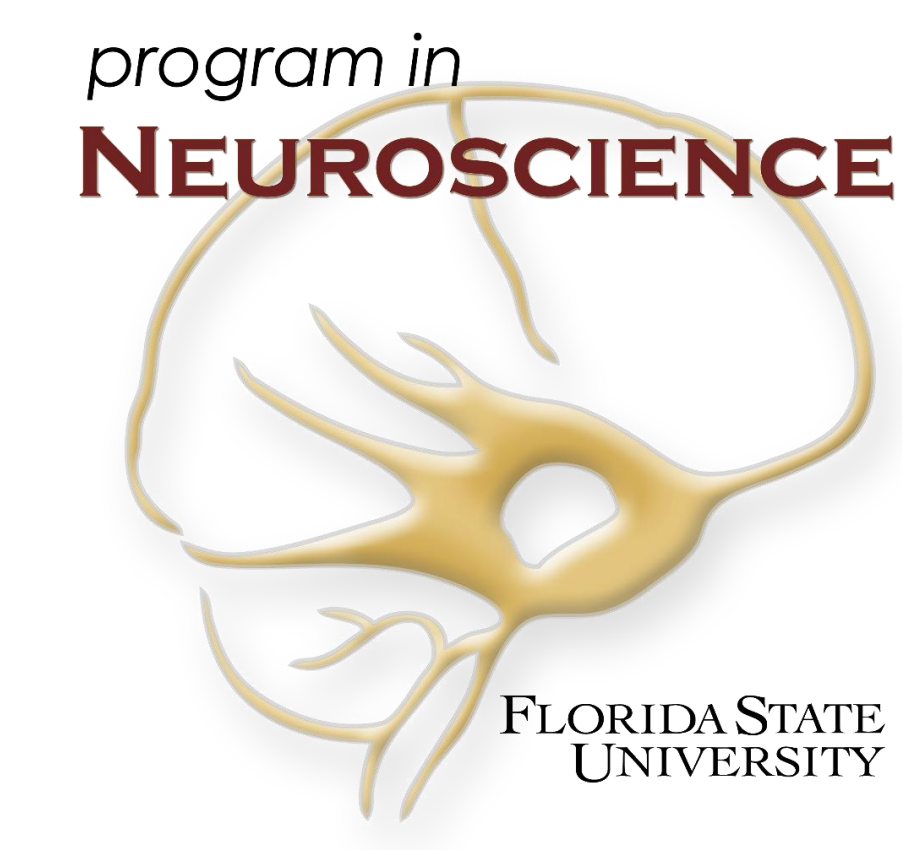


Musical valence and arousal influences human recognition memory



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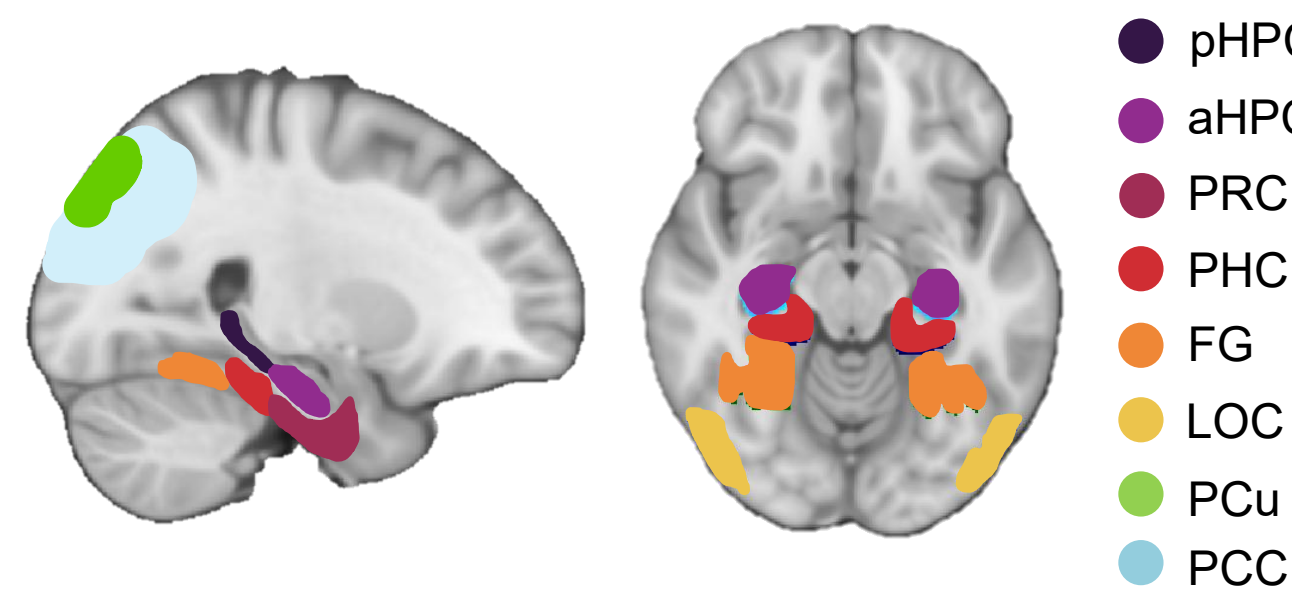
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Background

