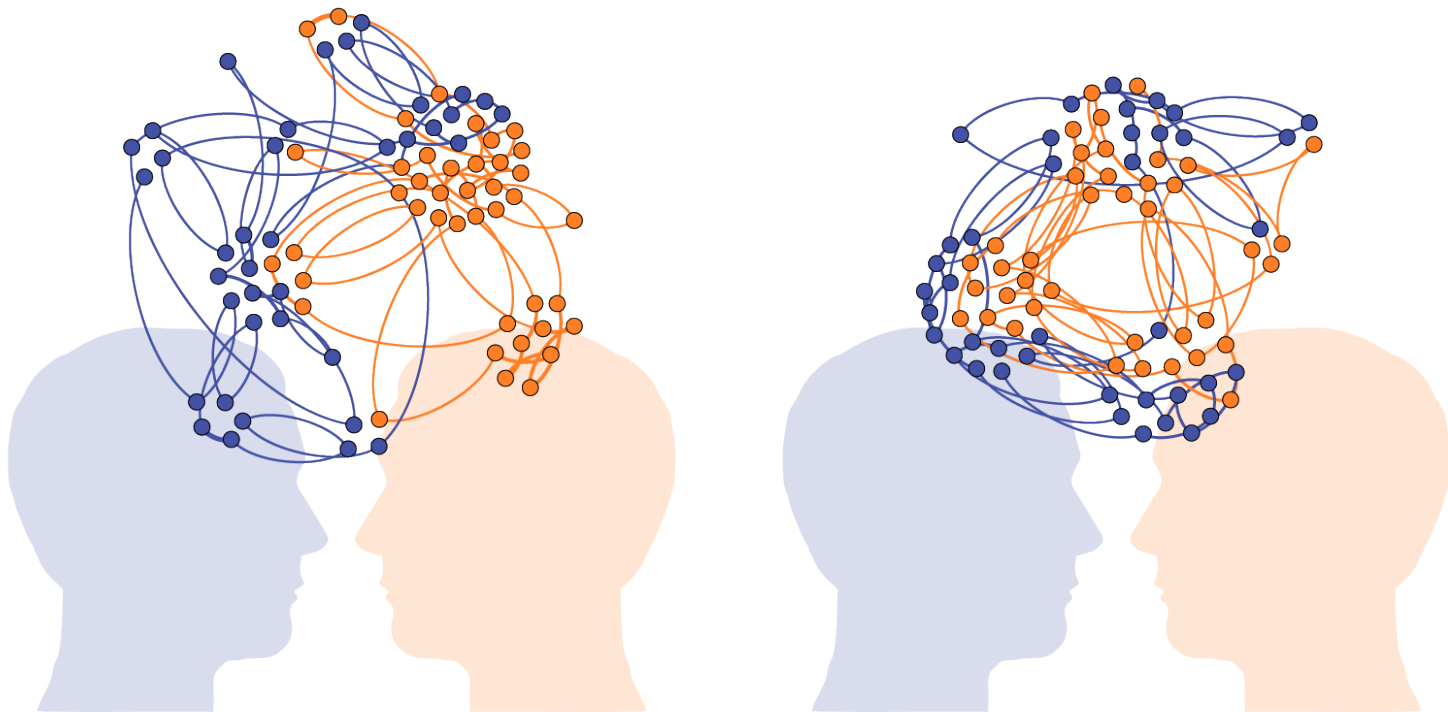


What do we share?

