

# Adults Hold Two Parallel Causal Frameworks For Reasoning About Minds, Actions and Bodies

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## What is the causal structure of adult's representations of mental states, actions and bodily states?

- One research tradition uses dimensionality reduction to find latent factors (e.g. “the mind”)<sup>1,2</sup>
- Another research tradition emphasizes intuitive theories as abstract causal beliefs articulating direct causal relationships between variables (e.g. mental states cause actions)<sup>3</sup>

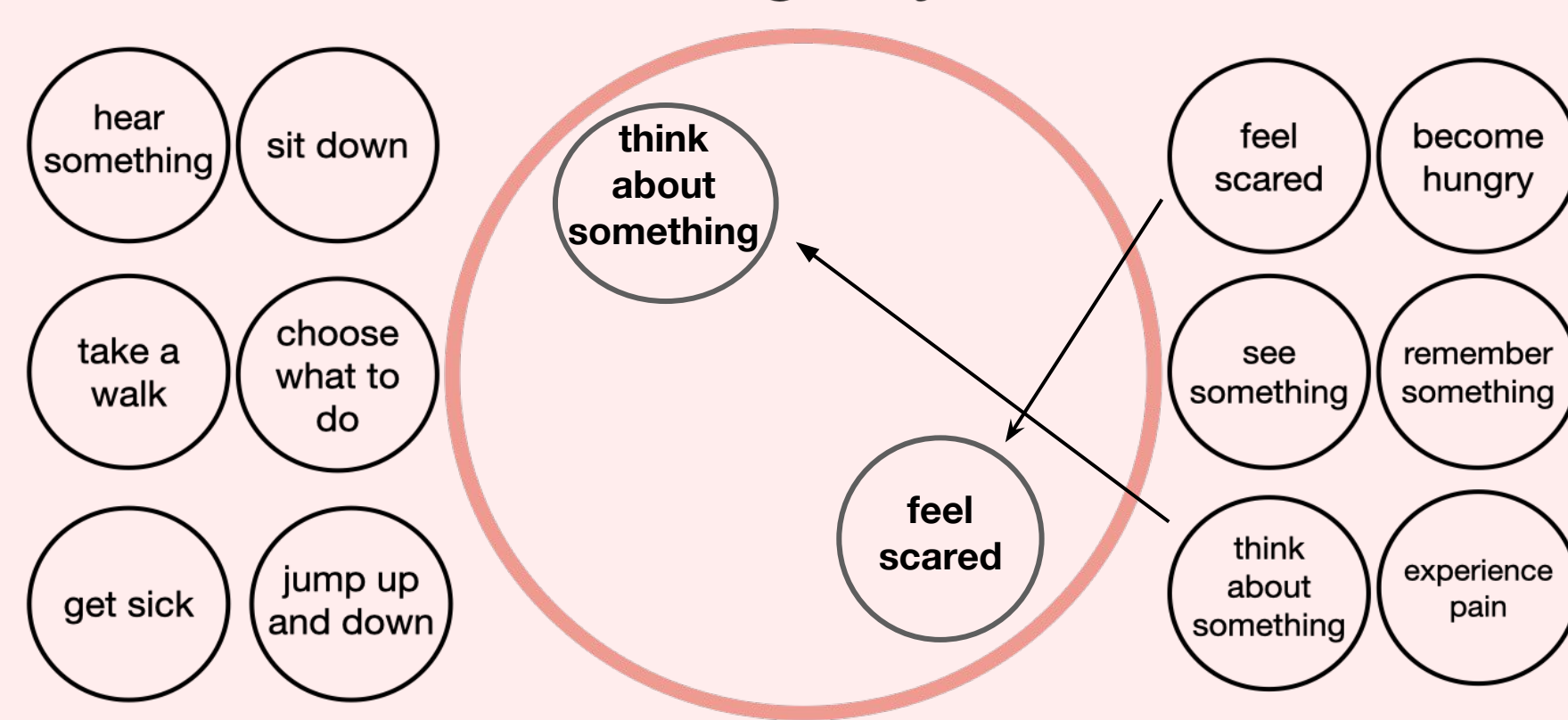
- How do these representations compare to each other?
- When do people implicitly use them in social cognition?

## Study 1: Explicitly measuring and comparing the two representations

### Method: Freesort Task Causal Task

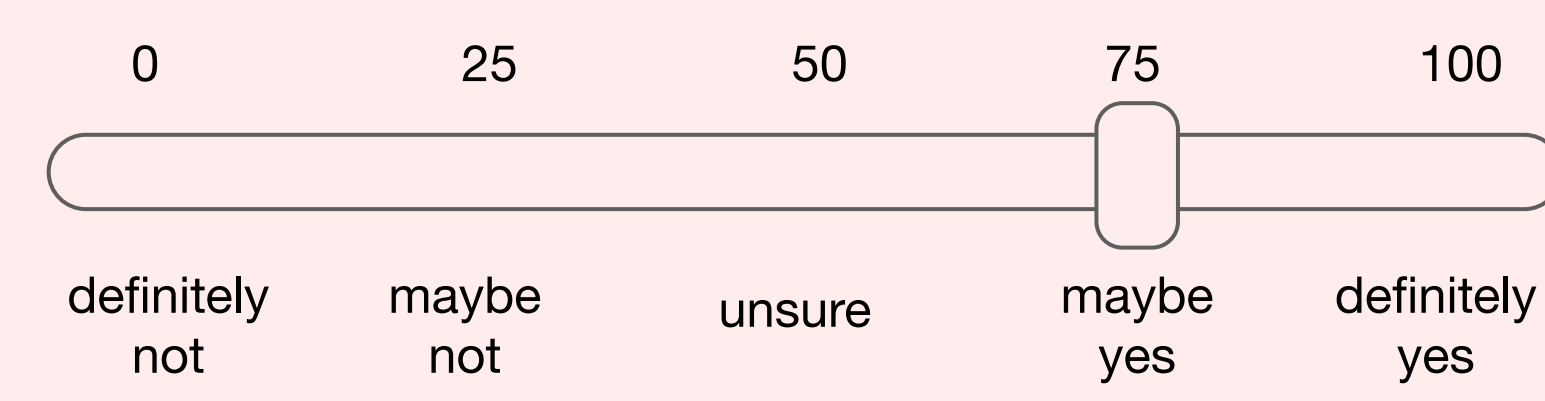
(N = 50, within-subjects)

Please group similar phrases together.  
Take as long as you need.

