Neural representations of others' mental states grow less distinct with psychological distance

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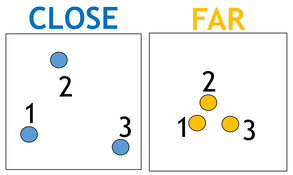
Introduction

The brain represents others' mental states within a reliable representational space[1]. However, people do not automatically assume that others have rich mental lives. Research on mind perception[2] suggests that we imbue close others with rich, nuanced mental experiences, but fail to do so for distant others. How does psychological distance affect the resolution of our mental state representation space?

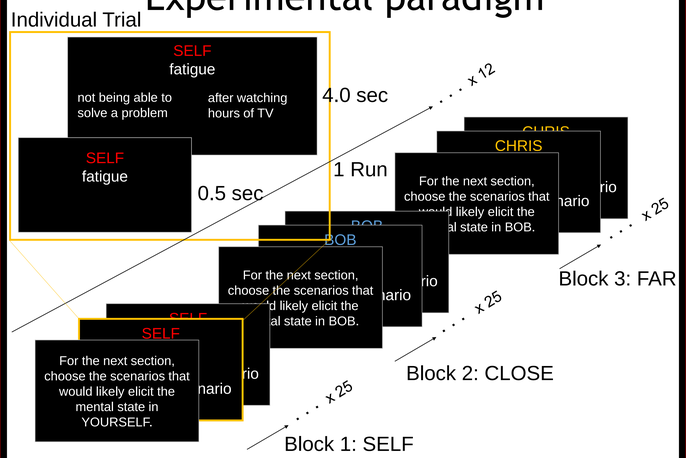
Hypothesis: People represent their own and close others' mental states in high resolution, and distant others' mental states less distinctly.

We test this hypothesis by measuring the **size** of the representational space of mental states for three targets: self, close other, and far other.

The size of the mental state space reflects the resolution of our representations: the larger the space, the more we distinguish between the states. The smaller the space, the lower the resolution, and the more similar the states seem.



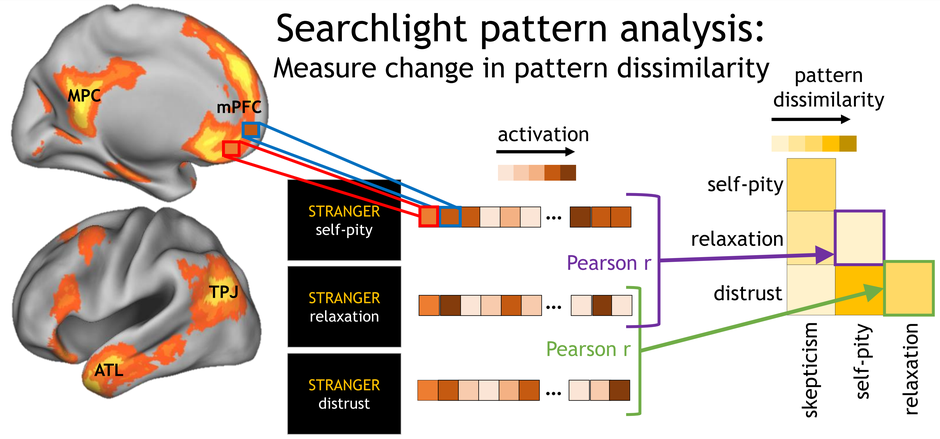
Experimental paradigm

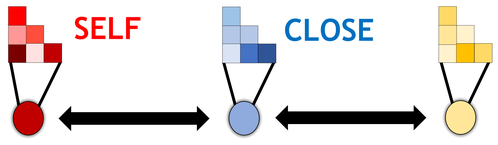


- N=35 (12M, 23F; 18-31yrs, mean age = 21yrs)
- 3T Siemens Prisma Scanner, 2.25s TR, 2mm^3 voxels

Searchlight pattern analysis:

