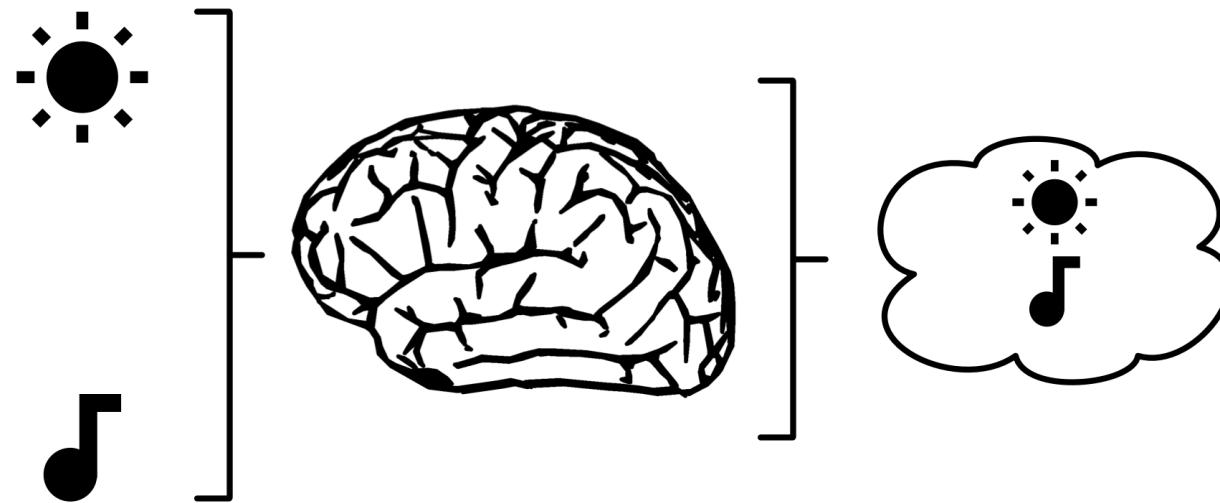


# Emotion and cognition influence multisensory integration



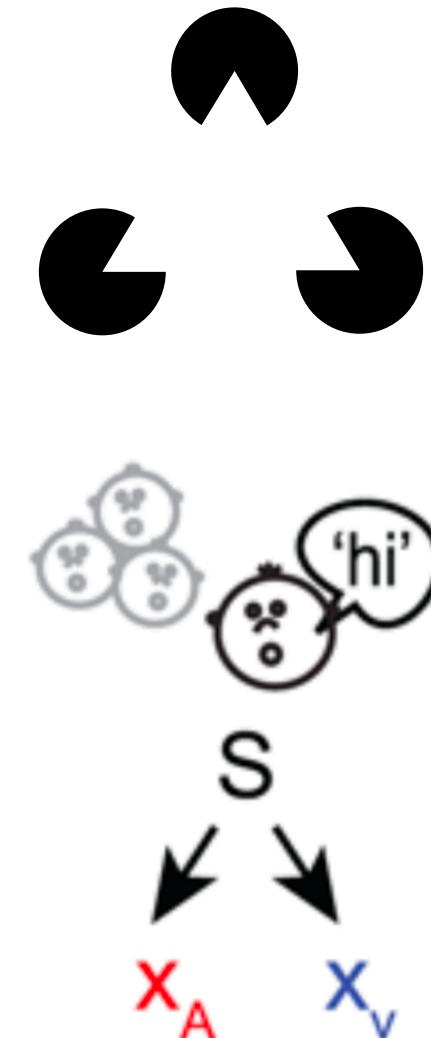
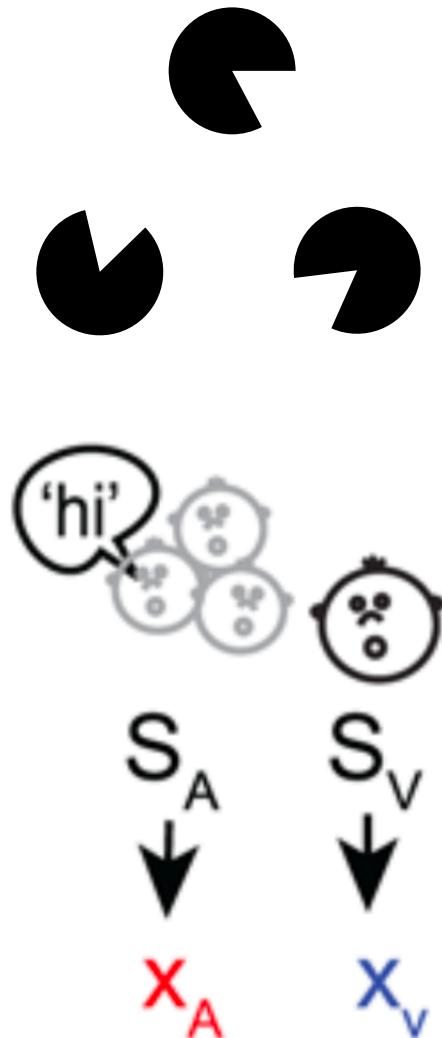
Dr. Julian Keil