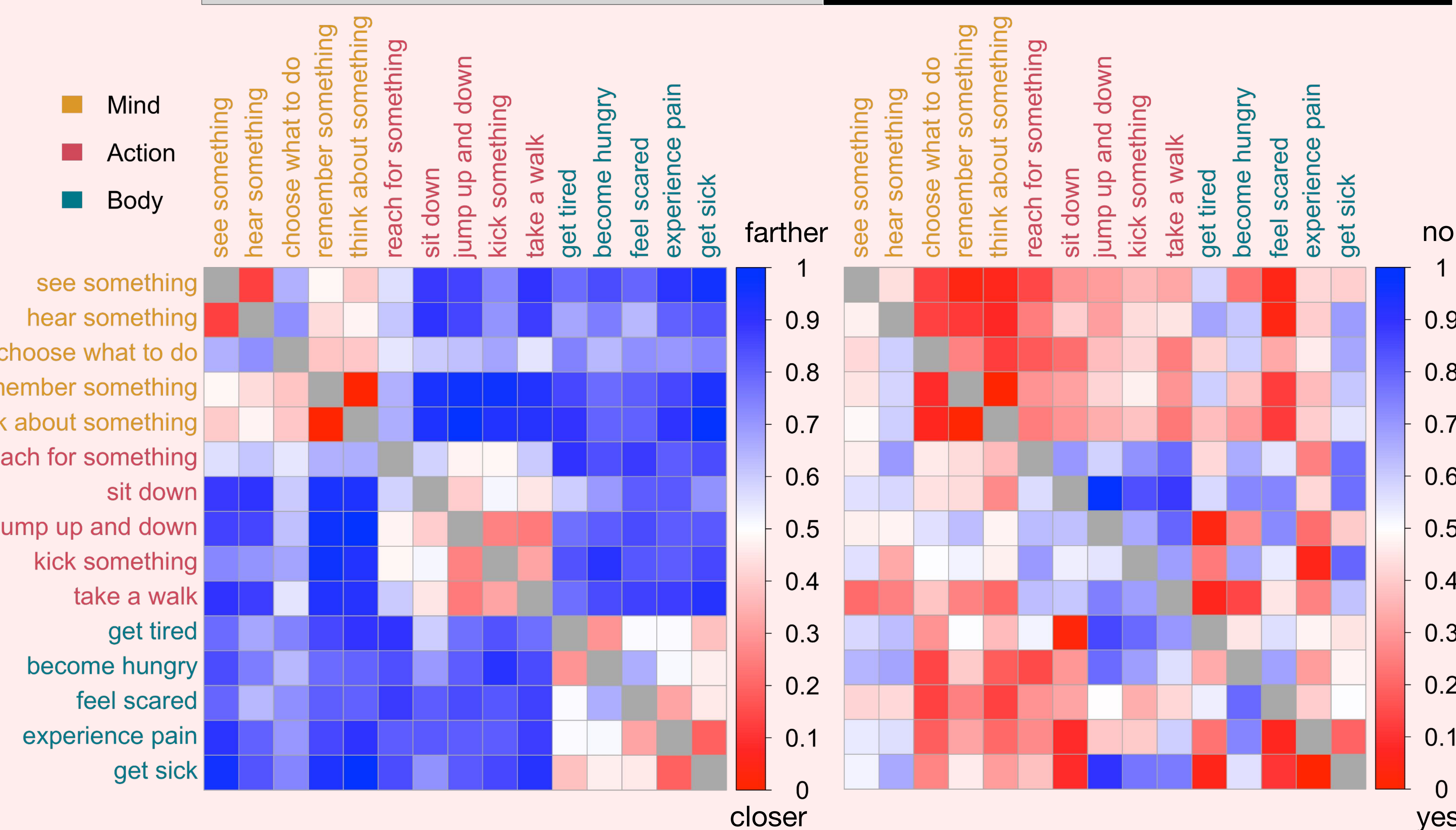


To what extent can the first event cause the second event?