Shared Conceptual Spaces I



1. Theoretical framework

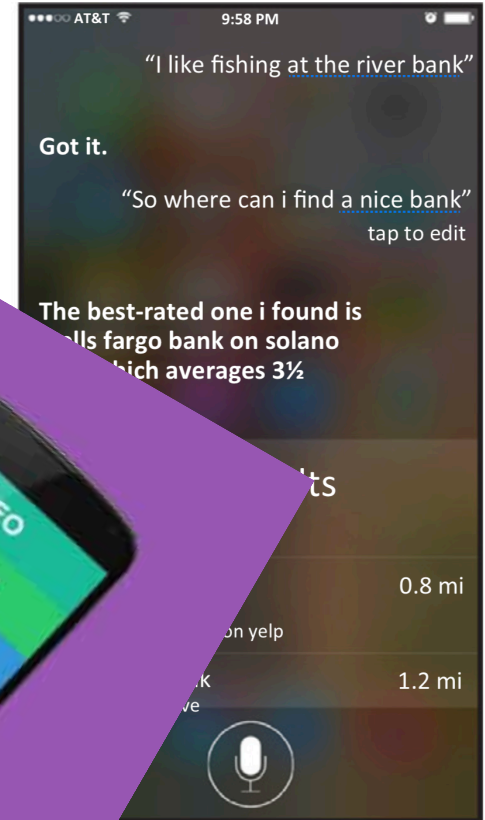
Building a shared conceptual space

2. Neural predictions

Neural activity supporting shared conceptual spaces

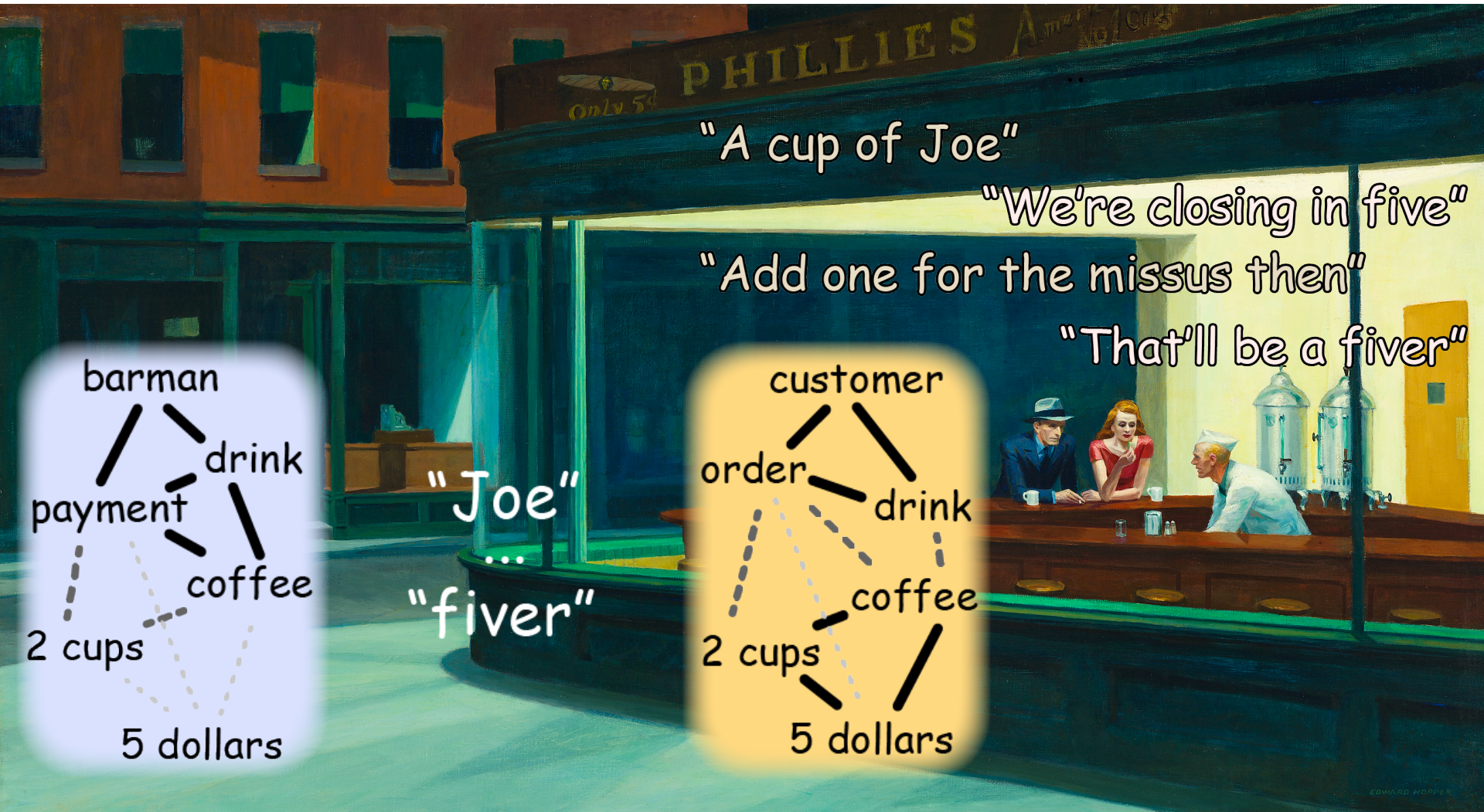
3. Neuroscientific evidence

MEG, TMS, and lesion studies



Problem: You determine the context?

Solution: We build a shared conceptual space?

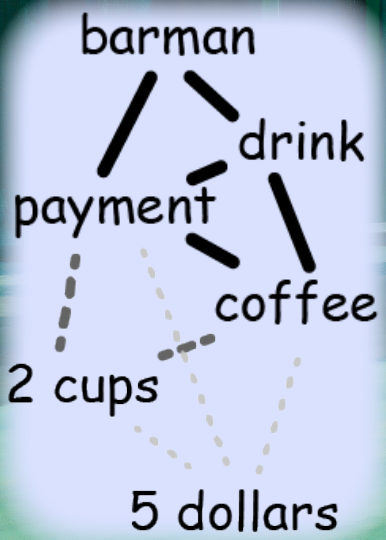


"A cup of Joe"

"We're closing in five"

"Add one for the missus then"

"That'll be a fiver"



Customer
concept space

Communicative
signal

Barman
concept space

1. Theoretical framework

Building a shared conceptual space

2. Neural predictions

Neural activity supporting shared conceptual spaces

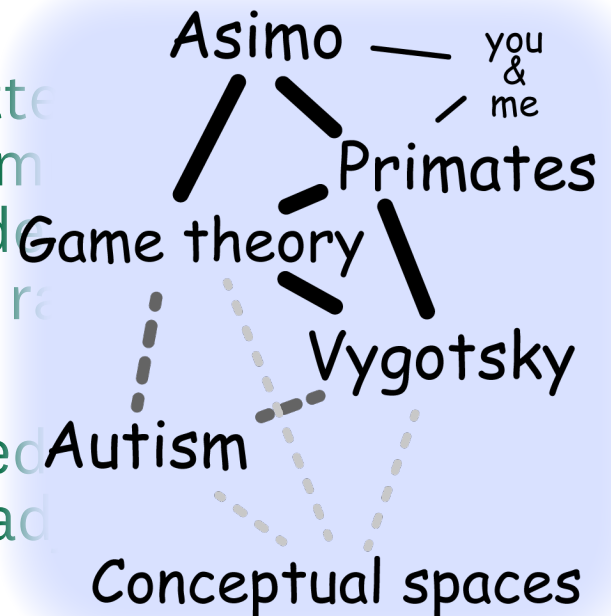
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4 predictions of neural activity supporting shared conceptual spaces

1. Achieving mutual understanding should evoke neural activity reflecting flexible conceptual processes, in regions known to support conceptual knowledge
2. There should be shared patterns of neural activity during communicative production and comprehension given that these processes relate to the same conversational context
3. The timing of this shared neural pattern should not follow, the occurrence of a communicative act given that the conceptual space is defined by the ongoing communicative interaction rather than the signal itself
4. The temporal dynamics of the shared neural activity should reflect the communicators' access to a shared conceptual space



1. Theoretical framework

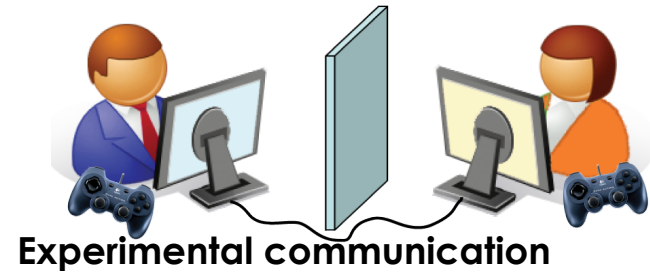
Building a shared conceptual space

2. Neural predictions

Neural activity supporting shared conceptual spaces

3. Neuroscientific evidence

MEG, TMS, and lesion studies



What's different?