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<https://tinyurl.com/Keil-TeaP-2020>

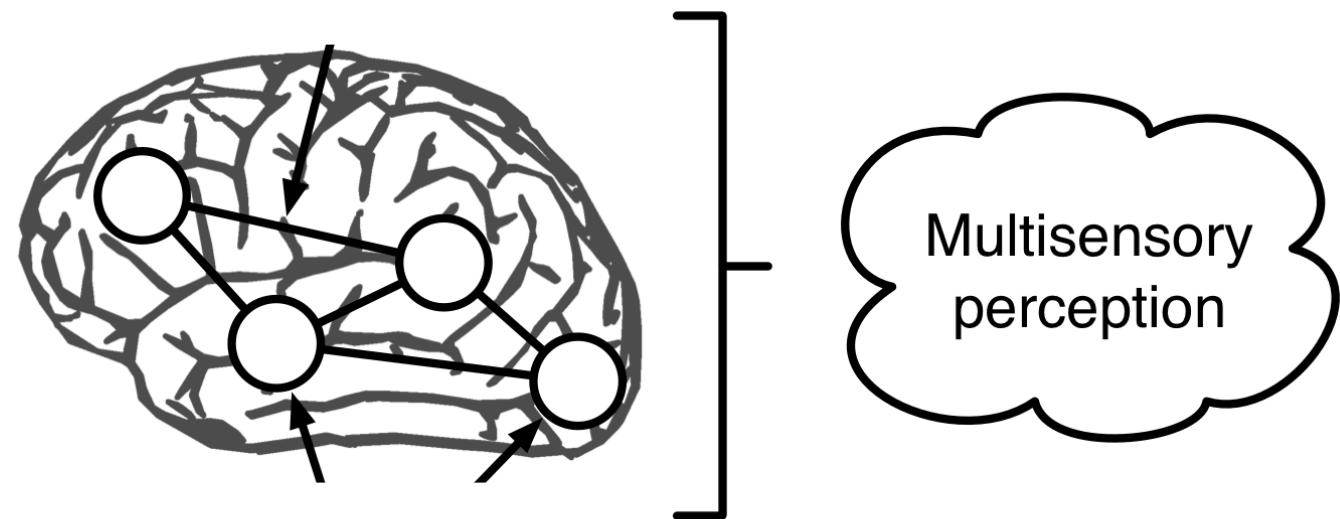
# Causal Inference



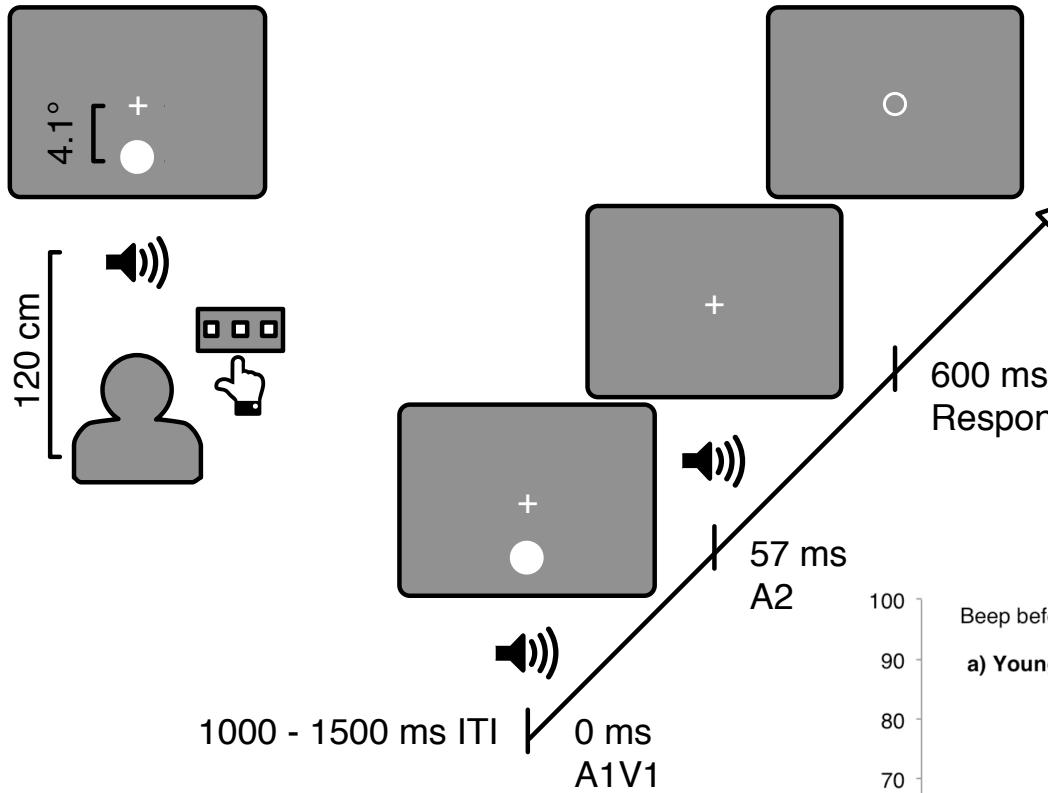
Bizley et al., 2016

# Research Question

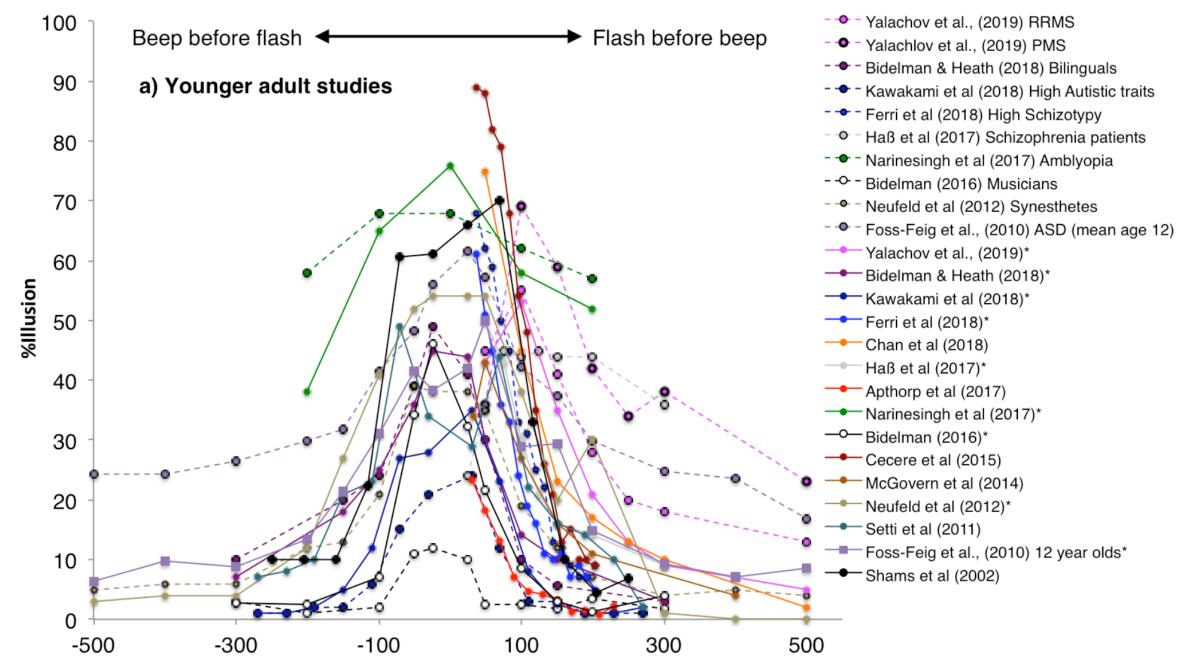
- Is our perception stable?
- What influences our perception?
- Which neural processes reflect our perception and the interaction with cognitive or emotional factors?



