Gordon Feld | RG Psychology and Neurobiology of Sleep and Memory

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Landesstiftung des öffentlichen Rechts

So you want to take the plunge?

Mannheim (online), 21.09.2021

Open Science Activities

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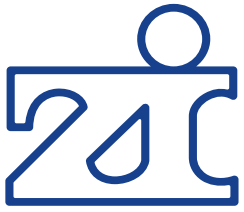
- Practicing open science in my Emmy-Noether-Group since 2019
- Scientific coordinator of the Open Science Office of the Central Institute of Mental Health
- Coordinator of the Interest Group for Open and Reproducible Science (IGOR) in the Biological Psychology Section of the German Psychological Society
- Award committee of the Society for the Improvement of Psychological Science

IGOR
Biological Psychology and Neuropsychology

Emmy Noether-Programm
DFG Deutsche Forschungsgemeinschaft



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SIPS
SOCIETY FOR THE IMPROVEMENT OF PSYCHOLOGICAL SCIENCE

So you want to take the plunge? Open science from perspective of a research group leader

Do

~~So~~ you want to take the plunge? ~~Open science from perspective of a research group leader~~

Three motivations to do open science

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1. You

2. Others

3. Your research

1. You

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- It is „the right thing to do“

- Standardized implementation of *Good Scientific Practice*

2. Others

- Journals
  - E.g., open data, preregistration, badges
- Funders
  - E.g., Open Science Approach
- Job market
  - Open science in job adverts

Your research

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Repeatability

„Can the effect be reproduced under the original conditions?“

Can be assessed through direct replication.

Example:
Oxytocin improves social behaviour in rats

Credit: B. MELLOR

Butler, *Nature* 2008

Generalisability

„Can the effect be reproduced under different conditions?“

Can be assessed through conceptual replication.

Example:
Oxytocin improves social behaviour in ADHD

So you want to take the plunge? **Open science from perspective of a research group leader**

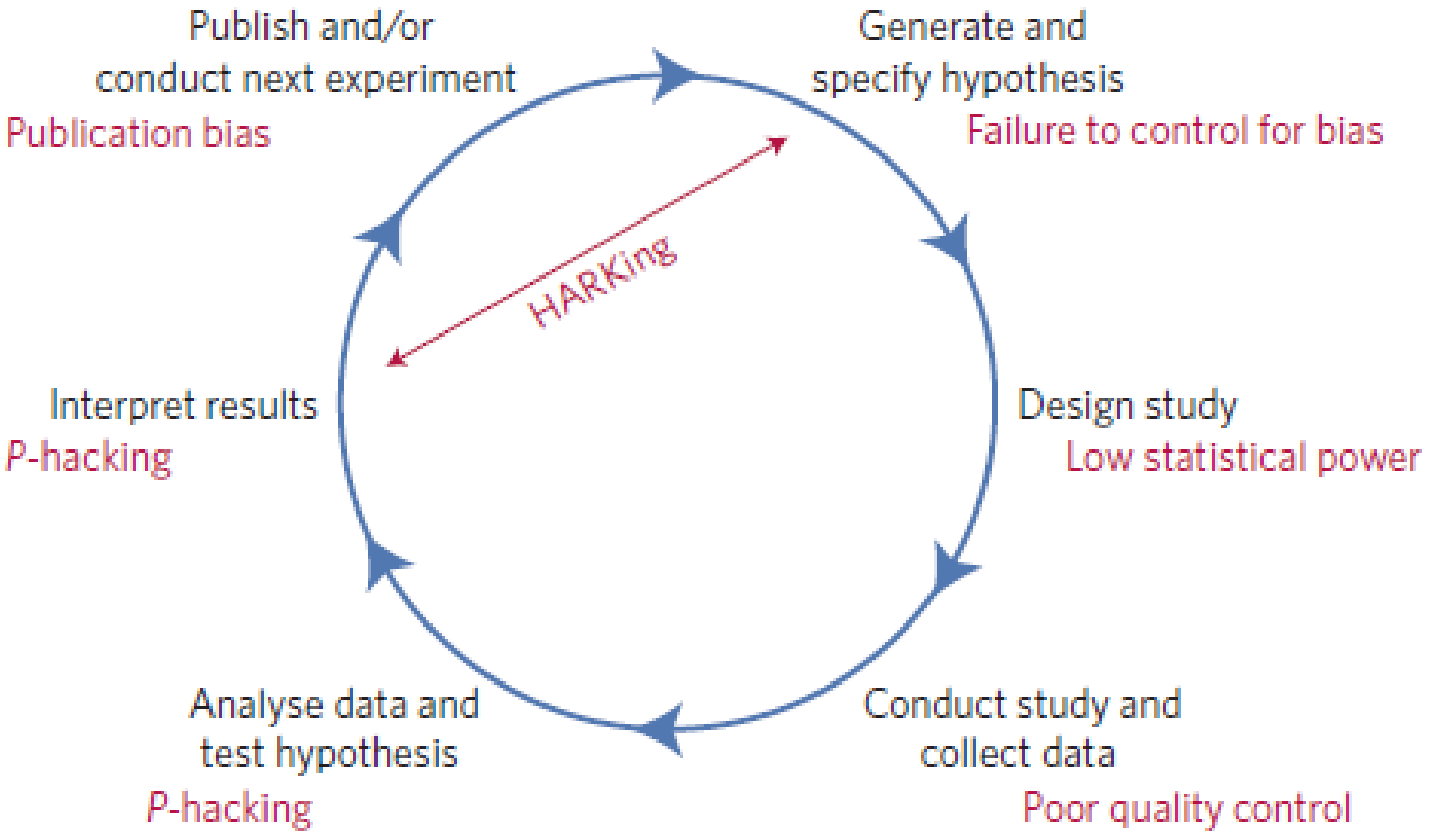
What is open science?