Multiple communication channels
(vocalizations, bodily and facial postures/movements, eye contact)

Access to pre-existing conventions
(a common language, body emblems, facial expressions)

Spontaneous turn-taking

Single communication channel
(movements of a geometric shape:
experimental control over communicative environment)

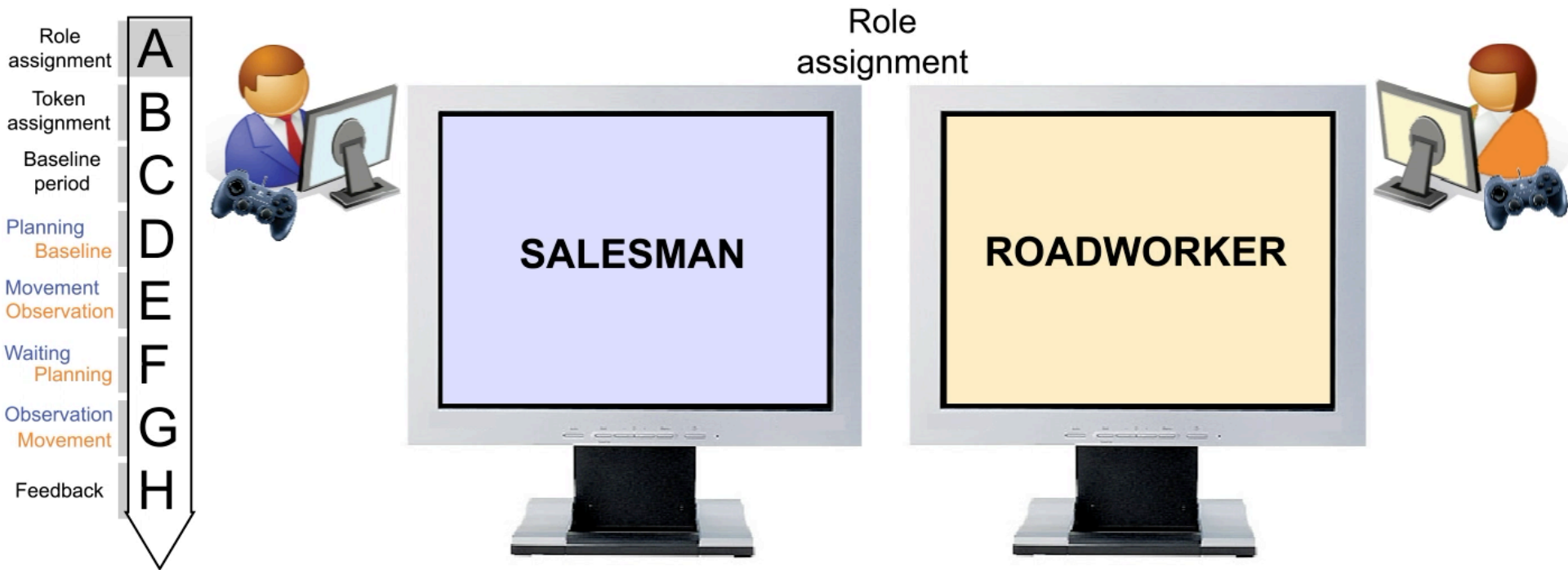
Novel communicative signals
(lack of pre-existing shared representations:
experimental control over shared cognitive history)

Experimentally-controlled roles
(isolation of production and comprehension)

What's identical?

Dynamic communicative context
(jointly built, updated according to the fleeting idiosyncrasies of an ongoing interaction)

Control interaction task involving the same stimuli, responses, attention and between-subjects dependencies, but no communicative necessities

