The brain in the social world: Integrating approaches from social neuroscience, psychology and social network analysis

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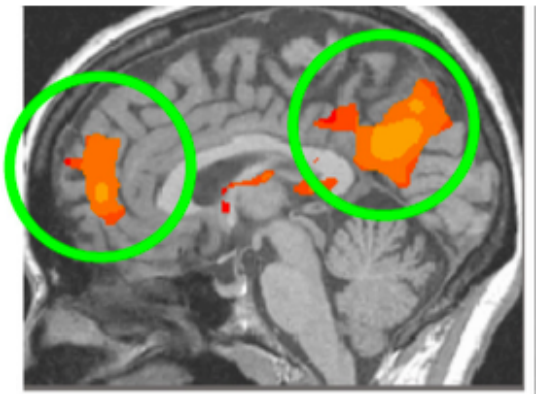
How do real-world social relationships shape cognition and behavior?

- Common approaches in social neuroscience:
  - Coarse distinctions (e.g., familiar others vs. strangers)
  - Study single relationships in isolation

- Such approaches have provided insight into how social factors shape how individuals think and behave

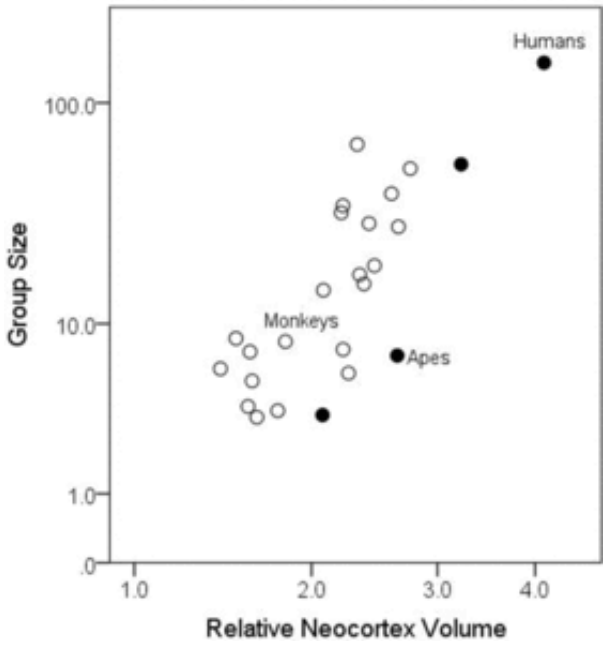


Seeing familiar individuals (vs. strangers) recruits brain regions involved in retrieving person knowledge and processing social cues (Gobbini & Haxby, 2007)

Little social neuroscience research has looked beyond coarse distinctions (e.g., friends vs. strangers), despite the likely importance of more nuanced social relationship information to social cognition and behavior