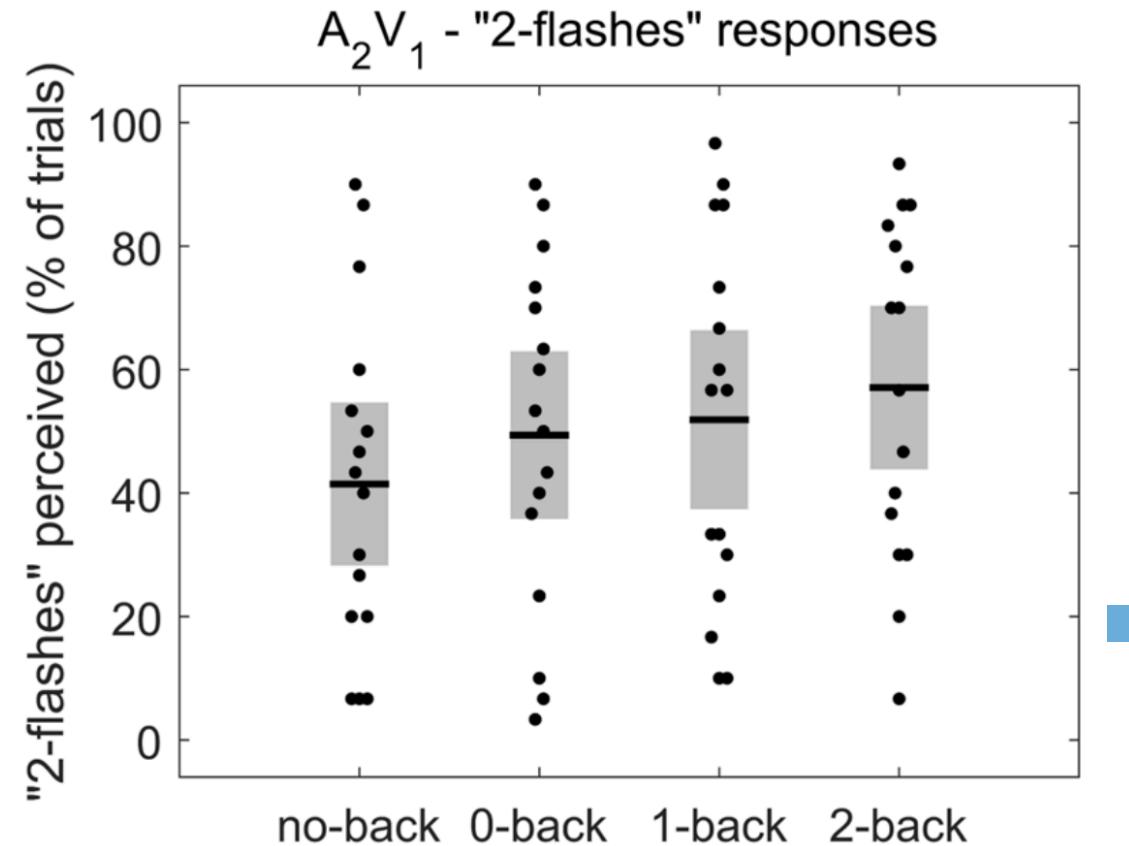
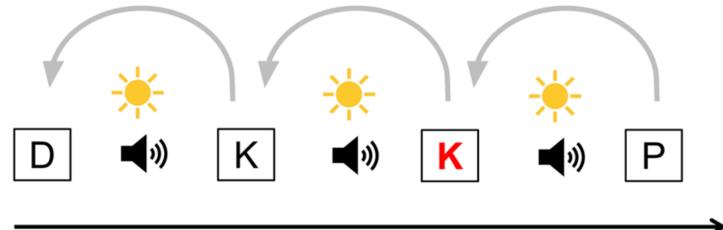
# Sound Induced Flash Illusion



Hirst et al., 2020  
Keil, in press



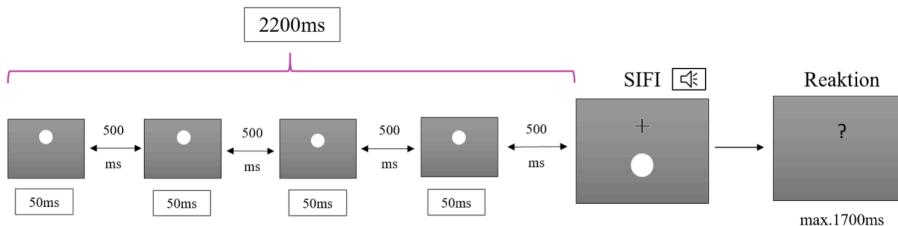