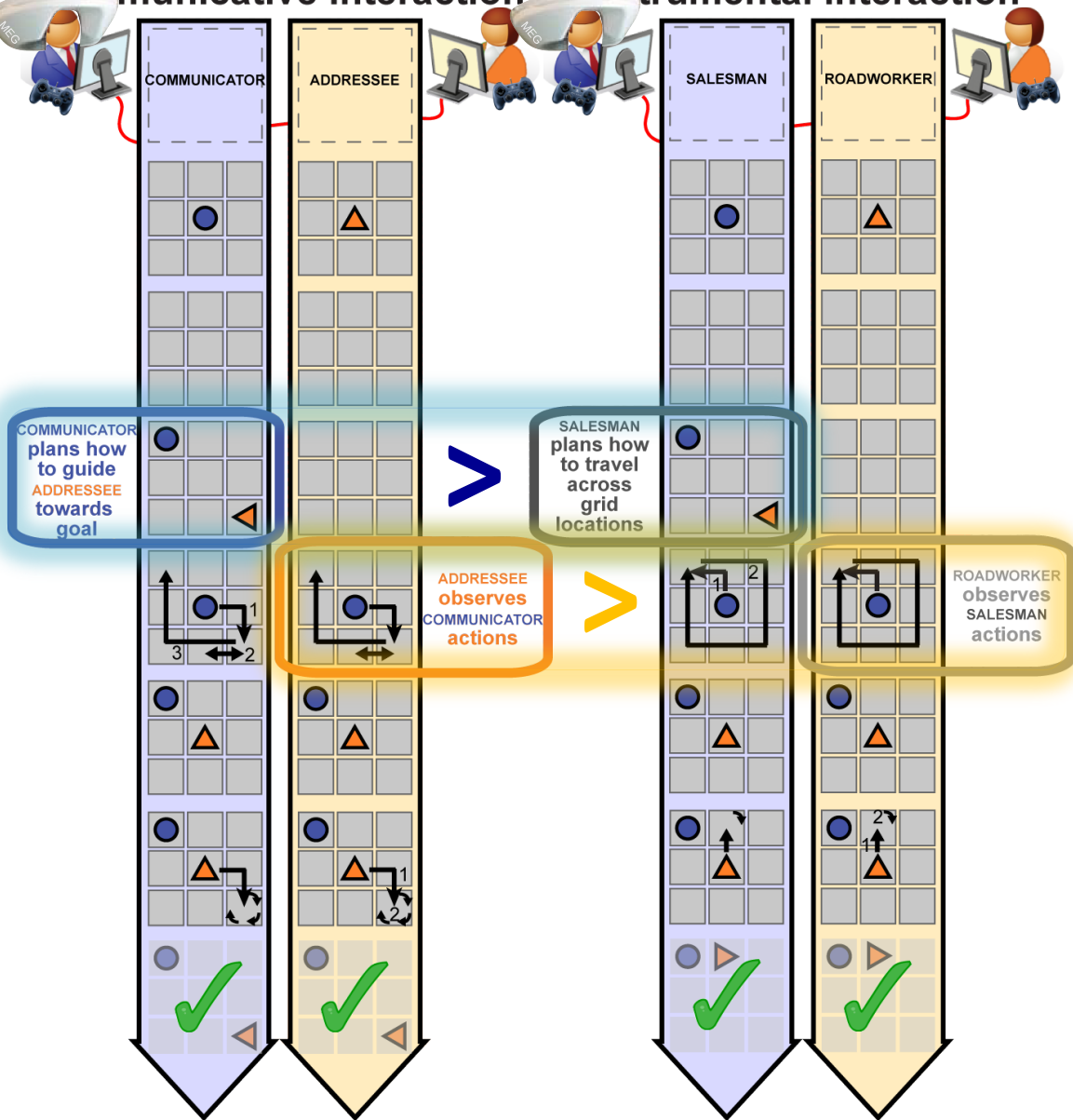




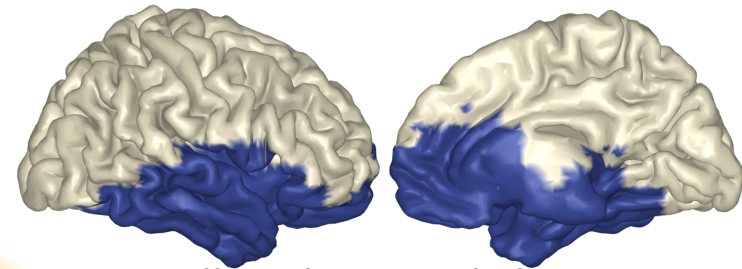
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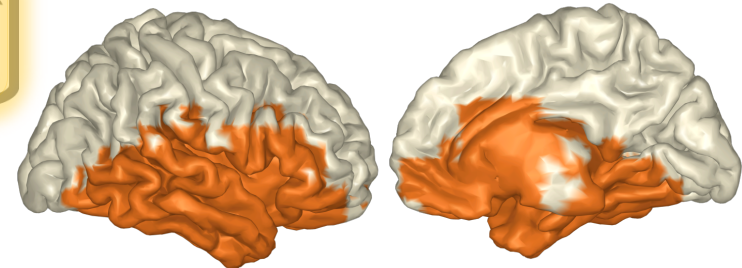
Communicative interaction Instrumental interaction



Production of **communicative** actions



Broadband spectral changes



Comprehension of **communicative** actions

Neural mechanisms of communicative innovation



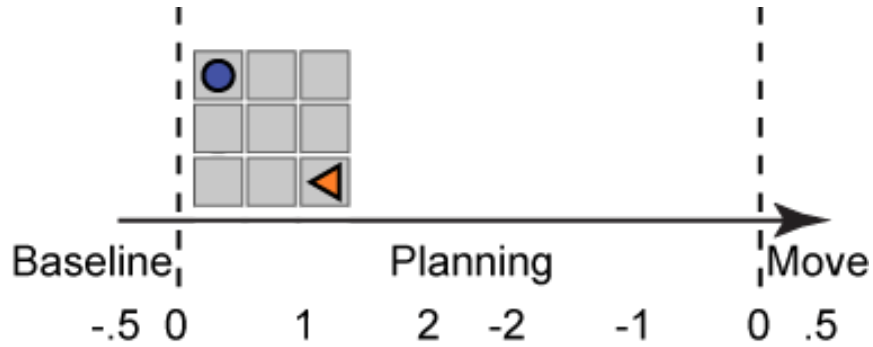
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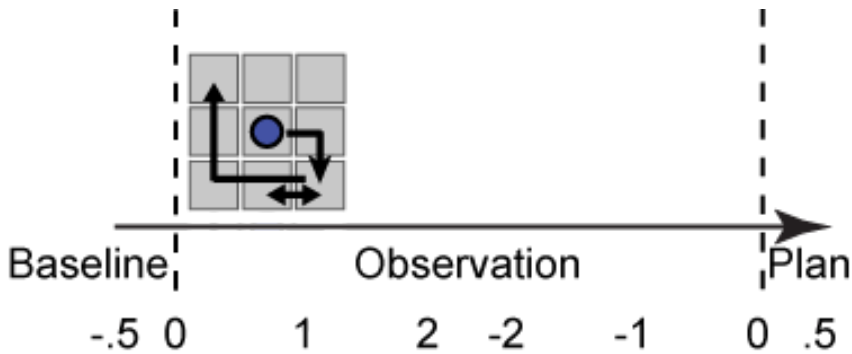
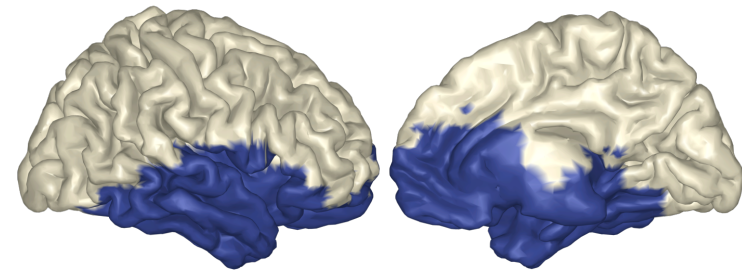


4 predictions of neural activity supporting shared conceptual spaces

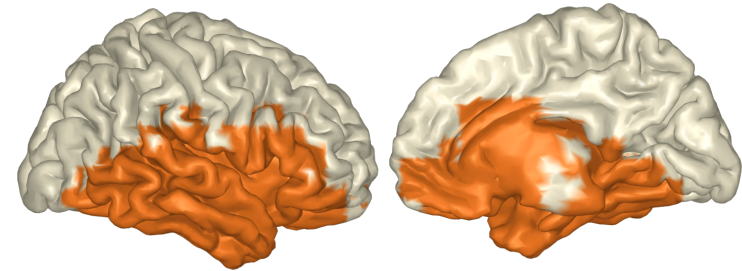
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Production of
communicative actions
 instrumental actions