“The first principle is that you must not fool yourself — and you are the easiest person to fool.”

Richard Feynmann

→ Practices that help prevent fooling yourself!

Where can you fool yourself?



Munafo, 2017 *Nature Human Behaviour*

What are the open and reproducibly science practices?

Open access

Open data, materials and code

Sample size planning

Preregistration

What are the open and reproducibly science practices?

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NEUROVAULT
A public repository of unthresholded statistical maps, parcellations, and atlases of the brain

OpenNEURO

figshare

DEVELOP | DESIGN | COLLECT &

leibniz-psychology.org

PsychData

Stage 1 Peer Review

Peer

GitHub

So you want to take the plunge? Open science from perspective of a research group leader

Where should you start?

Example 1
Our Experience with Registered Reports

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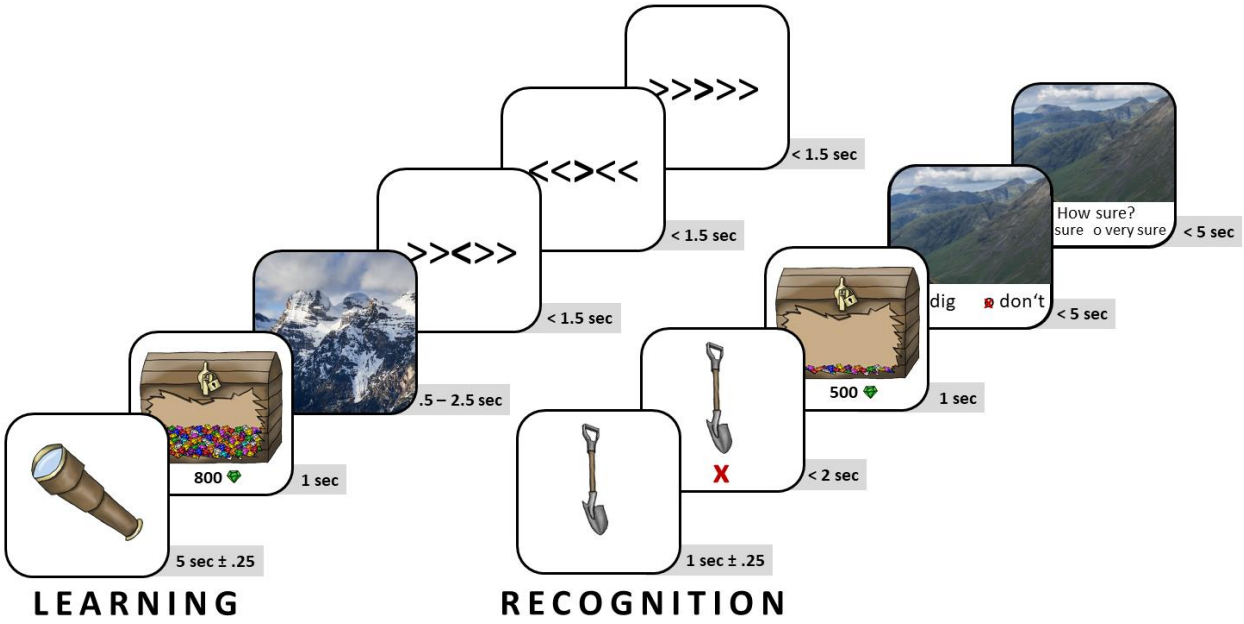
Task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.5 – 2.5 sec
800
1 sec
5 sec ± .25
LEARNING
How sure?
sure o very sure
< 5 sec
dig don't
< 5 sec
500
1 sec
X
< 2 sec
1 sec ± .25
RECOGNITION