# 1. Experiment: Cognitive Load



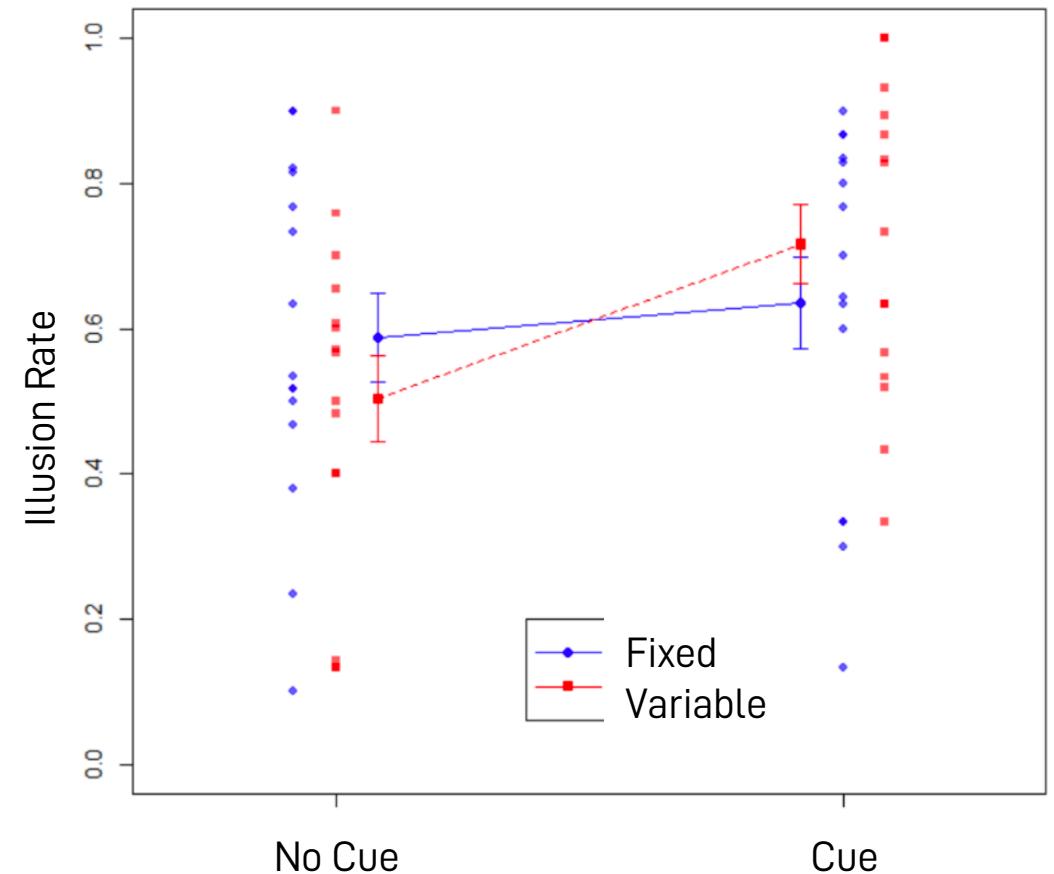
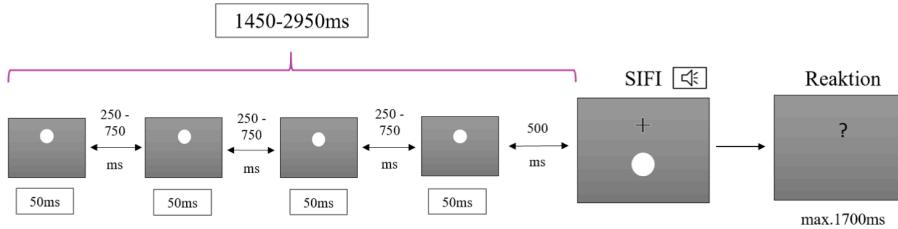
- Perception fluctuates between trials
- Cognitive load increases the SIFI