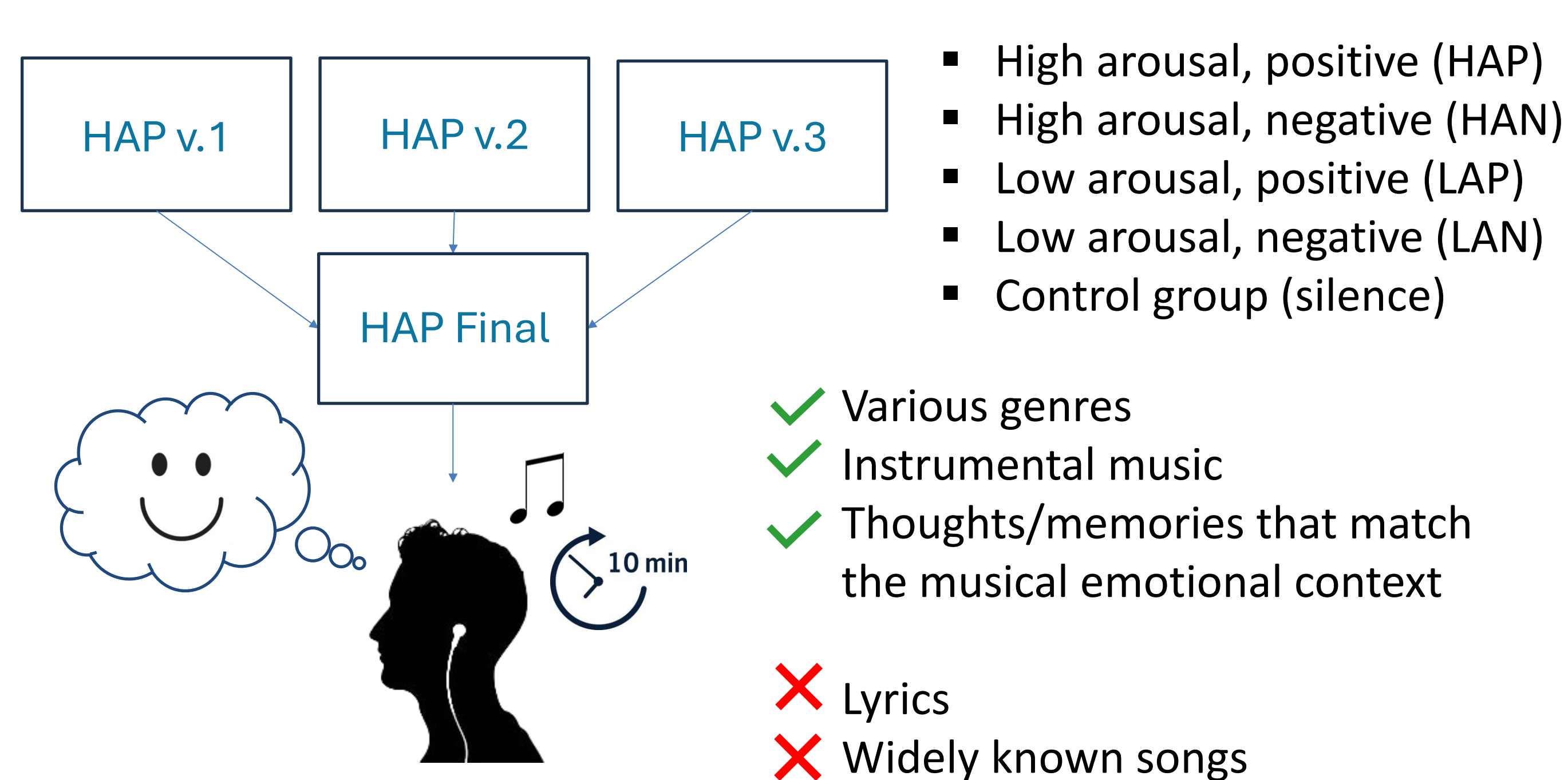
- “Mozart Effect” suggests that listening to music prior to task performance improves overall cognition, evoking the idea of priming.
- The arousal and mood hypothesis^{1,2} argues that music indirectly influences cognition by way of intrapersonal emotions, revolving around two main components of the circumplex model of emotions³.
 - **Mood**: the valence of the perceived emotion
 - **Arousal**: the degree of psychological and/or physiological activation, i.e., the intensity of the emotional response
- Dual-process models of recognition memory^{4,5} separate recognition into distinct processes of recollection and familiarity
 - 1) Recollection:
 - slower, more effortful process through which details about a remembered stimulus can be recalled directly and accurately
 - associated with positive-going electrophysiological activity recorded over posterior parietal locations between 500-800 ms after cue onset, titled “**P600 - parietal old/new effect**”
 - 2) Familiarity:
 - fast, automatic process often viewed as a more implicit form of memory, underlying a general feeling that a stimulus has been previously encountered
 - associated with negative-going electrophysiological activity recorded over frontal scalp locations between 300-500 ms after cue onset, “**FN400 – mid-frontal old/new effect**”

