

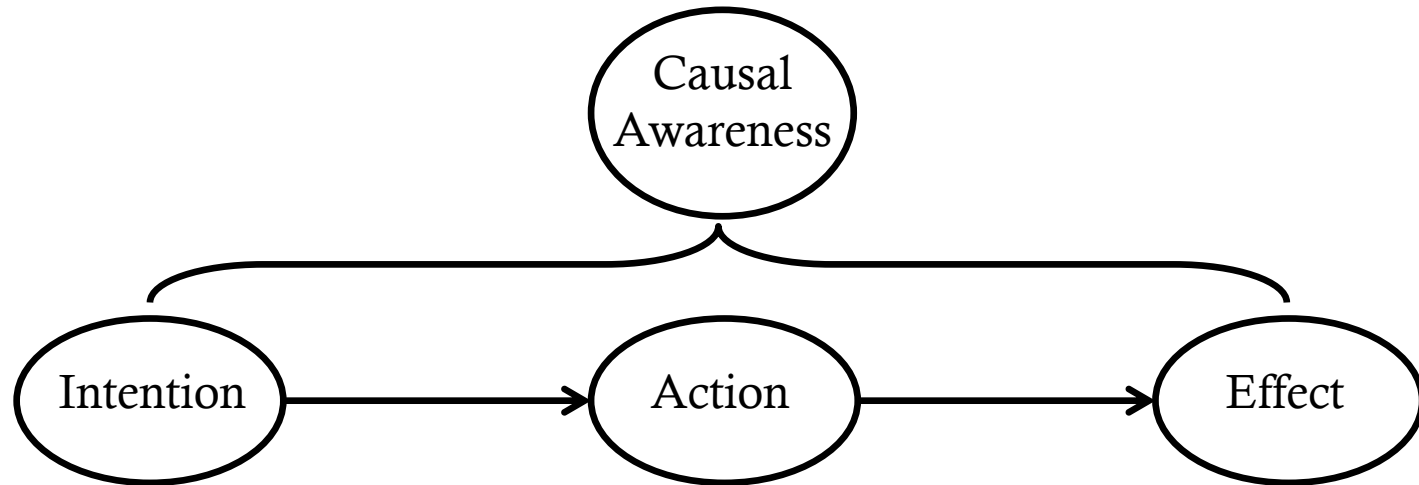
The role of the medial portion of the anterior PFC in attributing expected consequences to the self

Simmy Poonian

Outline

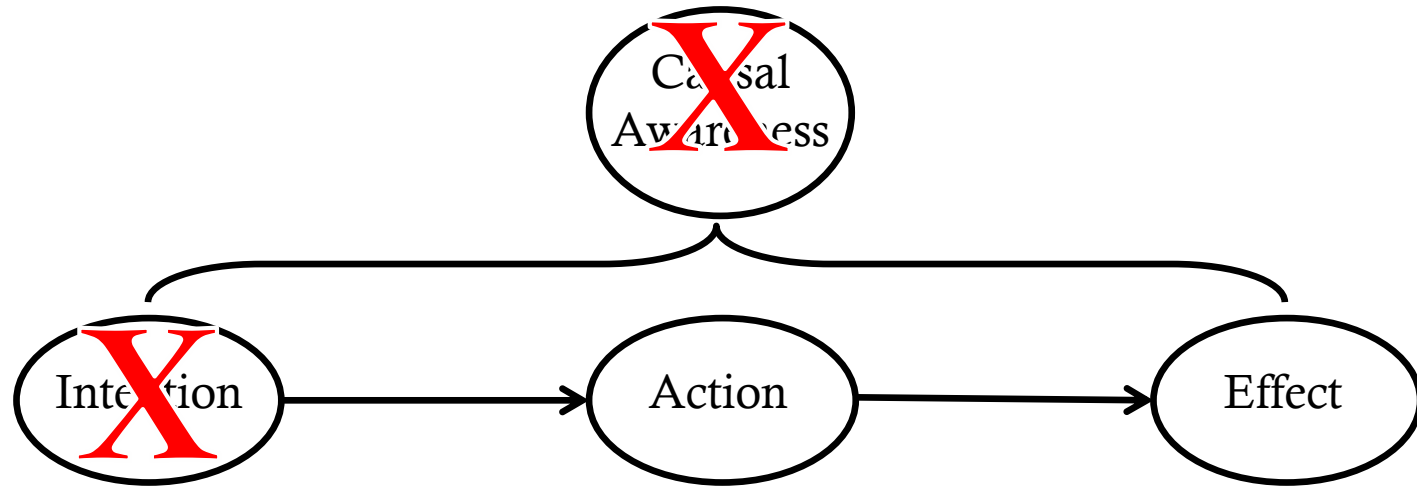
- Sense of Agency
- Comparator Model
- Intentional Binding
- Interval Estimation Task
- fMRI
- Conclusion

