

aware dictionary analysis, allowing automatic interpretation of text including idioms and 'emojis'.

**Results** 13347 tweets were collected, with tweets not in English having been excluded from the analysis. The analysis showed a majority positive sentiment in the tweets. The most negative discourse was related to search terms: 'Medically Unexplained Symptoms' and 'Psychosomatic'. Engagement with charities and tweets aiming to promote awareness of the disorders in question were common. Most frequent links to posts about FND were synonyms for the disorder, along with NEAD and charities and awareness movements. For NEAD, the most common links made were with FND, awareness campaigns, synonyms for NEAD, and Chronic Fatigue Syndrome.

**Conclusions** FND and NEAD have active communities on Twitter. These include both health professionals, patients and lay advocates. The overall sentiment is positive ( $p < 0.05$ ), but with some negativity from sceptical patients and some who are disappointed with their care, and with more negativity associated with certain search terms. (For example, more negative sentiment in tweets about 'Medically Unexplained Symptoms' compared to ones about 'Functional Neurological Disorder',  $p < 0.0005$ ). Public discourse analysis on websites such as Twitter may prove fruitful for monitoring patient understanding, trends in patient acceptance of diagnosis and factors contributing to these.

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#### CEREBELLAR COGNITIVE AFFECTIVE SYNDROME – A CASE REPORT OF DIAGNOSIS AND MANAGEMENT USING SELECTIVE SEROTONIN AND NOREPINEPHRINE REUPTAKE INHIBITORS

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**Objectives/aims** The objective of this case is to describe and report on a case of Cerebellar Cognitive Affective Syndrome (CCAS) which improved after the use of high dose venlafaxine therapy. To our knowledge, there are only a few case reports discussing on the effectiveness of various drug therapies in CCAS patients and none had reported on the use of Selective Serotonin and Norepinephrine Reuptake Inhibitors (SNRI).

**Methods** We describe a 55-year-old male with a history of partially excised grade 1 left cerebellar haemangioblastoma in 2005 followed by Gamma Knife in 2006.

Unfortunately, he suffered a recurrence in 2018 requiring embolisation of the haemangioblastoma followed with surgery to resect the tumour. He presented to our specialist neuropsychiatric unit following episodes of new acute unprovoked behavioural changes after surgery. During these episodes, he would become verbally abusive, refuse to engage in any rehab activity, refuse any oral intake, become sexually disinhibited, and experience distressing hallucinations. On the neuropsychiatric ward, he continued to have episodes of severe emotional regulation difficulties. There were no obvious triggers identified and it was noted that the peaks and troughs in his behaviour lasted for a few days before self-resolving and did not follow any particular pattern. In between these episodes, the patient was pleasant, engaging in physiotherapy, and conversed normally with staff.

**Results** He scored a total of 4 out of 10 on the CCAS-scale. A diagnosis of CCAS was concluded given the extensive history of cerebellar injury, nature of presenting complain, and his CCAS-scale score. He was started on high dose SNRI (Venlafaxine XL 150 mg BD). On repeating the CCAS-scale after being on SNRI for 4 months, his score was worse at 6 out of 10. However, we observed a decrease in the frequency, duration, and severity of behavioural change after commencement of SNRI. He benefited greatly from physiotherapy on the ward however despite our best efforts functional independence was not regained. He had to be transferred with the aid of 2 members of staff and mobilised with the aid of an electronic wheelchair.

**Conclusions** CCAS is a complex disease and the management is yet to be agreed on by the neuropsychiatry community. Our case report illustrated the therapeutic benefit of venlafaxine in the treatment of severe emotional regulation difficulties associated with resection of a cerebellar haemangioblastoma. Furthermore, patients with cerebellar injuries should be managed in a multi-disciplinary manner with input from neurology, neuropsychiatry, neuropsychology, occupational therapist, and physiotherapist.

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#### CAN AN AUTOMATED ASSESSMENT OF LANGUAGE HELP DISTINGUISH BETWEEN FUNCTIONAL COGNITIVE DISORDER AND EARLY NEURODEGENERATION?

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**Objectives/Aims** We used our automated cognitive assessment tool to explore whether responses to questions probing recent and remote memory could aid in distinguishing between patients with early neurodegenerative disorders and those with Functional Cognitive Disorders (FCD).

**Hypotheses:** pwFCD would have no significant differences in pause to speech ratio and measures of linguistic complexity compared to healthy controls. pwFCD would have significant differences in pause to speech ratio and measures of linguistic complexity compared to pwMCI and pwAD.

**Methods** We recruited 15 participants with FCD, MCI and AD each as well as 15 healthy controls. Participants answered 12 questions posed by the 'Digital Doctor'. Automatic processing of the audio-recorded answers involved automatic speech recognition including detecting length of pauses. Two questions probe recent memory, exploring knowledge of current affairs. Two probe remote memory, asking for autobiographical details.

We analysed the data using: Pause to speech time ratio. Moving average type token ratio (MATTR): An automated measure of vocabulary richness. Computerised propositional idea density rater (CPIR): An automated measure of propositional idea density.

**Results** There was a significant difference in the pause to speech ratio for recent memory questions for HC versus AD ( $P = 0.0012$ ) and MCI ( $p < 0.0001$ ) but also compared to those with FCD ( $p = 0.0128$ ). There was a significant difference in

the pause to speech ratio for remote memory questions for HC vs AD ( $p=0.0008$ ) and MCI ( $p=0.0049$ ) but not FCD ( $p=0.0613$ ). There was no significant difference between FCD v AD or FCD v MCI. The MATTR and CPIDR were similar across all groups but highest in HC and FMD.

