

Lecture 5 - A problem in theory?

The Social Brain: Critical Perspectives on Science, Society and Neurodiversity

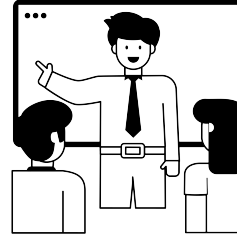
Richard Ramsey



Today

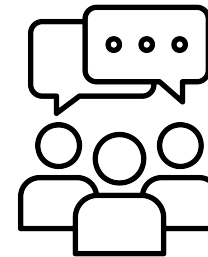
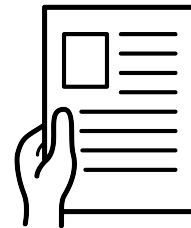
Part 1

- A problem in theory?



Part 2

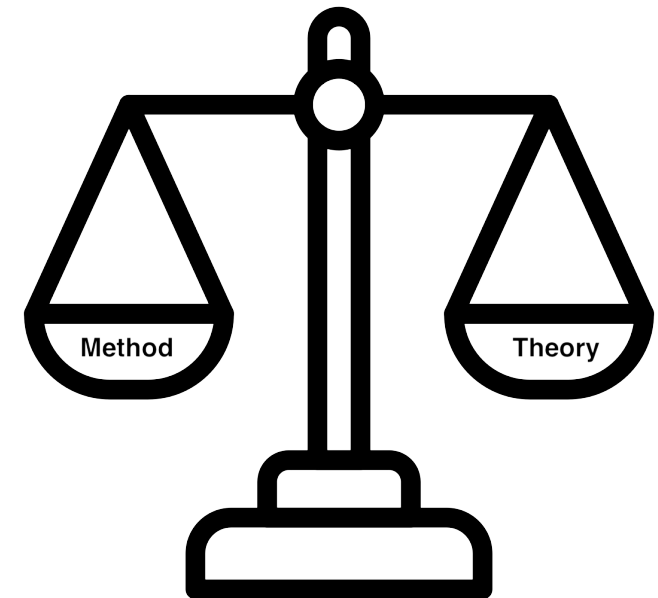
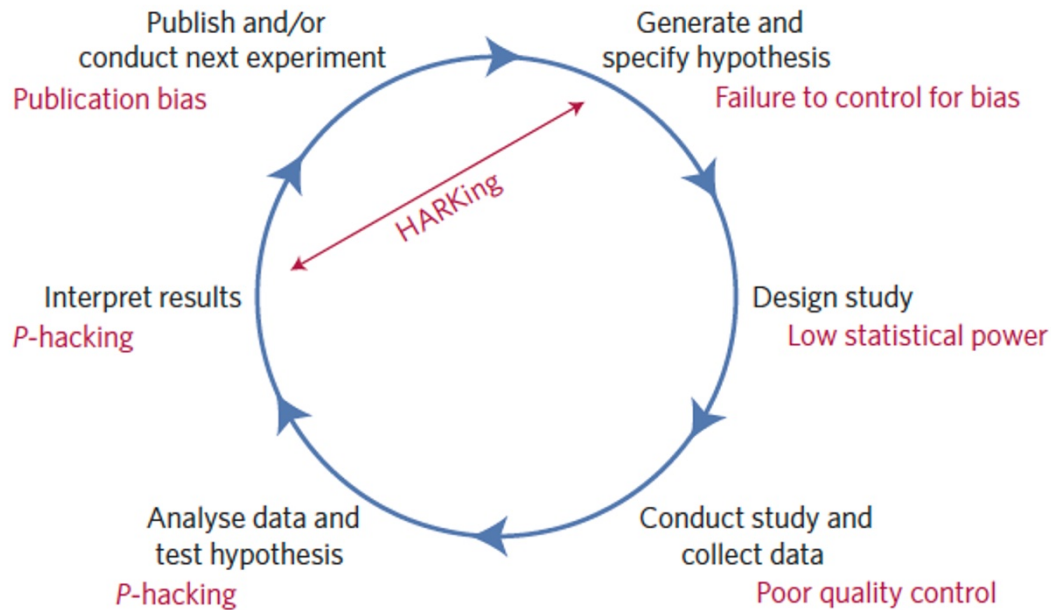
- Read articles and discuss



Context



Unreliable methods, but what about theory?



(Munafò et al. 2017)

A problem in theory

Without a sufficiently well-developed theory, then it is hard to interpret results in a meaningful way.

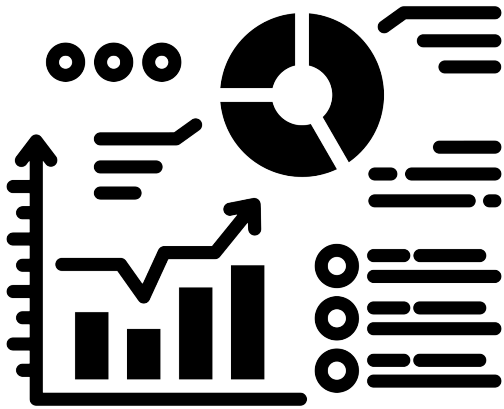


- Anything that turns up as statistically significant can be used to tell a story or sell newspapers.
- At most, only 0.4% of adolescent wellbeing is related to screen use - which only slightly surpasses the negative effect of regularly eating potatoes.