Design

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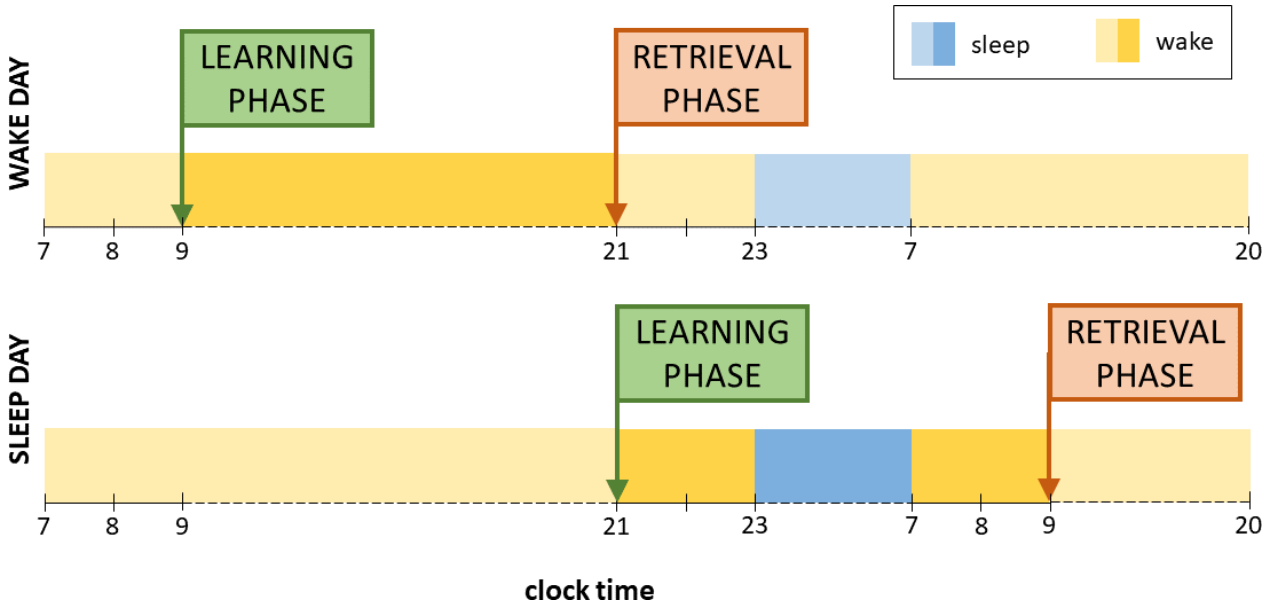
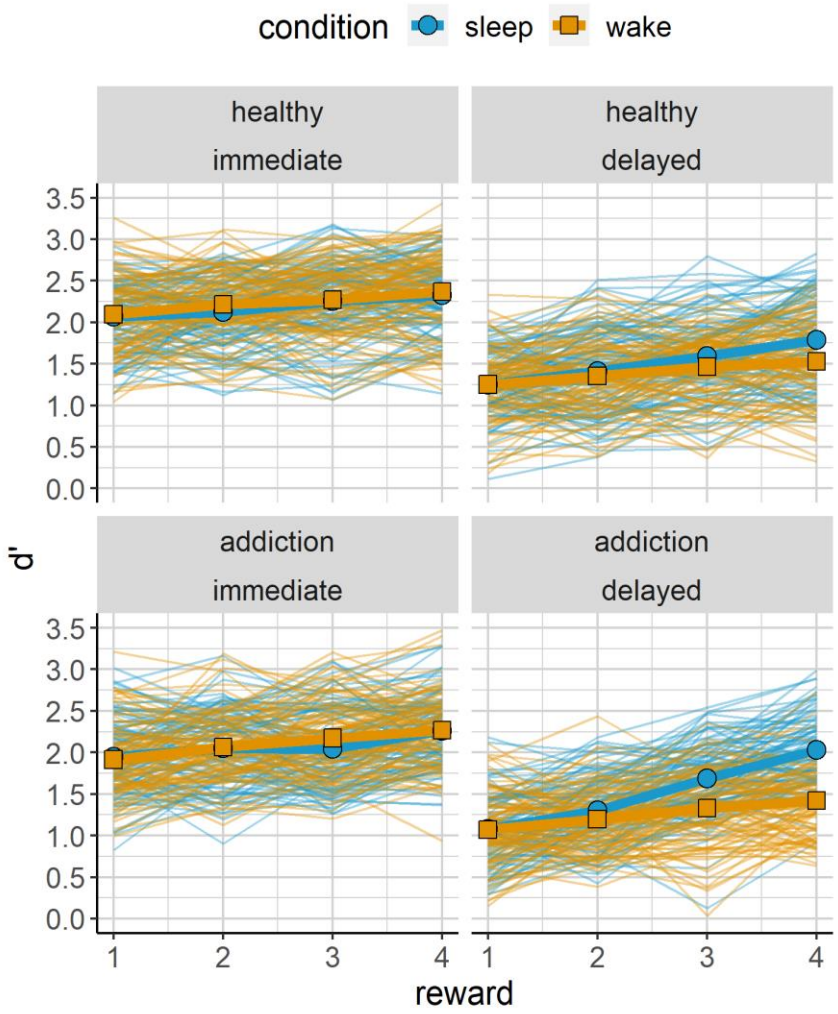
Alcohol used disorder patients and healthy controls



Data simulation



Submission

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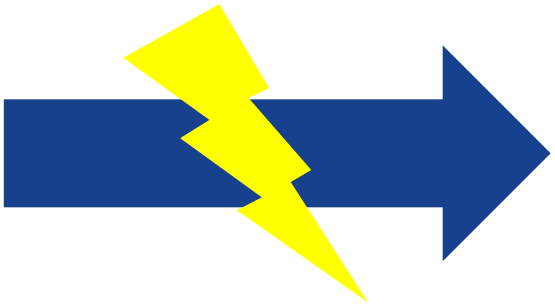
- 12 month writing manuscript and data simulations
- Submitted to highest tier journal offering RRs
- Moved to second highest tier journal and reviewed by 5 reviewers
- Rejected

Theory



Hypotheses

What to do after your manuscript has been rejected?

Choose a lower tier journal and submit there?

Appeal to the editor?

Do the study without Registered Report?

What to do after your manuscript has been rejected?

Take the reviews seriously?

Neuron
Volume 50, Issue 3, 4 May 2006, Pages 507-517

Article

Reward-Motivated Learning: Mesolimbic Activation Precedes Memory Formation

R. Alison Adcock [1, 2], Arul Thangavel [1, 2], Susan Whitfield-Gabrieli [2, 3], Brian Knutson [2], John D.E. Gabrieli [2, 3]

Show more

+ Add to Mendeley Share Cite

https://doi.org/10.1016/j.neuron.2006.03.036

Cited 939 times!

Building the connection between theoretical question and the empirical approach

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Behavioural studies:
Two studies
N = 200 each
Prolific
Estimating effect size
Fine-tuning paradigm

MRI studies:
Two studies
N = 60 each
Effect size with our paradigm
Effect in Alcohol Use Disorder