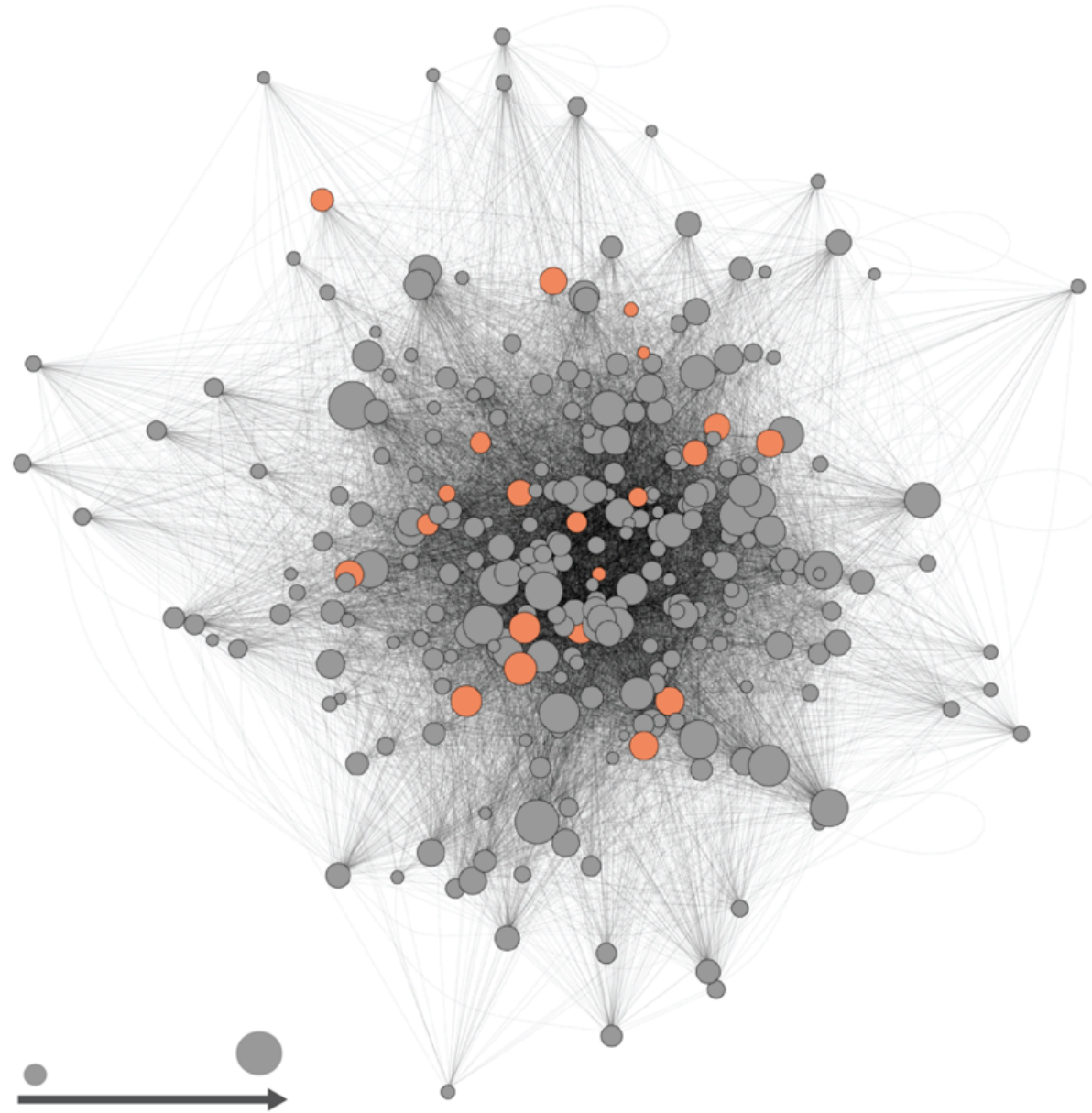
Little is known about if and when our brains encode information about others' positions in our social networks, and how this information shapes our thoughts and behavior

The Social Brain Hypothesis



- Humans inhabit large groups comprised of many long-term, non-reproductive bonds with non-kin
- As group size increases, the number of possible relationships (e.g., who is friends with whom) for individuals to keep track of increases exponentially
- **The Social Brain Hypothesis** suggests that the cognitive demands of living in large, complexly bonded social groups drove the evolution of humans' unusually large brains for our body size

Robin Dunbar

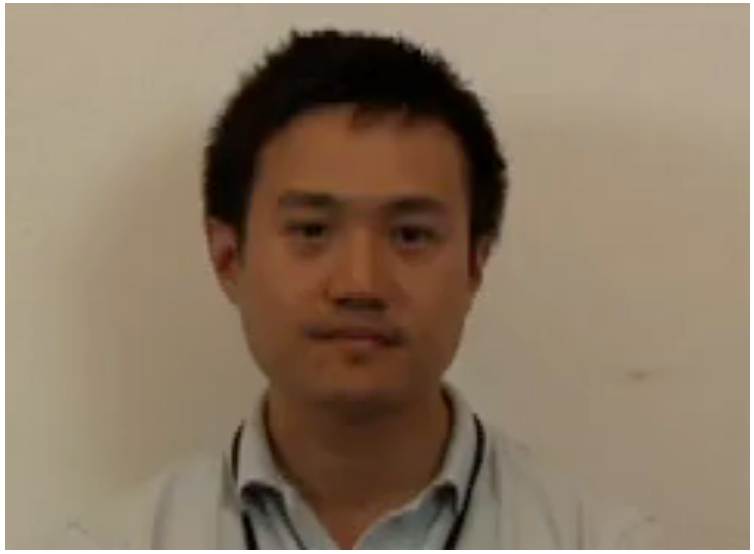


<u>fMRI Study 1:</u>

Do we spontaneously retrieve knowledge of familiar others' social network positions when encountering them?

fMRI Study 1: Paradigm

- During the fMRI study, participants viewed videos of their classmates



- These classmates varied in terms of multiple social network position characteristics:

Social Distance

"Degrees of separation" from participant

Eigenvector Centrality

How well-connected is someone to well-connected others?