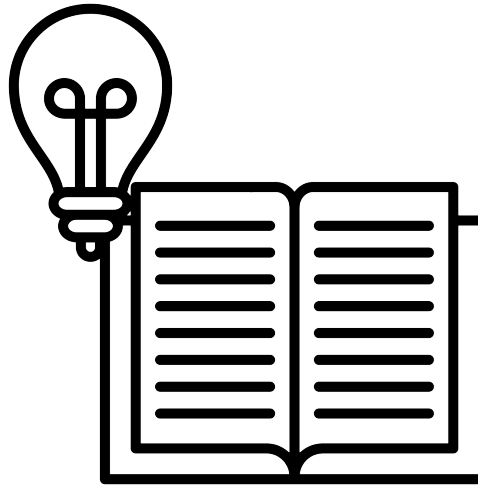


A problem in theory

Predictions are often impossible to falsify because of infinite wriggle room...



Data



HARKing



Wriggle room

Theory as a blueprint for science



Evidence / Facts /
Experiments



Theory



Organised knowledge

(Gray 2017)

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Theory before the test

Are psychological scientists ready to test hypotheses?

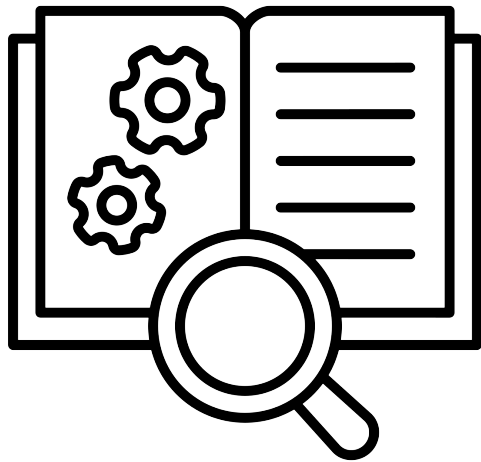
Inputs to informative hypothesis tests:

- Concept formation
- Developing measures
- Establishing relationships between concepts
- Boundary conditions and auxiliary assumptions
- Deriving statistical predictions



Concept formation

What do we mean by terms such as screen time, intrinsic motivation or depression?



Why is this important?

- Lots of time and money is spent having pointless debate and argument about reproducibility, when key terms are not adequately defined



Measurement

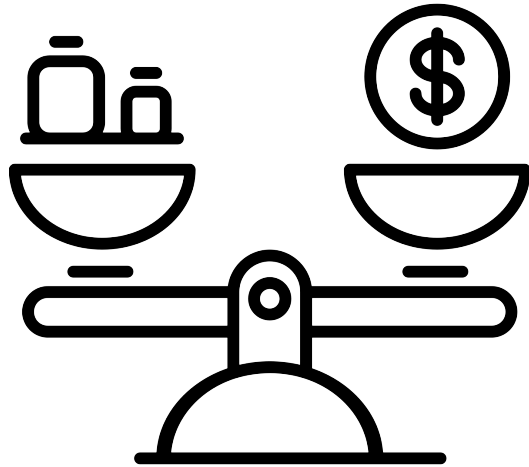
Measurement schmeasurement

We demonstrate that psychology is plagued by a measurement schmeasurement attitude: questionable measurement practices are common, hide a stunning source of researcher degrees of freedom, pose a serious threat to cumulative psychological science, but are largely ignored.

([Flake & Fried, 2020](#))