Study 1

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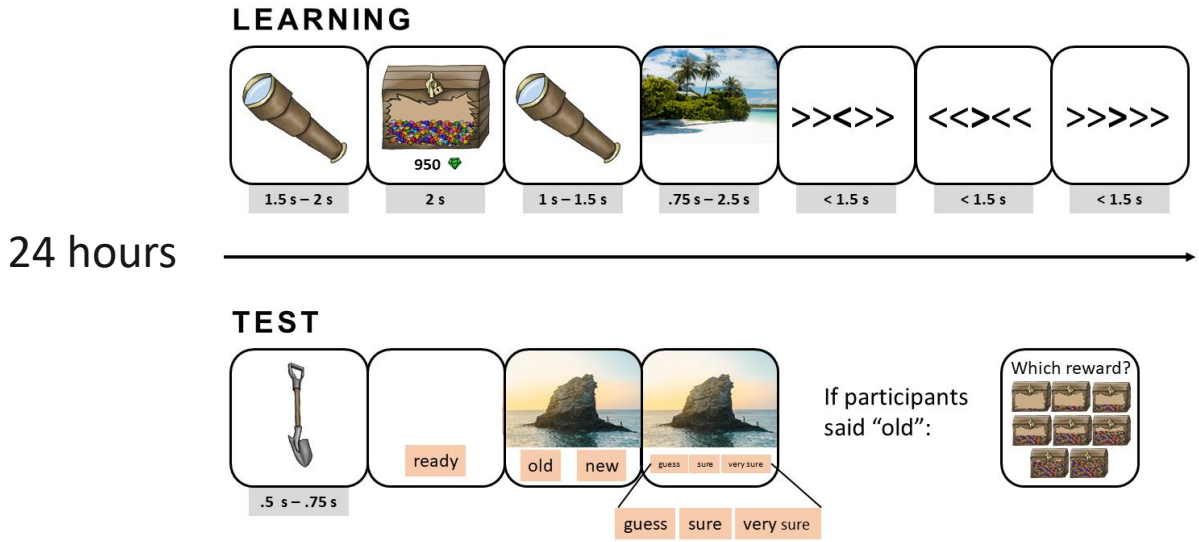
Online Study with 200 participants



Tkotz, Morgan, Feld, in prep