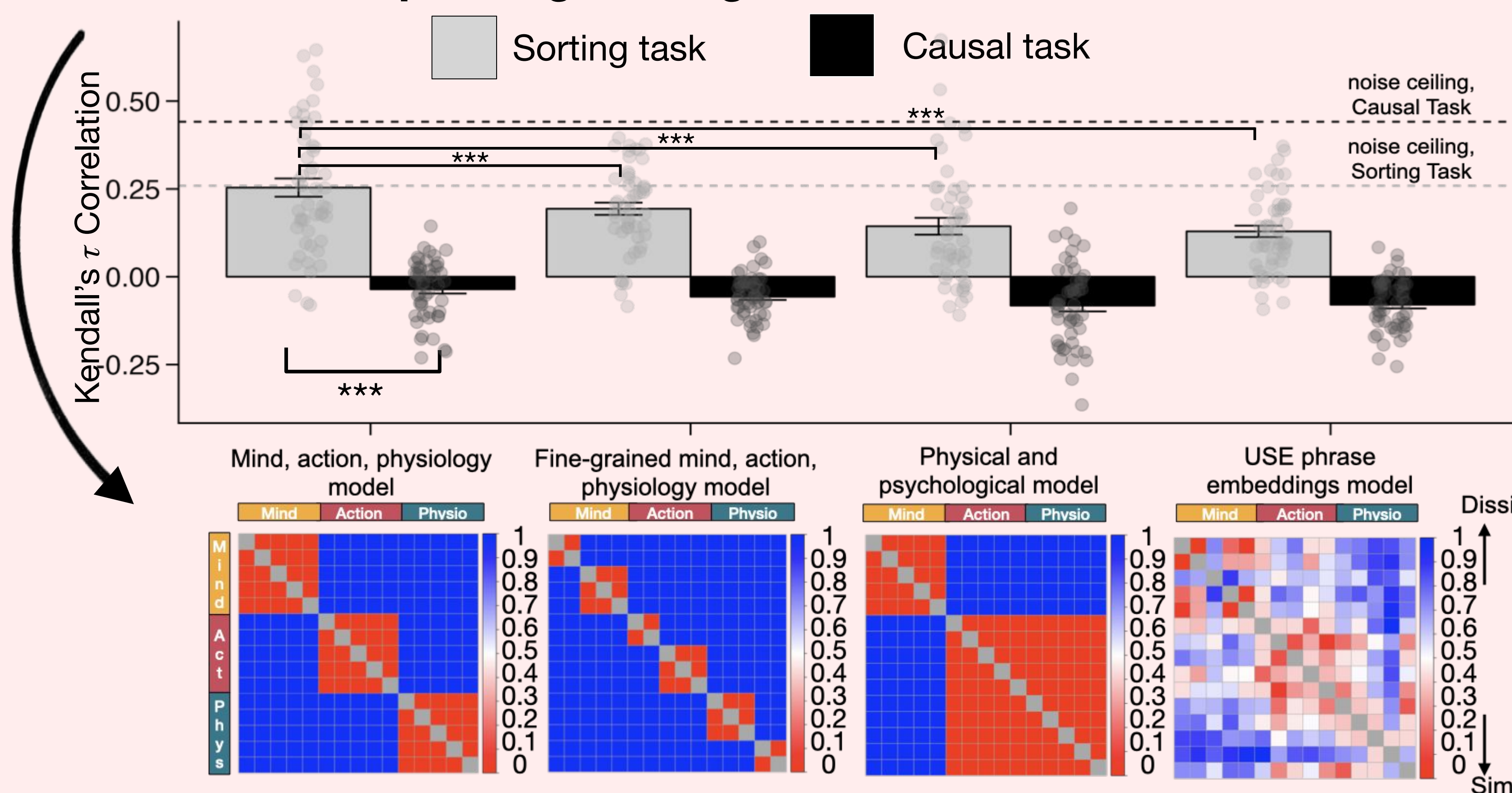
Can **thinking about something** make someone **feel scared**?



