Cortical Thickness and Volume Differences in Individuals with Severely-Deficient Autobiographical Memory (SDAM)

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INTRO

- People with SDAM lack vivid re-experiencing of specific personal past episodes or events[1], yet they perform normally on tests of recognition memory[1,2]
- Intact recognition in SDAM is associated with:
  - Diminished functional connection between early visual cortex and posterior hippocampus[2]
  - Increased engagement of regions involved in semantic processing[2]
- The original case series SDAM indicated an atypical hippocampal asymmetry (L>R vs R > L, which is typical in healthy brains)[1]
- Aside from hippocampal volumetry, cortical structure in SDAM has not been assessed.

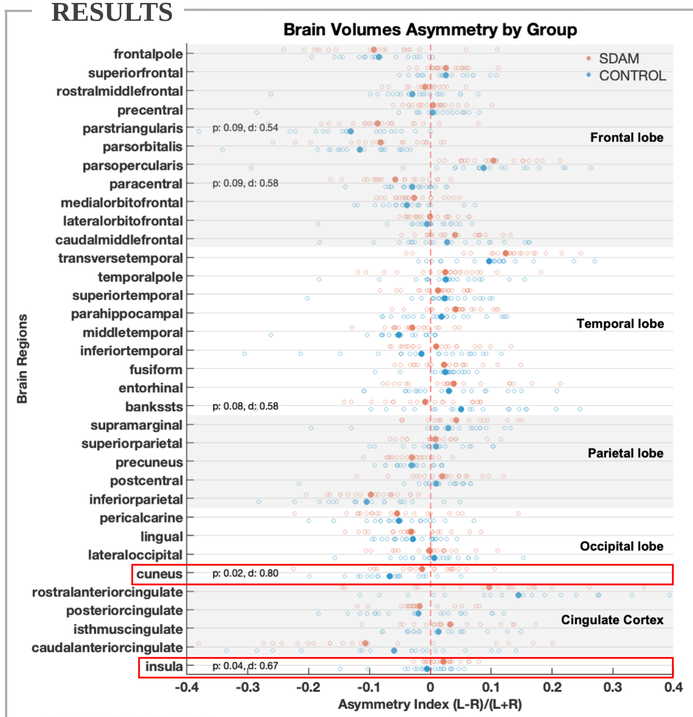
Aims

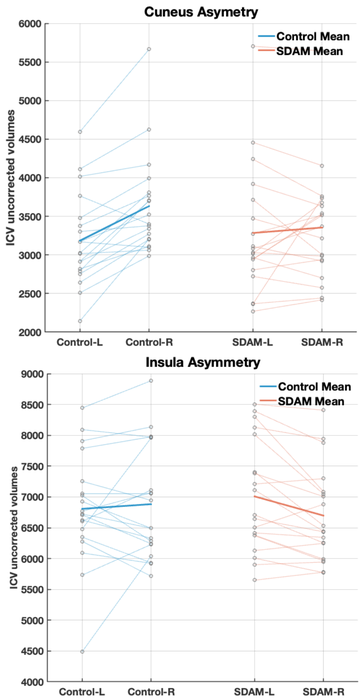
Assess cortical volumes, asymmetry, and thickness in people with and without SDAM

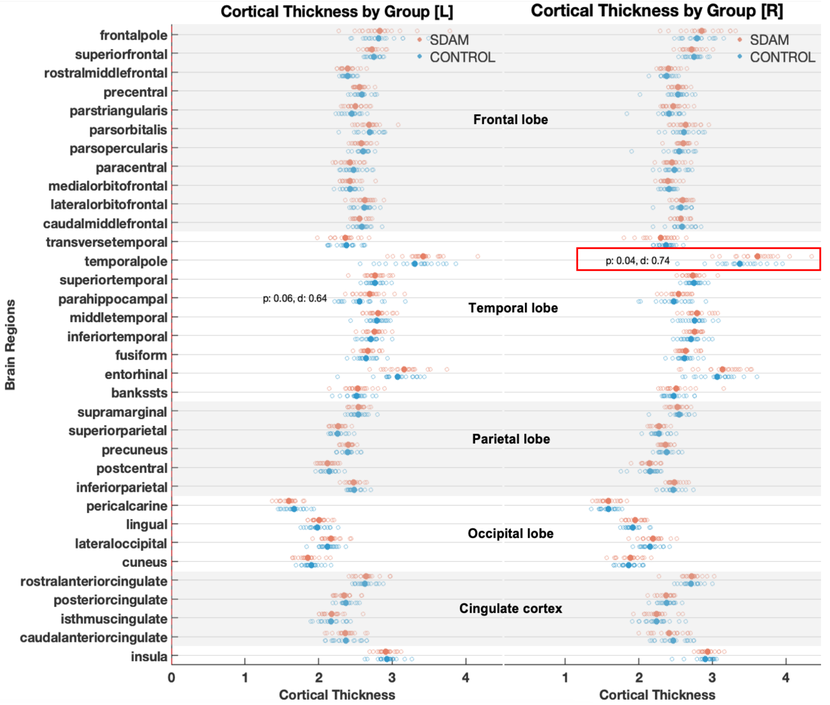
METHODS

- Participants
  - 38 healthy adults (M/F: 16/22)
    - SDAM : non-SDAM = 1:1
    - Age range: 25-64 (mean = 39)
- Preprocessing
  - Recon-all preprocessing through FreeSurfer
  - 68-ROI DK atlas was used
- Analysis
  - A permutation test with 1,000 iterations was conducted for each ROI
  - We computed 3 metrics: 1) cortical thickness; 2) cortical volume; 3) volume asymmetry.
- FDR-uncorrected results are reported.

RESULTS







DISCUSSION

- At the whole brain level, there were only subtle differences between people with and without SDAM.
- The observed differences correspond with prior research on SDAM.
- Increased cortical thickness in the right temporal pole may relate to lifelong reliance on semantic (as opposed to episodic) processes[2].
- Previous research in SDAM found reduced asymmetry in the medial temporal lobe (i.e., contrary to the expected R>L hippocampal volume)[1].
  - A similar pattern is observed in the cuneus and insular, involved in visual memory and sensory processing (for related finding in Highly Superior Autobiographical Memory (HSAM), see ref 3.
  - This finding is consistent with reduced functional connectivity between the hippocampus and visual cortex in SDAM[2]

CONCLUSION

- Consistent with their normal everyday functioning, there are only subtle differences in cortical structure between people with/without SDAM
- The memory of profile of SDAM may relate to altered hemispheric specialization in relation to episodic autobiographical memory.

REFERENCES

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