Measurement



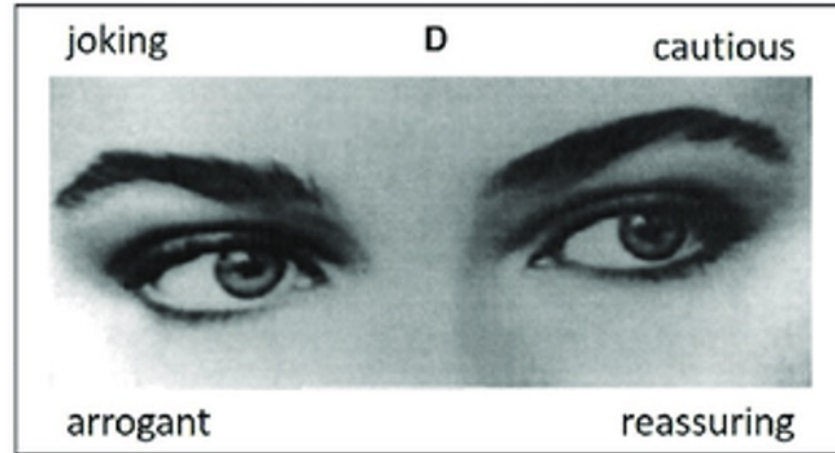
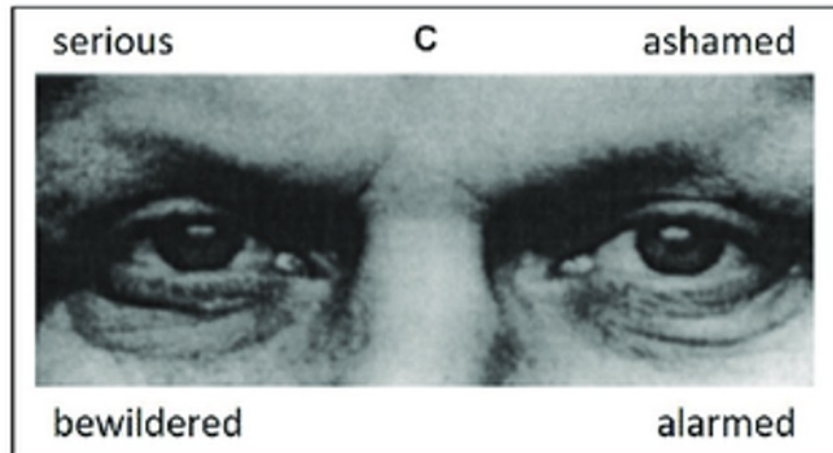
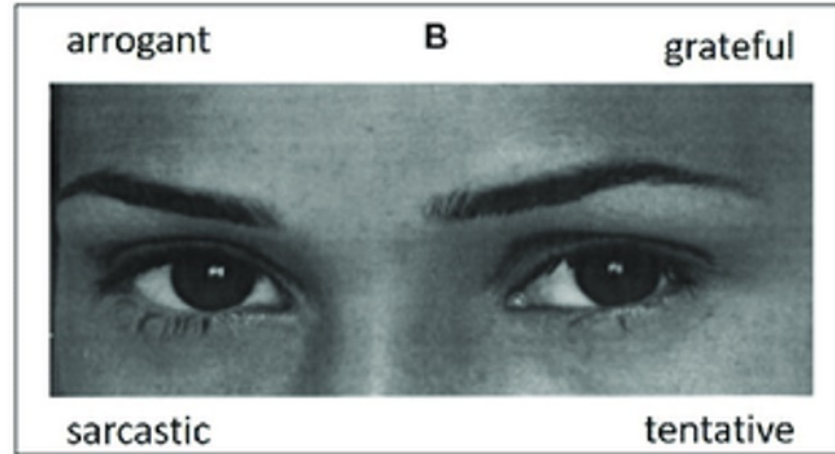
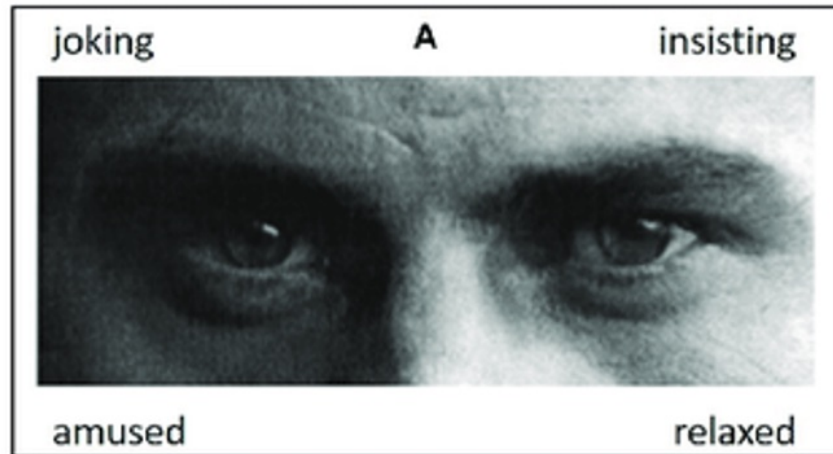
- Are the measures valid and reliable?
- And are they measuring the concept of interest?

(Flake & Fried 2020)

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RMET - Example



RMET - Problems

- The task is widely used in clinical and non-clinical settings, despite very limited evidence about the validity of the tool.
- A large-scale study has shown that it has poor psychometric properties, which provide considerable doubts to reliability and validity of the RMET as a measure of theory-of-mind.