Question

In what ways does music-evoked emotion influence recognition memory? How can different combinations of mood and arousal impact ERP components associated with familiarity and recollection?



Music Selection

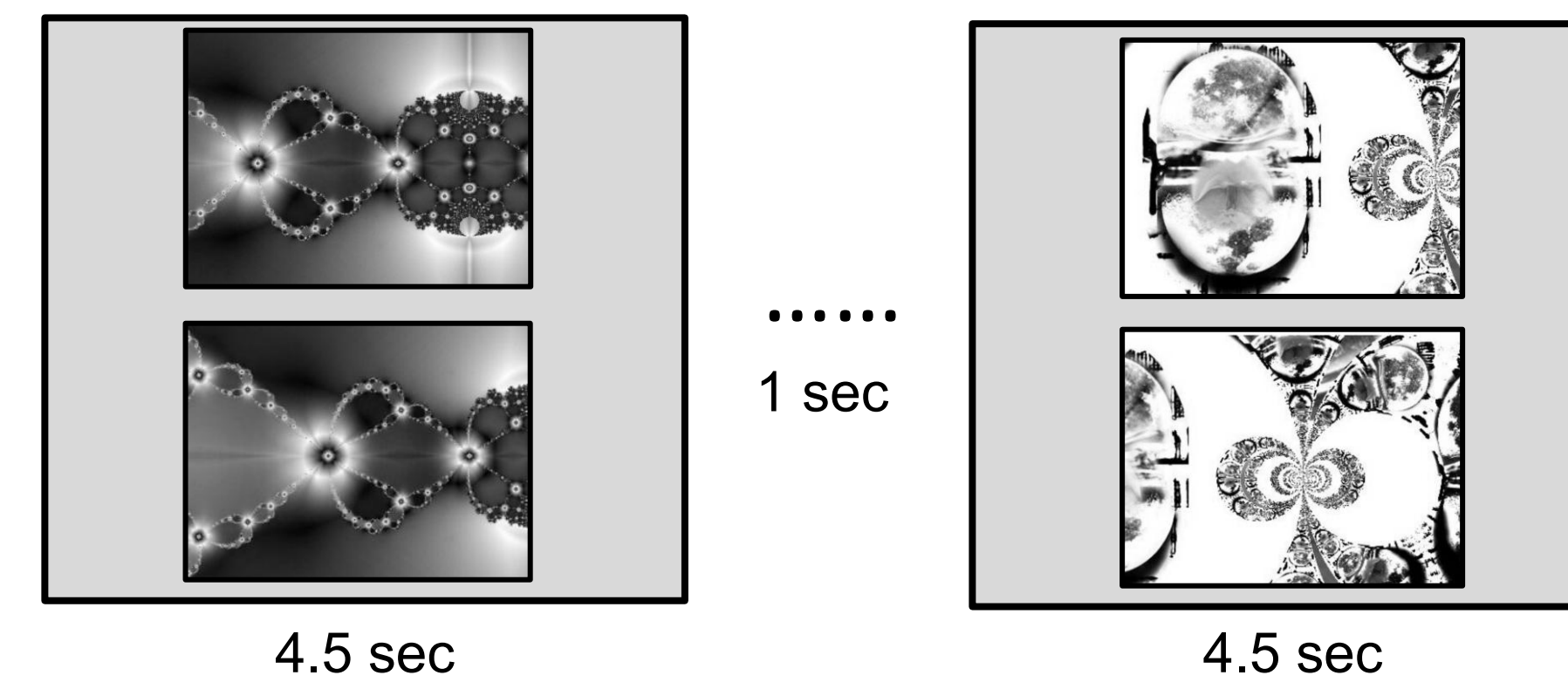


Experimental Design

