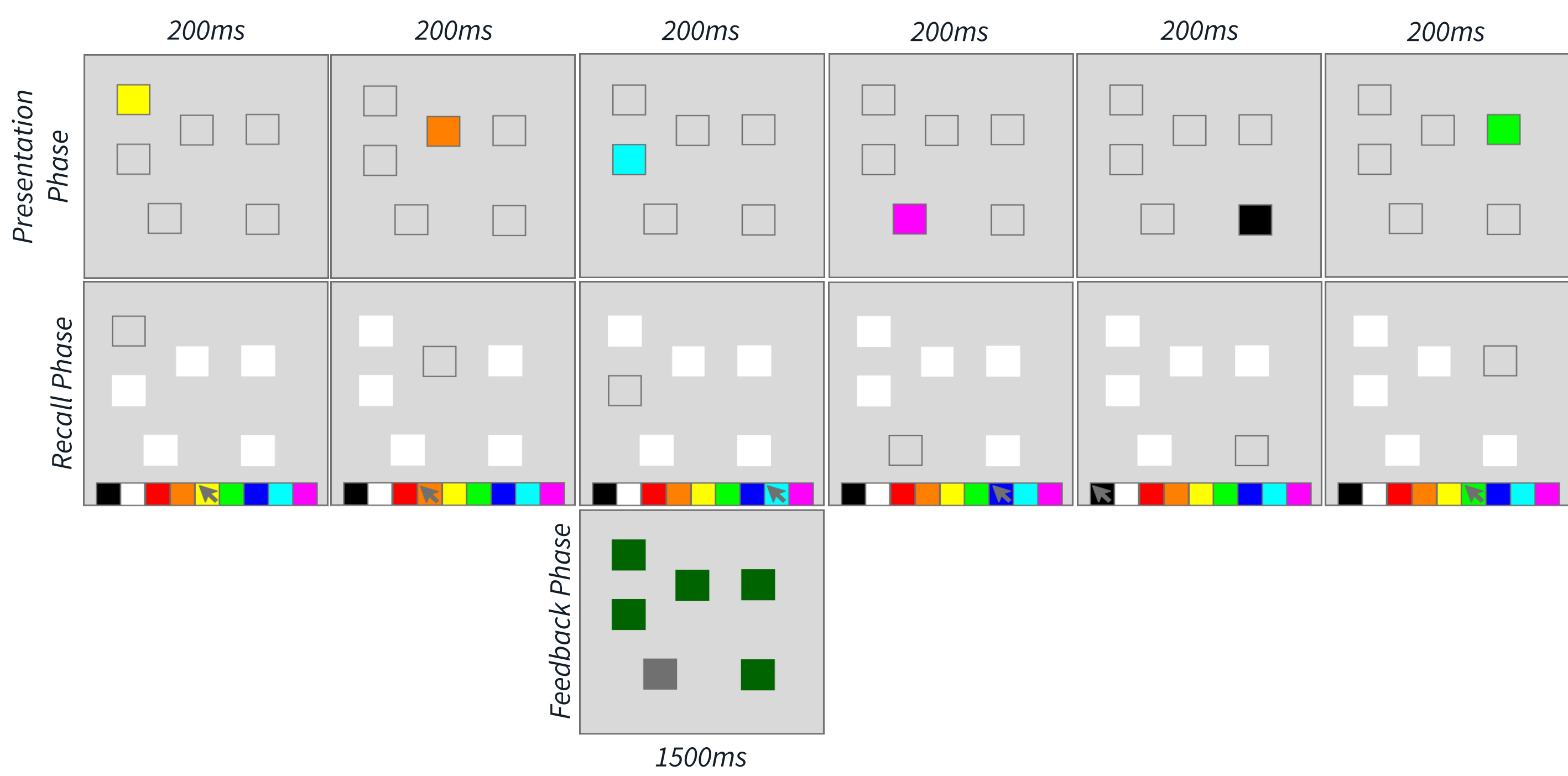


BACKGROUND

- Video game expertise provides valuable insight into cognitive plasticity within a controlled ‘sandbox’ setting, allowing us to study adaptation to challenging environments through targeted activities.
- **First-person shooter (FPS)** games are fast-paced video games that require quick responses to dynamic situations, potentially involving various cognitive abilities
- Previous research shows FPS players to outperform non-video game players in a range of cognitive domains such as perception, attention and spatial ability^{1&2}.
- These benefits may arise from enhanced **probabilistic inference**³ – our ability to make predictions based on statistical patterns and prior knowledge.
- Probabilistic inference increases **working memory efficiency**; by integrating current information with updated past knowledge to make informed predictions⁴.
- However, there is limited research investigating probabilistic inference in FPS players - this study examines the association between expertise in the FPS game **Counter-Strike 2 (CS2)** and learning in a visuospatial Hebb-repetition task.