Study 1 results

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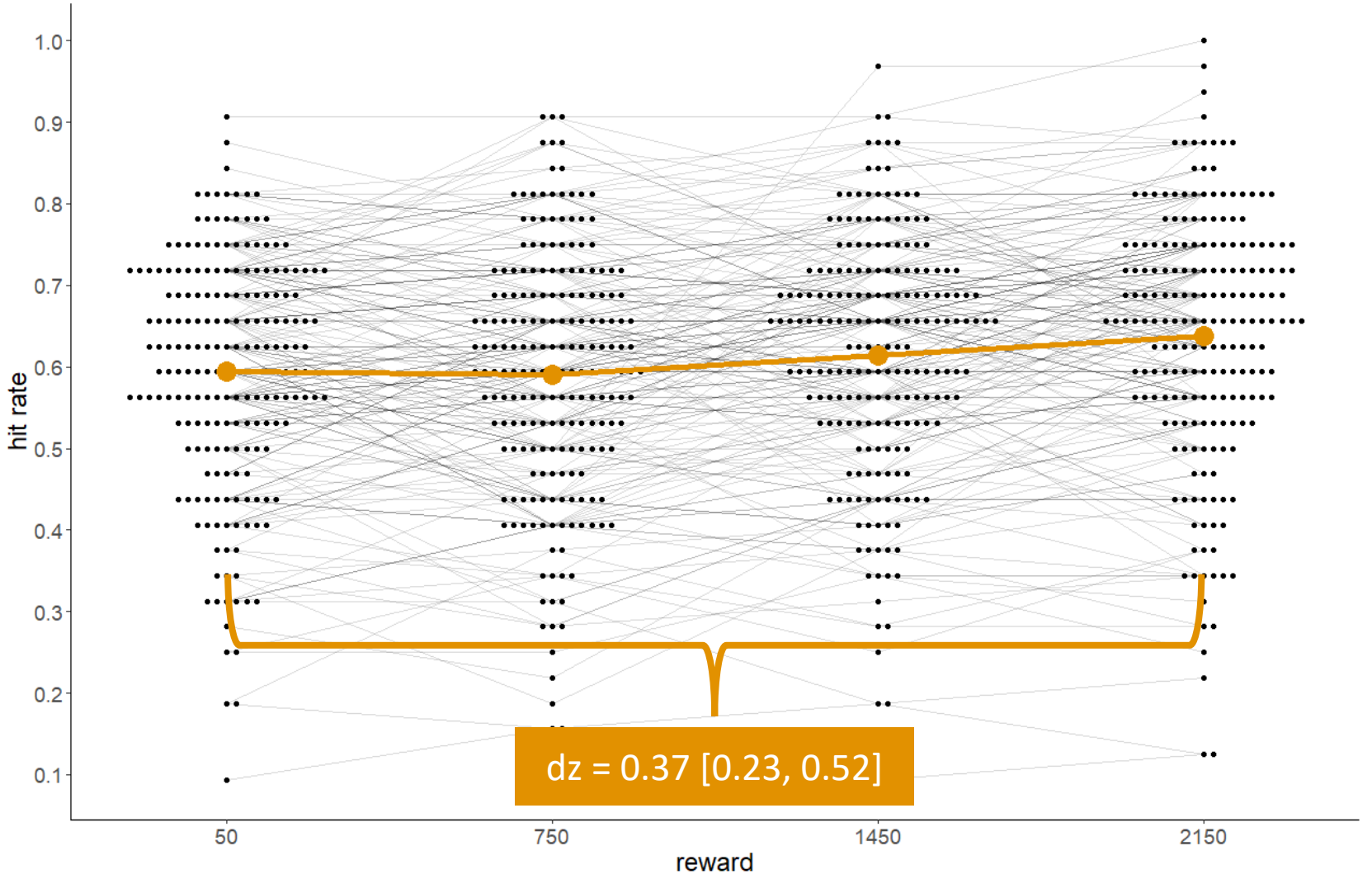
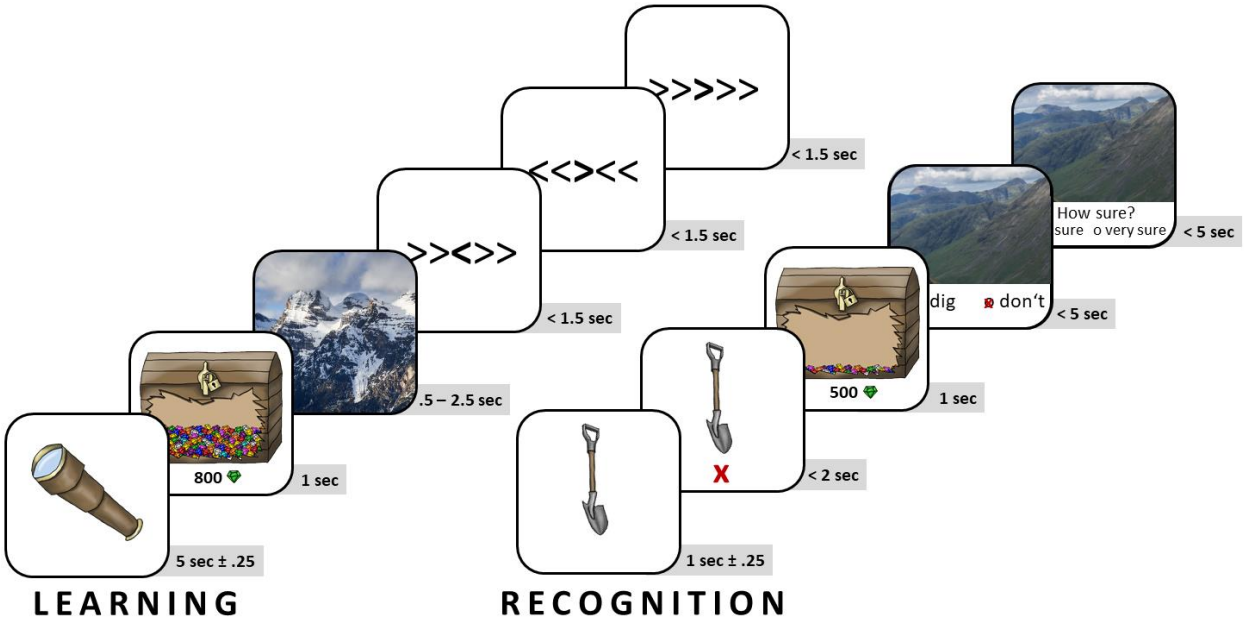