Action and Sensory Consequence



- Sense of Agency: I caused an action to occur
 - Explicit – judgement of agency
 - Implicit – action-effect

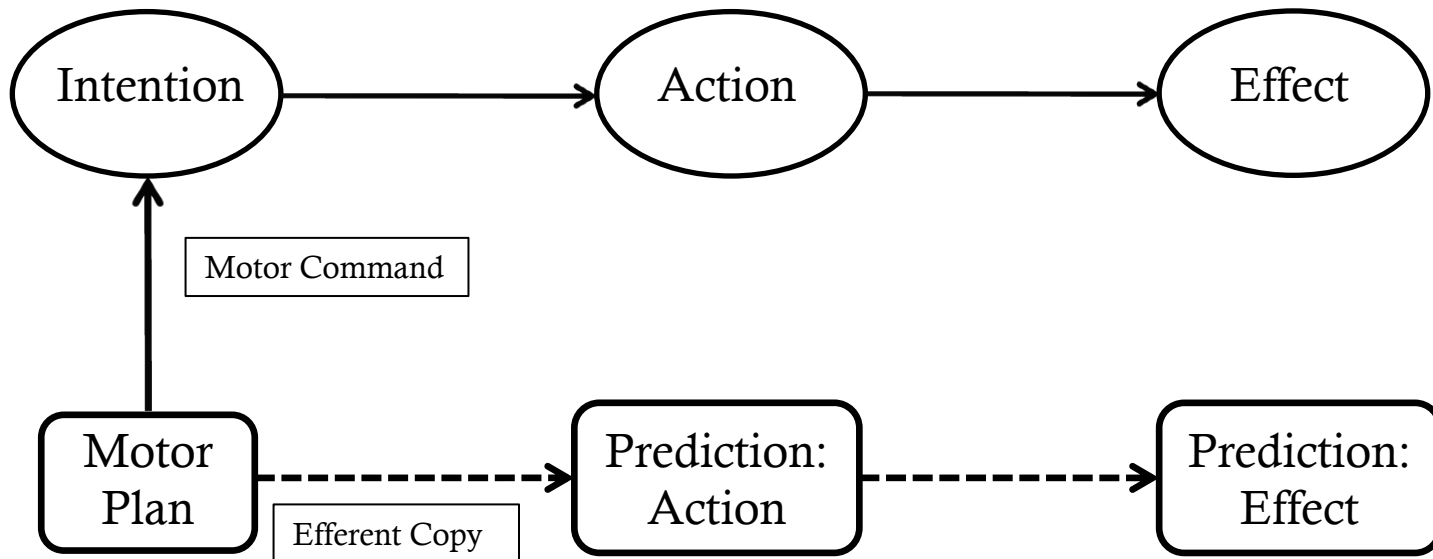
When agency goes wrong?



