Time spent in conversation over meals predicts default network function
Evidence from a passive mobile-sensing and fMRI study

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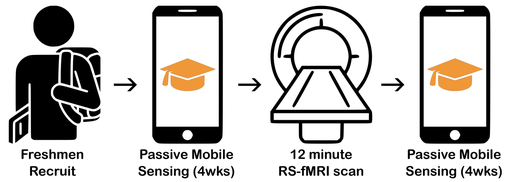
Introduction

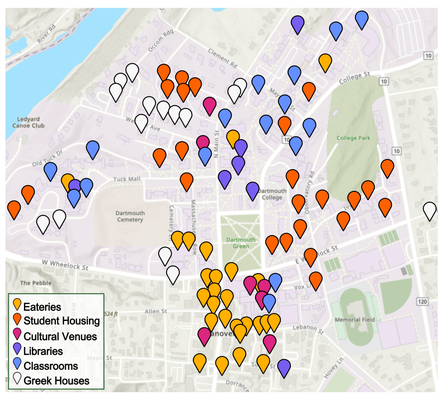
Commensality, the act of sharing meals, is important to group living.[1] A lot of naturally occurring conversations studied in social sciences take place over shared meals and include sharing salient social information.[1,2] However, not much is known about the brain functions that relate to commensal conversations.

Here, we utilize passive mobile sensing to track conversations that occur at locations of communal eating and relate the real-world conversation behaviours with brain functions as collected via the fMRI scan.

Data and Methods

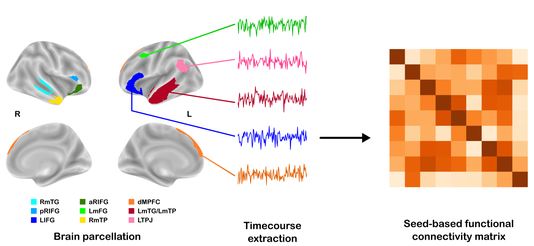
We tracked freshmen (N=88) for 2×4 week periods with an fMRI scan in between.





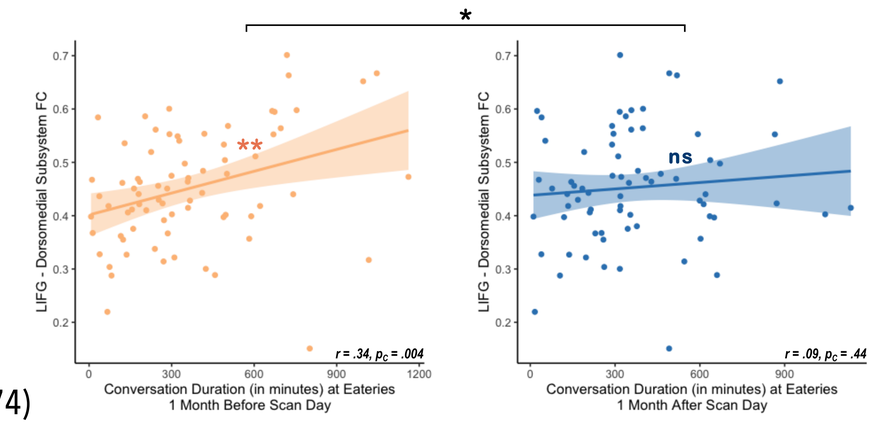
We used *StudentLife* [3] app for passive mobile sensing. The app employs Global Positioning System (GPS) to track the participants across 6 "locations" having N>50 visitors (.80 power). The app employs an online HMM classifier to identify conversations from the audio features.

We use the functional time series of the dorsomedial subsystem regions as seeds for functional connectivity.



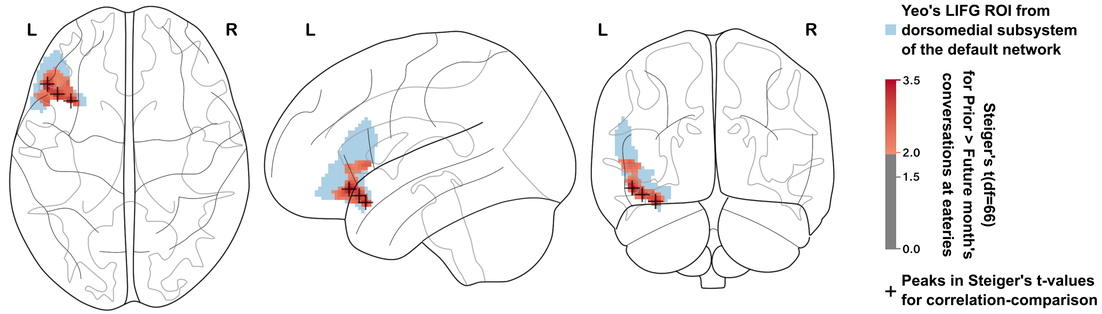
Results

Time spent in conversations over the prior month significantly predicts the average LIFG – dorsomedial subsystem functional connectivity, but the same is not true for that over the future month. Moreover, there is significant difference in the correlation between the two correlation coefficients.



The relationship is robust when we checked:

1. the seed region (|r's| < .23, p > .05, 69 ≤ df ≤ 74)
2. the locations of conversation (|r's| < .18, p's > .2, 50 ≤ df ≤ 72)
3. the time spent at Eateries (|r's| ≤ .13, p > .2, 71 ≤ df ≤ 73)



Peak Coordinates (MNI-152)			Preferential Processing
X	Y	Z	
-48	28	12	Autobiographical Memory, Semantics, and Language
-42	22	-16	
-34	18	-20	Affective Processing

The average functional connectivity of the posterior Left IFG voxels with other regions of the dorsomedial subsystem (of the default network) preferentially differentiated between the time spent in conversations over the past and future months.

The voxel-wise analysis gave us 3 peaks, the standard MNI-152 coordinates are tabulated on the left. A meta-analytic search on the locations (using NeuroSynth[4]) implicated the locations in autobiographical memory, semantic, and affective processes. These are common processes utilized as individuals indulge in conversations.

References

1. Powdermaker, 1932; DOI: 10.1525/aa.1932.34.2.02a00040
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3. Wang et al., 2014 (ACM); DOI: 10.1145/2632048.2632054
4. Denny et al., 2012 (JoCN); DOI: 10.1162/jocn_a_00233

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