Study 2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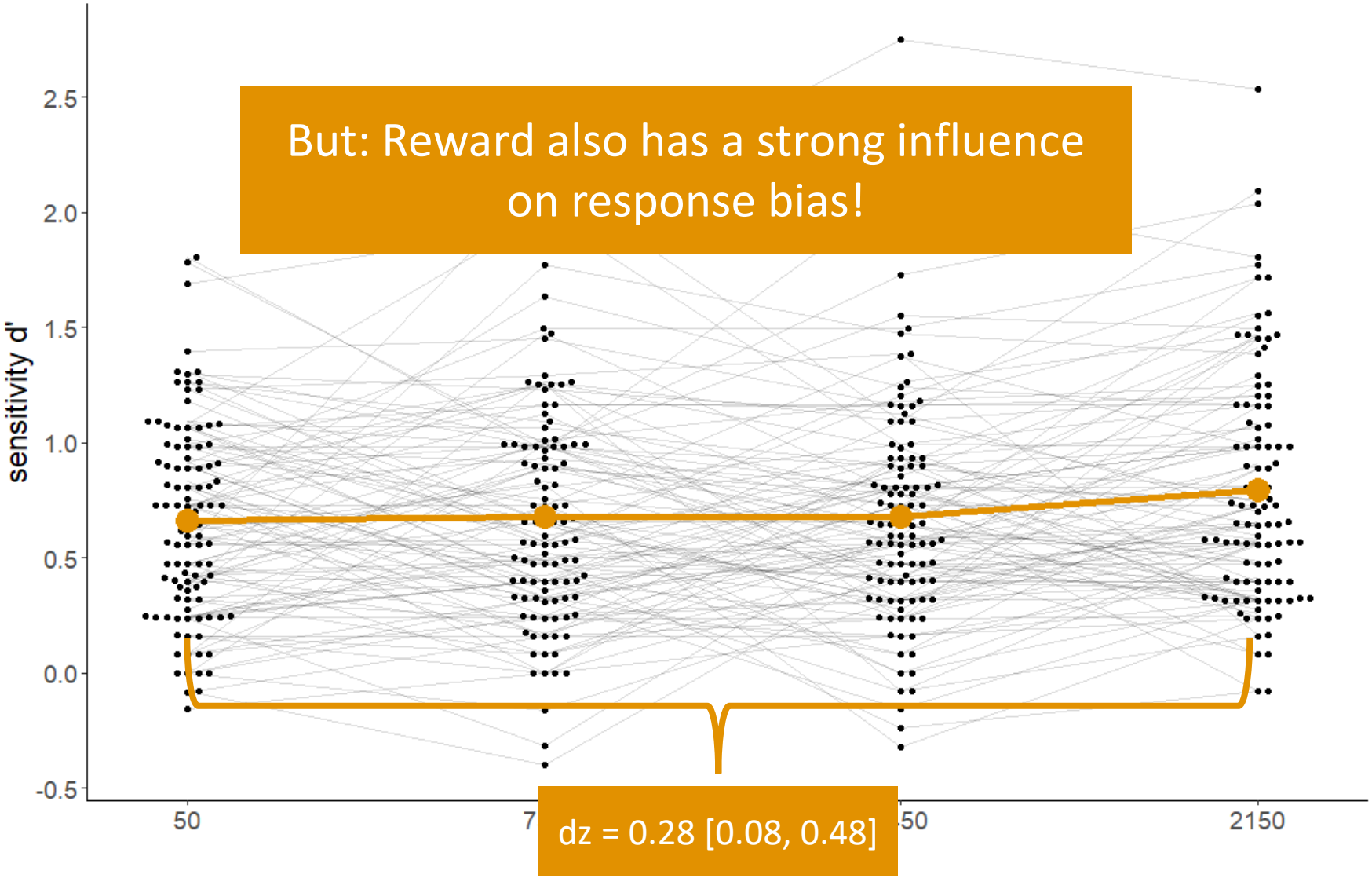
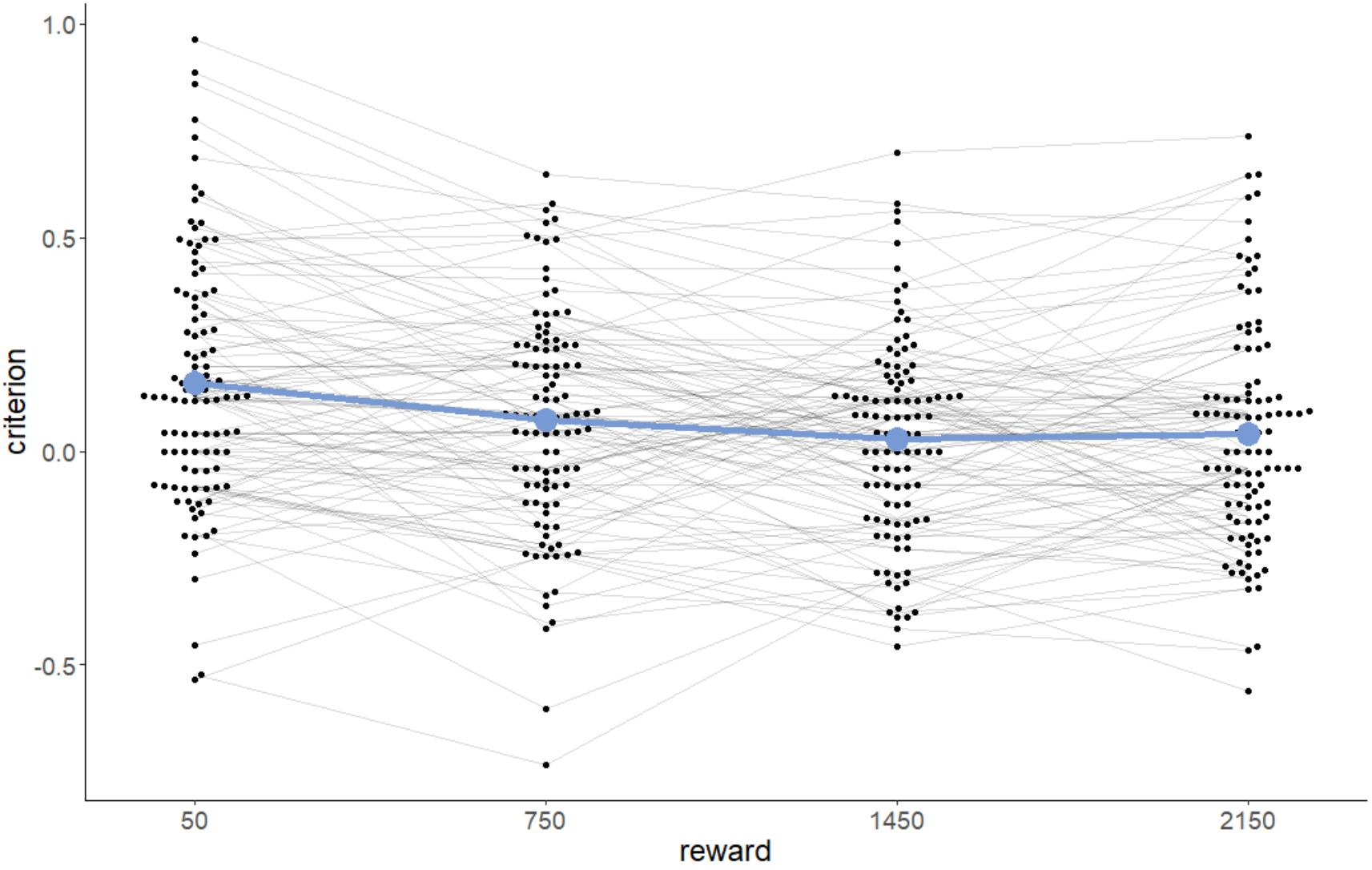
X
< 2 sec
5 sec ± .25
1 sec ± .25
LEARNING
RECOGNITION