Brokerage

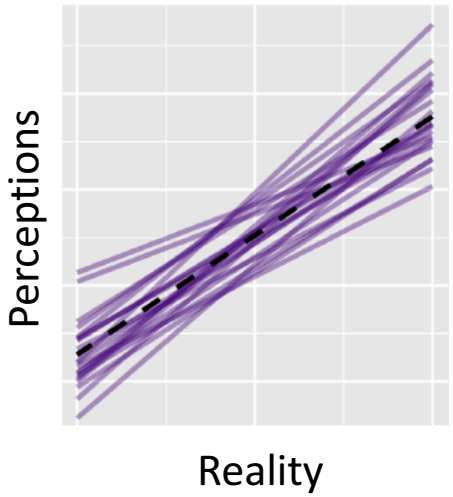
Do they "bridge" different areas of the network?

Parkinson, Kleinbaum & Wheatley (2017)

Accurate explicit knowledge of others' social network positions

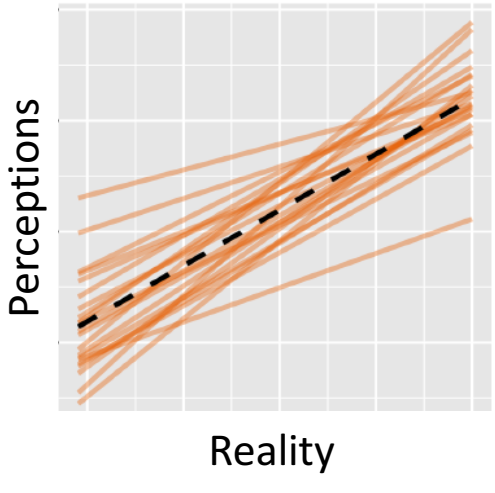
Social Distance

("degrees away")



Eigenvector Centrality

(well-connected to well-connected others)