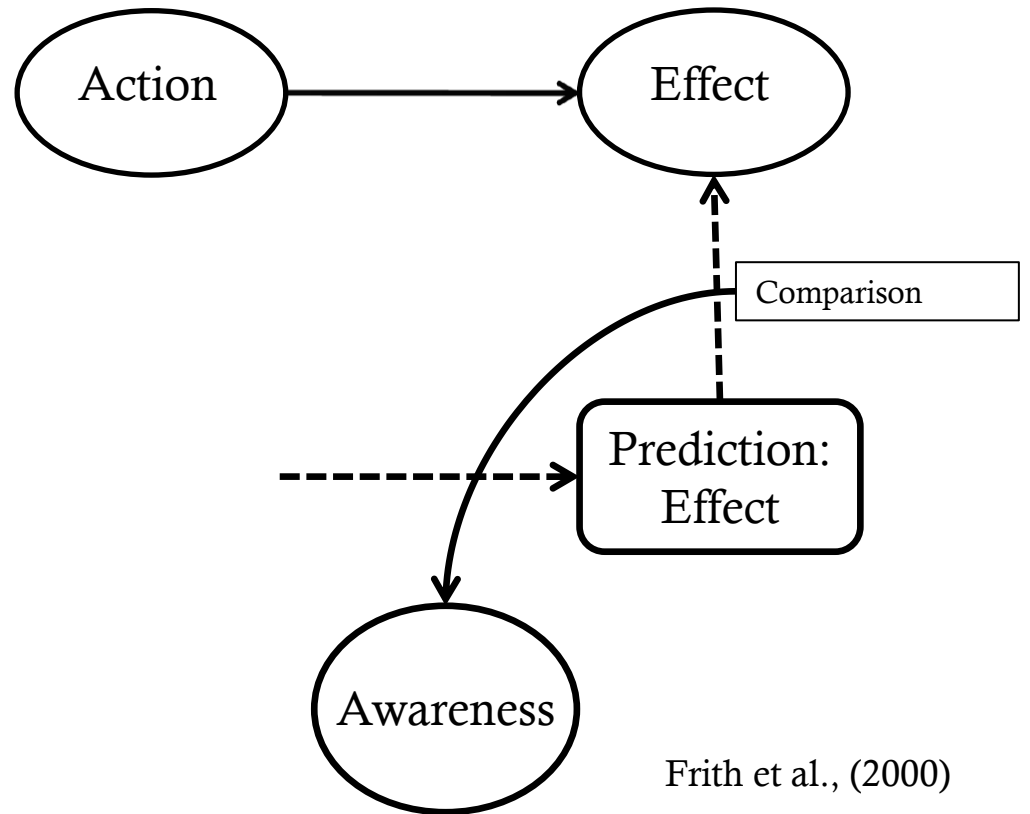
- Alien-hand syndrome
- Schizophrenia

Models of action awareness

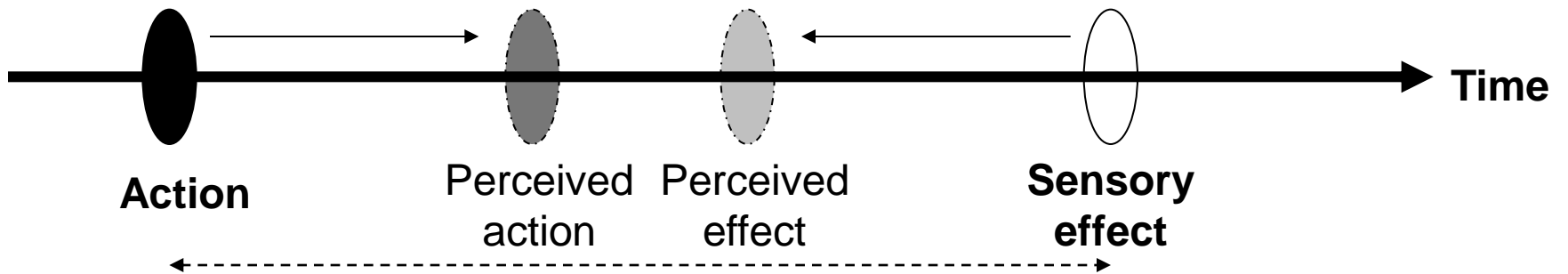
- Predictive Model (motor system)



Comparator Model

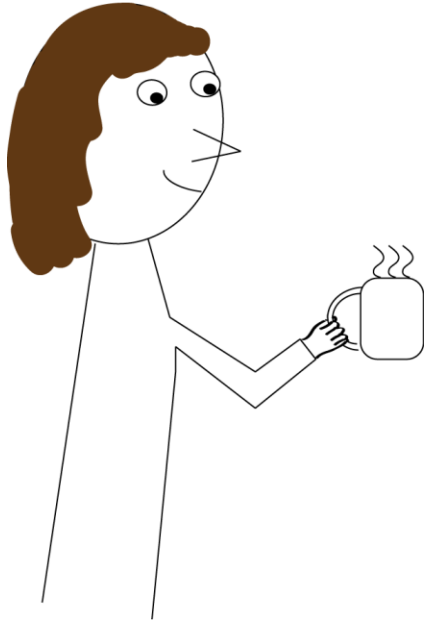


Intentional Binding



(Haggard, 2002)