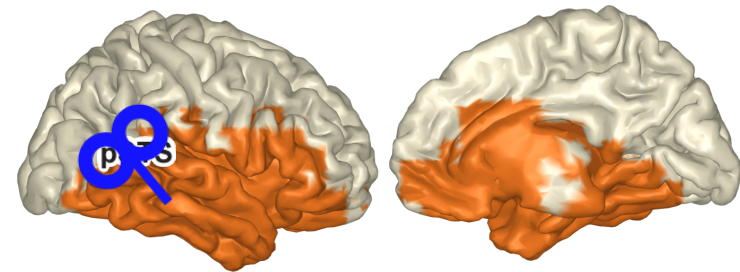
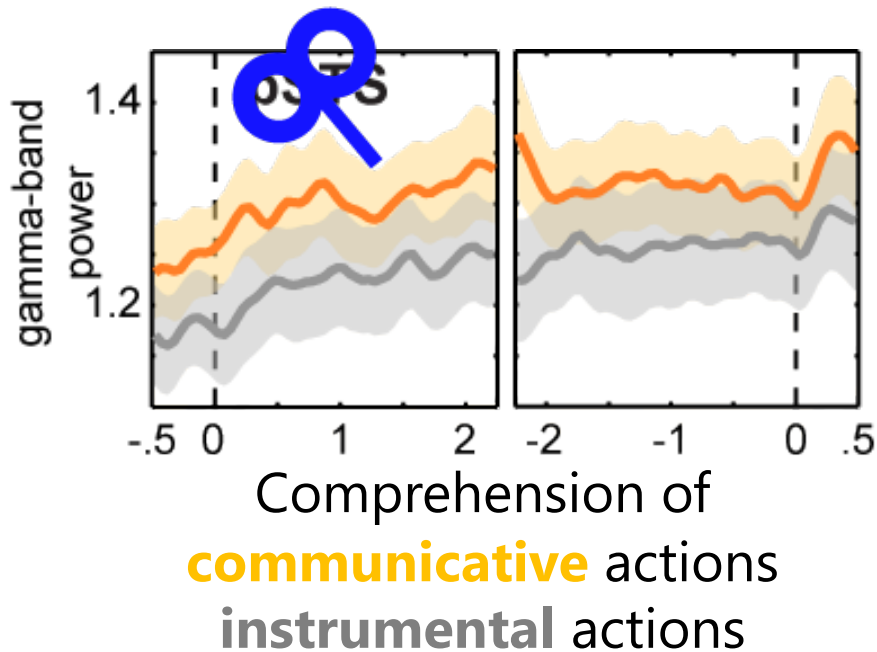
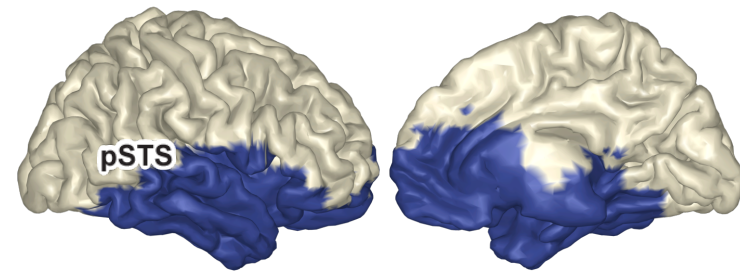
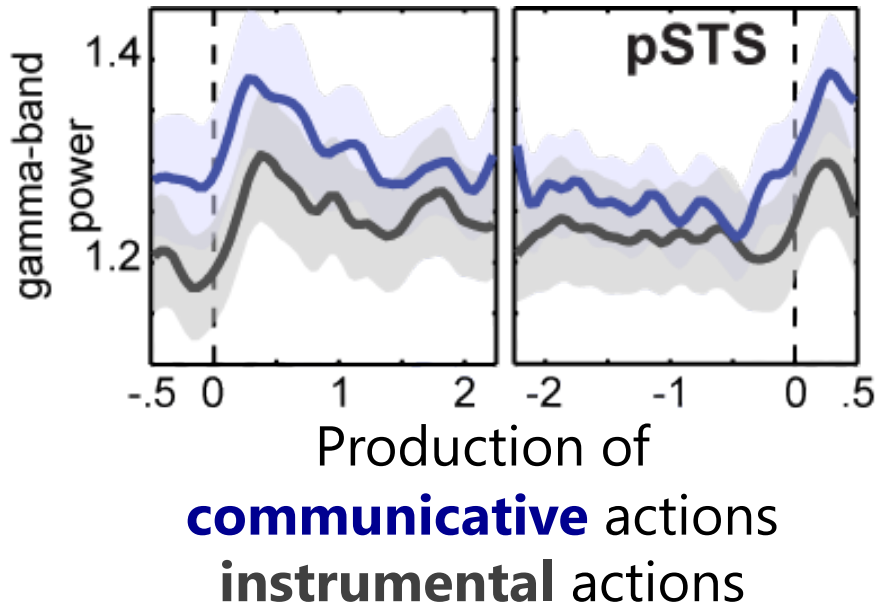