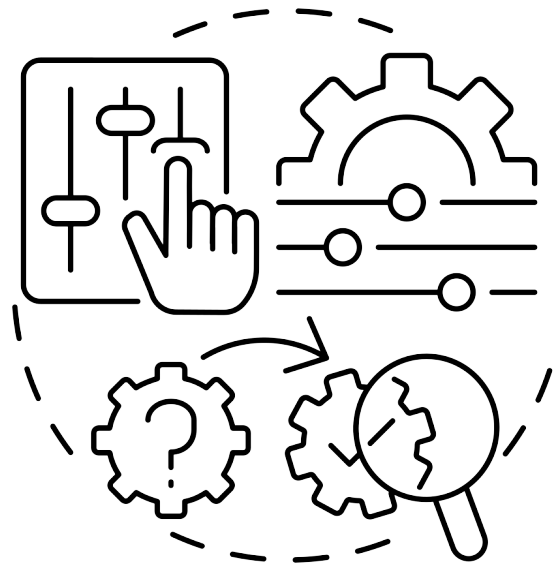
(Higgins et al. 2022)

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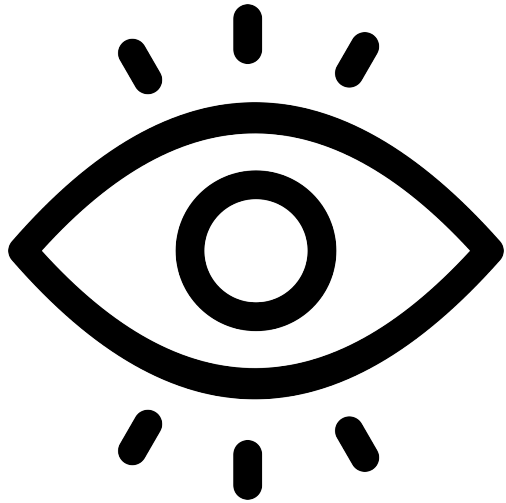
Relationships between concepts

Once concepts are defined, we need a causal model of how they relate to each other.

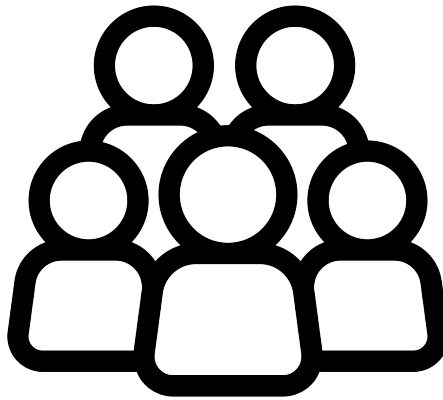


Boundary conditions

A good theory is clear about its boundary conditions – where does the theory apply and where is beyond its scope?



Basic vision vs. social cognition



Individual differences



Cultural variation



Why is there a lack of good quality theory?

- OK, these seem like sensible ideas. But they are not **new** ideas?
- Paul Meehl was writing about this in (1967).

Question for the class:

- Why don't researchers do more “theory” before the test?



How can we improve theory building?



How can we improve theory building?

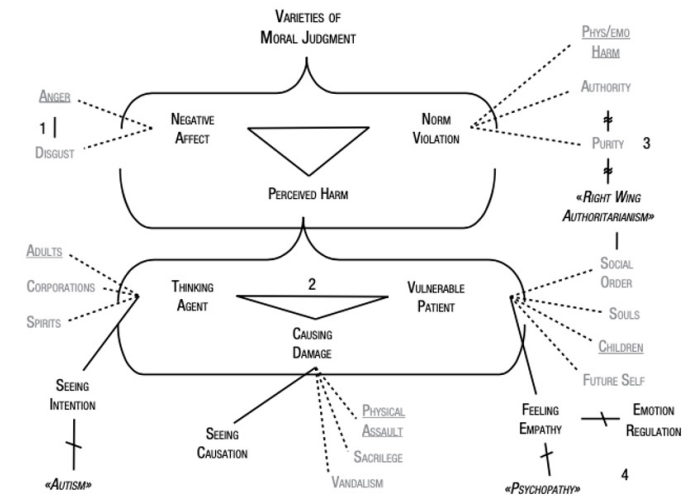
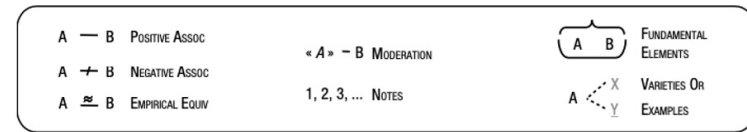
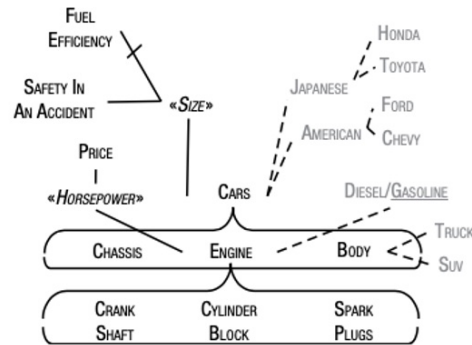
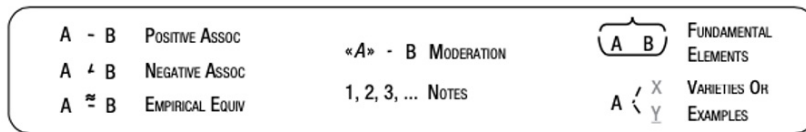
- This is hard and it is generally undervalued