**Conclusions** This study rejects both hypotheses. However, the data supports the application of linguistic measures to recent and remote memory questions in distinguishing those with MCI & AD from HC's. Further work will investigate the utility of incorporating additional measures of lexical and grammatical complexity (word frequency, sentence structure). Longitudinal study will provide insights into which features may predict stability in FCD and HC's and progression from MCI to AD, supporting the system's promise as a monitoring tool.

## 27 THE COEXISTENCE OF SOCIAL WITHDRAWAL AND IMPULSIVITY: A TRANS-DIAGNOSTIC APPROACH

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**Introduction** Social anxiety disorder or phobia (SAD) is a debilitating condition, where an individual experiences overwhelming fear to situations involving social interactions. Prototypically, SAD presents as shy, submissive, inhibited, and risk-averse behaviours. Contrastingly, an atypical sub-group show impulsive, aggressive, novelty-seeking behaviours along with severe substance abuse problems. In scenarios, where there is co-existence of polar opposite symptoms, trans-diagnostic approaches extrapolate the characteristics of a disorder as a continuum rather than a categorical one. Data-driven computational models such as drift diffusion model utilize behavioural measures and extract potential markers that reflect the activity of specific brain networks. Here, we aim to analyse and correlate the psychological traits with computational estimates of behaviour during risk-taking and value based decision making.

**Methods** We used the data from 1400 participants who completed the 2 stage sequential learning task. We focused on the second stage of the task, where the reward probabilities of the choices are stochastic. The computational measures were estimated for two scenarios i.e. when the participants made 1) accurate choices and 2) risky choices (the choice with maximum variance in reward probability was labelled as risky). This computation was performed for all the trials across all the participants. We then used choice-(risky vs non-risky or correct vs incorrect) and response time as inputs to the hierarchical drift diffusion model to extract threshold ( $a$ ), drift rate ( $v$ ) and response bias ( $z$ ) parameters. The computational parameters were then correlated with the 3 psychological factors that span the compulsive, anxiety-depression and the social withdrawal spectrum.

**Results** The computational parameters from both accuracy and risk taking scenarios of the sequential learning task were correlated with the 3 factors. While controlling for IQ and age, we found a generalized correlation which is significant between the threshold parameter ( $a$ ) and social withdrawal, with the former estimate being negatively correlated (Accuracy:  $|r| = -0.078$ ,  $p=0.003$ ; Risk:  $|r| = -0.075$ ,  $p=0.005$ ) with the latter. This relation was not observed with regard to anxiety-depression and compulsive traits.

**Conclusions** We show that individuals with higher social withdrawal levels are impulsive as they accumulate less evidence while making a choice. This behaviour holds irrespective of the choice being chosen is an optimal or a risky one. Critically, we show how a trans-diagnostic approach of integrating computational model and psychological questionnaires can reveal the existence of psychological traits as a continuum.

## 28 THE LINK BETWEEN FUNCTIONAL NEUROLOGICAL DISORDER (FND) & MIGRAINE: A SYSTEMATIC REVIEW

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**Background** FND and migraine are both common disorders that occur in the absence of structural brain damage. Clinically, it is suspected that they might co-occur more often than would be expected by chance. It is important to distinguish them in some clinical situations, especially hemiplegic migraine from migraine that triggers FND with weakness but there are no systematic, and limited narrative reviews of the topic.

**Objectives** To study the association of FND and migraine with a systematic review of the literature.

**Methods** Searches for relevant literature were performed in July 2018 in MEDLINE and PsycINFO electronic databases without time limitation and augmented by hand searching the reference lists within these papers and the knowledge of literature from selected experts in the field

**Results** Five studies were identified; two from electronic, one from hand searches and two from experts. The total number of the sample size from the included studies was 2385. Findings generally indicated a positive association between migraine and FND. A prospective epidemiological study found that number of FND symptoms reported by migraineurs was 2.2 and 1.1 on controls. In a retrospective review of medical report study functional movement disorders occurred within 6 months or concomitantly with migraine onset in 71% of chronic migraine (CM) & 87.5% episodic migraine (EM) cases and the outcome effect of treating migraine on FND symptoms was a decrease or remission in 91% in CM and by 67% in EM. In a retrospective chart review study in the epilepsy monitoring unit, migraine diagnosis had a predictive value for diagnosing PNES & epilepsy  $OR=1.83$ ,  $p<0.037$  (95% CI: 1.04–3.32) compared to other biological factors. 40% of people diagnosed with FND reported having headache compared to 9% of controls in patients with other neurological disorders ( $P<0.0001$ ). Unpublished data from a case-control study by Stone et al, revealed that 36% of 107 FND patients with limb weakness experienced migraine. Additionally, a clinical-based observational study from India of 1000 patients highlighted the common occurrence of psychogenic non-epileptic seizures (PNES) during acute migraine attacks.

**Conclusions** Despite a limited evidence base, migraine and FND appear to co-occur at elevated rates. It is imperative to explore how treating either migraine or FND impacts on the other. More studies are needed to confirm these findings and to investigate any potential mechanistic overlap.