### Results: Freesort Task RDM Causal Task RDM



## An RDM model positing 3 categories describes Freesort RDM better than Causal RDM

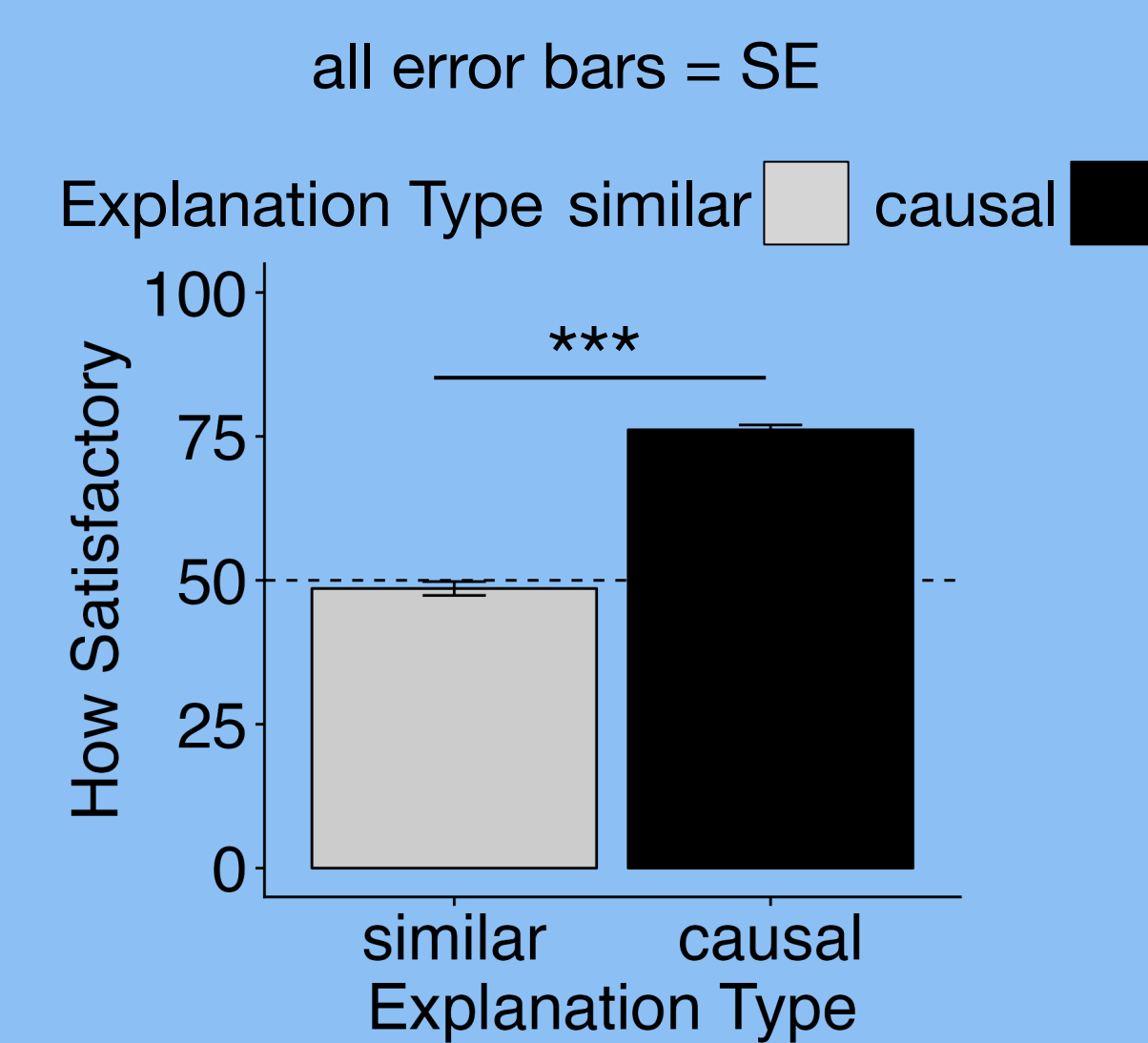
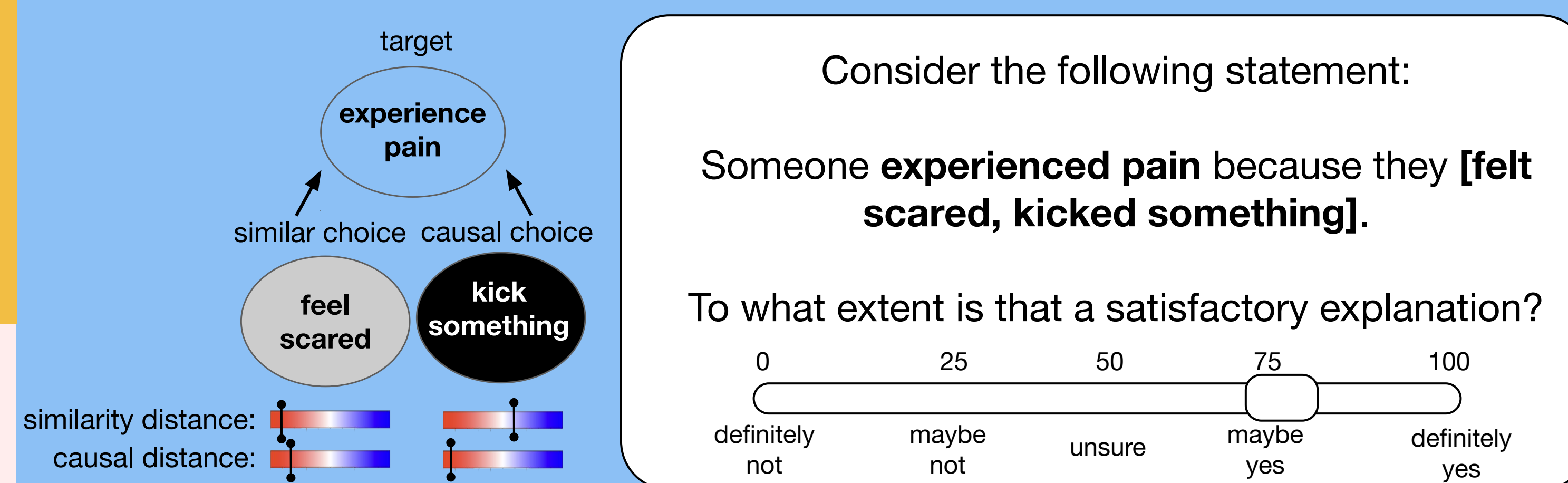