Intentional Binding and other agents



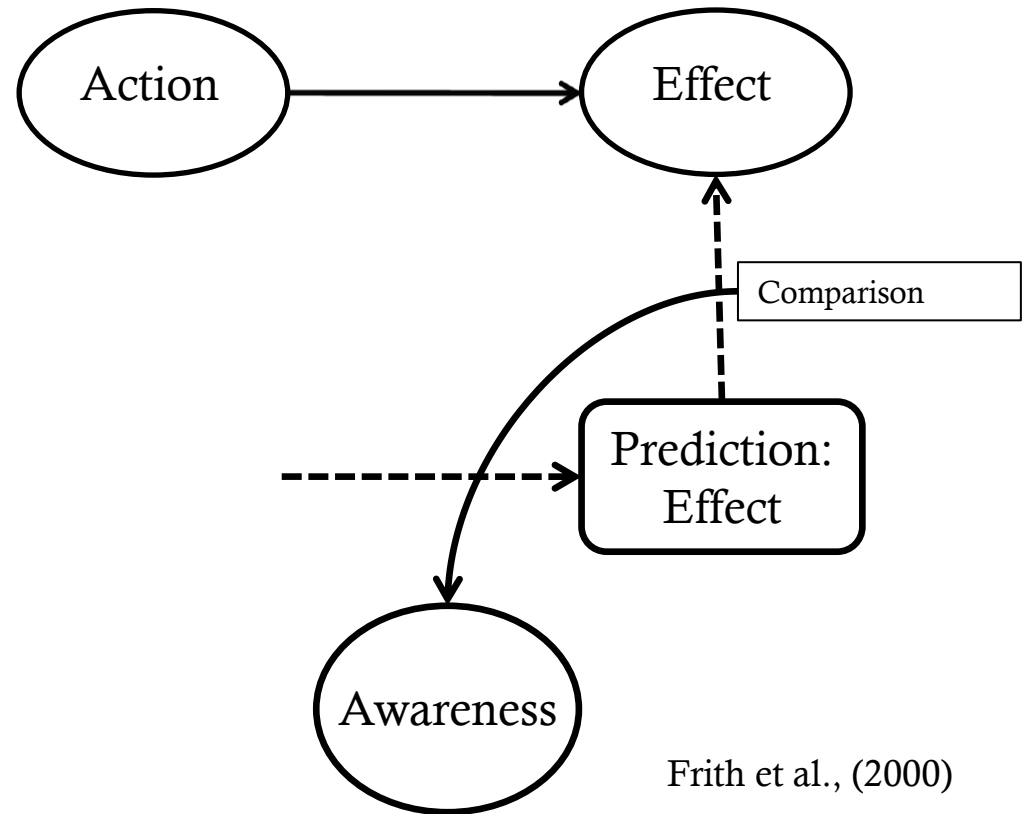
Self

Other

- Same causal relationship for others action and effects as we do for our own actions and effects?

Aim

- Investigate the anatomical areas involved in the comparison between predicted and actual consequences, when attributing agency to the self compared to attributing causality to another agent
- The predictability of a specific consequence was manipulated