Comprehension of
communicative actions
 instrumental actions

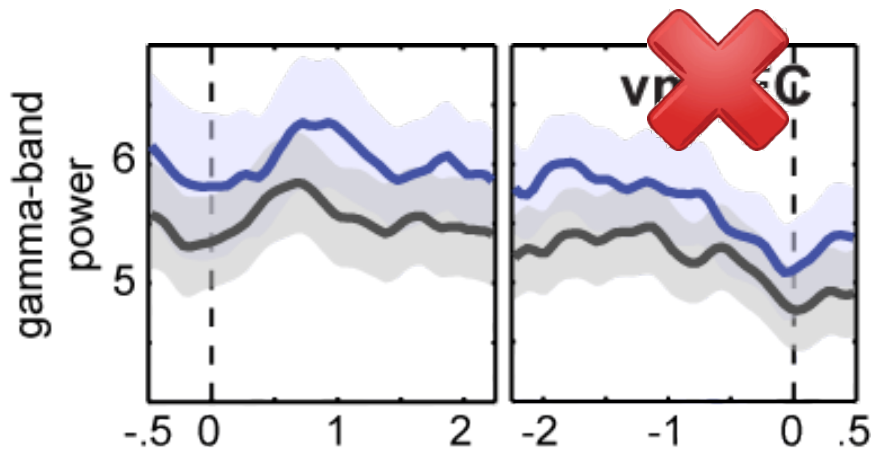


Understanding communicative actions: A repetitive TMS study

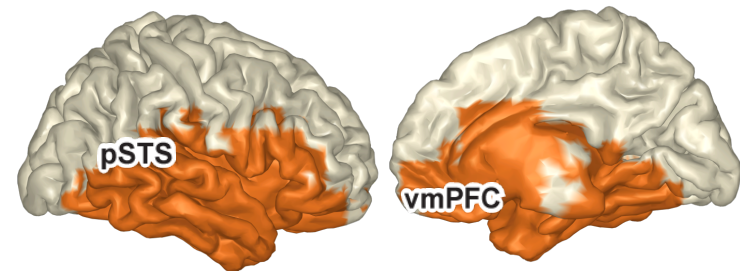
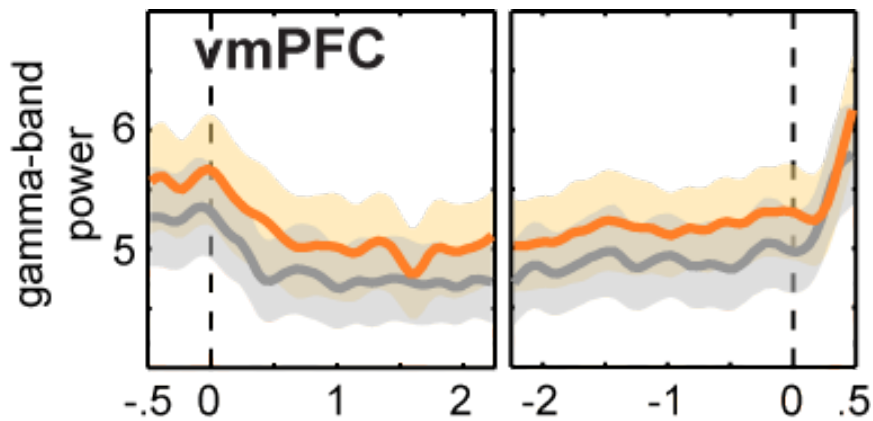
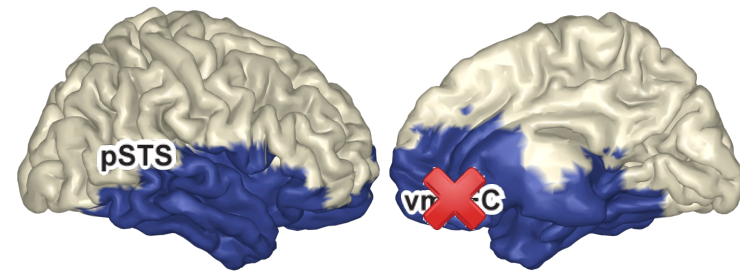
Arjen Stolk^{a,*}, Matthijs L. Noordzij^b, Inge Volman^{a,c}, Lennart Verhagen^a,
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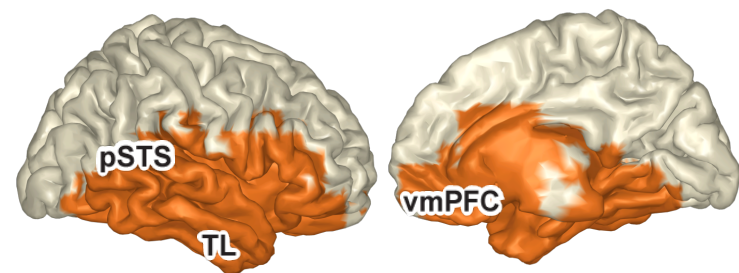
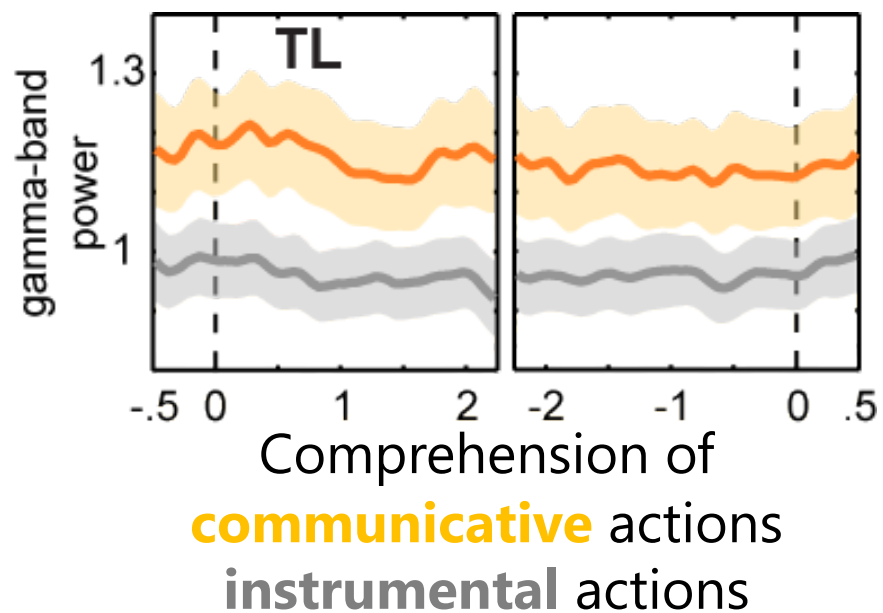
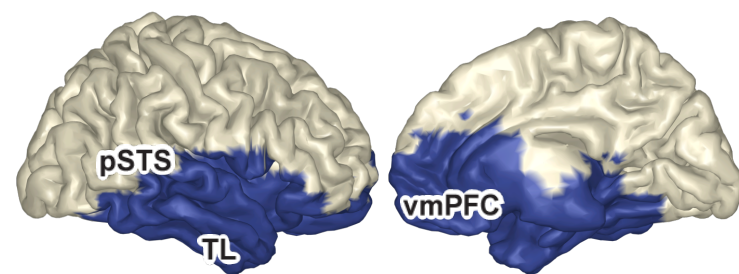
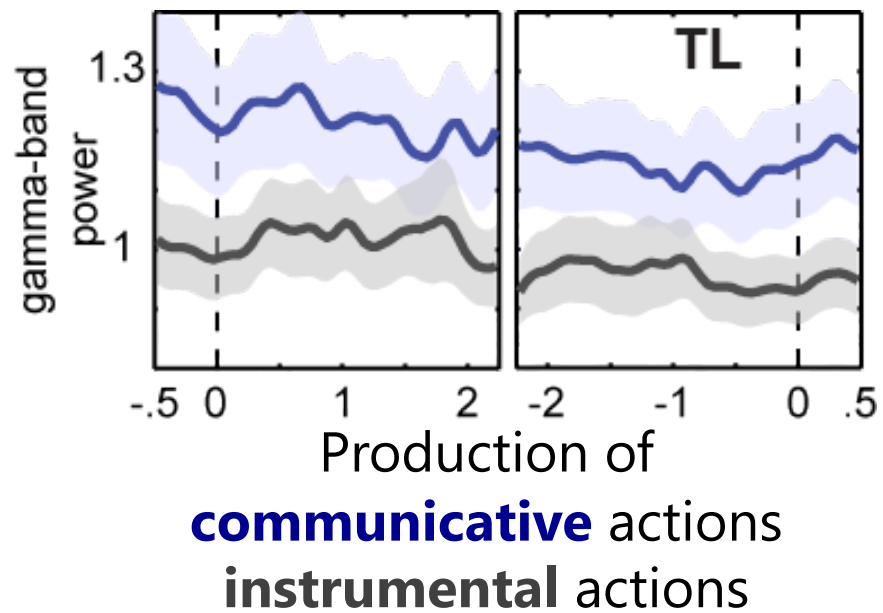
*Necessary for
integrating knowledge
of the recent
communicative history*



