Connectomics Presentation

Frances Hung, Rihui Ou, Justin Weltz

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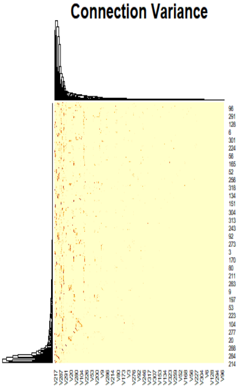
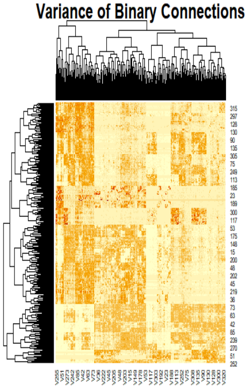
Preprocessing Data

- Binarizing connectome matrices (using chosen thresholds)





Memory Metrics

- Long term memory (across days) vs. short-term memory (across trials)

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- Mean standardized SW times/distances for each animal

Memory Metrics (cont.)

- Which mice show the most time/distance improvement?
- Account for lucky mice on the first day

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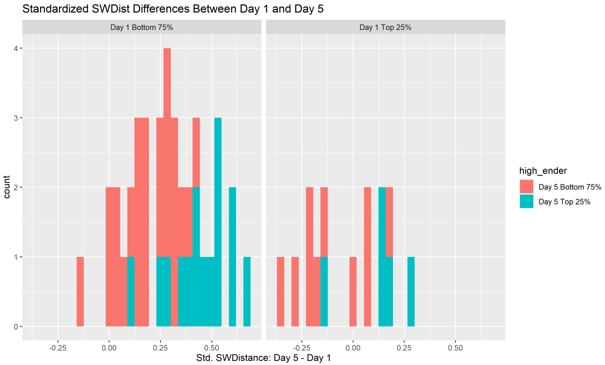
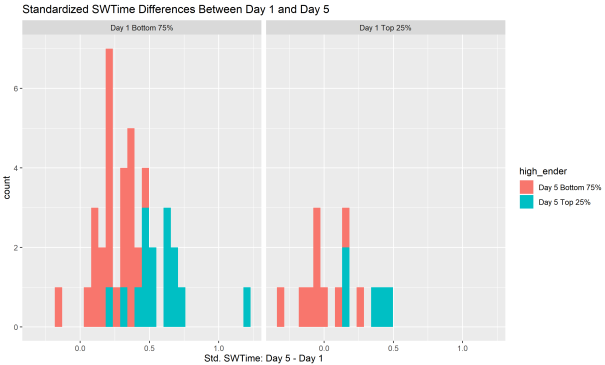


Memory Metrics (cont.)



-Differences of target times/distances appear roughly normal

The Model

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- $f(B_i; B_0) = \prod_{j=1}^{R} \prod_{l<j} \psi_{00}^{1(B_i[j,l]=1, B_0[j,l]=0)} \psi_{01}^{1(B_i[j,l]=0, B_0[j,l]=1)}$
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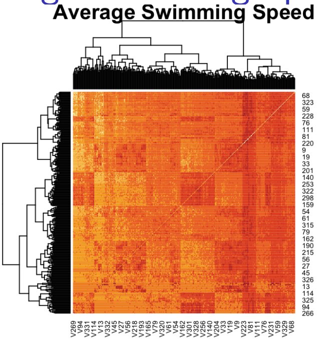
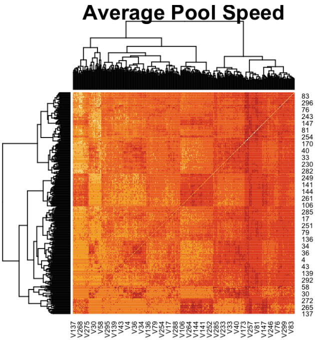
- Introduce latent component indicators C_i and probit regression variables Z_i.

Results–Average Swimming Speed



- Score each region pair to evaluate how such pair is related to the response. $score = \sum_i p(C_i = 1|y) \times connectome[i]$
- Some regions are almost always connected with other regions: 223, 81. . . .
- Some clusters are related to the high swimming speed:$\{140,253,322,298\dots\}$

Results–Average Pool Speed



- Some regions are almost always connected with other regions: 257, 81. . . .
- Some clusters are related to the high pool speed:{106,264,144,141. . . }

Conclusion & Discussion

- We build a extreme graph model to identify clusters that are highly realated to swimming.speed/pool.speed.
- The threshold to binarize the data can be tuned.
- Can also use a temporal modeling to study how the responses change over time.