## 2. Experiment: Expectations

Fixed Interval

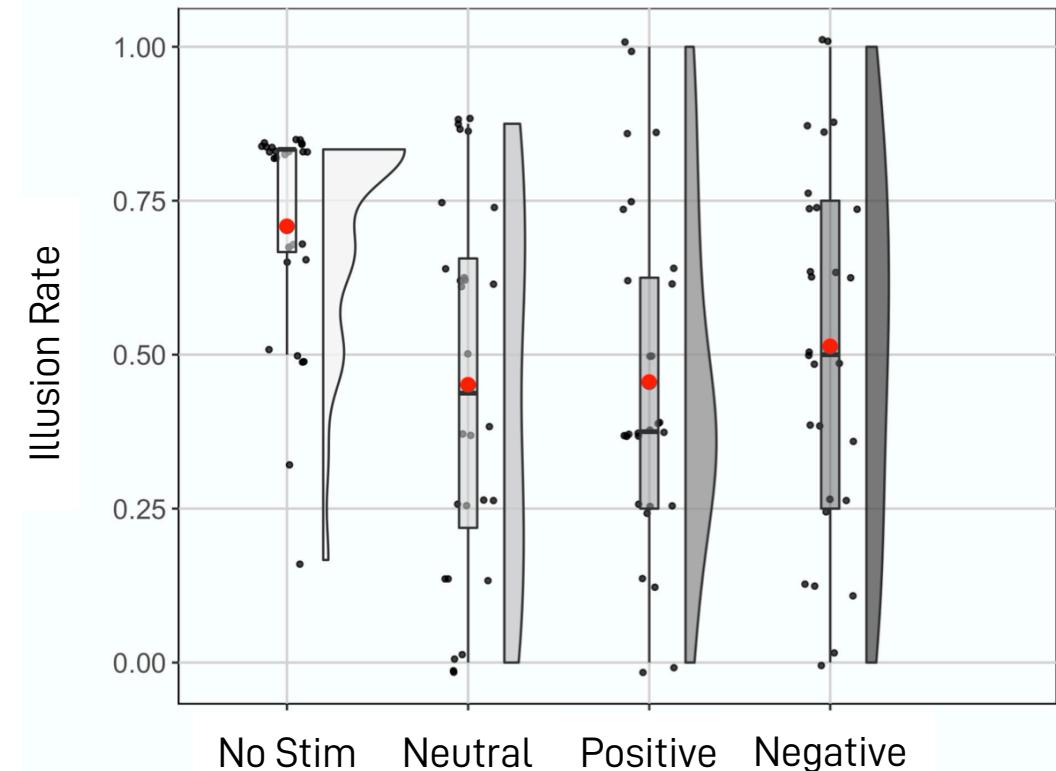
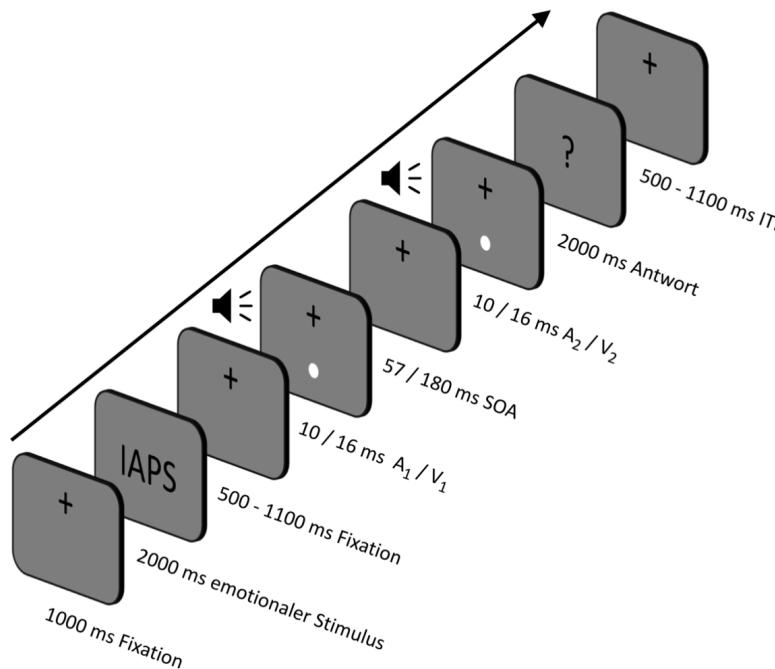


