-stroke aphasia (left hemisphere) using regression models. We compared: lesion volume alone (LV model) vs. a four-principal component (phonology, semantics and speech quanta plus residual) functional-partition of the lesions (LV-PCA model), while also testing the effect of adding demographic information (age, education and months post-onset). The winning model was identified using adjusted and predicted R^2 metrics (model fit and generalisation, respectively). In parallel we used logistic regression to predict fluent/non-fluent status and aphasia subtype. The LV-PCA plus age model was almost twice as good as lesion-alone, had the highest average adjusted (0.29) and predicted (0.21) R^2, and outscored other models on 13/21 tests. The same model most accurately predicted fluent/non-fluent status (88.6%) and aphasia subtype (68.6%). In conclusion, behavioural prediction based on functional-partitioned lesions improves on simple anatomical-only models.

Phrase frequency effects in aphasia

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Frequency effects are well documented at the single word level in aphasia. However, frequency exerts an influence beyond the single word level. High-frequency combinations are processed more rapidly by neurotypical speakers and are often preserved even in severe aphasia. We employ an online word monitoring task to test sensitivity to phrase frequency at the level of three-word combinations in aphasia. Participants (including 45 normative controls) performed an auditory word recognition task in which target words are embedded in low- versus high-frequency contexts (e.g., 'box of TEA' vs. 'cup of TEA'). The task comprises three conditions: first-word manipulations ('from this POINT' vs. 'at this POINT'), second-word manipulations ('the only DAY' vs. 'the other DAY') and common versus less common noun pairings (e.g., 'gin and TONIC' vs. 'lime and TONIC'), all embedded in longer sentences. Participants respond via button press, and reaction times are recorded. Preliminary results reveal facilitation of word recognition in higher frequency constructions in all conditions in both younger and older neurotypical controls, while aphasic participants shift from normative patterns. We also present relationships between sensitivity to combination frequency and other cognitive and language variables.

Development of a new screening test to identify emotion recognition problems after brain injury

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Brain injury will be one of the major causes of death and disability by the year 2020 (Hyder et al., 2007). Personality and behavioural changes are often long lasting (Marsh et al., 1990). Problems recognising emotions after brain injury cause significant difficulties with relationships. This pilot study attempted to develop a new, easily administered test, which enables clinicians to quickly assess people with brain injury. Poor performance may indicate emotion recognition difficulties and the need for detailed investigation. The test consisted of 14 short video clips of actors portraying different emotions. Half the clips included neutral carrier phrases and half had no phrases. Performance of 92 neurologically healthy adults was compared with that of 20 adults who had sustained moderate-to-severe brain injury. Analysis demonstrated a statistically significant difference in performance ($p< .05$) between the groups in six the seven clips without phrase and 5 of the 7 with phrase. Initial results suggest the new test may provide a valid, reliable method of rapidly detecting emotion recognition difficulties after brain injury. Further investigation of the usefulness of this new measure is being undertaken.

Goal maintenance and verbal working memory: The effect of concurrent suppression.

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Complex tasks require individuals to actively maintain rules to guide successful performance. Task-switching studies have suggested that this ability – goal maintenance – relies on verbal working memory resources. In task-switching, concurrent articulatory suppression impairs the use of important switch cues, but only when task cues are abstract; more transparent cues can guide switching without goal maintenance. However, the effect of articulatory suppression has yet to be demonstrated in paradigms more common to the goal maintenance literature, in which only a single task set is maintained. The present study examines the effect of concurrent suppression on goal maintenance within a shape-monitoring task with either abstract or transparent task cues. One-hundred and forty-five younger adults participated in a 2 (abstract vs. transparent task cues) X 4 (no suppression vs. articulatory suppression vs. simple foot-tapping vs. spatial foot-tapping) between-subjects design. There was no significant main effect of either cue transparency or suppression condition. However, there was a significant interaction effect: use of abstract task cues was unaffected by any modality of suppression, whereas use of transparent task cues was impaired under articulatory suppression and simple foot-tapping. This suggests that goal maintenance within a single task set does not rely on domain-specific working memory resources.

GABA concentrations in the anterior temporal lobe predict human semantic processing

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There is now considerable convergent evidence from multiple methodologies and clinical studies that the human anterior temporal lobe (ATL) is a semantic representational hub. However, the neurochemical nature of the ATL in the semantic processing remains unclear. The current study investigated the neurochemical mechanism underlying semantic processing in the ATL. We combined functional magnetic resonance imaging (fMRI) with resting-state magnetic resonance spectroscopy (MRS) to measure task-related blood-oxygen level-dependent (BOLD) signal changes during sematic processing and resting-state GABA concentrations in the ATL. Our combined fMRI and MRS investigation showed that the stronger ATL BOLD response induced by the semantic task, the lower GABA concentration in the same region. Moreover, individuals with higher GABA concentration in the ATL showed better semantic performance and stronger BOLD-related fluctuations in the semantic network. Our combined fMRI and MRS investigation demonstrated that the resting-state GABA concentration predicts neural changes in the human ATL and task performance during semantic processing. Our data indicate that individuals with higher GABA may have a more efficient semantic processing leading to better task performance and imply that GABAergic neurochemical processes are crucial to the neurobiological contribution of the ATL to semantic cognition.