Alternative models are worse at describing Freesort RDM

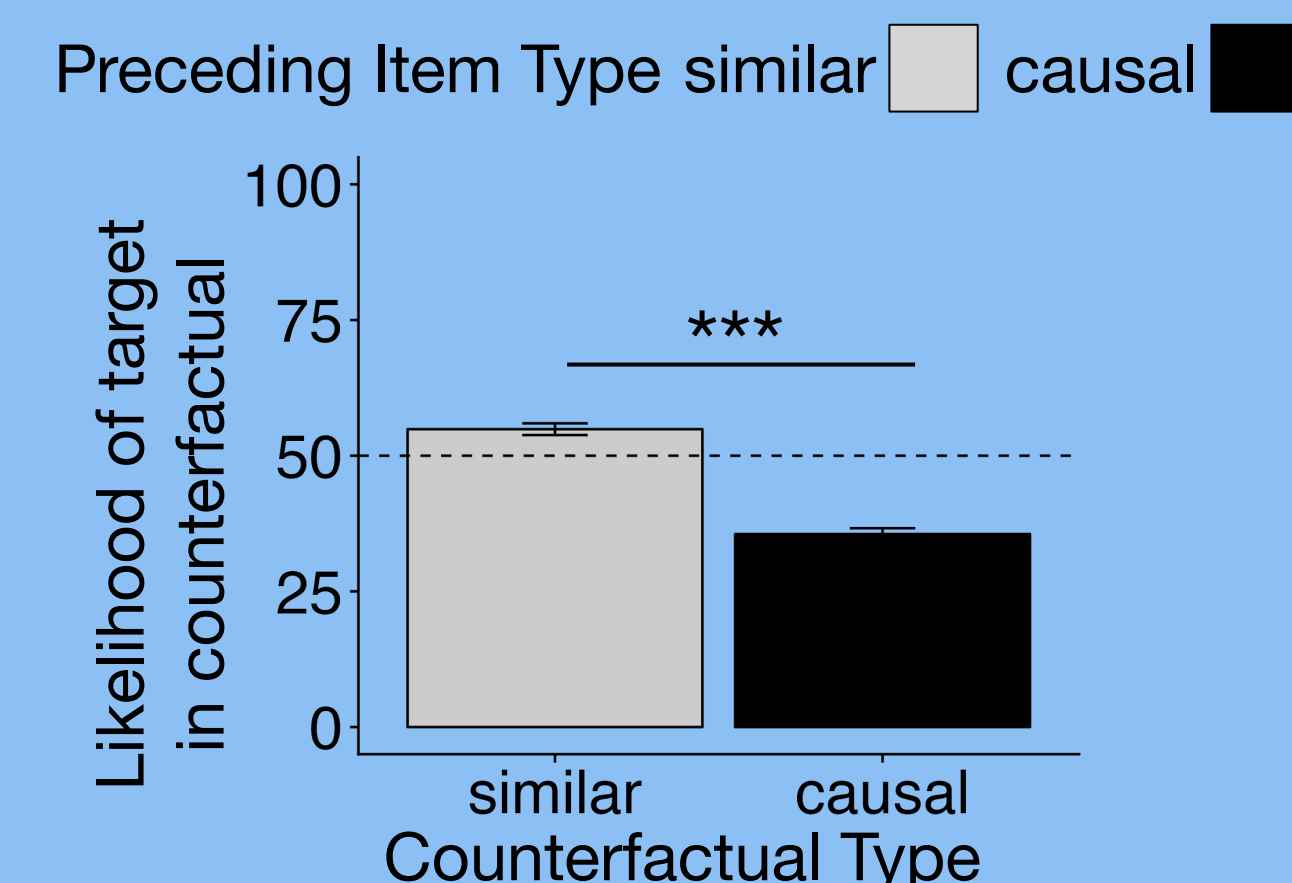
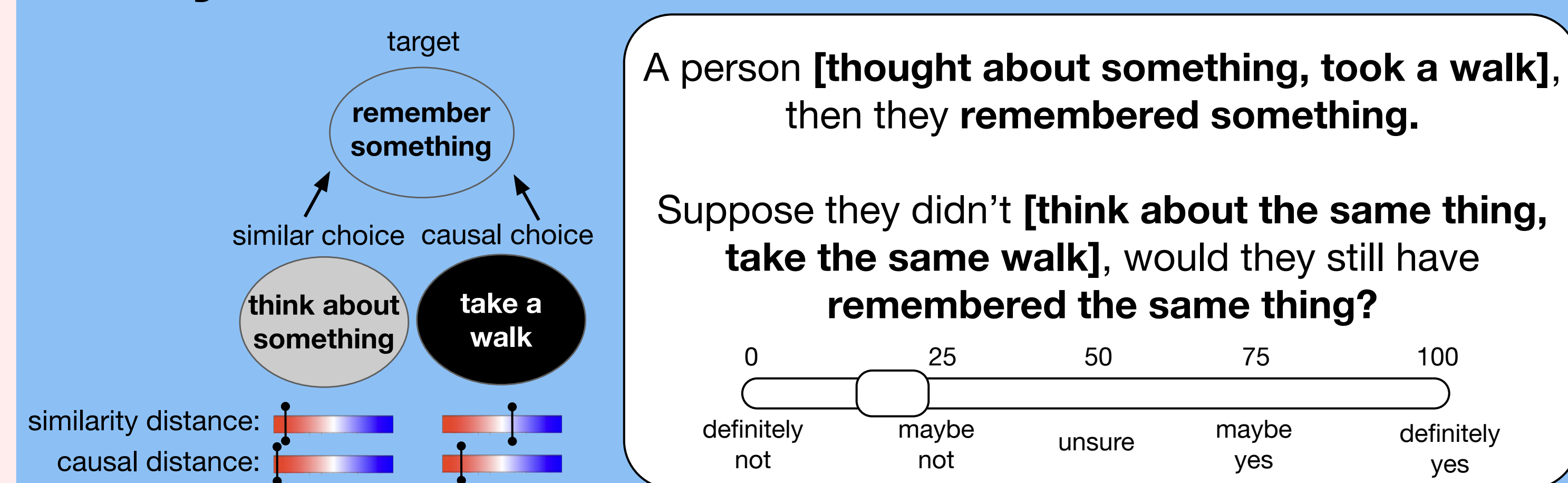
When do people use these representations?  
Are they genuinely causal?