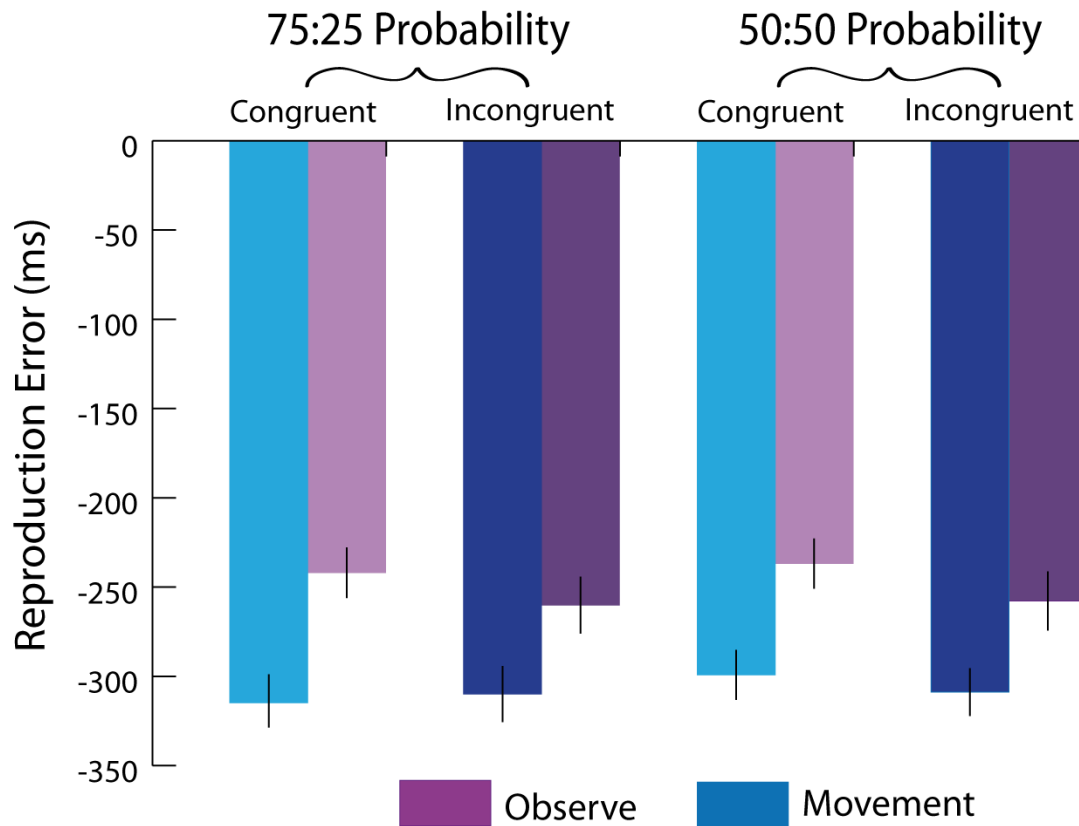
Method



- Reproduction Error ~~Response Interval~~ ~~Stimulus Interval~~
Non-Predictable: 50% Congruent Tone
25% Incongruent Tone

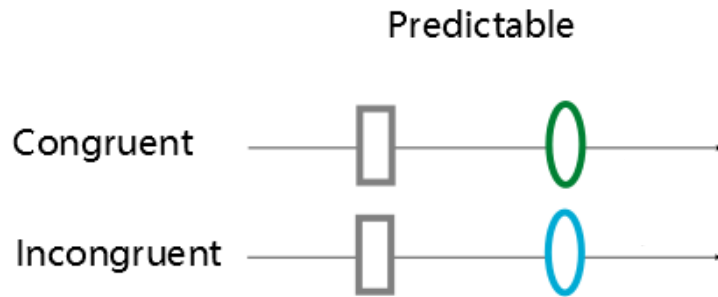
Catch trials: Identify the tone (high/low)

Behavioural Results



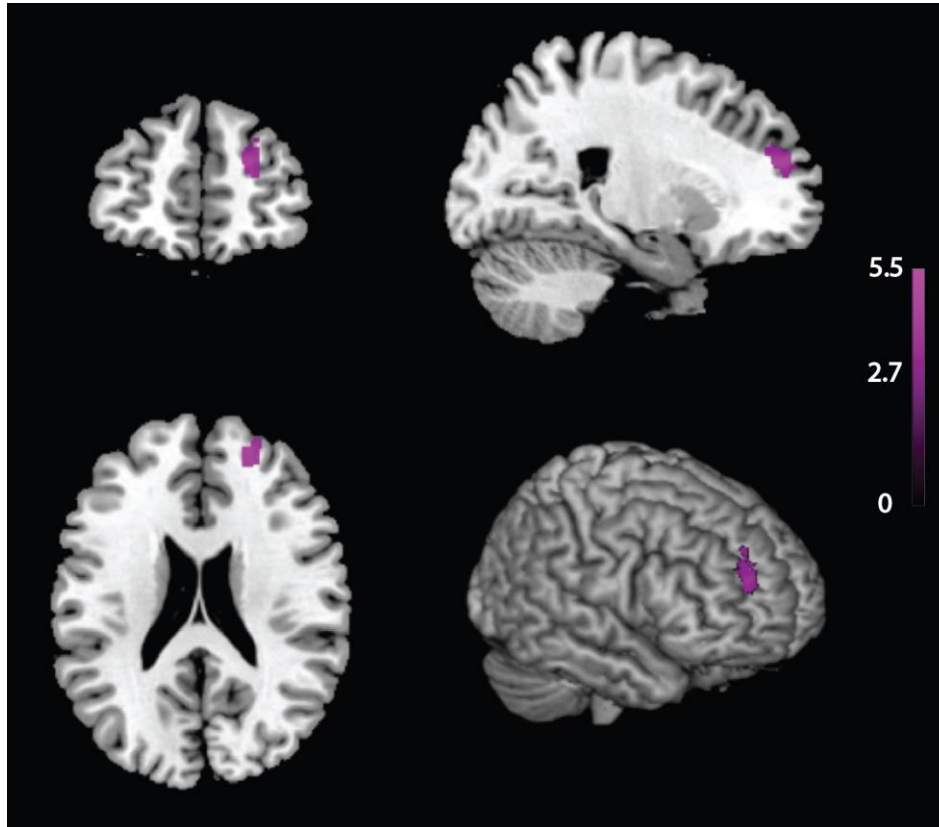
- Reproduction Error = Response Interval – Stimulus Interval
- Main effect of action type: greater binding for movement ($p = .015$)