But: Reward also has a strong influence on response bias!
sensitivity d'
2.5
2.0
1.5
1.0
0.5
0.0
-0.5
50
2150
dz = 0.28 [0.08, 0.48]


1.0
0.5
0.0
-0.5
criterion
50
750
1450
2150
reward

Your research

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Credit: B. MELLOR

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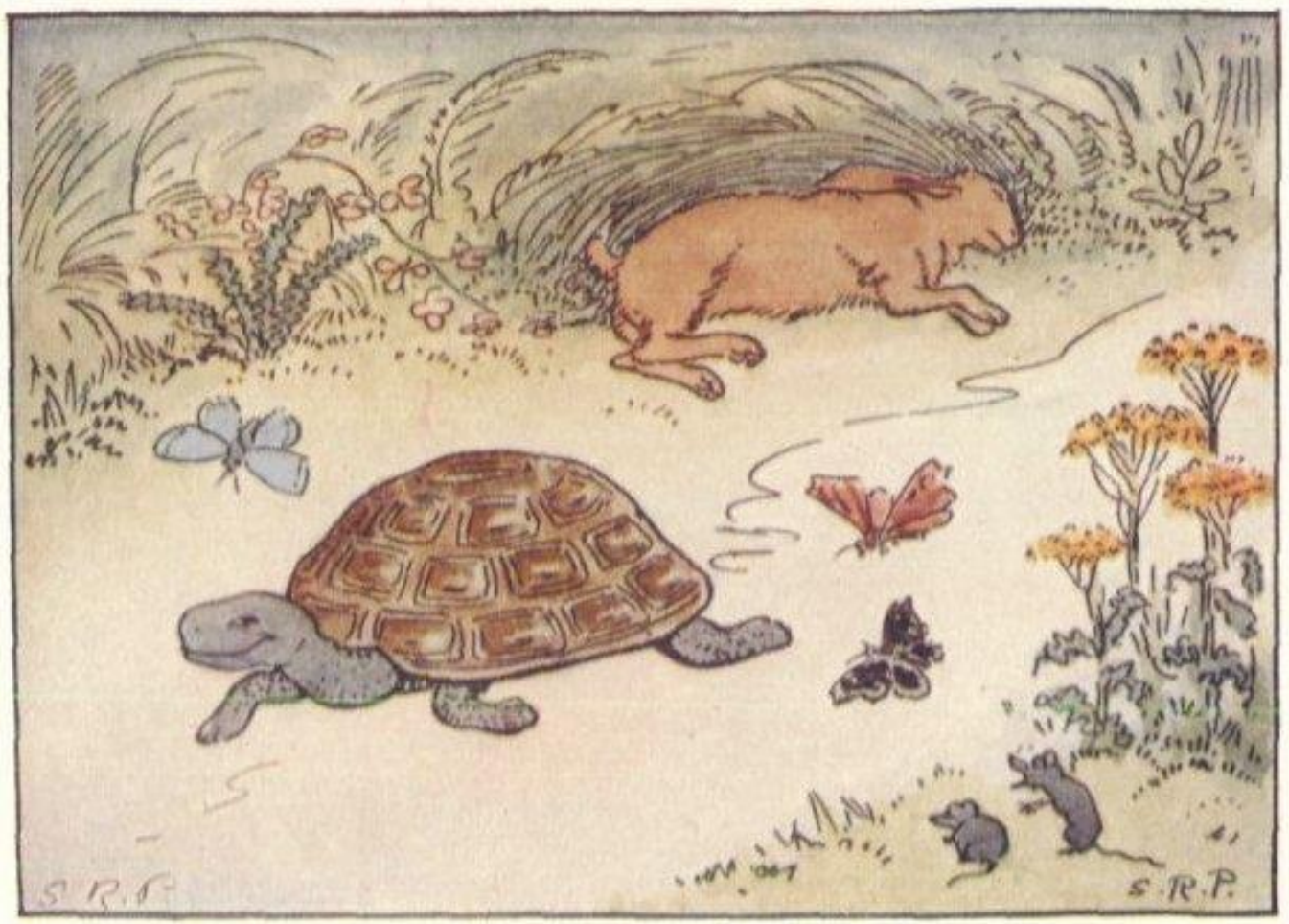
Example:
Monetary reward enhances memory performance in addicts

The tortoise and the hare



THE TORTOISE AND THE HARE

Example 2
Equivalence tests in fMRI

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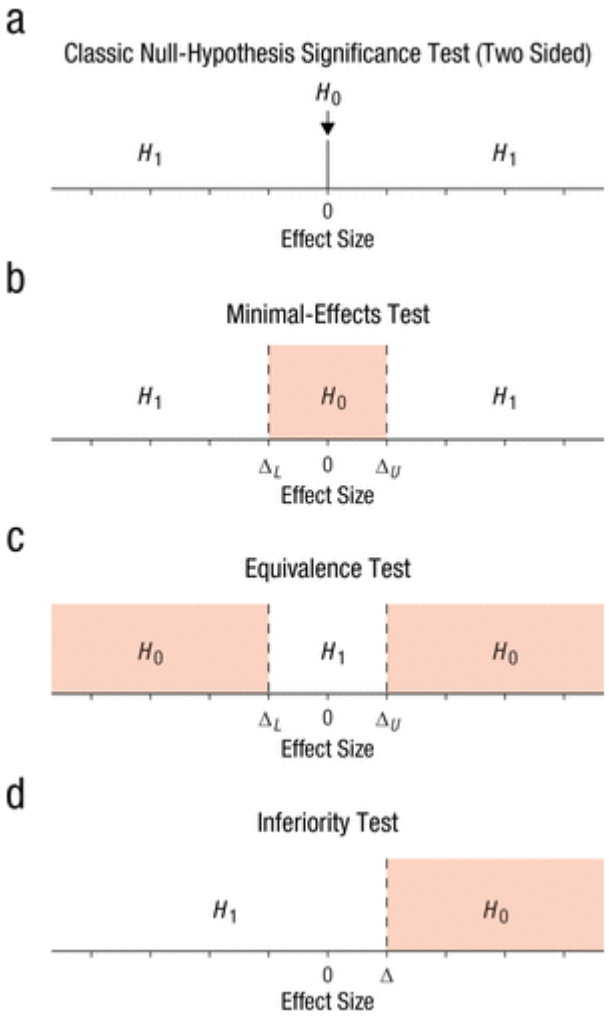