Measure change in pattern dissimilarity

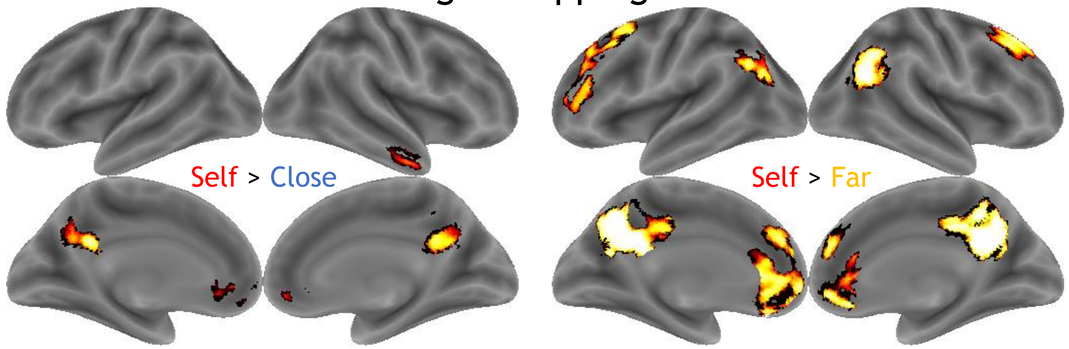




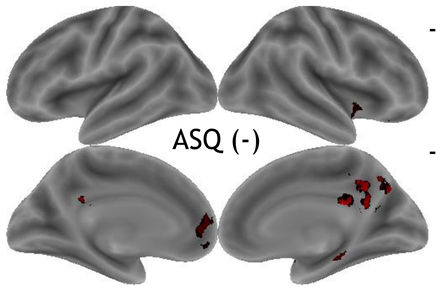
Random effects analysis

1. Calculate mean dissimilarity for each target
2. Compare means via ANOVAs/t-tests

Searchlight mapping results

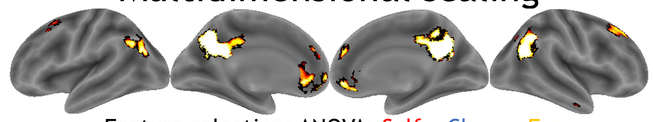


ps < 0.05, corrected via maximal statistic permutation testing with TFCE

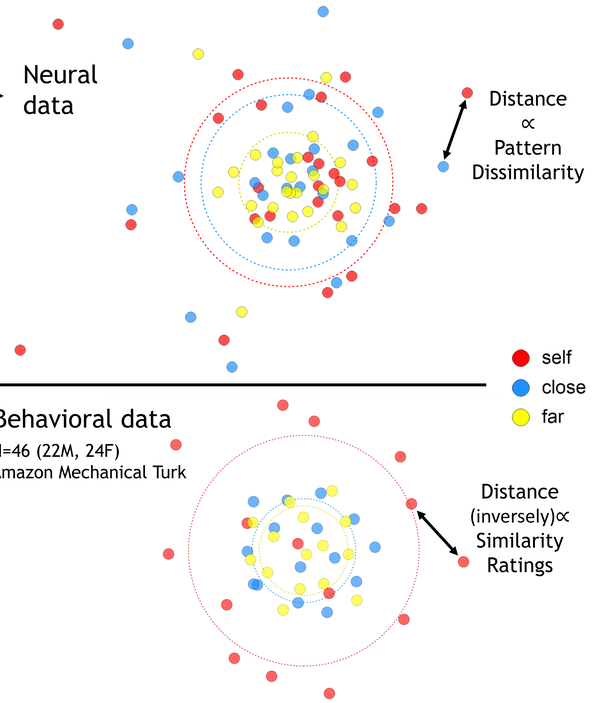


- People have less distinct representations of the mental states of psychologically distant others in mPFC, TPJ, ATL, and MPC
- Consistent individual difference results: higher ASQ scores associated with less pattern distinctiveness for (all others') mental states, in accordance with impoverished social cognition

Multidimensional scaling



Feature selection: ANOVA: Self ~ Close ~ Far



Discussion

Results support the hypothesis that people have rich representations of their own mental states and these representations become "fuzzier" with increasing psychological distance. This may reflect the neural mechanism of differential mind perception, and the dehumanization of outgroup members.

References:

1. Tamir, D. I.*, Thornton, M. A.*, Contreras, J. M., & Mitchell, J. P. (2016). Neural evidence that three dimensions organize mental state representation: Rationality, social impact, and valence. *Proceedings of the National Academy of Sciences*, *113*(1), 194-199.
2. Waytz, A., Gray, K., Epley, N., & Wegner, D. M. (2010). Causes and consequences of mind perception. *Trends in cognitive sciences*, *14*(8), 383-388.

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