HEBB-REPETITION LEARNING IN PLAYERS OF THE VIDEO GAME *COUNTER-STRIKE*

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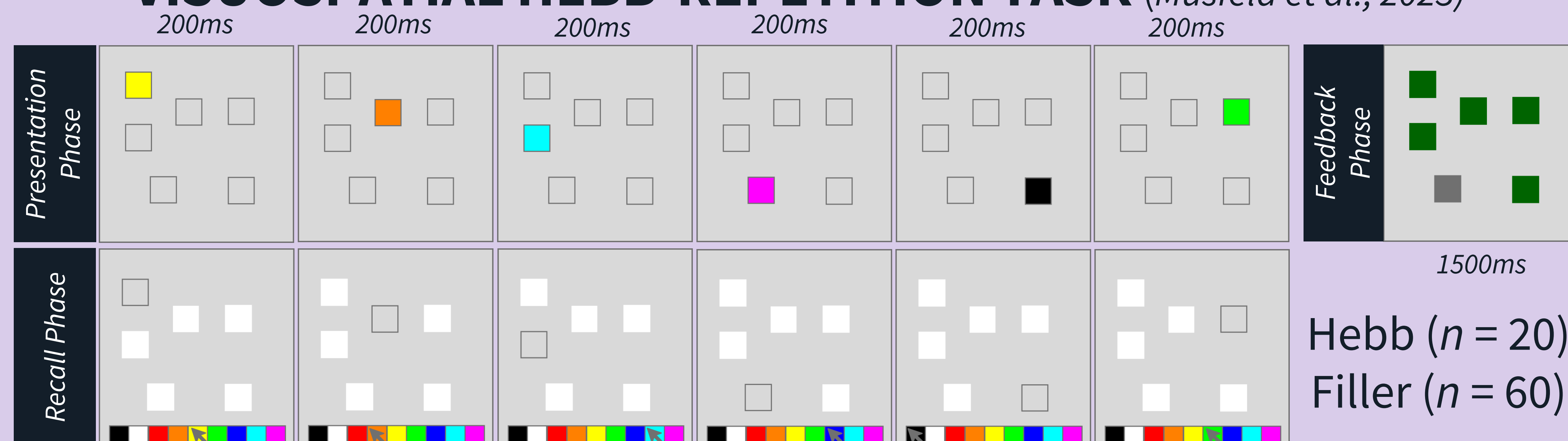3126 PSYCHONOMIC SOCIETY

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Background

- Research shows associations between video gameplay and performance across various cognitive domains *(Bediou et al., 2018; 2023)*.

- A potential mechanism is *'Learning to Learn'*, where **gaming expertise facilitates faster learning on novel tasks** *(Zhang et al., 2021, Bavelier, et al., 2012)*.

Counter-Strike 2

- The **Hebb-repetition learning paradigm** *(Hebb, 1961)*, which assesses learning through repeated sequence exposure, has not yet been tested in gamers but may reveal enhanced **probabilistic inference** or pattern recognition, supporting *'Learning to Learn'*.
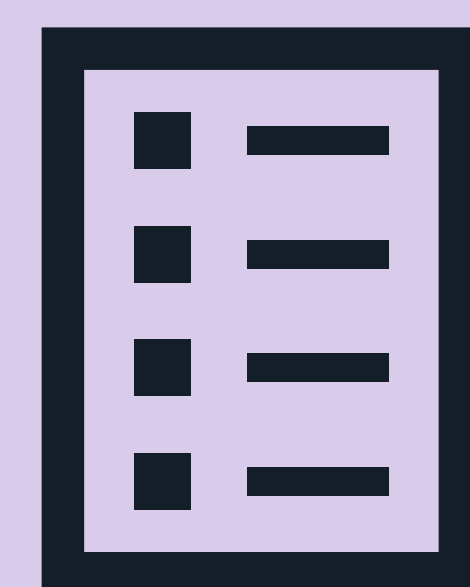
Method

VISUOSPATIAL HEBB-REPETITION TASK *(Musfeld et al., 2023)*

Presentation Phase: 200ms, 200ms, 200ms, 200ms, 200ms, 200ms

Feedback Phase: 1500ms

Recall Phase

Hebb (*n* = 20)
Filler (*n* = 60)

Unbeknownst to participants, one **HEBB** sequence is (on average) repeated every fourth trial, while other **FILLER** sequences are not repeated.

