Song familiarity relies on evidence accumulation

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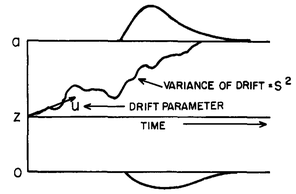
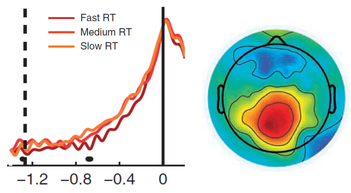
Evidence accumulation models explain perceptual decisions, value-based choices, and recognition memory. What about familiarity?



Evidence accumulation model. Ratcliff, 1978.

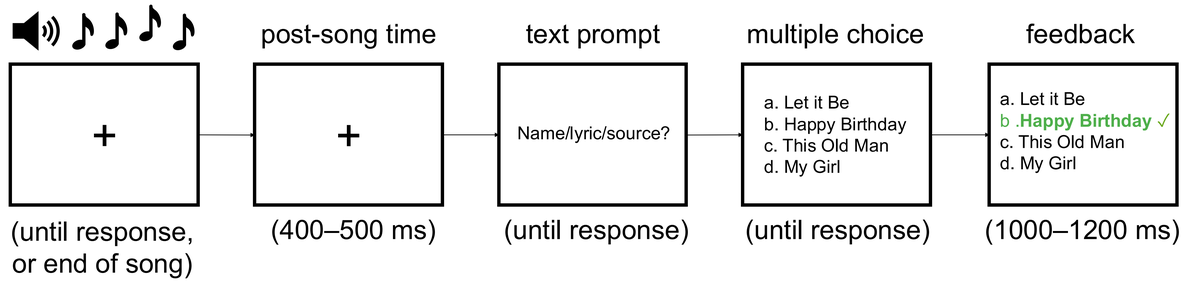


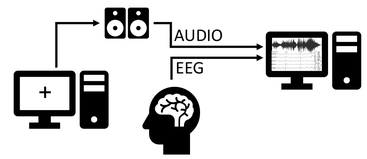
Neural measure of EA. O'Connell et al, 2012.

Song Familiarity Task: *Respond as soon as the song feels familiar.*

N = 30

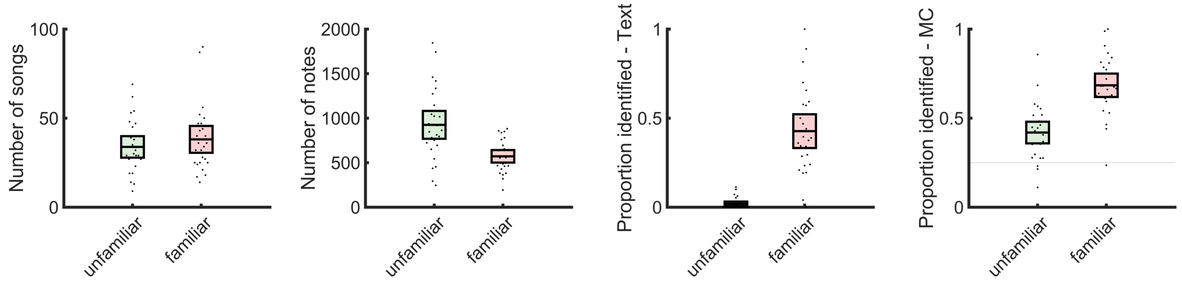
Stimuli: 121 melodies (5 – 17 s)



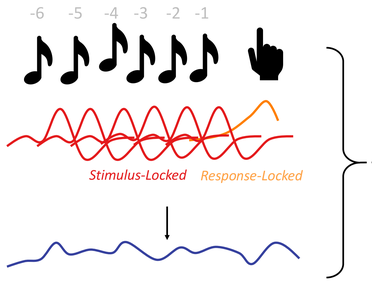


Simultaneous EEG + audio recording.