I'll provide two examples:

- Theory Mapping
- Formal theory



Theory mapping

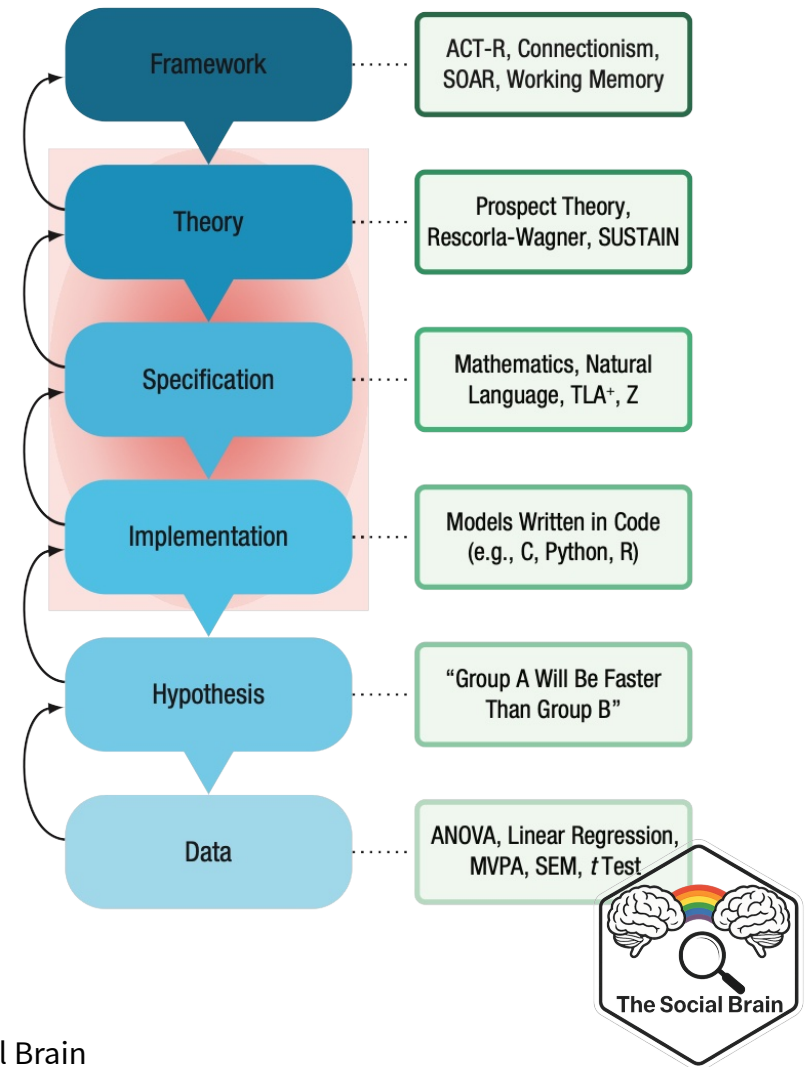


- 1: ANGER AND DISGUST ARE HIGHLY OVERLAPPING (CAMERON, LINDQUIST, & GRAY, 2015)
- 2: PERCEIVED AGENCY, CAUSATION & PATENCY ARE MUTUALLY REINFORCING (DYADIC COMPLETION; GRAY, SOHEN, & WARD, 2014)
- 3: CORRELATION BETWEEN AUTHORITY AND PURITY, $r = .80$ (FIG 3; GRAHAM ET AL., 2011) AND CORRELATION BETWEEN PURITY AND RWA, $r = .70$ (TABLE 7; GRAHAM ET AL., 2011)
4. OPERATIONALIZATION OF PSYCHOPATHY: SRP-III (PAULHUS, HEMPHILL, & HARD, 2009)



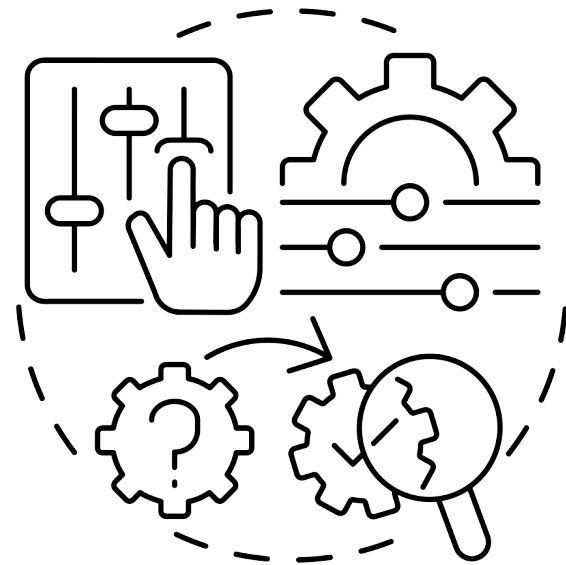
Formal theory

- Psychological theory tends to be narrative
- Predictions are ordinal
- Formal theory is a mathematical description that can give rise to quantitative predictions