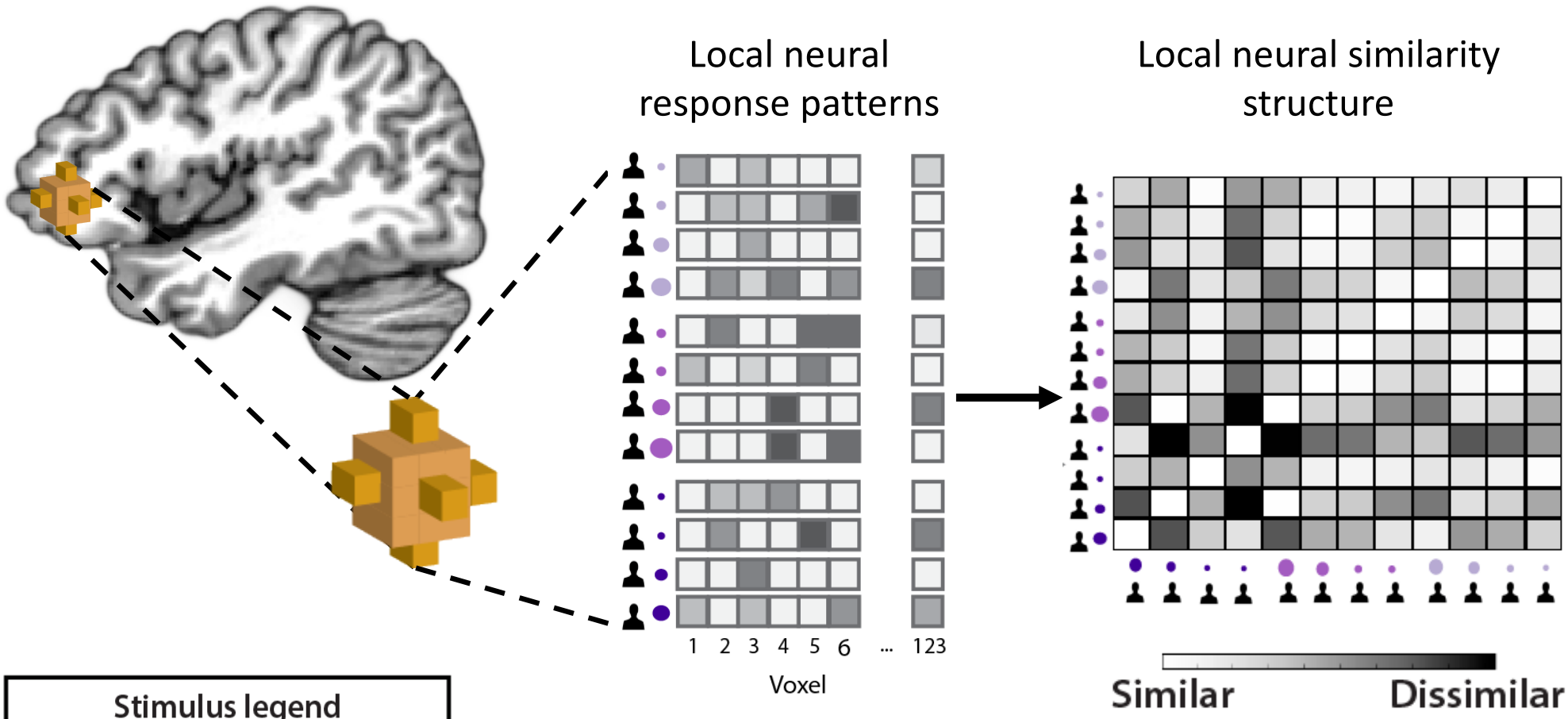


Brokerage

("social bridges")

- Do people have accurate knowledge of familiar others' social network positions? ***Yes***.
- Is this knowledge spontaneously retrieved when encountering familiar others?

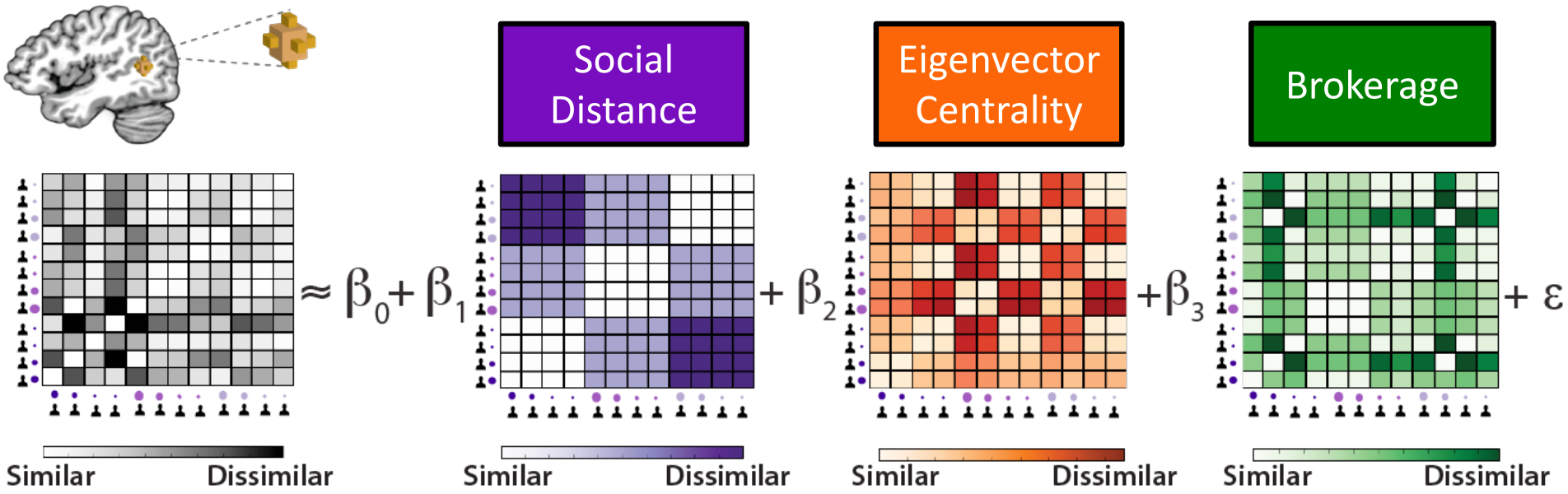
Parkinson, Kleinbaum & Wheatley (2017)



Local "information signature": Describes representations contained in a given area