## US adults' use of these representations, when not explicitly asked to

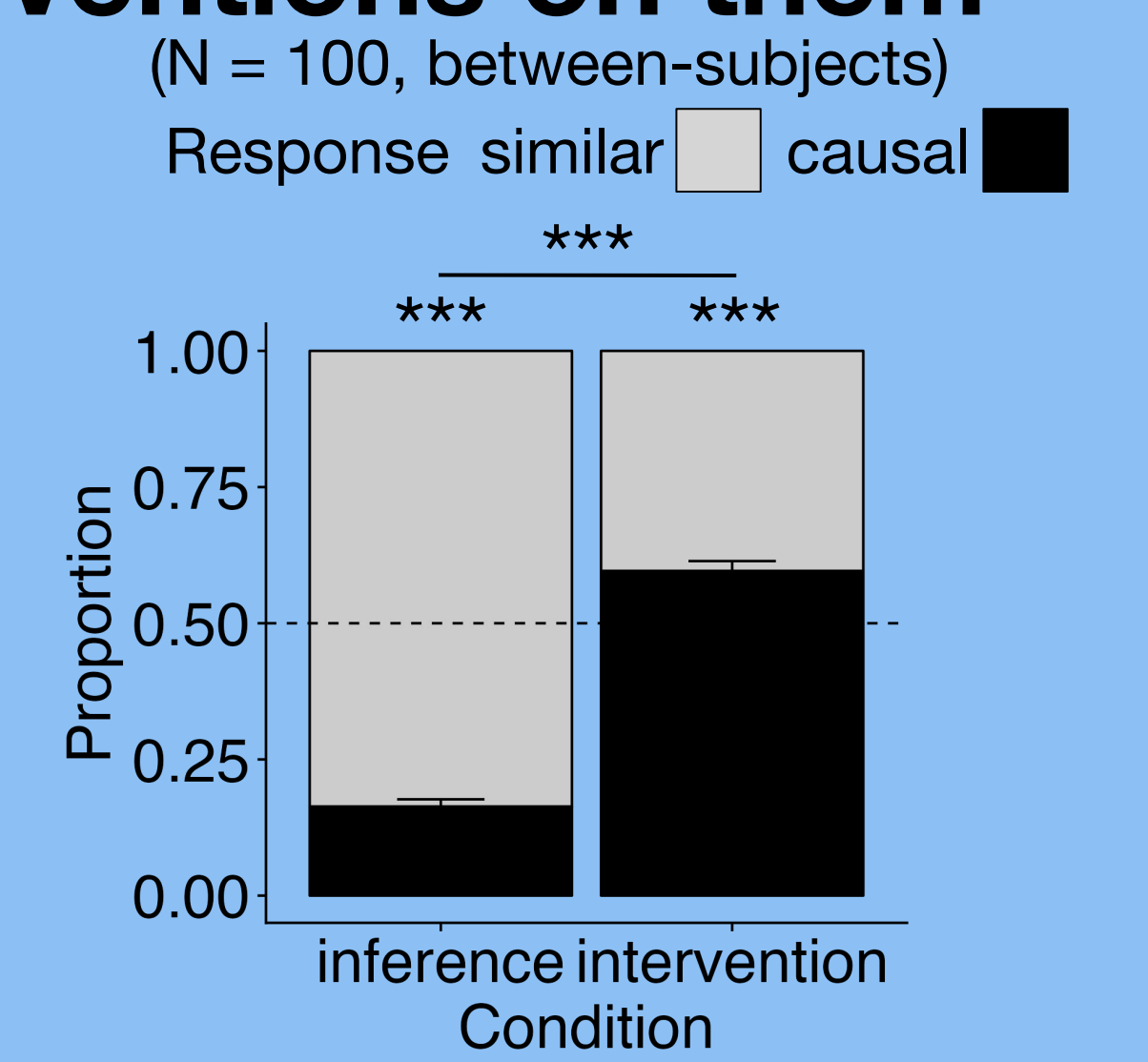
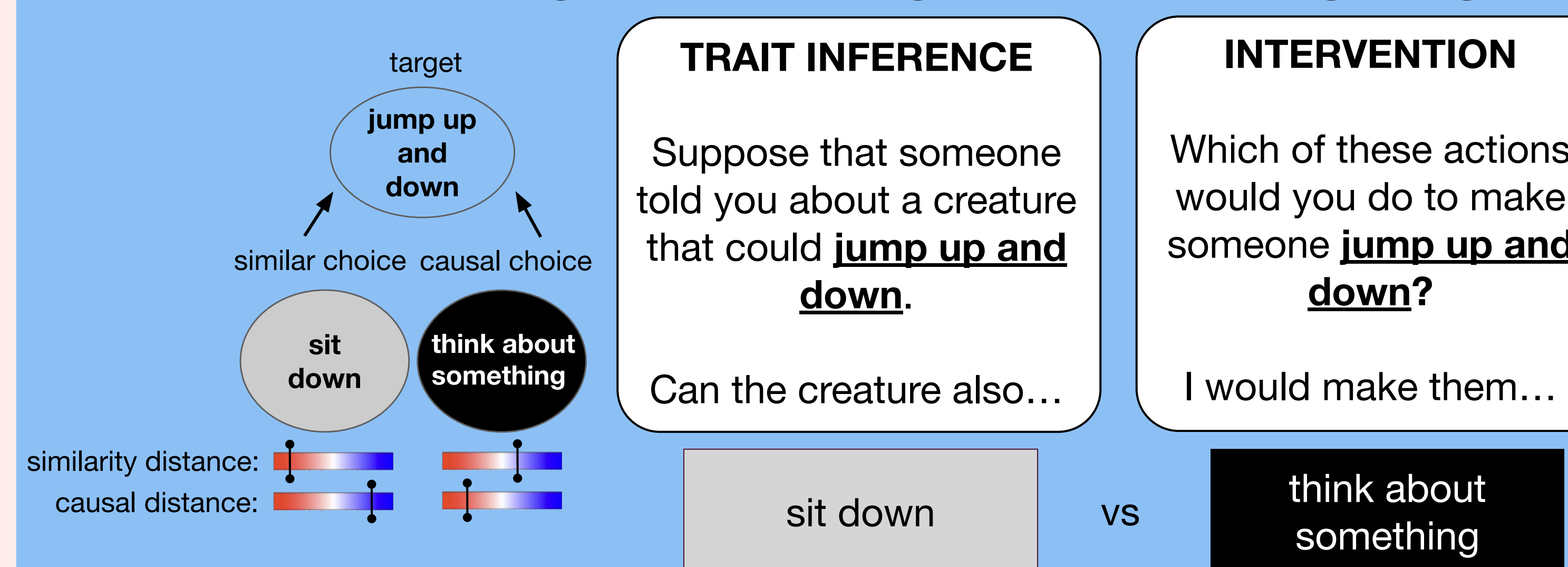
### Study 2: Explanations for events (N = 50, 1 condition)