COUNTER-STRIKE EXPERTISE QUESTIONNAIRE

Total hours of playtime
Fortnightly hours of playtime
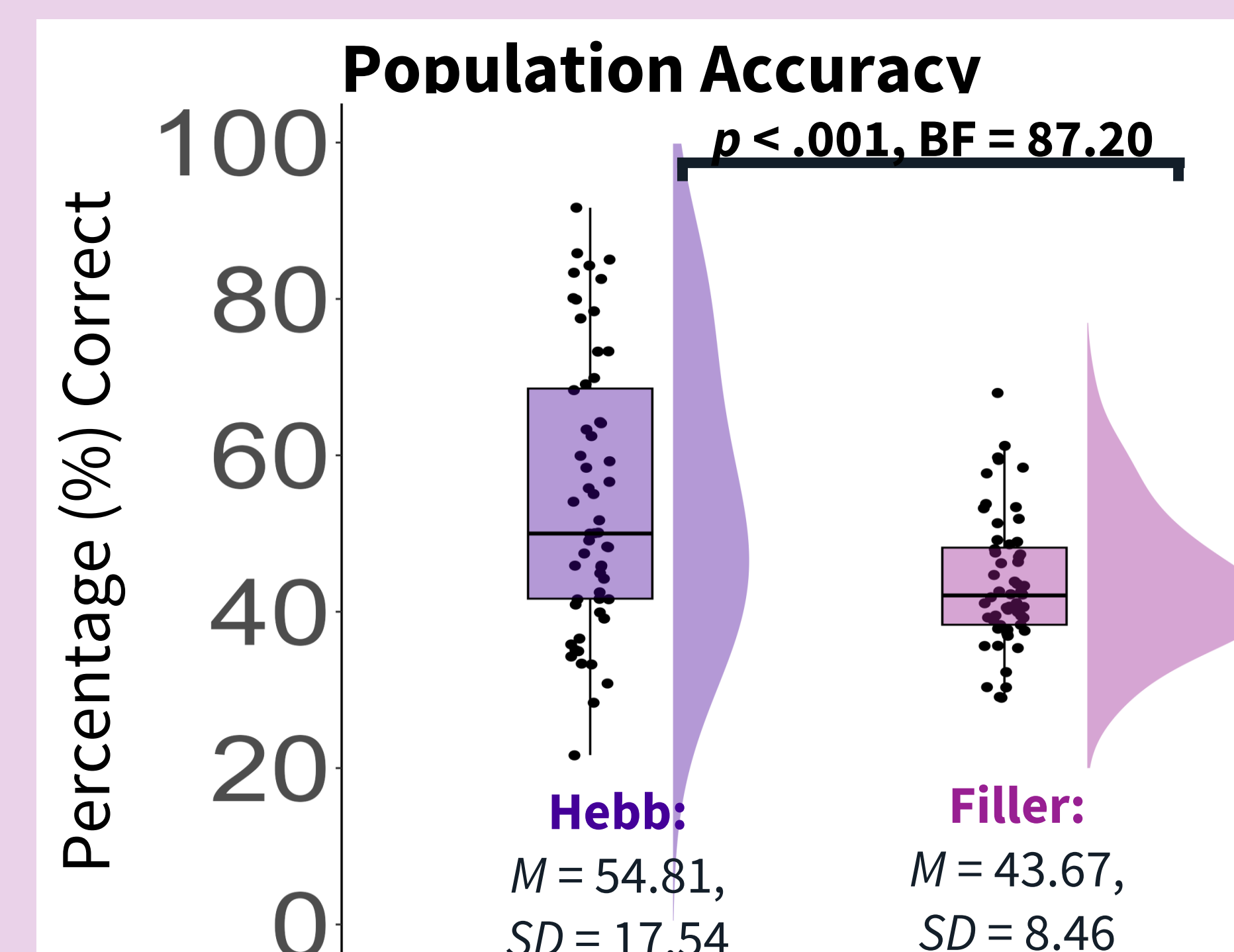Self-rated expertise
Current in-game ranking

PARTICIPANTS

- 56 *Counter-Strike 2* players aged 16-35 years (*M* = 24.34, *SD* = 5.04)
- Mostly male (50), from the UK (45), and predominantly white (46)
- Mostly well educated (*M* = 16.07, *SD* = 2.81), and high self-rated socioeconomic status (SES) (*M* = 5.88, *SD* = 1.50)

References and extra figures!