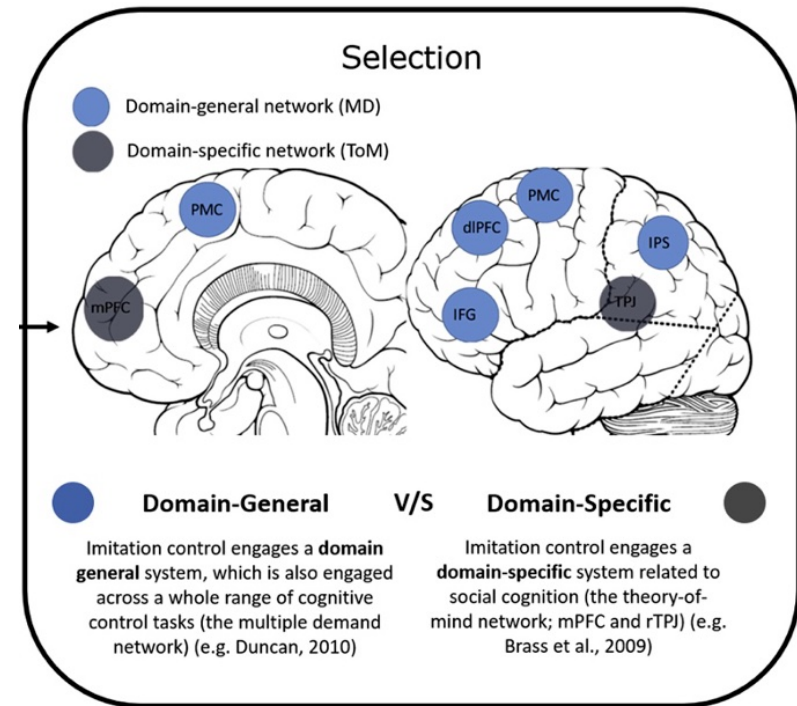
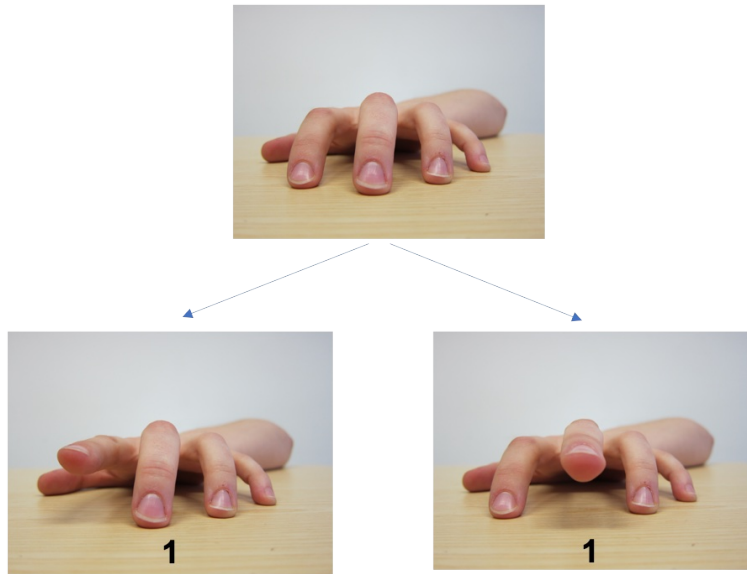


What are the benefits of formal theories?