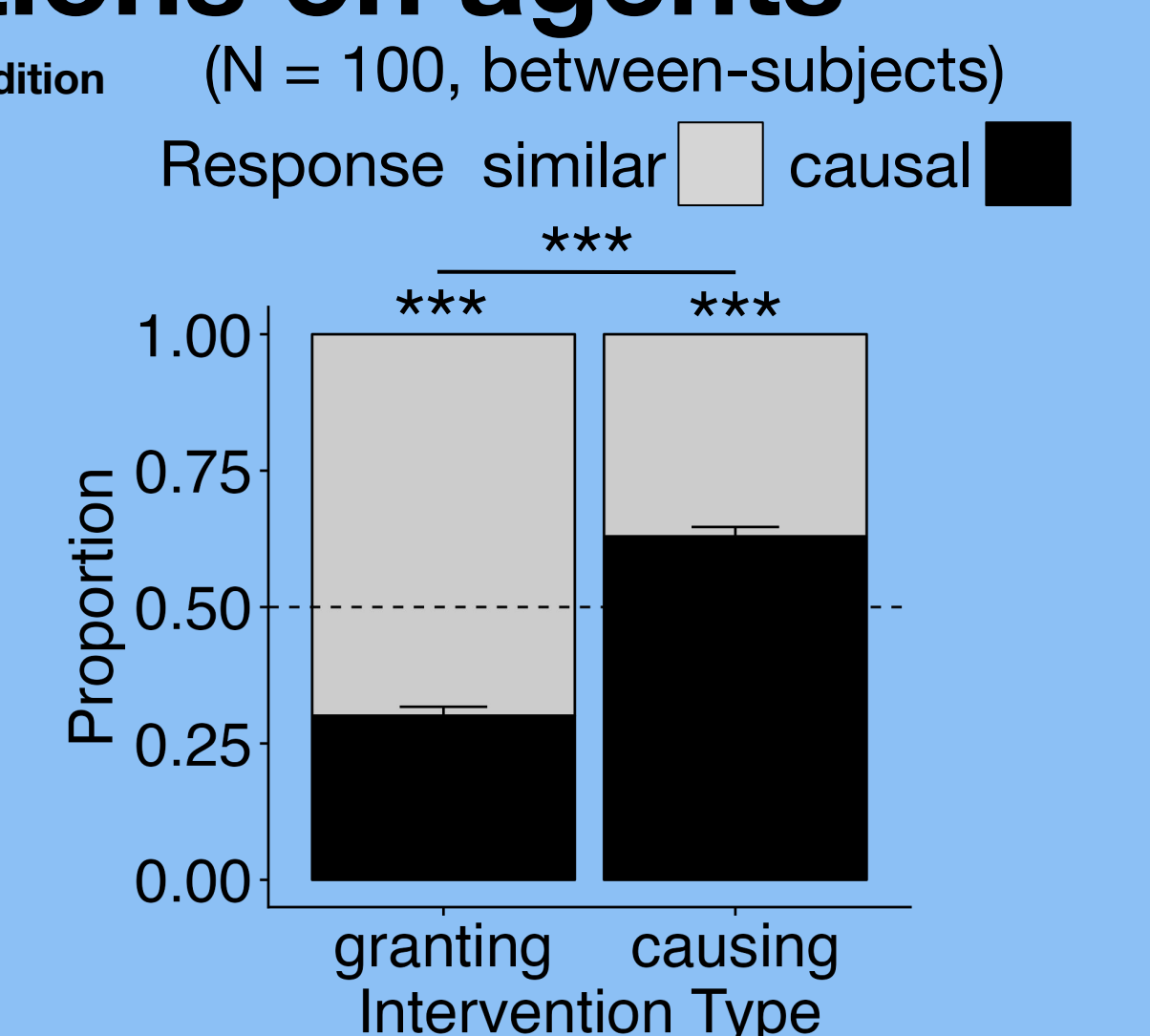
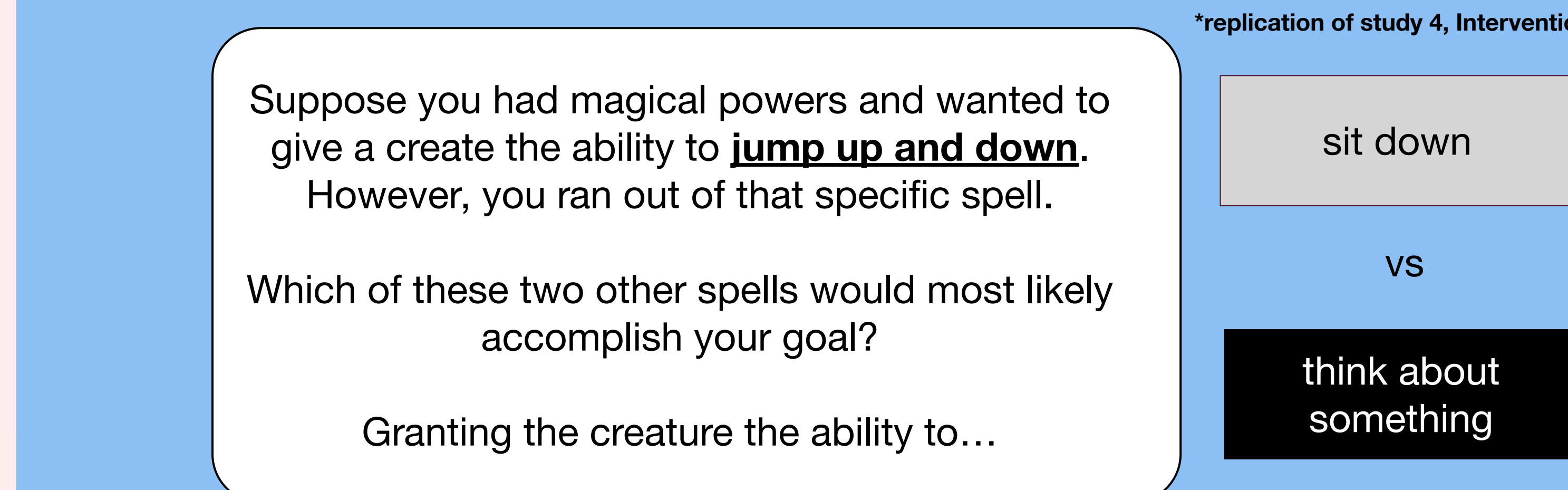
### Study 3: Counterfactuals (N = 50, 1 condition)