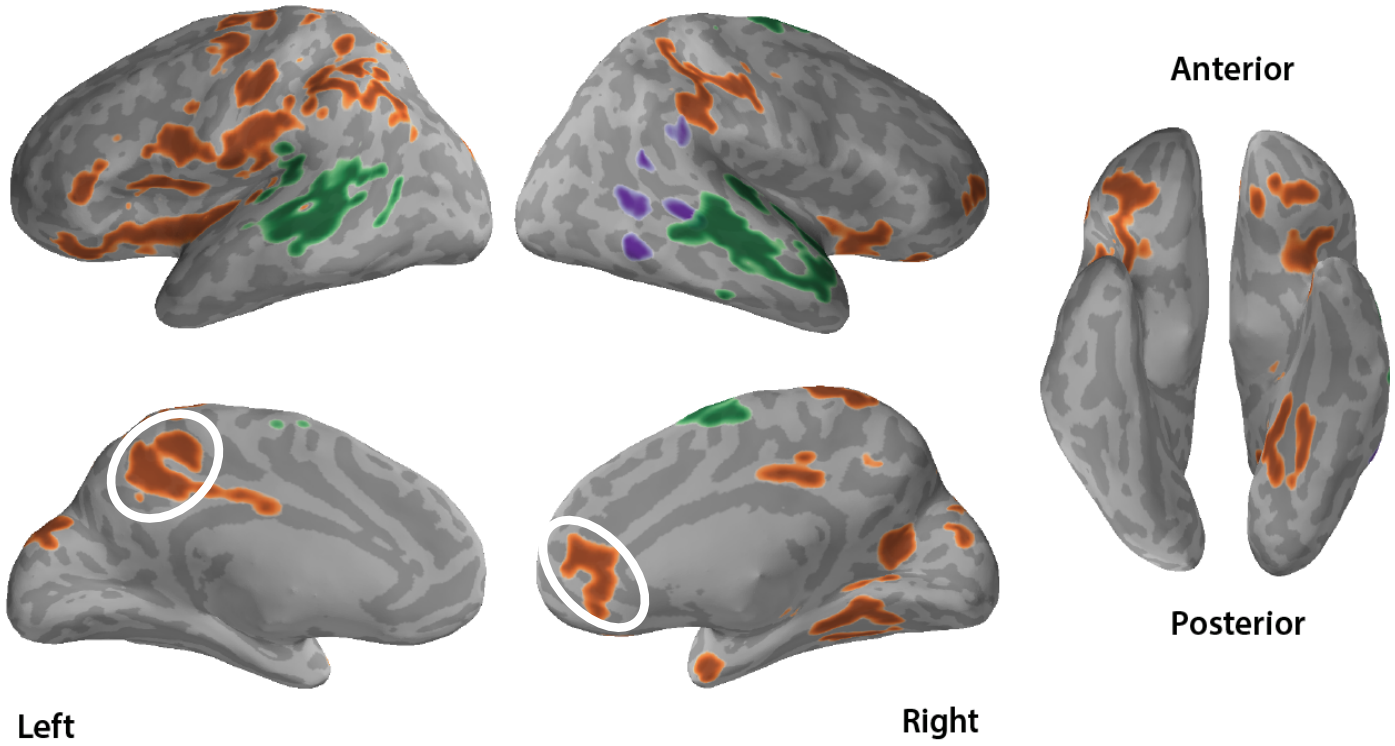
Parkinson, Kleinbaum & Wheatley (2017)

To what extent can spontaneous responses to familiar people be explained by their positions in our social networks?



Parkinson, Kleinbaum & Wheatley (2017)

Distinct sets of brain regions encode different aspects of social network position



Eigenvector Centrality
β > 0

Social Distance
β > 0

Brokerage
β > 0

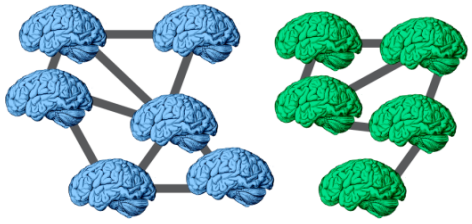
Integrating these findings with knowledge of the functions of different brain regions can inform predictions about how particular facets of someone's social network position impact how others respond to him/her

Parkinson, Kleinbaum & Wheatley (2017)

Benefits of integrating approaches from social neuroscience and social network analysis

2 examples

- Elucidate factors that shape how we respond to others in everyday life
  - …but that would be missed without integrating these approaches

