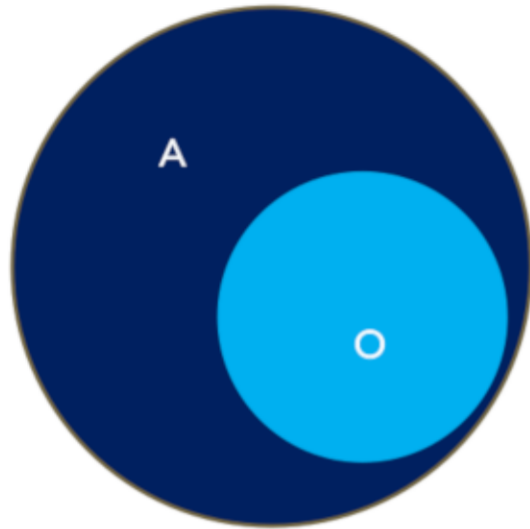


Introduction

Self-consciousness consists of several dissociable experiences, including the **sense of ownership of one's body (O)** and the **sense of agency over one's action consequences (A)**.

The relationship between body-ownership and the sense of agency has been described by different neurocognitive models, each providing specific neurofunctional predictions:

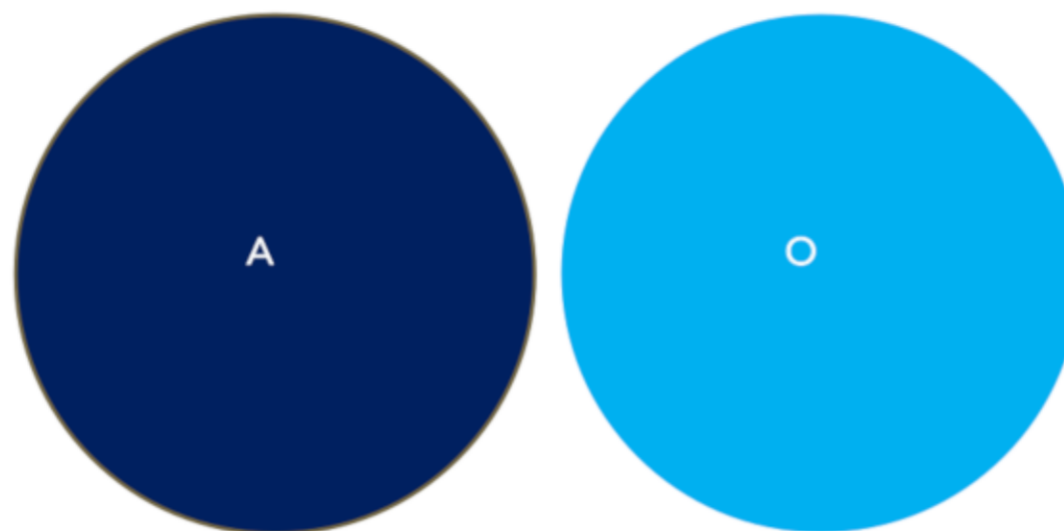
ADDITIVE MODEL:
agency includes body-ownership



Neural predictions:

- a brain network shared by both the sense of agency and the body-ownership
- additional brain regions specifically related to the sense of agency
- no additional regions specifically associated to body-ownership

INDIPENDENT MODEL:
agency and body-ownership are qualitatively different experiences

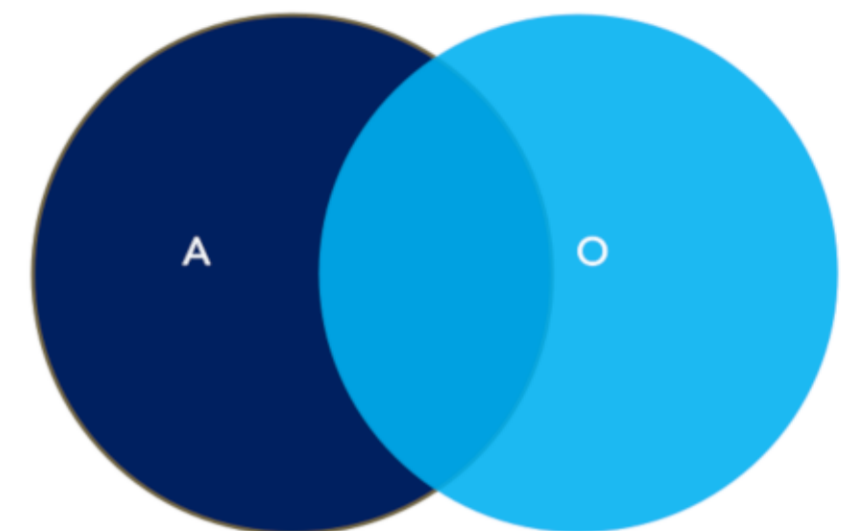


Neural predictions:

- body-ownership and the sense of agency should be associated with different and non-overlapping brain networks

¹Tsakiris M., Longo M.R. and Haggard P. 2010

INTERACTION MODEL:
agency and body-ownership are partly different experiences



Neural predictions:

- brain regions specifically associated with either the sense of body-ownership and the sense of agency
- a shared set of brain regions at the interface between processes

Methods

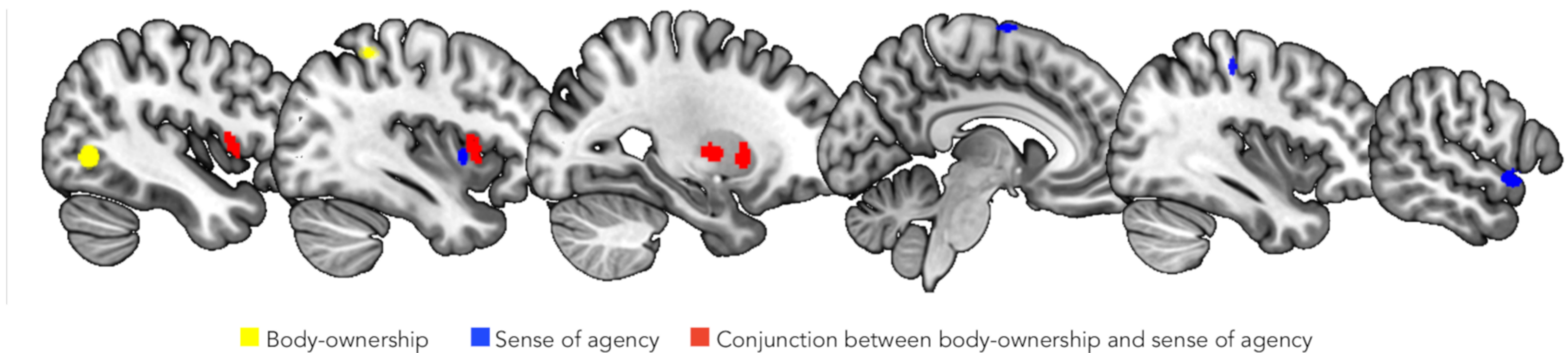
We reviewed the available neurofunctional literature of body-ownership and the sense of agency, with a **quantitative meta-analytical approach**^{2,3} that allowed us to statistically compare their neural correlates.

We selected neuroimaging articles investigating the neurofunctional correlates of body-ownership and sense of agency through the PubMed database.

Body-ownership: 17 studies
205 activation peaks

Sense of agency: 14 studies
106 activation peaks

Results



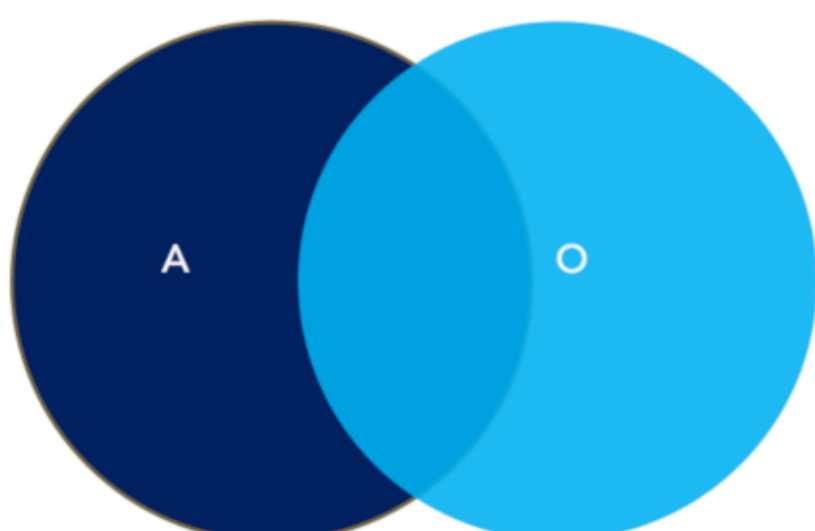
Discussion

We identified:

- a body-ownership-specific network including the left inferior parietal lobule and the left extra-striate body area;
- a sense-of-agency-specific network including the left SMA, the left posterior insula, the right postcentral gyrus, and the right superior temporal lobe;
- a shared network in the left middle insula.

These results provide support for the interactive neurocognitive model of bodyownership and the sense of agency. Body-ownership involves a sensory network in which multisensory inputs are integrated to be self-attributed. On the other hand, the sense of agency is specifically associated with premotor and sensory-motor areas, typically involved in generating motor predictions and in action monitoring. Finally, body-ownership and the sense of agency interact at the level of the left middle insula, a highlevel multisensory hub engaged in body and action awareness in general.

INTERACTION MODEL:
agency and body-ownership are partly different experiences



References

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