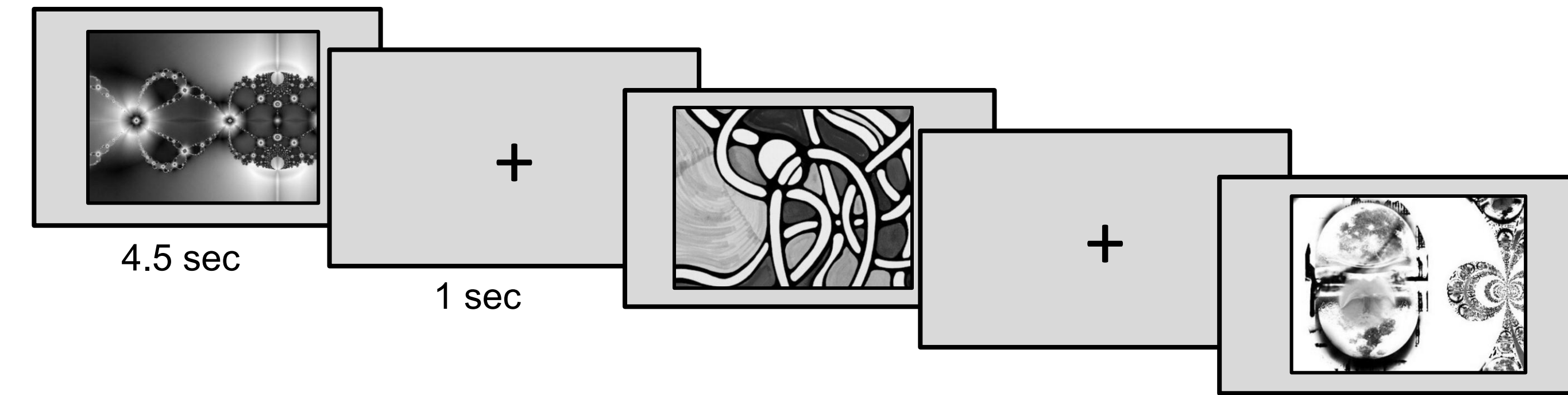
Each participant (N = 50, M_{age} = 20, Women = 35) completed a single session experiment with an encoding task and a recognition task

1. Encoding Task

All targets presented twice, once shifted left and once shifted right (10-pixel shift)