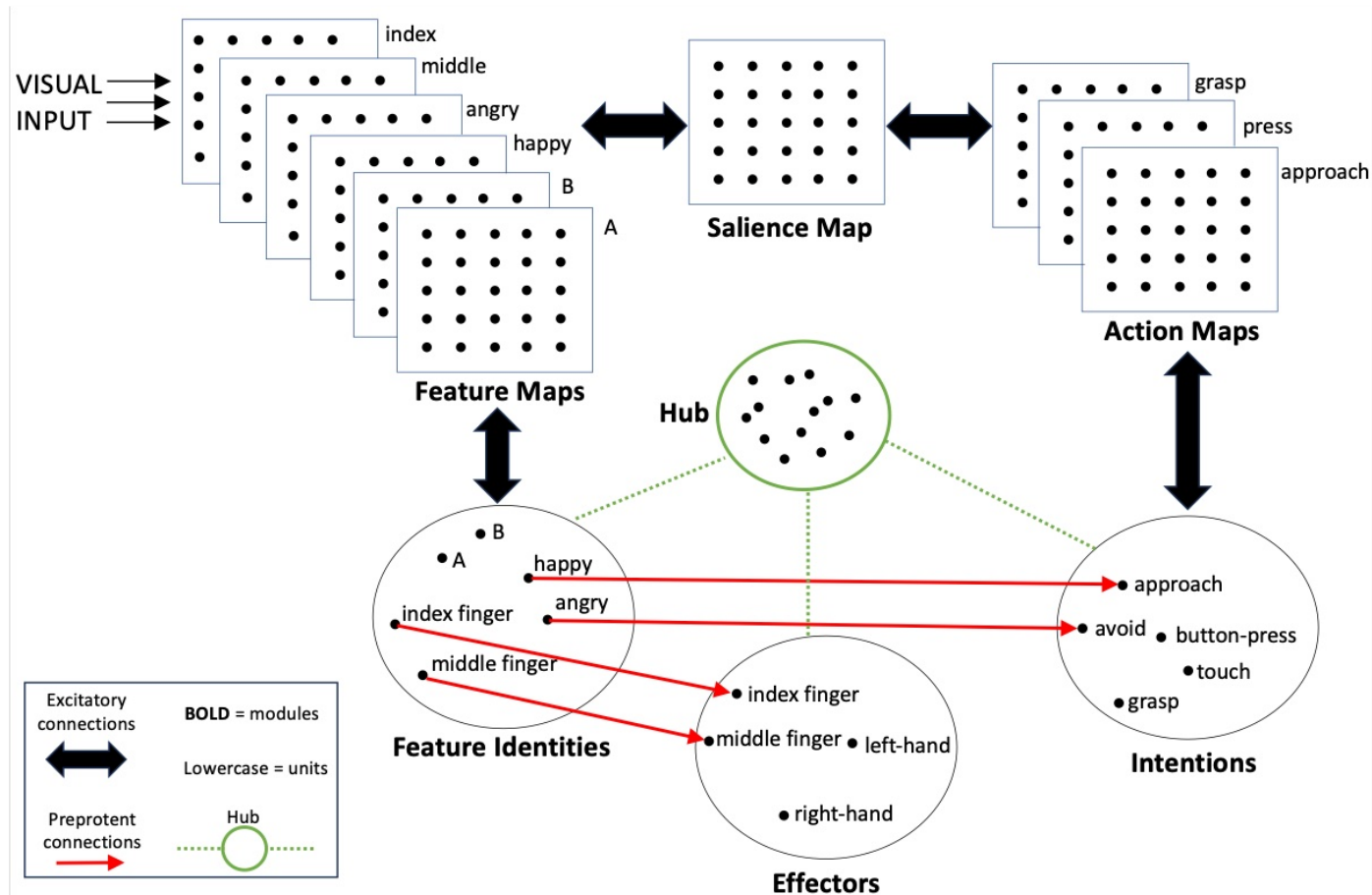
It forces researchers to be explicit about parts of the system under investigation and how they are linked together (e.g., $E = mc^2$).



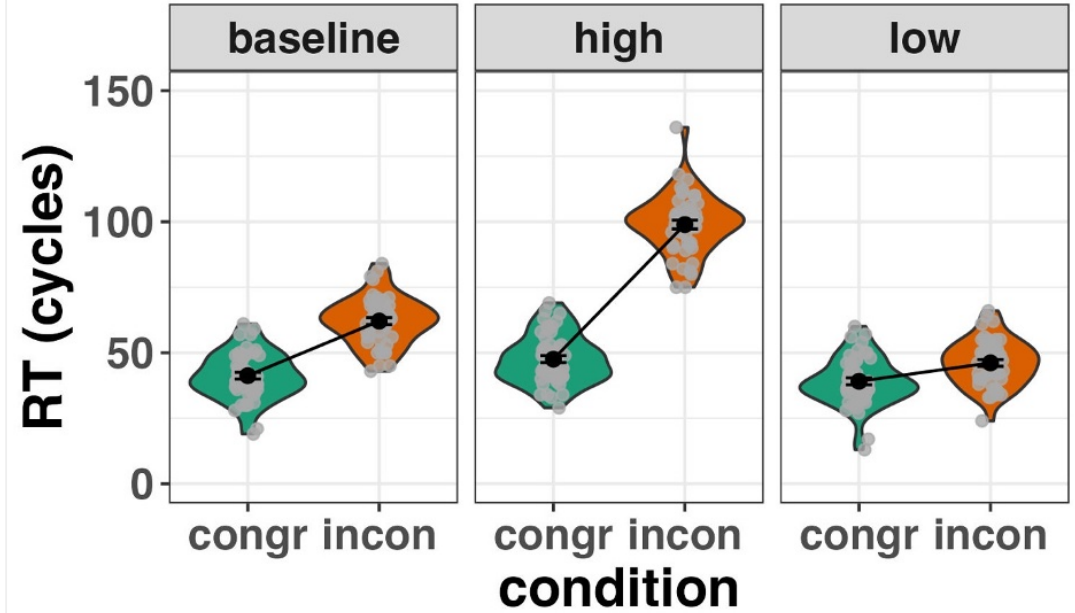
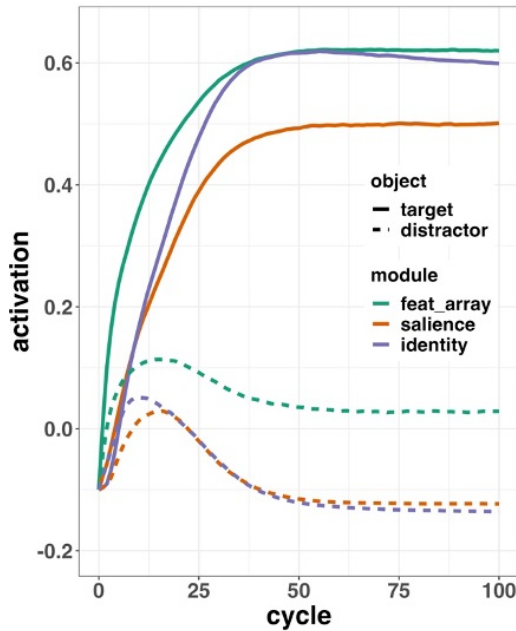
Formal theory from my lab