Results

Population Accuracy
p < .001, BF = 87.20

Hebb:
M = 54.81,
SD = 17.54

Filler:
M = 43.67,
SD = 8.46
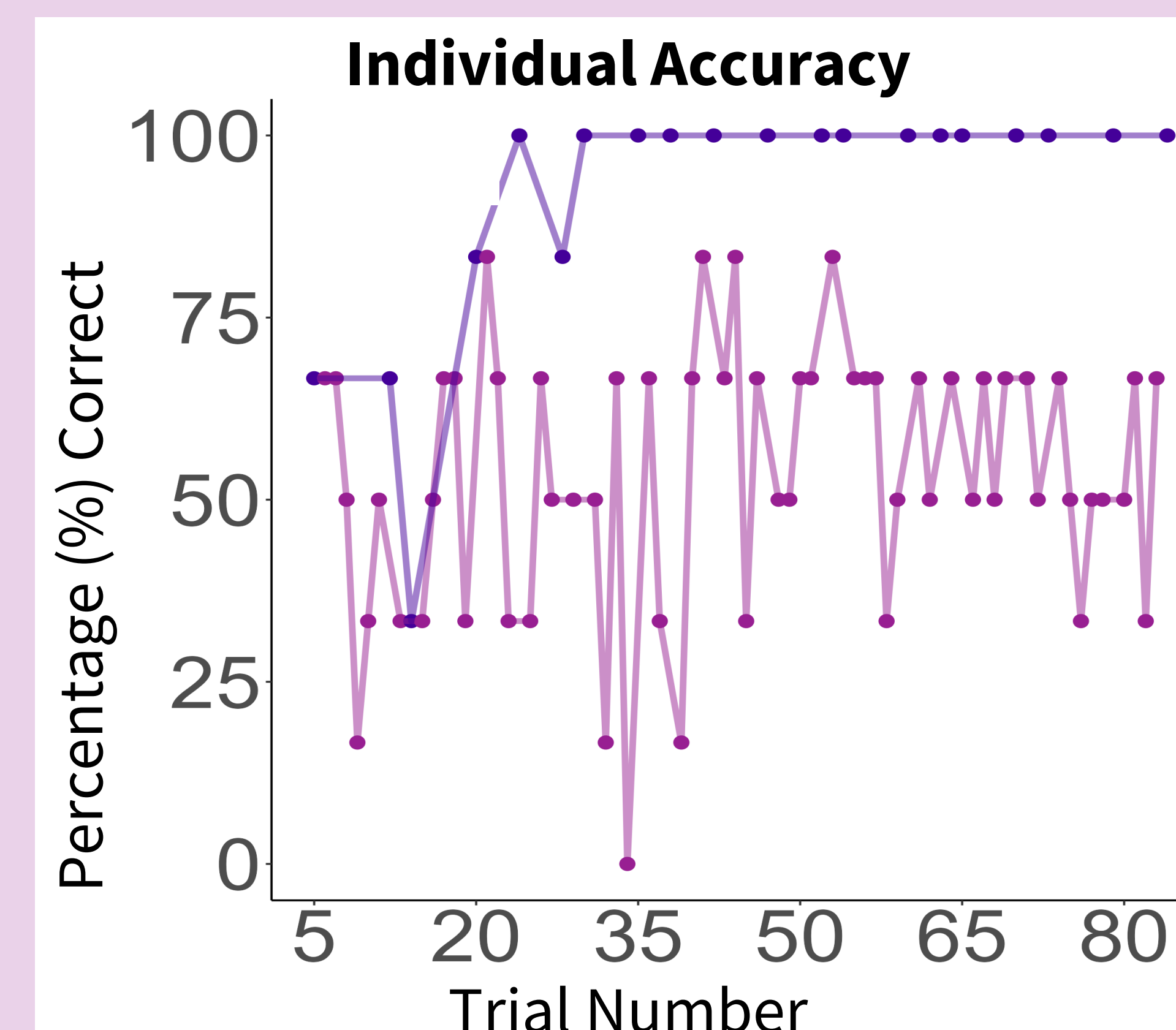
Individual Accuracy