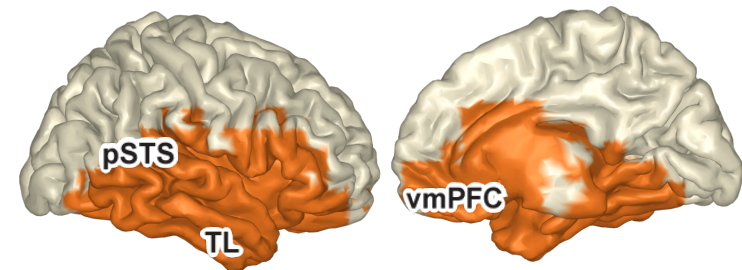
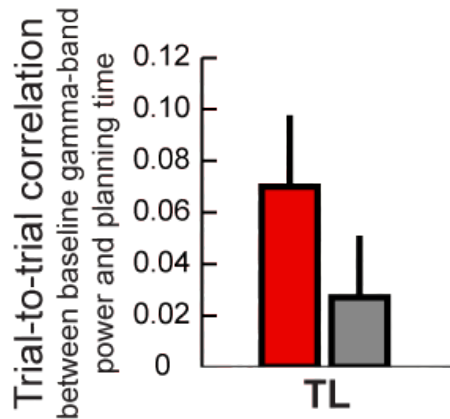
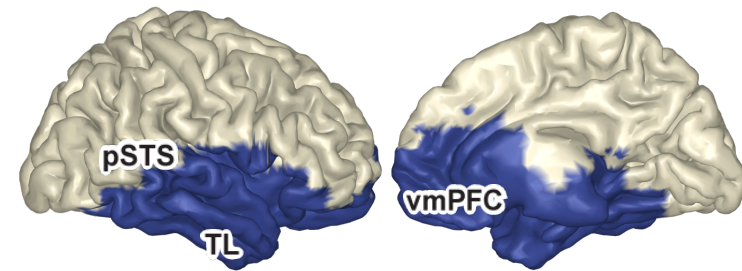
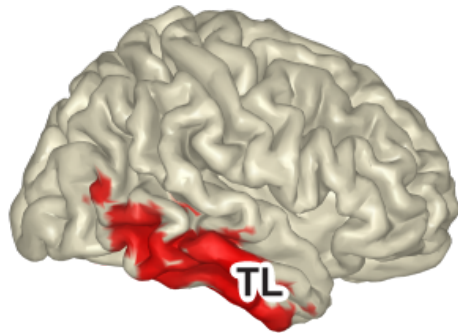
Necessary for tuning decisions with knowledge of a communicative partner