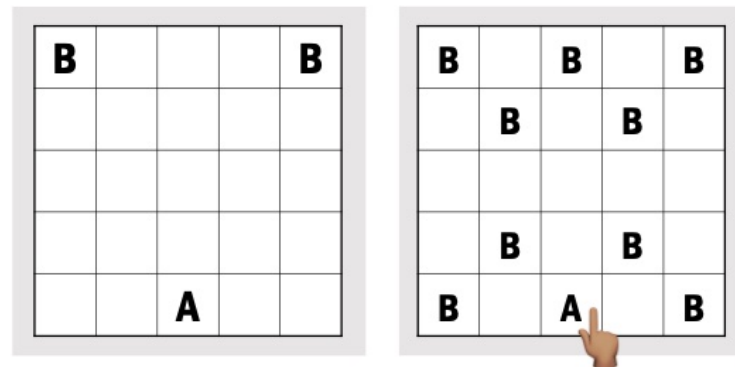
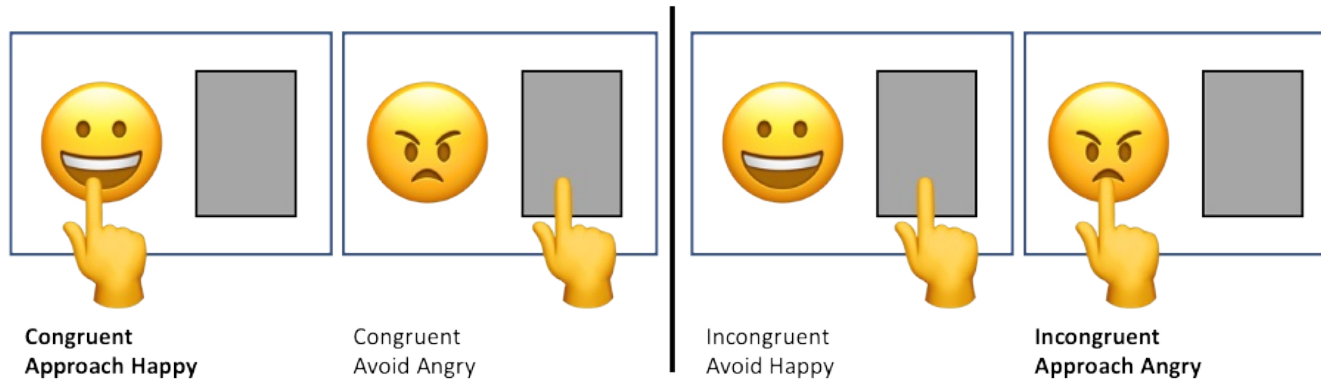
Formal theory from my lab



Formal theory from my lab



Formal theory from my lab



Formal theory from my lab

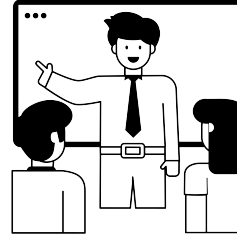
- The benefit of formal theory here is not that our model is “**correct**”, but that it is explicit and it can therefore be more easily falsified.
- Formal theory reduces verbal wriggle room



Today

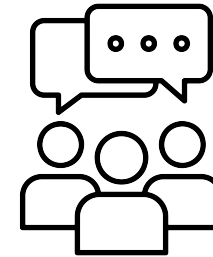
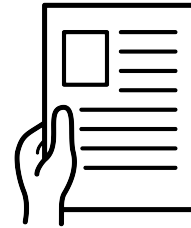
Part 1

- A problem in theory?



Part 2

- Read articles and discuss



Take a break



Part 2 - Read and discuss



Discussion material

- break into small groups (~ 5 per group)
- discuss aspects of the lecture
- discuss aspects of the journal article: <https://journals.sagepub.com/doi/full/10.1177/1745691620966795>



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