Variable Interval



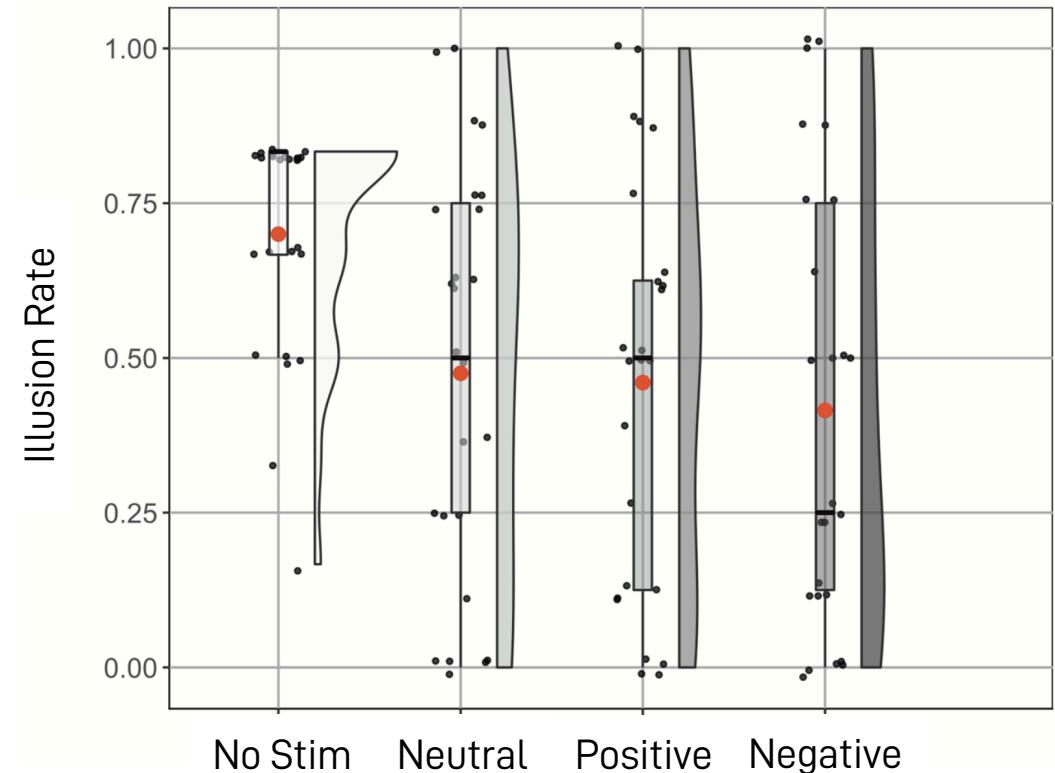
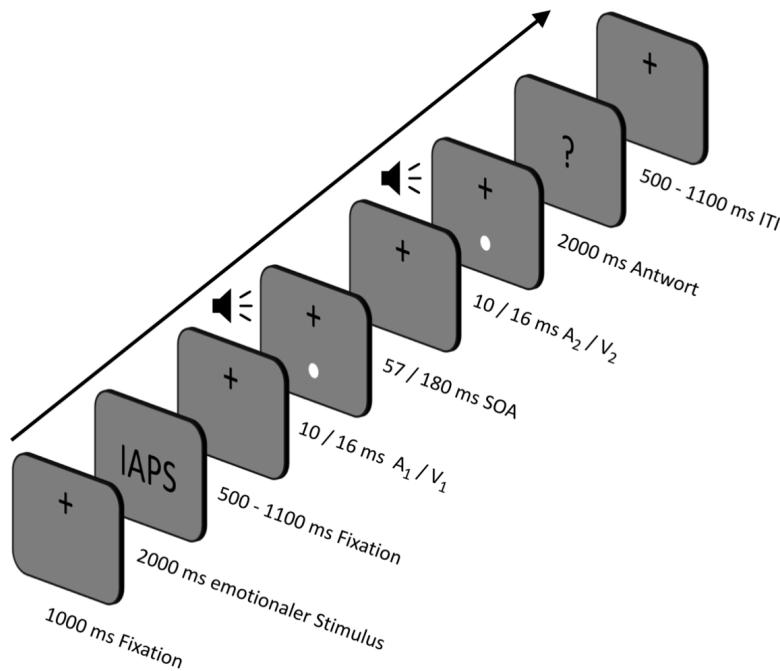
- Perceptual load increases SIFI
- Expectations don't influence perception