Altered Communicative Decisions following Ventromedial Prefrontal Lesions



Supports communicative behaviors in a state-dependent manner



-  Communicative interactions
-  Instrumental interactions



4 predictions of neural activity supporting shared conceptual spaces

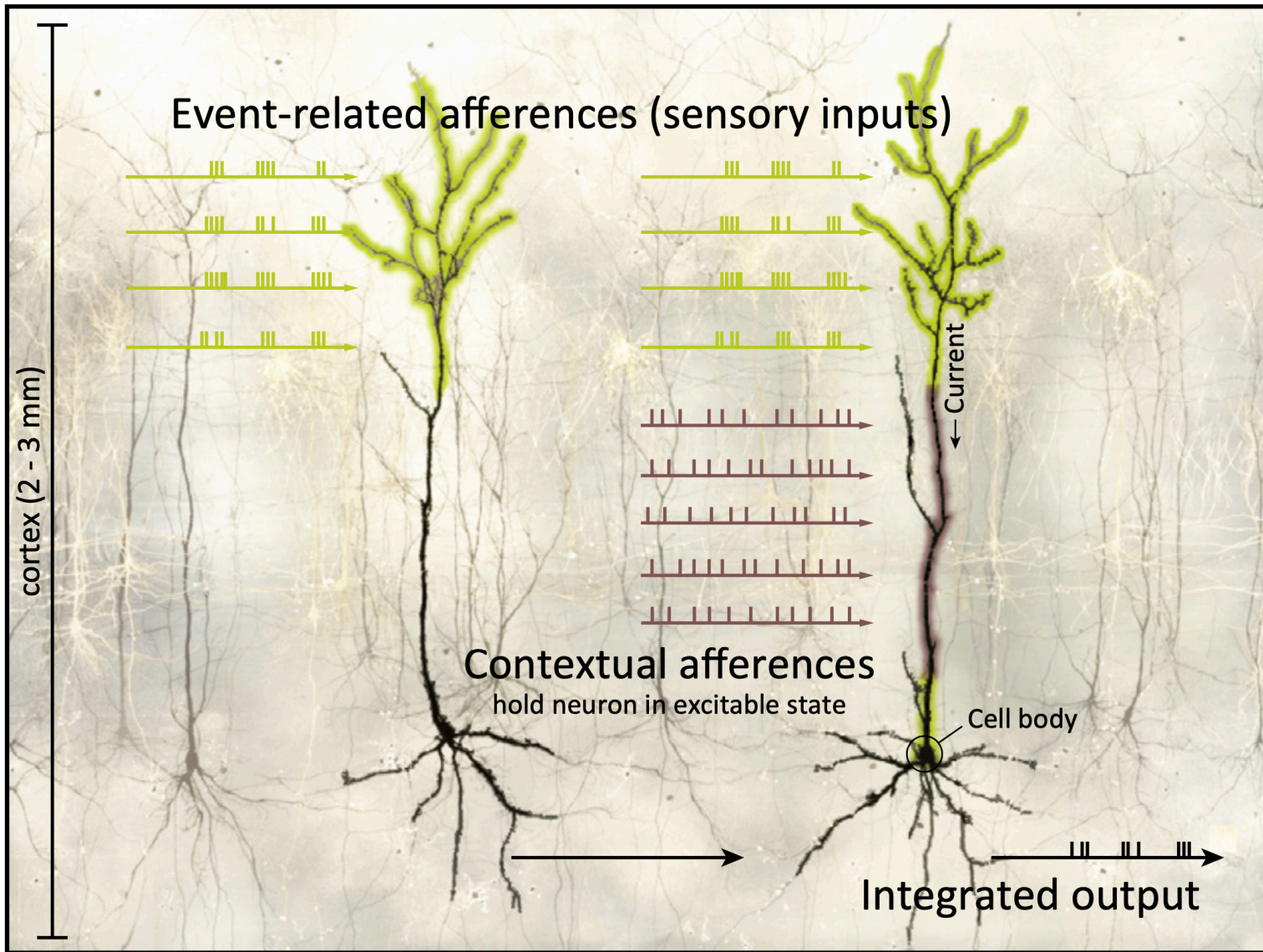
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- Communicators and addressees achieve mutual understanding by using the same computational procedures and neuronal substrates
(implemented in a right-lateralized frontotemporal network)
- Brain regions supporting communication are already upregulated before a communicative utterance is produced or comprehended

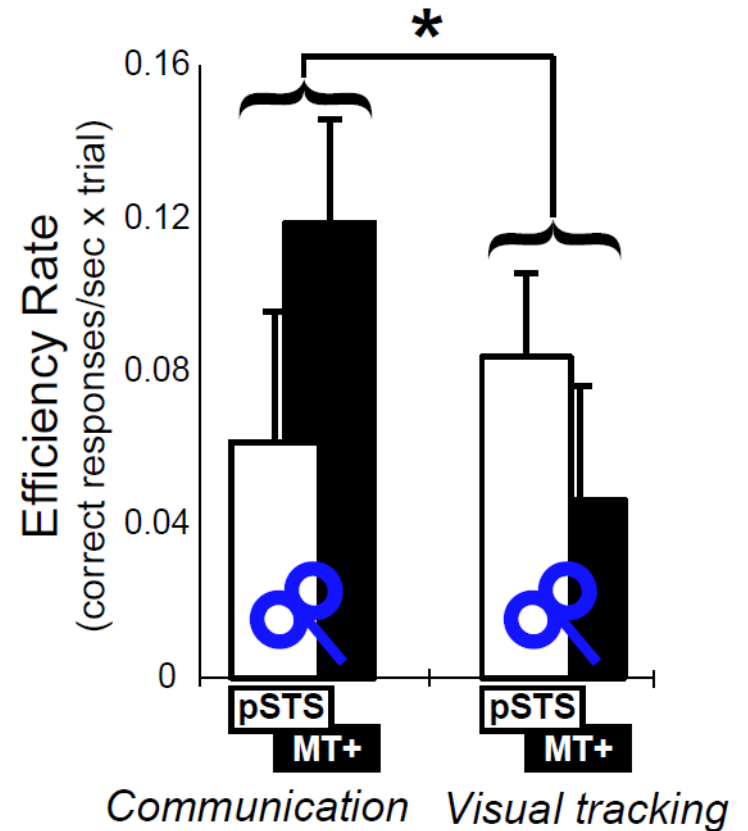
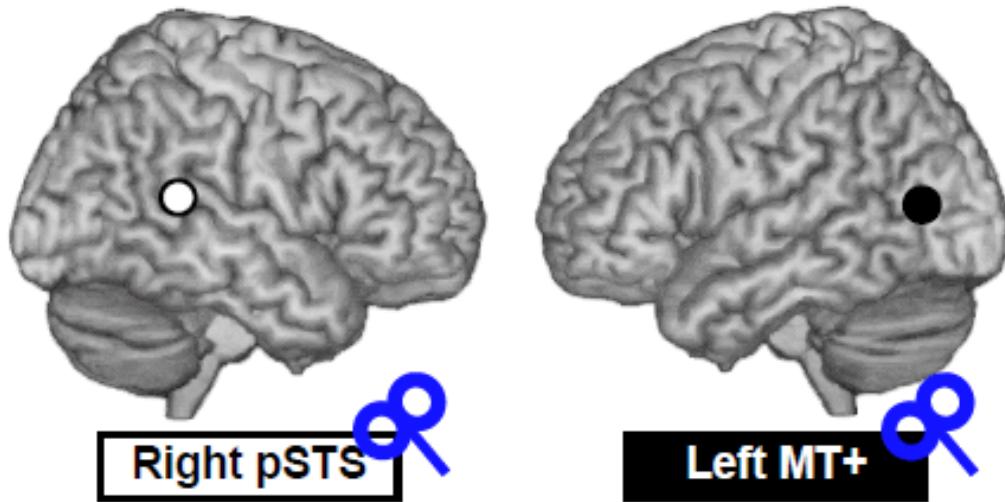
- Shared Conceptual Spaces II



Bonus: A putative neuronal integrative mechanism



Ongoing contextual inputs can hold neurons near an excitability threshold



Understanding communicative actions: A repetitive TMS study

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Right pSTS is necessary to benefit from the recent communicative history