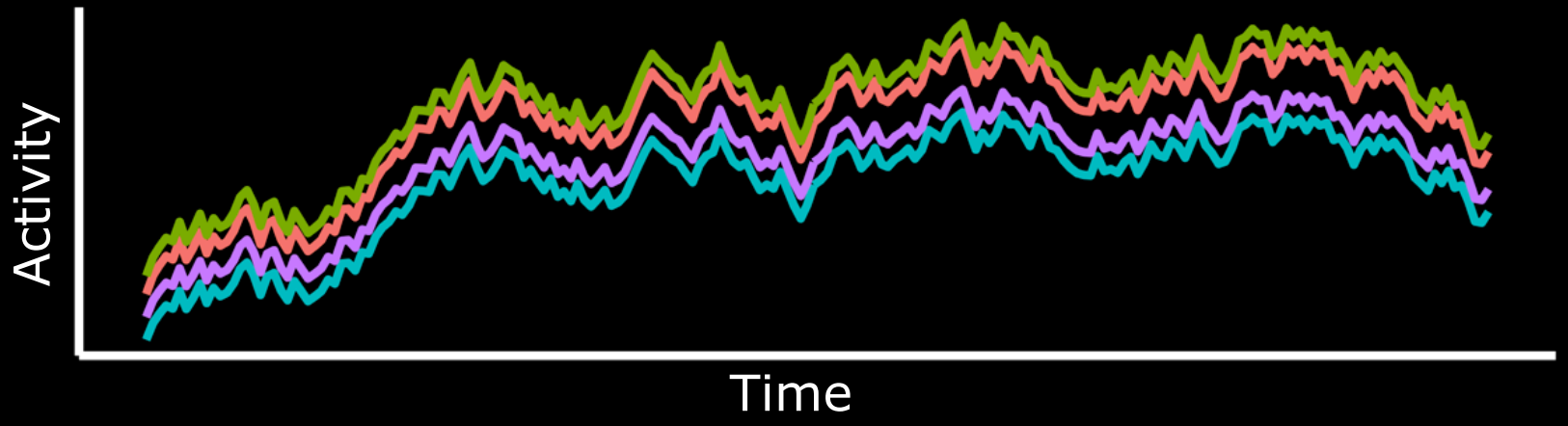


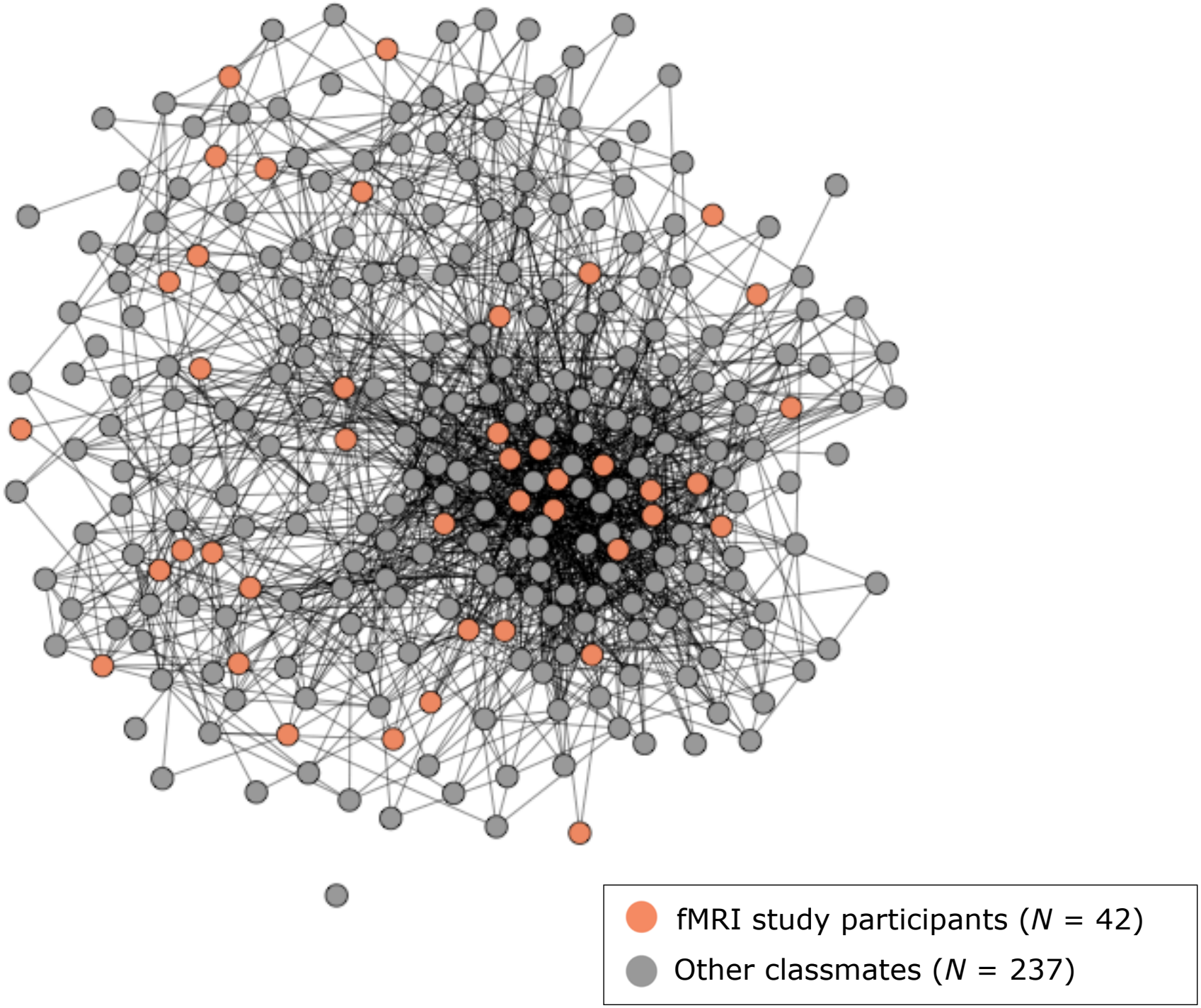
- Gain insight into processes related to homophily and social influence