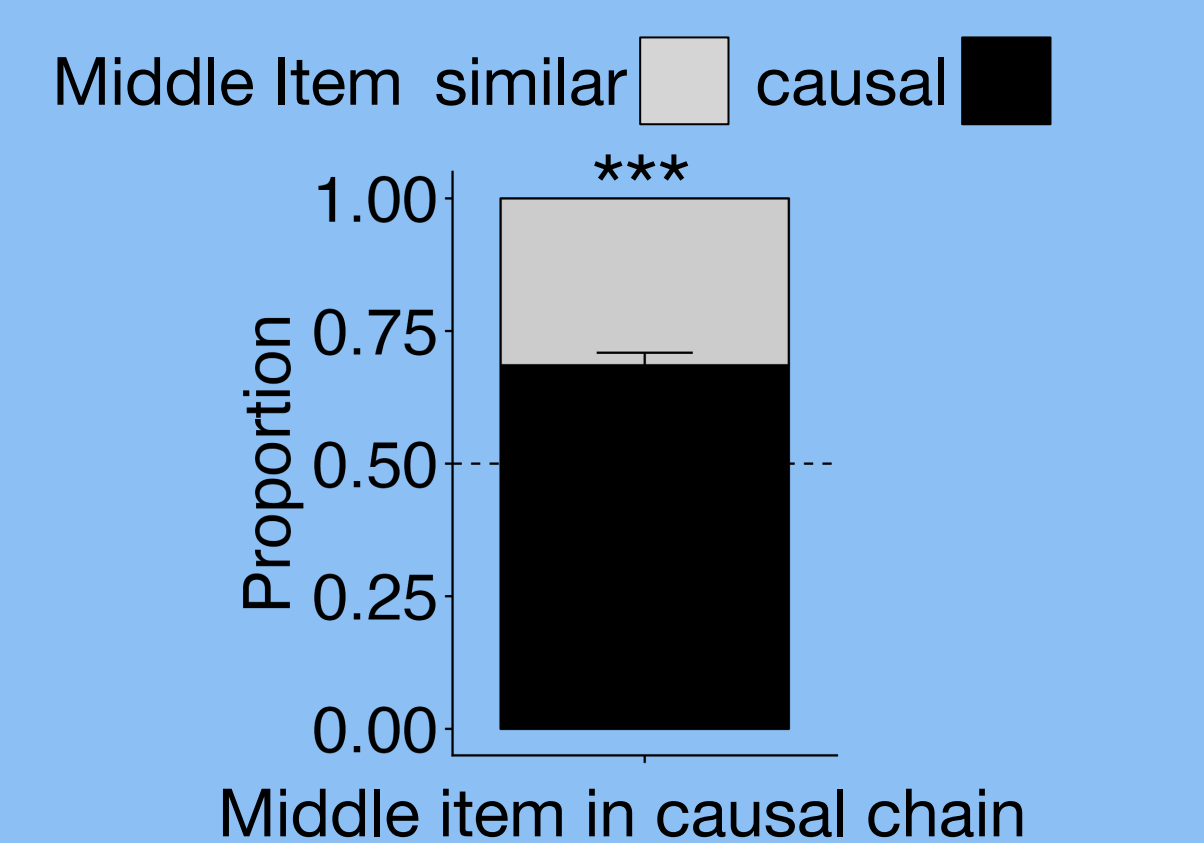
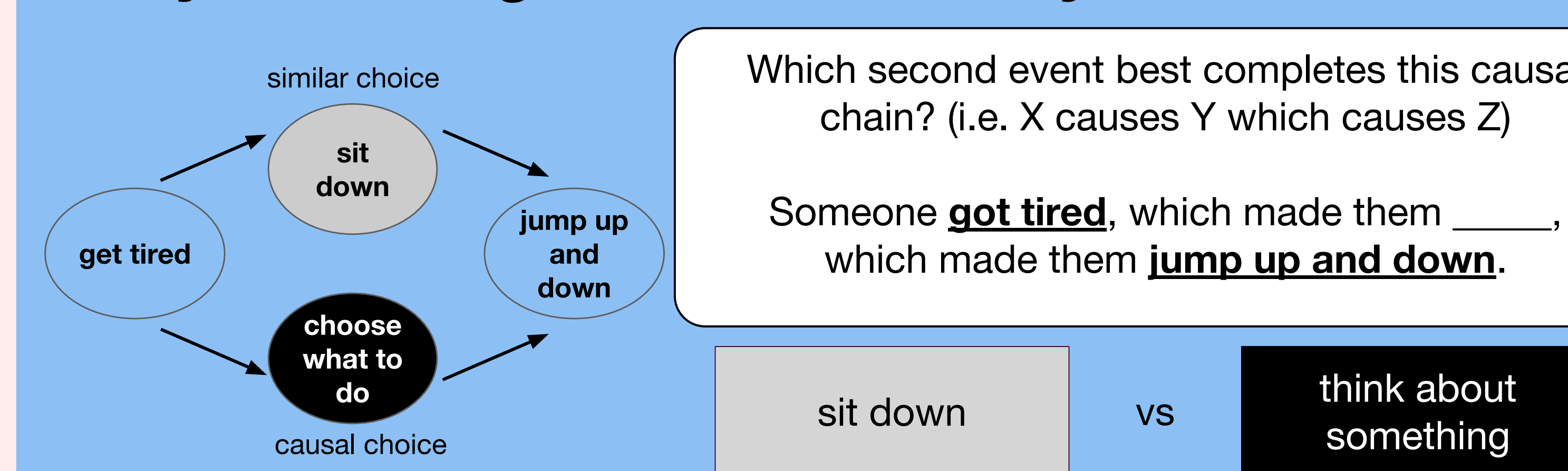
## Study 4: Inferring traits of agents vs designing interventions on them



## Study 5: Designing fantastical vs ordinary\* interventions on agents



## Study 6: Making sense of causally distant events (N = 50, 1 condition)



## Discussion

- Adults represent other agent's capacities as organized into distinct yet causally connected domains. These capacities are organized in terms of both their **latent causes** and **direct causes**, and adults flexibly use them for various social cognitive functions.
- Speculation:** Adults have a causal meta-theory of other people as mental beings, physical actors, and biological systems
- Future questions:** How do children acquire this meta-theory?

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