The Cognitive Neuroimaging Laboratory
Biology and Molecular Biology
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Freewill and awareness: A Transcranial Magnetic Stimulation study

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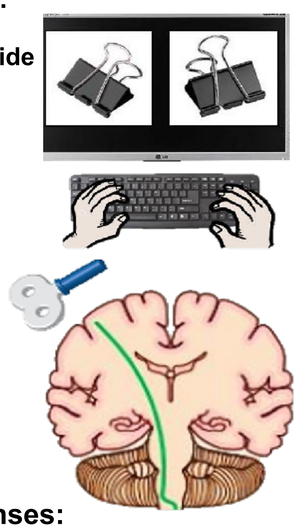
In a Glance

Decision making is often thought of as a conscious process where regions such as the frontal cortex would be active ***before*** and action is performed. Evidence exists, however, that conscious awareness of the decision occurs after the decision has been implemented. Here we examine the fragility of freewill where we attempted to a) Manipulate freewill and b) Determine if participants would be aware of such manipulation. Participants were given a forced choice preference task between two options. TMS biased participants to choose objects presented on one side of the screen. Participants remained unaware that their preferences were biased and they reported their choices with rationales for their choices. These data indicate that choices may be 'explained' post-hoc.

A Participants choose which mundane object they prefer. Without TMS (Sham TMS), they choose right and left side equally.

A



B

B Following left hemisphere TMS, participants reported preferring the left sided image indicated that freewill can be manipulated, How? We slowed down the left motor cortex which made the right hemisphere and left hemifield more dominant (and did the same for the right).

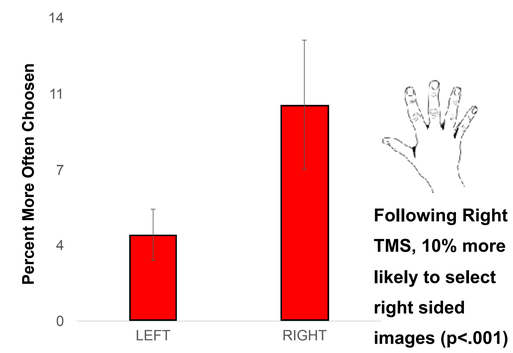
C

Sample Responses:

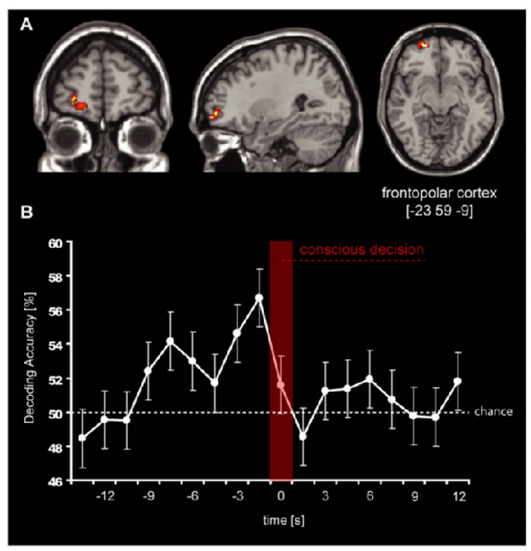
- Bigger
- Shinier
- Larger
- Movement
- More wrinkly
- Better Pattern
- More aligned
- Liked the Color Coordination
- Less Realistic
- Less Quantity

C The participants then described why they choose their image by RATIOANLIZING their choice.

Following Left TMS, 4% more likely to select left sided images (p<.05)

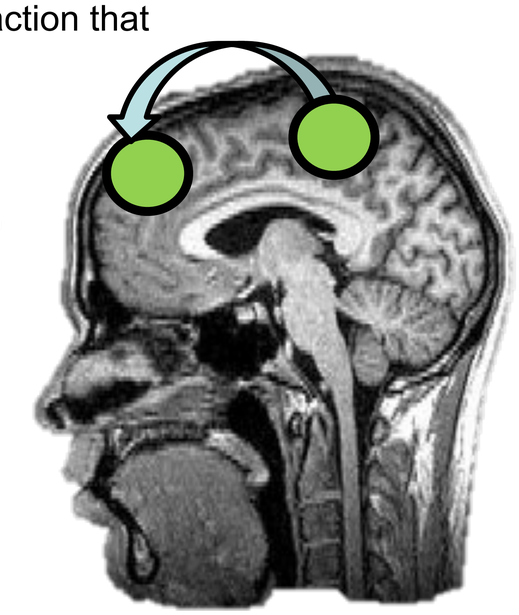


Following Right TMS, 10% more likely to select right sided images (p<.001)



Using fMRI, different brain activations readily predict an action (in this case moving the left or right hand), suggesting that the decision is made seconds before you are aware or conscious of the decision (Bode et al., 2011; Soon et al., 2008).

Motor regions activate BEFORE the frontal regions, indicating it is action that comes first.

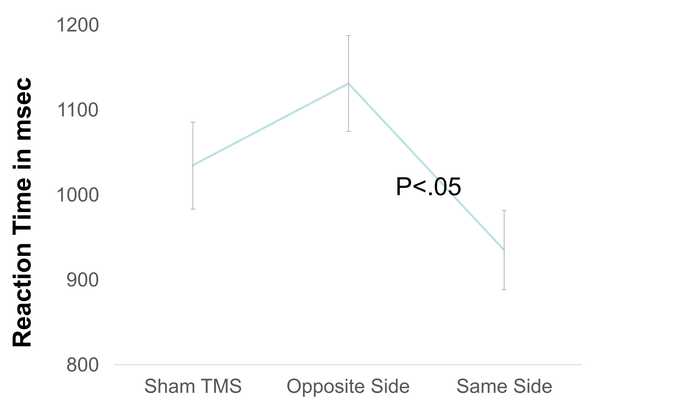


To Perform an Conscious Action, we assume:

1) Conscious Attention
2) Action
3) Outcome

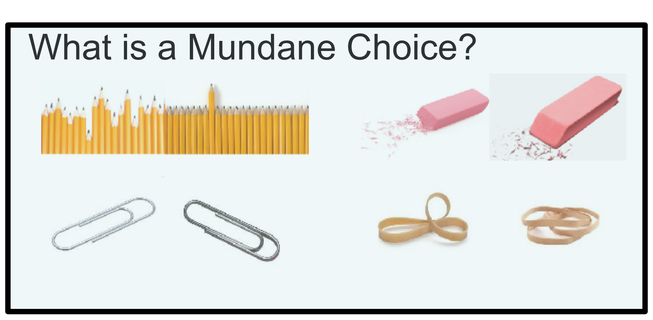
However, Libet and others have found evidence of:

1) Action
2) Conscious Attention
3) Outcome



In Conclusion

- Choices were biased
- They preferred the biased hemispace image
- They were quicker to choose them
- They rationalized their choice, unaware that they were made to be biased



Please contact Julian Paul Keenan with any questions: julianpaulkeenan@gmail.com
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