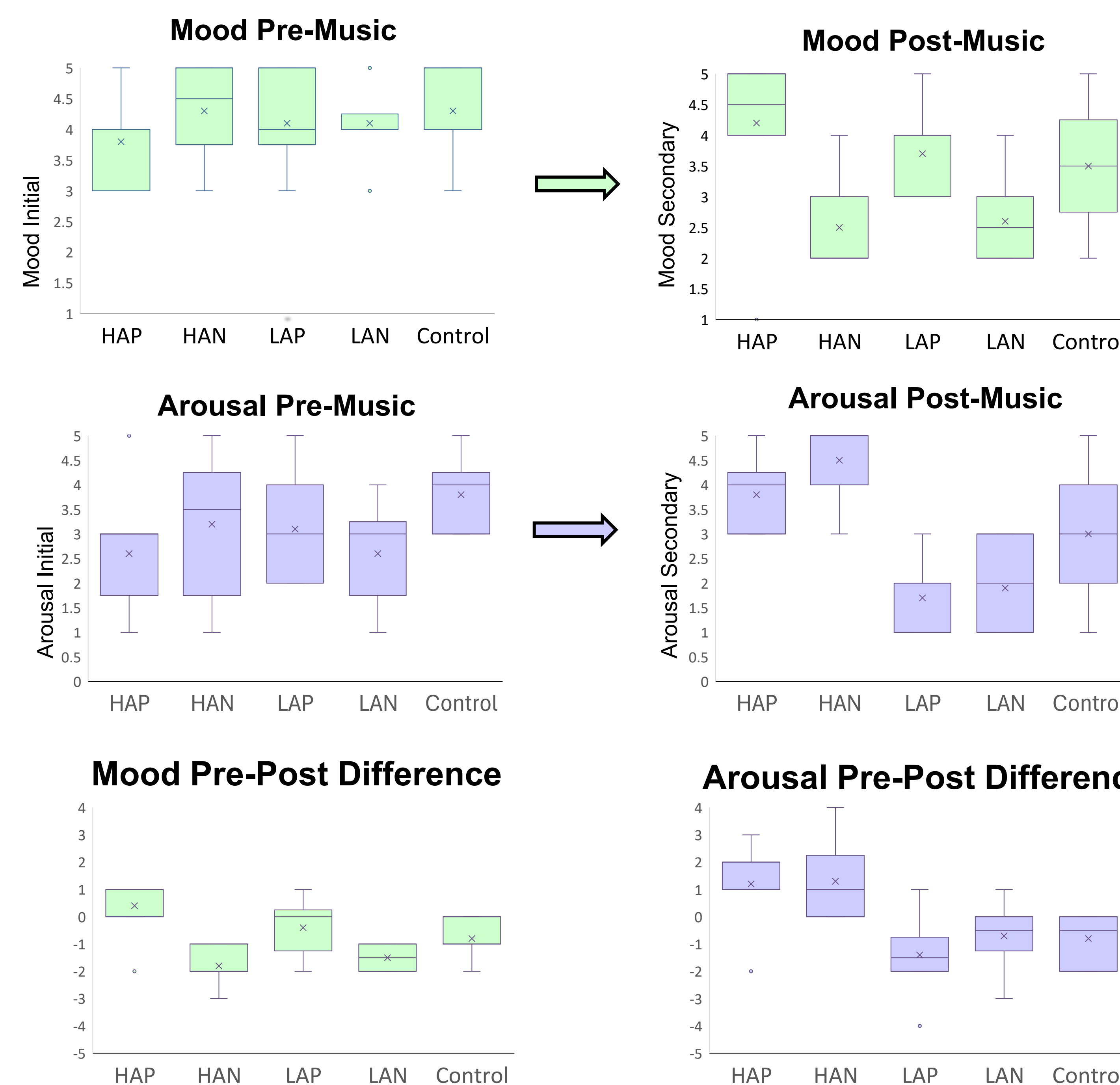
2. EEG Recognition Task



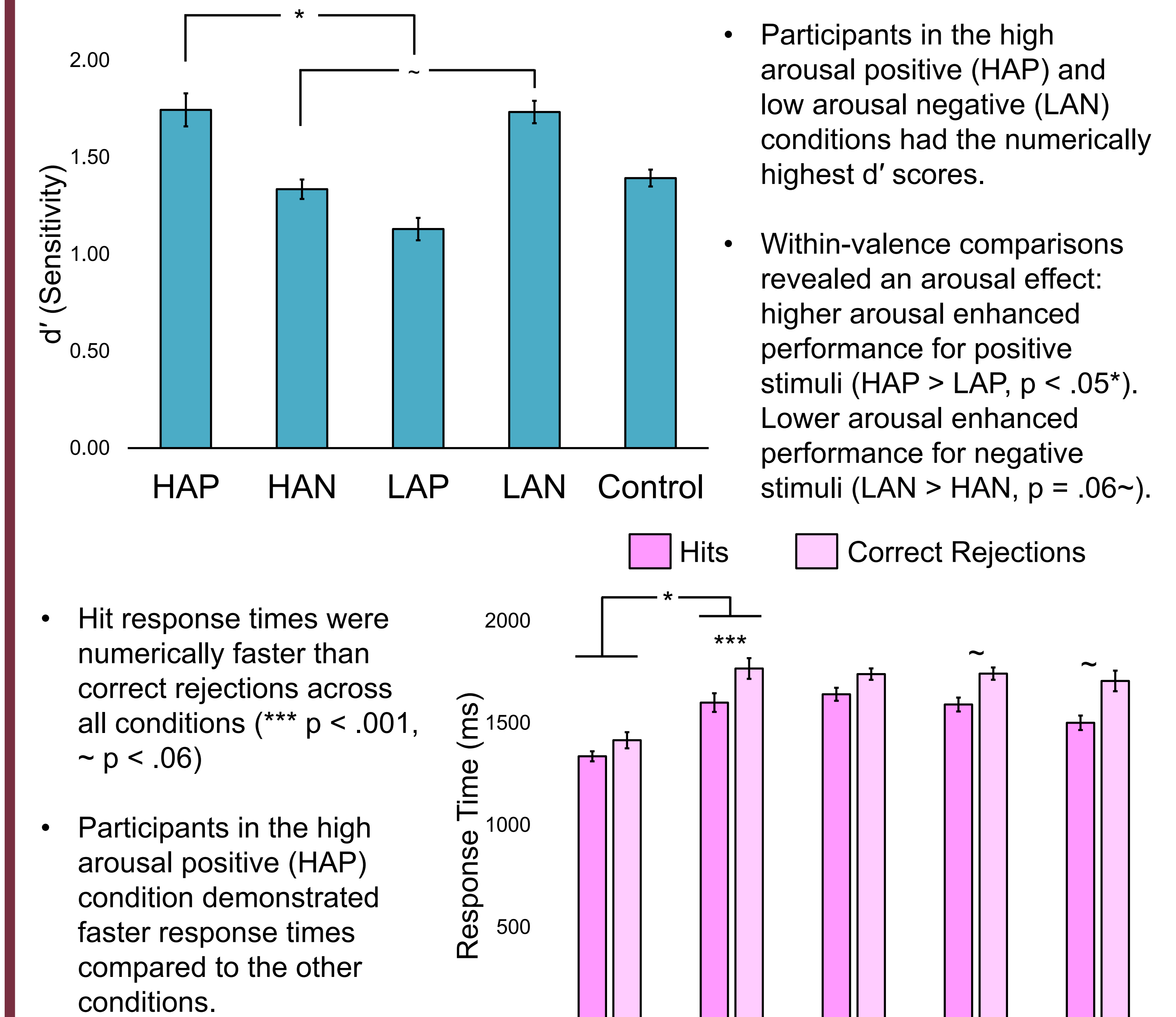
Participants discriminated between previously encoded items and lures: “High Confidence Old” “Low Confidence Old” “New”

recollection familiarity

Emotional Induction



Behavioral Data



Significance

- Music is a pervasive element of the human experience, yet its role in memory is surrounded by broad uncertainties.
- Significant correlations between music-primed emotional inductance and behavioral results contribute to a deeper understanding if music's effects. This understanding can:
 - advance theoretical models of music processing
 - provide invaluable information on how different mood and arousal states influence recognition memory
 - pave the way for developments of non-invasive, music-based treatment interventions mitigating memory decline and enhancing cognitive performance

Summary

- Emotional induction was effective, supporting the validity of using these conditions to examine downstream effects on recognition memory.
- Recognition performance may depend on the interaction between valence and arousal, aligning with past literature regarding the Yerkes-Dodson Law⁶.
- Recognition sensitivity appeared higher for positive music when arousal was high and for negative music when arousal was low.