BAYESIAN HIERARCHICAL MIXTURE MODELLING

- Estimates **population**-level and **individual**-level parameters, whilst accounting for individual variability in the **learning curve** *(Musfeld et al., 2023)*.
  - **Mixture Proportion:** % of trials where learning occurs
  - **Intercept:** initial performance before learning
  - **Slope:** rate of performance improvement per repetition
  - **Learning rate:** rate of progression from baseline to learning
  - **Onset:** point where learning begins
  - **Asymptote:** point where performance levels off
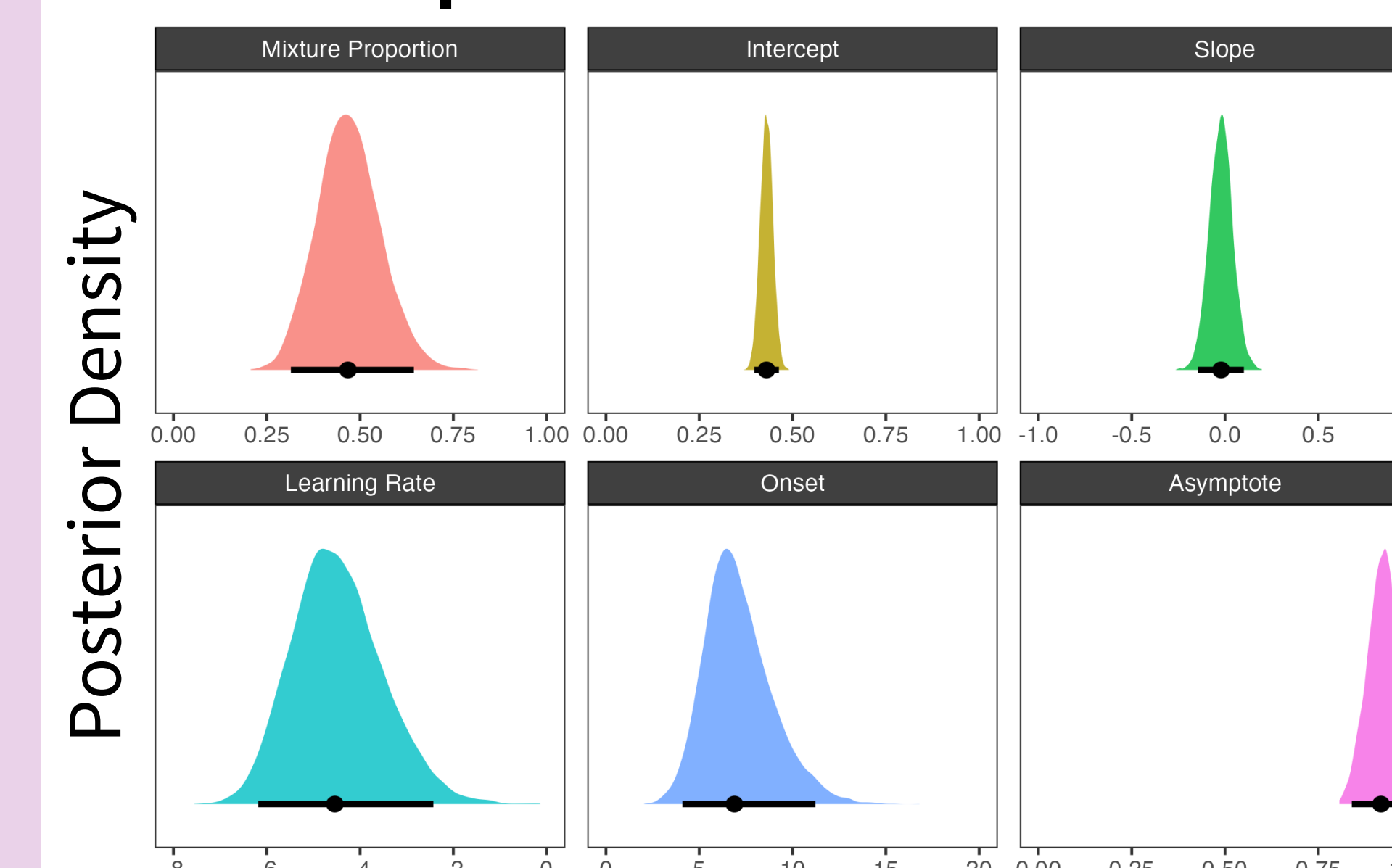- Identified **Learners** (*n* = 27) and **Non-Learners** (*n* = 29)

COUNTER-STRIKE EXPERTISE

- **No clear evidence** supporting a relationship between Counter-Strike expertise and Learner group status.

Limitation: small number of Hebb trials may have limited exposure and learning

Population Parameters

Mixture Proportion | Intercept | Slope
Learning Rate | Onset | Asymptote

Individual Parameters

Learning Rate | Onset