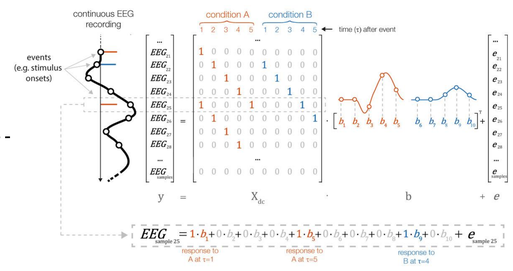
Behavioural Results



EEG Analysis: Unmixing overlapping signals



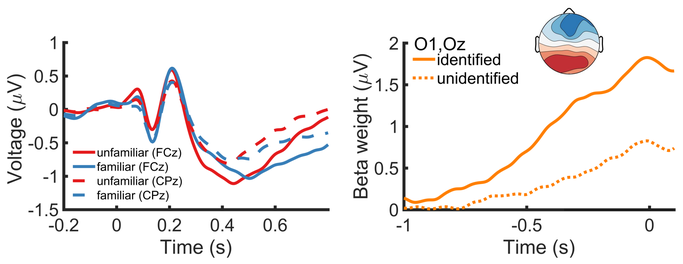
EEG: A mixture of overlapping signals



Deconvolution of EEG signals. Ehinger & Dimigen, 2019.

Model 1
Stim + Resp

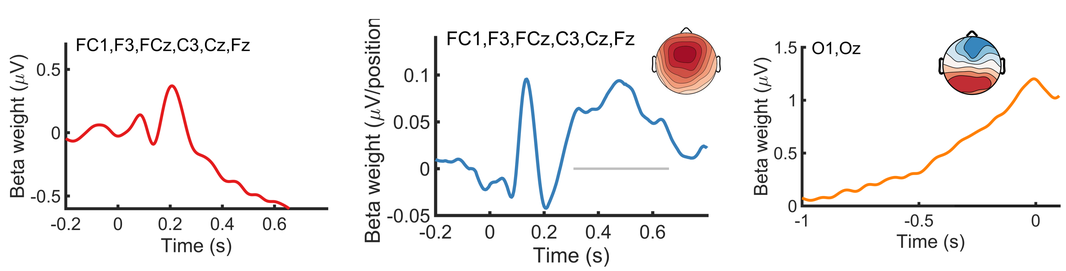
EEG = *stimulus* + *response*



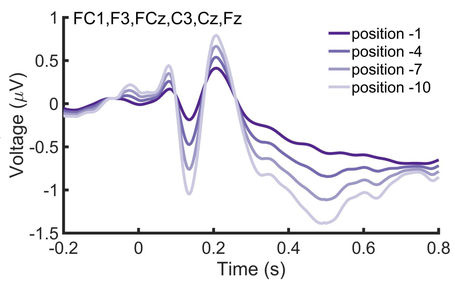
A response-locked CPP

Model 2
Note position regressor

EEG = *stimulus (intercept)* + *p** *stimulus (note position)* + *response*



A note-position effect



Reconstructed EEG shows a building positivity as the decision approaches.

Ratcliff, R. (1978). A theory of memory retrieval. *Psychological Review*, *85*(2), 59–108. https://doi.org/10.1037/0033-295X.85.2.59

O'Connell, R. G., Dockree, P. M., & Kelly, S. P. (2012). A supramodal accumulation-to-bound signal that determines perceptual decisions in humans. *Nature Neuroscience*, *15*(12), 1729–1735. https://doi.org/10.1038/nn.3248

Dimigen, O., & Ehinger, B. V. (2021). Regression-based analysis of combined EEG and eye-tracking data: Theory and applications. *Journal of Vision*, *21*(1), 3. https://doi.org/10.1167/jov.21.1.3

Conclusions

Presence of a CPP -> Song familiarity relies on evidence accumulation.

Note-locked buildup -> Notes act as "evidence" in favour of familiarity decision.

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