METHOD

VISUOSPATIAL HEBB-REPETITION TASK⁵



Participants were presented with sequences of six coloured squares (for 200ms each) at differing locations in a grid, which they must immediately recall. Unbeknownst to them, 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

H1: The typically observed memory benefits for **Hebb** sequences will be more pronounced with higher Counter-Strike expertise.

PARTICIPANTS

42 participants aged 17 – 38 years ($M = 25.31$, $SD = 5.52$) were recruited online. Participants were mostly male (35) from the United Kingdom (35), identified ethnically as White (36), varied in their education from 12 – 24 years ($M = 16.14$, $SD = 2.93$), and self-rated socioeconomic status (SES), on a scale from 1-10, from 3-8 ($M = 5.81$, $SD = 1.53$).

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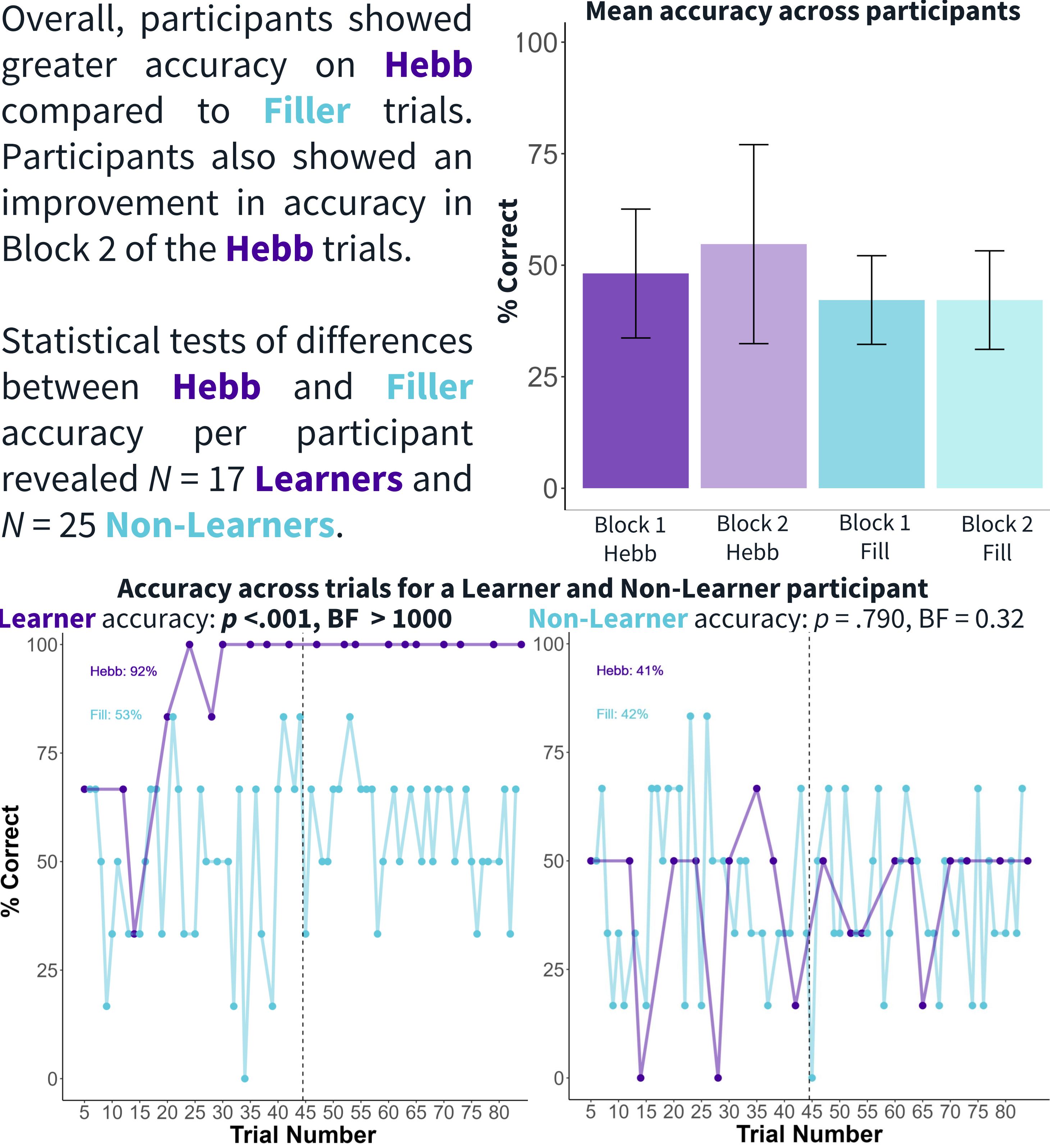
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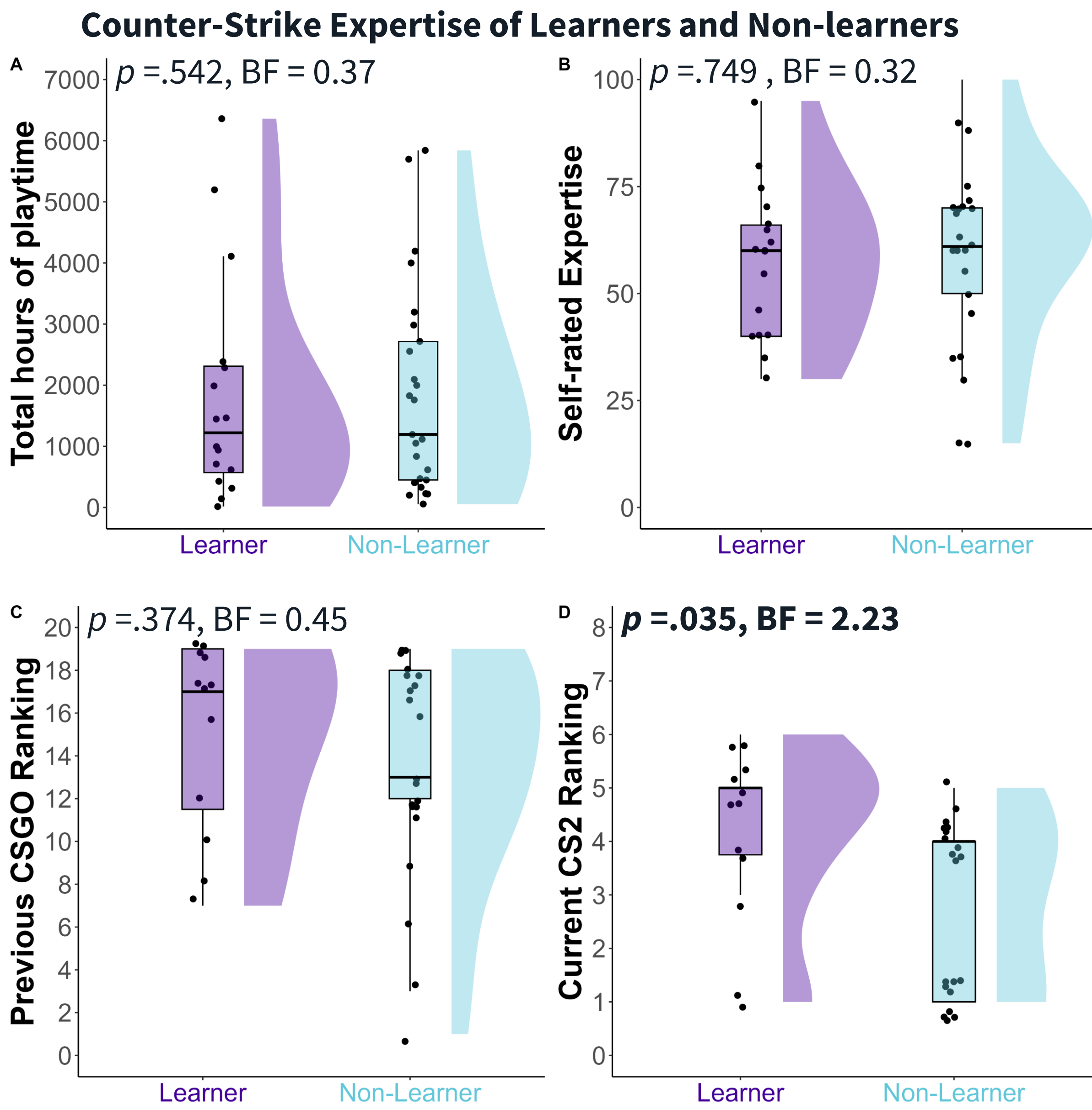
RESULTS

Overall, participants showed greater accuracy on **Hebb** compared to **Filler** trials. Participants also showed an improvement in accuracy in Block 2 of the **Hebb** trials.

Statistical tests of differences between **Hebb** and **Filler** accuracy per participant revealed $N = 17$ **Learners** and $N = 25$ **Non-Learners**.



Preliminary tests show a significant difference between **Learners** and **Non-Learners** Counter-Strike 2 matchmaking ranking.



NEXT STEPS: Collect more data and conduct a k-means cluster analysis of Counter-Strike expertise in **Learners** and **Non-Learners**.

TAKE HOME MESSAGE

Establishing cross-sectional FPS expertise benefits in probabilistic inference could inform training programs for professionals who require quick, accurate decisions under pressure (paramedics, surgeons, and air traffic controllers). However, more data collection is required as preliminary evidence is too ambiguous to draw conclusions.