Eating disorders in musicians: A survey investigating self-reported eating disorders of musicians

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This study aimed to estimate the prevalence of Eating Disorders (EDs), using the Eating Disorder Examination Questionnaire (EDE-Q), Body Mass Index (BMI) and self-reports, and their relation to perfectionism, stress, anxiety and depression in musicians using the Depression Anxiety Stress Scale (DASS-21), Perfectionism Inventory (PI), demographic details, information about participants' musical and career development, lifestyle, eating habits and health. An online survey was distributed worldwide and 301 English-speaking musicians aged 18 years and older participated. Our screening tools for EDs showed an increased prevalence of EDs in musicians. The EDE-Q Global Score showed pathological values in 18.66% of musicians. The EDE-Q subcategories eating concern in musicians were significantly higher than the general population. In male musicians, restraint was significantly higher compared to the general population (p<0.001) and there was a marginal significant difference in shape concern (p=0.085). Regarding lifetime prevalence, 32.3% of musicians answered positively. The DASS-21 showed that depression and stress were severe, anxiety was extremely severe and perfectionism was significantly higher in musicians compared to the general population (p<0.001). Eating Disorders are more prevalent in musicians compared to the general population and possible risk factors are perfectionism, depression, anxiety and stress due to the demands of their job.

Early executive difficulties predict lower levels of participation in personally meaningful activities 6 months after cerebrovascular accident.

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Objectives: There is interest in using early cognitive assessment to predict functioning after stroke. It has been argued that the most meaningful outcome is participation, which has been linked to executive difficulties. This study investigated whether early executive difficulties predicted participation levels 6 months post-stroke. **Method**: A retrospective analysis was conducted, using data initially collected to validate the Oxford Cognitive Screen (OCS). Data from 74 participants was available on the measures required for inclusion at acute (Mean days post-stroke: 6.11) and follow-up (Mean months post-stroke: 6.5) assessments. A stepwise multiple regression analysis investigated whether a significant amount of variance in the participation subscale of the Stroke Impact Scale at follow-up was predicted by acute performance on the OCS executive functioning subtest (OCS Trails test), over and above that predicted by acute functional severity (Barthel Index), a general cognitive screen (MoCA) and demographic variables (age, years of education and gender). **Results**: The model significantly predicted higher participation levels, R= .67, F (3, 70)= 18.76, p< .001. Three predictor variables significantly

contributed: higher Barthel Index scores, faster Trails performance and lower education. **Conclusion**: Early executive difficulties may be clinically informative but further work is needed to replicate the current findings.

Improving motor function in participants with cerebral palsy, Duchenne muscular dystrophy and Down's syndrome: clinical utility of the virtual-reality, mobile-phone game scenario

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Background: Various motor difficulties are associated with Cerebral Palsy (CP), Duchenne Muscular Dystrophy (DMD) and Down Syndrome (DS). Research has indicated that Virtual Reality (VR) as an assistive technology can be useful in rehabilitation of such conditions. **Aim**: We explored differences in improvement of performance in individuals with CP, DMD and DS after practice, based upon smartphone virtual-game-use. **Materials and Methods**: 25 individuals with CP, 50 with DMD and 50 with DS completed a VR maze task as quickly as possible on a mobile phone. Participants performed 20 repetitions divided in four blocks of five attempts. **Results**: repeated measures ANOVA showed that all individuals improved performance from first (M= 9.8ms) to last block (M=7.7ms, $p<0.001$) with statistically significant differences between groups ($p<0.001$). Post-hoc testing identified that the DMD group achieved better performance (M= 7.29ms) than the CP group (M= 9.26 ms, $p=0.018$) and the DS group (M= 9.83ms, $p<0.001$), but no difference was evident between the CP and DS groups ($p=0.495$) **Conclusions**: Individuals with CP, DMD and DS all improved in performance, thus there was improvement in motor performance, particularly in relation to participants with DMD. We conclude there is preliminary evidence of clinical utility in such approaches.

Changes in cognitive function following cardiac resynchronisation therapy (CRT) in heart failure patients

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Cognitive impairment in heart failure is common and is believed to be due, at least in part, to reduced cardiac output and cerebral hypoperfusion. Cardiac Resynchronisation Therapy (CRT) increases systolic blood pressure (SBP) and cardiac output in patients with reduced systolic function. A small cohort of consecutive patients (n=17) attending a Cardiology Clinic completed a battery of neuropsychological tests, rating scales, walking tests and transthoracic echo before and after CRT device insertion. Prior to CRT insertion, all patients were borderline or impaired in at least one cognitive domain (Verbal Memory, Language, Information Processing Speed, Dexterity and Verbal Fluency). 11/17 patients were impaired in two or more domains. Significant improvements were recorded six weeks post-operatively on some measures. Patients reported better Quality of Life on the Minnesota Living with Heart Failure questionnaire and walked longer distances in six minutes. Processing speed was measured using parallel forms of the Symbol Digit Modalities Test and demonstrated significant improvement. There was no change in performance on memory tasks or verbal fluency. Findings suggest that some information processing deficits associated with heart failure are reversible. Further analysis will be presented at the meeting.