“Birds of a feather flock together”

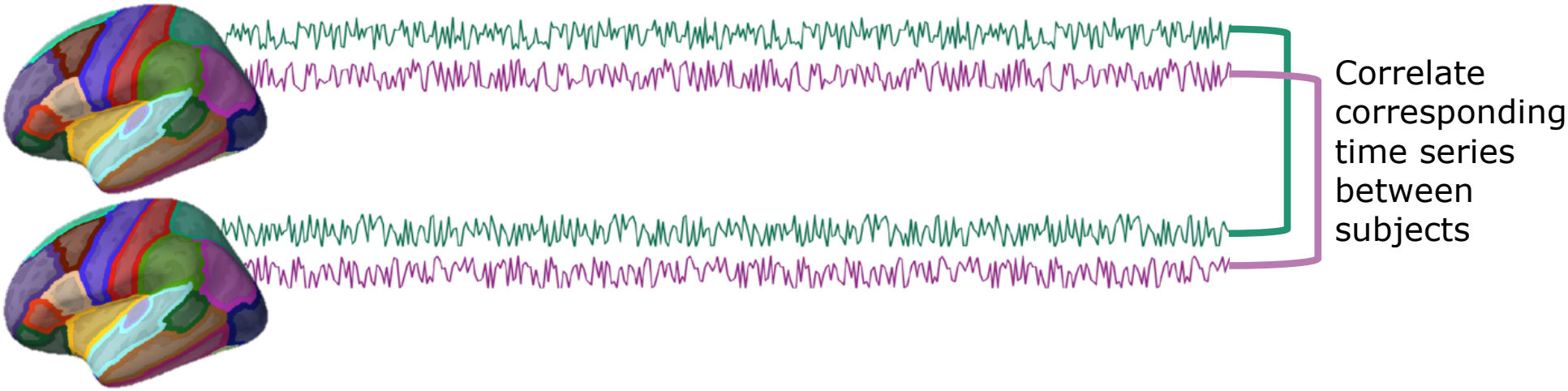
Do we see the world like our friends do?