Imaging Analysis

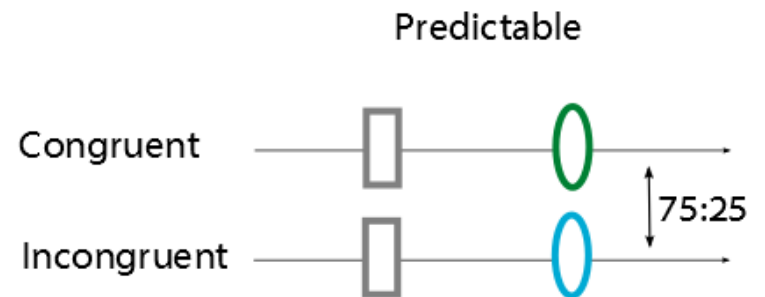


- Congruency Effect:
 - 75:25: Difference between congruent and incongruent
- Movement vs Observe:
 - Congruency effect for 75:25

Movement vs Observe



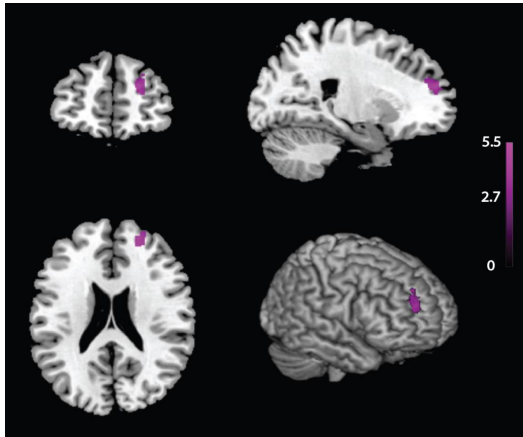
- *Congruency Effect*



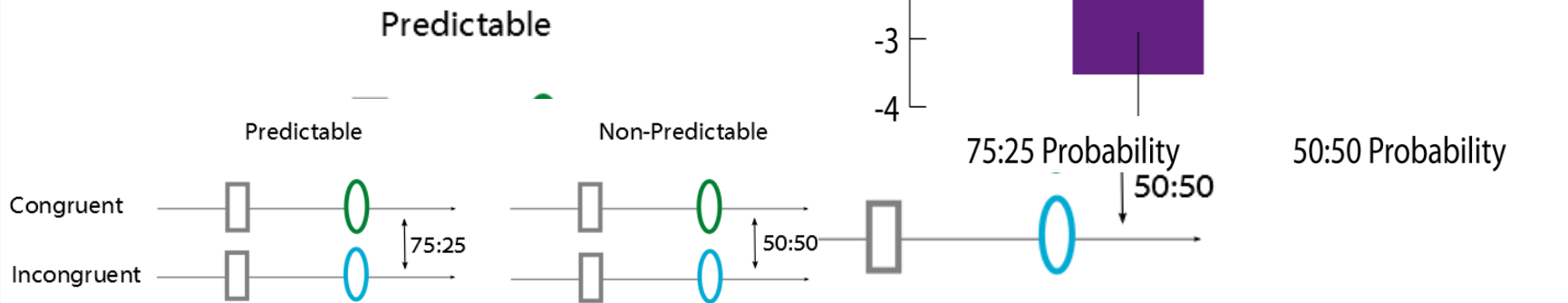
- Anterior Medial PFC

- xyz = 20,50,22
- P(FWE) < .05; Z = 4.31

Movement vs Observe



- Anterior Medial PFC



Conclusion

- Role of prediction
 - No binding difference in two types of action for spectral prediction (“what”)
- Role of the medial PFC:
 - Area of the anterior medial PFC more active for expected consequence of self-made actions compared to expected consequence of actions of other agents.