Lakens et al. 2018 *Advances in Methods and Practices in Psychological Science*

Effect sizes and CIs for fMRI group analyses

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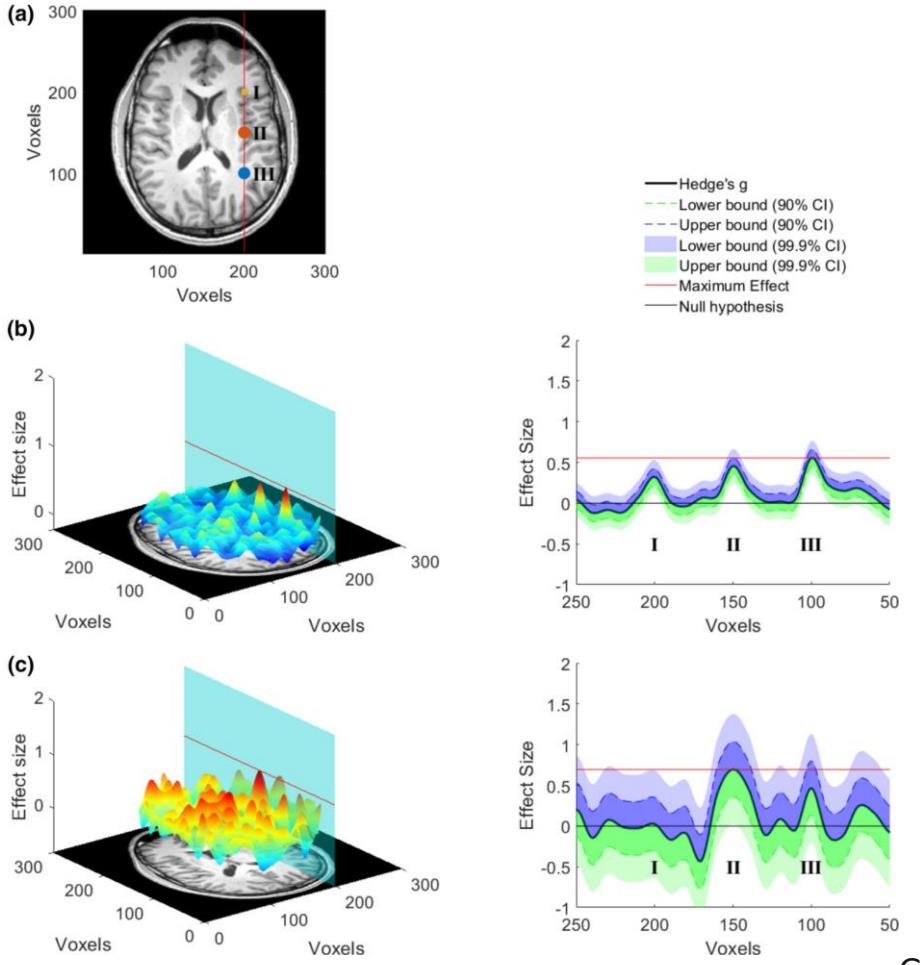
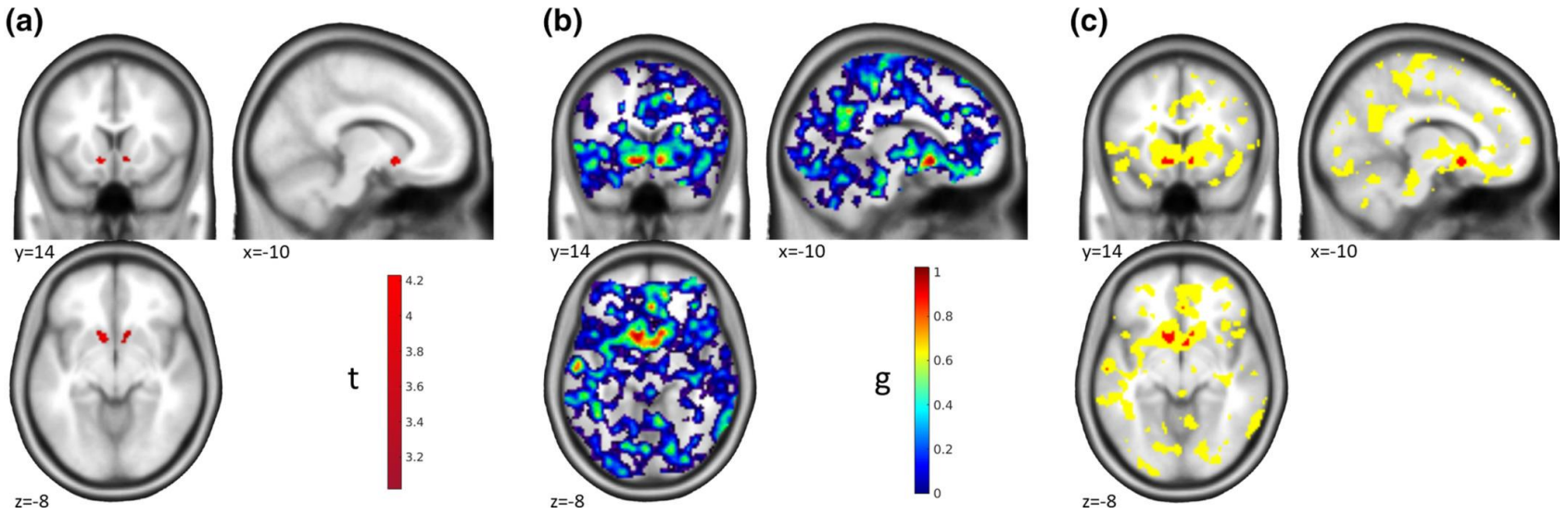


Gerchen, Kirsch & Feld, 2021 *Human Brain Mapping*

Maps of undecidability



Gerchen, Kirsch & Feld, 2021 *Human Brain Mapping*

Your research

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Repeatability

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Example:
The ventral striatum is involved in reward processing

Credit: B. MELLOR

Butler, *Nature* 2008

Generalisability

„Can the effect be reproduced under different conditions?“

Can be assessed through conceptual replication.

Example:
The ventral striatum is malfunctioning in addicts

Recommendations

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1. Adopting open and reproducible science pratices has risks and benefits!
2. Take it slow, every step counts!
3. Don‘t „just“ change the practices!
4. Discuss openly with your staff!
5. Find partners (e.g., found or join an open science initiative)

Emmy Noether-Programm

DFG Deutsche Forschungsgemeinschaft

Thank you for your attention!

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Post-Doc

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PhD Student

Simon Kern
PhD Student

Cagatay Guersoy
PhD Student

Dr. Fungi Gerchen

Prof. Peter Kirsch