PDQ-anxiety. In contrast, cognitive ability (delta ELPD = 36 (SD 8)) and age (delta ELPD = 11 (SD 5)) provided useful predictive information of future PDD.

Conclusion

Cognitive ability and age strongly out-performed neuropsychiatric measures, including hallucinations, as markers of developing dementia within four-years. Therefore, hallucinations and other neuropsychiatric symptoms do not appear to be useful markers of dementia risk.

Diagnosis and monitoring of neurodegenerative disorders using eye-tracking

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Aim

Understanding sensory deficits associated with neuro-degenerative disease is important both to illuminate the neural bases of these conditions and to improve how they are diagnosed and treated. In this talk I will describe how behavioural assessment based on eye movements has the potential to transform assessment of not only visual but also cognitive function.

In terms of vision, humans rely on the oculomotor system to maintain a stable, sharp view of the world. Having briefly reviewed the main classes of oculomotor dysfunction observed in neurodegenerative disease (eg, saccade generation) I will discuss how eye-tracking paradigms (eg, saccadic remapping) can also help us explore general brain processing "strategies" (eg, predictive coding). I will next describe how eye-tracking can be used to explore non-visual brain function both through (a) targeted tests, such as cognitive assessment based wholly on fixation and (b) free-viewing paradigms: analysis of patterns of fixation acquired while patients engage in everyday activities such as reading or watching movies. Finally, I will discuss ways in which my lab is working towards making these techniques more widely available. Although infrared eye-tracking is increasingly incorporated into consumer technologies such as virtual reality headsets, access to dedicated hardware remains a barrier to adoption of eye-tracking as a means of measuring behaviour. I will describe how the built-in imaging capabilities of ubiquitous technologies—such as tablets and smart phones—can be leveraged to provide basic eye tracking for (eg, home-monitoring applications).

Conclusion

Eye-tracking then, provides a means of objectively characterizing a whole range of patients' day-to-day visually-guided activities. This wealth of information—when paired with high throughput data analyses now achievable with machine learning—has the potential to support a patient-centred approach to the diagnosis and management of neuro-degenerative disease.

Audition and vision: links with cognition in older adults

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Aim

Longitudinal studies and metanalyses show associations between hearing and vision impairment and cognition. Clinical trials are assessing the efficacy of hearing treatment in reducing cognitive decline in elders with hearing loss but auditory/visual training effects on cognition have not been determined. Poorer childhood hearing appears to increase risk for poorer hearing in adulthood. Combined with evidence that mid-life hearing loss is a significant modifiable risk factor for cognitive impairment, this suggests a potentially modifiable trajectory from sensory to cognitive decline, that begins early. We aim to develop interventions to improve sensory processing and cognition that would be feasible and acceptable for all New Zealanders.

Method

Participants in Phase 1 assessment study were adults with suspected MCI, older healthy controls and younger control. Hearing, visual acuity and auditory and visual processing were assessed using behavioural, EEG and self-report measures. Feasibility of training, using in-person and online formats, has been explored in Phase 2.

Results

The MCI group had greater self-reported hearing difficulties, and poorer auditory temporal and visual motion perception scores. Lower MoCA scores were associated with greater self-reported hearing difficulties and slower cortical auditory evoked potentials. Phase 2 training trials using auditory training and global motion perceptual training highlight the need for training to be motivating and for technology to be accessible for older adults who have computer anxiety or low computer self-efficacy. Preliminary data from younger participants suggest cognitive flexibility and executive function may improve with auditory training.

Conclusion

Further work is needed to develop and trial engaging training technology that is accessible and efficacious for older adults, including those experiencing auditory processing difficulties from other neurological conditions. Research by our team (Purdy, Brewer, Taki) with Māori stroke survivors highlights that iwi are motivated and resourceful and willing to engage with new technological solutions for their communities.