### 3. Experiment: Visual Emotional Load



- Visual stimuli reduce SIFI
- Emotional valence does not influence perception

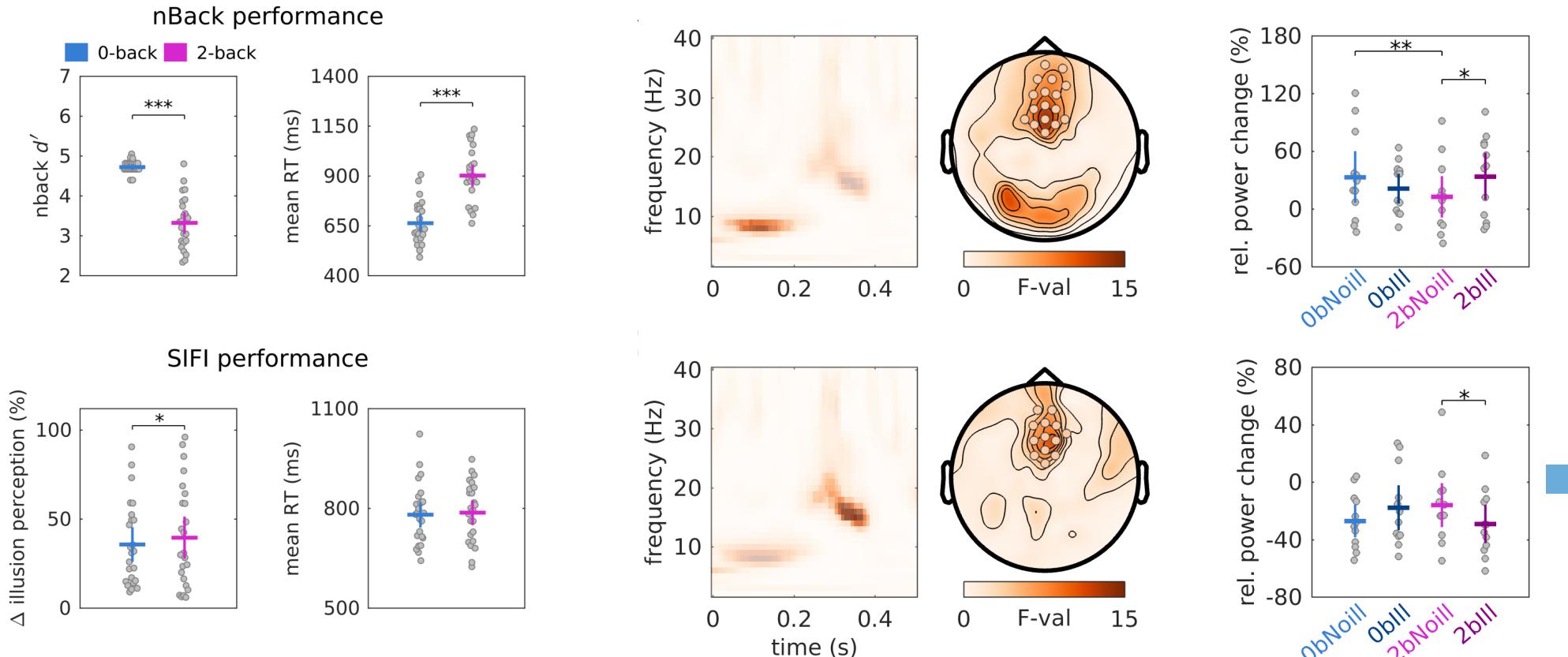
## 4. Experiment: Auditory Emotional Load



- Auditory stimuli reduce SIFI
- Emotional valence does not influence perception

Kerl & Keil, in prep.

