

## **Sensory function, cognition, and brain anatomy in older adults with or at risk for dementia**

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### **Abstract**

There is a strong cross-sectional relationship between sensory and cognitive function in healthy older adults. Moreover, prospective cohort studies have demonstrated that a sensory impairment (hearing, vision, and/or olfaction) is independently associated with increased risk for dementia. Although a number of plausible hypotheses for these relationships have been offered, the mechanisms remain unknown. However, understanding the relationship between sensory loss and brain neuroanatomy might help to constrain some of the hypotheses. The goal of this study is to examine: 1) the relationship between unimodal sensory loss and cognitive function, 2) the relationship between unimodal sensory loss and cortical brain structure, and 3) whether having more than one sensory loss compounds these relationships. To do so, we used data from the Comprehensive Assessment of Neurodegeneration and Dementia (COMPASS-ND) study. This is a large-scale study of older Canadians who are living with or are at risk for dementia, including those with subjective cognitive impairment (SCI), mild cognitive impairment (MCI), Alzheimer's disease (AD), other causes of dementia, and normal controls. We accessed clinical data, MRI imaging, measures of sensory function, key biomarkers, and extensive data on a broad range of cognitive function.

I will present current findings from participants with SCI (N=28), MCI (N=75), and AD (N=21). Controlling for age, sex, and education, cognitive performance measures decreased over the groups (SCI>MCI>AD), as expected. The groups differed in reading acuity, contrast sensitivity, and olfactory identification, but not hearing (audiometric category, perceiving digits in noise). In participants with SCI, hearing loss was associated with lower right hippocampal volume. In persons with MCI, olfaction was the strongest predictor of cognitive function. However, the presence of

a hearing loss was associated with less consistent cross-modal (auditory-visual) memory performance and weaker memory-hippocampal relationships. Overall, the results suggest either relative preservation of the left hemisphere or vulnerability of the right hemisphere in the presence of hearing loss and are consistent with the hypothesis that hearing loss is associated with long-term neural and cognitive changes. These results illustrate a complex interplay between sensory-cognitive-brain measures in older adults with or at risk for dementia and suggest that hearing status has important implications for brain structure and cognitive performance.

**Word count: 357 (of max. 400)**

**Invited speaker.**

**I have no conflict of interest to disclose.**

Acknowledgement of Funding Sources

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