WARNER HOME VIDEO

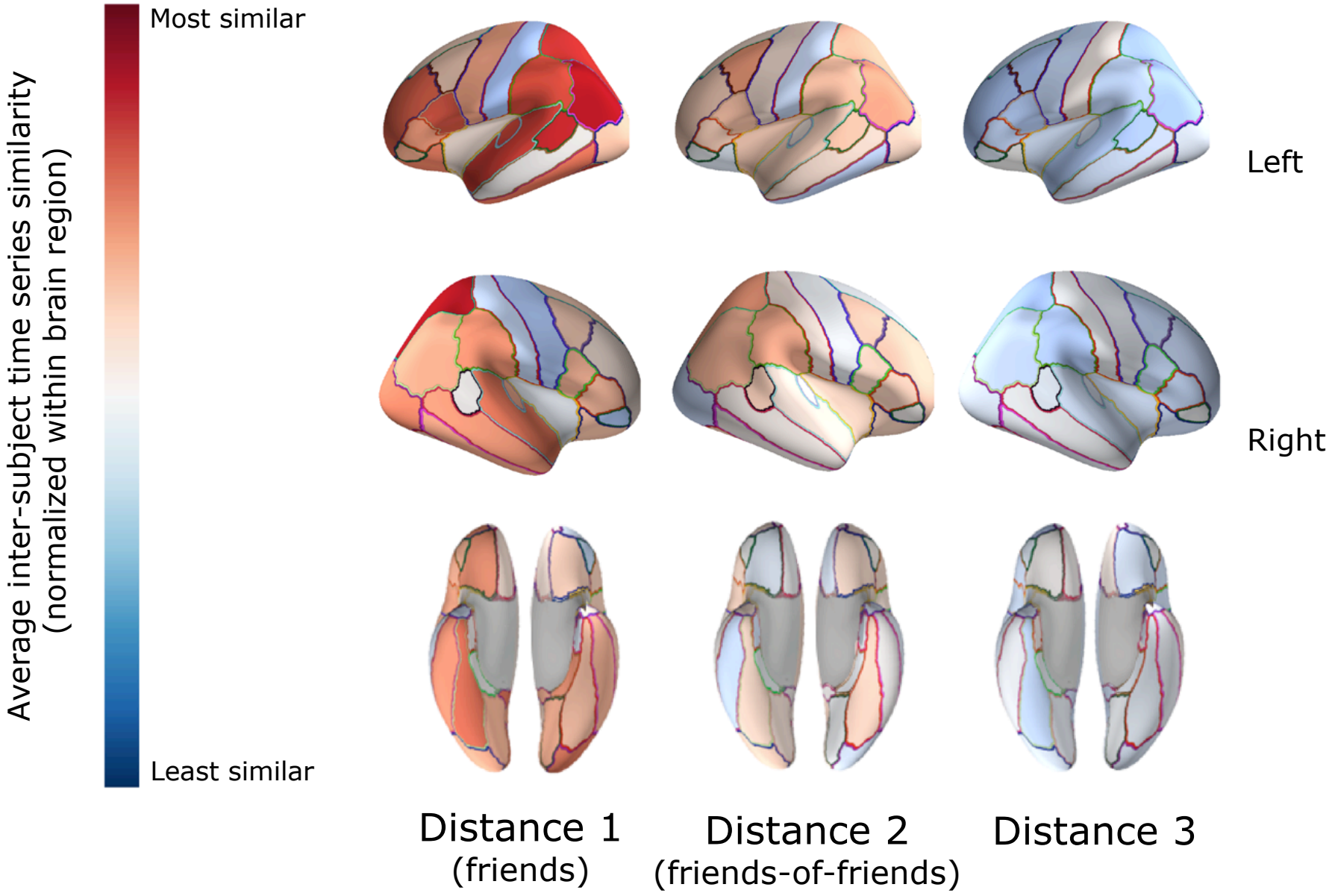

Activity
Time


fMRI study participants (N = 42)
Other classmates (N = 237)


ATM

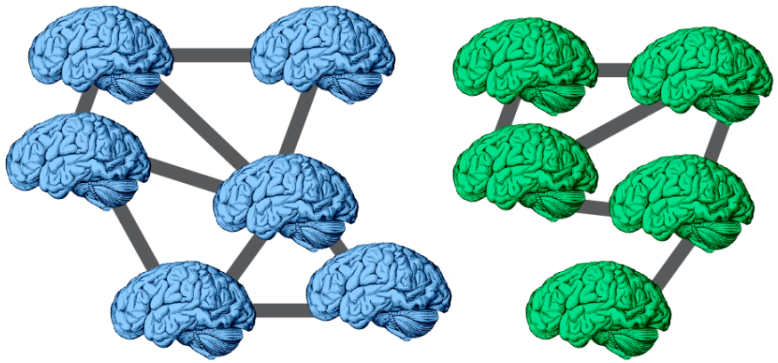

Correlate
corresponding
time series
between
subjects

Neural response similarities by social distance



Parkinson, Kleinbaum & Wheatley (In revision)

Do we see the world like our friends do?



Yes. People closer to one another in their social network respond to the world more similarly.

Is similarity a **cause** or **consequence** of friendship?

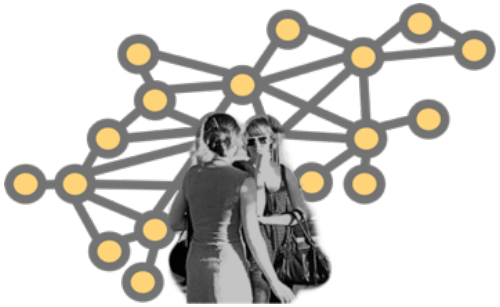
- What kinds of similarities predict who associates with whom?
- In what ways do we become more similar to those around us over time?

Benefits of neuroimaging in this context

- A rich implicit measure
  - Captures many different kinds of processing simultaneously
- Can measure responses that people may be unwilling or unable to report on explicitly
  - Overcome self-presentation concerns and limits of introspective accuracy

Benefits of integrating approaches from social neuroscience and social network analysis

2 examples



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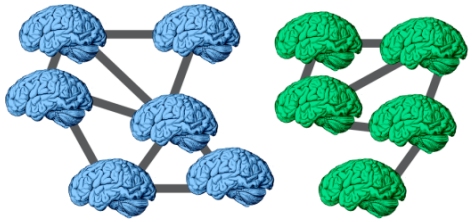

- Gain insight into processes related to homophily and social influence

Thank You

- Collaborators
  - Thalia Wheatley
  - Adam Kleinbaum
  - Bridget Lynn

- Funding Sources

- Questions or comments
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