## 5. Neural Mechanisms

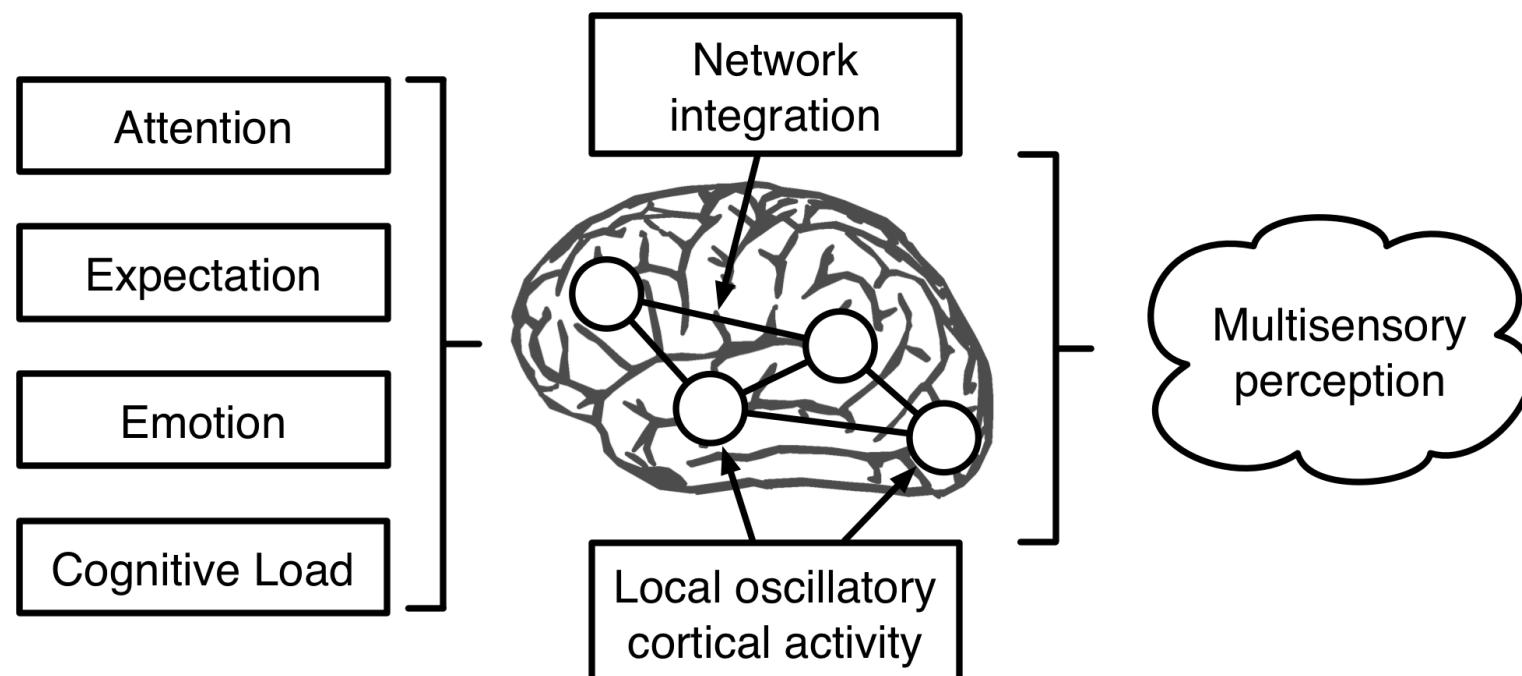


- Replication: Cognitive load increases the SIFI
- Theta and beta power reflect interaction between load and perception

Michail & Keil, in prep.

# Summary

- Emotional and cognitive processes influence multisensory perception
  - Load increases illusion
  - Arousal reduces illusion
- Theta and beta band oscillation reflect flexible multisensory perception
- Next step: Context?
  - #T-1-3 Merle Schuckart & #W-1-6 Christian Neumann



Thank you!



Prof. Dr. Daniel Senkowski, Dr. Johanna  
Balz, Mathis Kaiser, Martin Krebber,  
Dr. James Moran, Georgios Michail,  
Dr. Ulrich Pomper, Dr. Yadira Roa Romero



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Prof. Dr. Christian Kaernbach,  
Linda Coenen, Corinna Kerl,  
Anna Klingmüller, Joshua Lorenzen,  
Merle Schuckart



KE1828/2-1 (2014-2016)  
KE1828/4-1 (2016-2020)  
KE1828/4-2 (?)

## References

Bizley, J. K., Maddox, R. K., & Lee, A. K. C. (2016). Defining Auditory-Visual Objects: Behavioral Tests and Physiological Mechanisms. *TRENDS in Neurosciences*, 39(2), 74–85.

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Keil, J., & Senkowski, D. (2018). Neural Oscillations Orchestrate Multisensory Processing. *The Neuroscientist*, 83, 1073858418755352. <http://doi.org/10.1177/1073858418755352>

Hirst, R. J., McGovern, D. P., Setti, A., Shams, L., and Newell, F. N. (2020). What you see is what you hear: 20 years of research using the Sound-Induced Flash Illusion. <https://doi.org/10.31234/osf.io/7m586>

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<https://www.frontiersin.org/articles/10.3389/fnins.2020.00298/abstract>