COGNITIVE CORRELATES OF ACTION VIDEO GAMING: A CROSS-SECTIONAL STUDY OF COUNTER-STRIKE PLAYERS

University of Sheffield

Eleanor R. A. Hyde, Robert Schmidt, Daniel J. Carroll, & Claudia C. von Bastian

erahyde1@sheffield.ac.uk eleanorhyde.com @era_hyde

Background

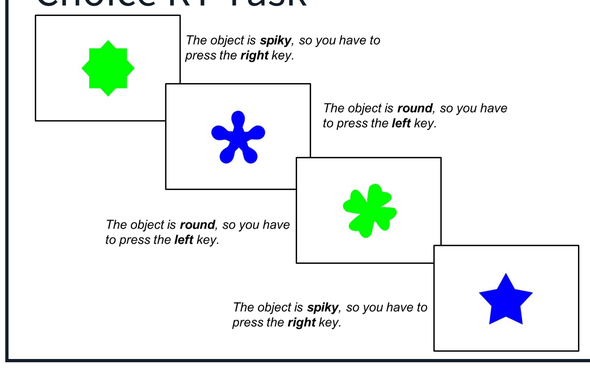
- **Action video games (AVGs)** are fast-paced, dynamic video games which require quick decision-making.
- Research shows an inconsistent association between AVG play and processing speed[1, 2].
- By decomposing **reaction times (RTs)** using the **drift-diffusion model (DDM)**[3], researchers found AVG training to improve drift rates[4], whilst others found AVG training to increase boundary separations[2].
- These mixed findings may be due to methodological limitations such as small samples, broad definitions of AVGs.
- It remains unclear how to measure AVG expertise if there is a relationship between AVG expertise and processing speed.
- **Counter-strike: Global Offensive (CS:GO)** is a popular AVG and the focus of this study.

Research Questions

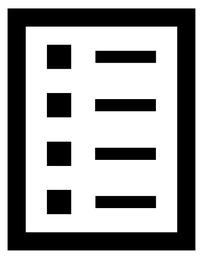
1. How should CS:GO expertise be measured?
2. Is greater CS:GO expertise associated with faster processing speed?
3. Do the decision processes underlying processing speed differ with CS:GO expertise?

Method

Choice RT Task

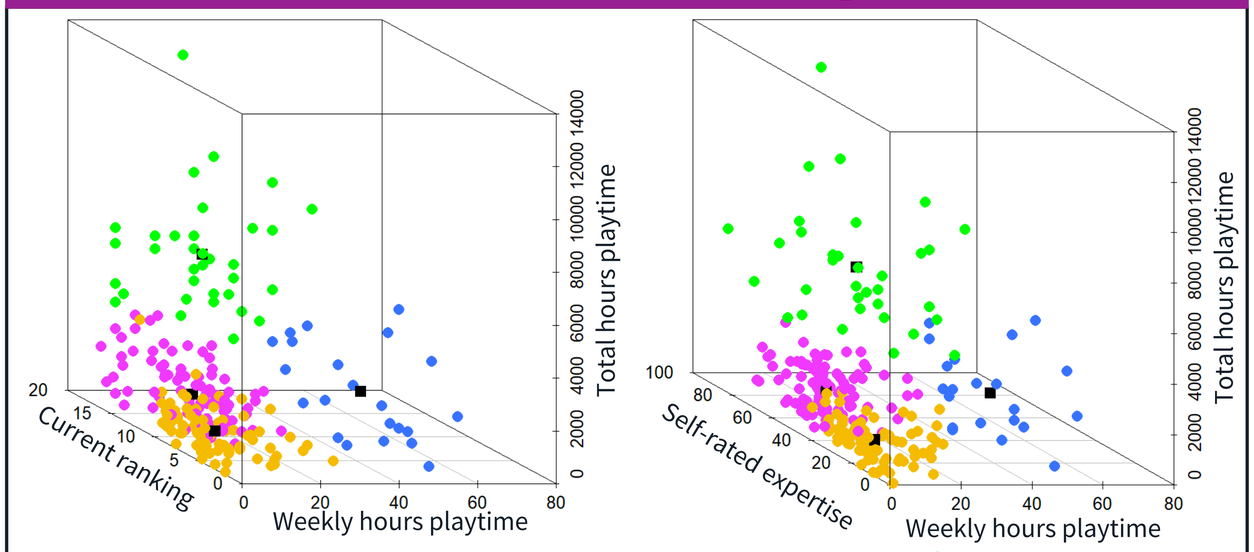


CS:GO Expertise Questionnaire



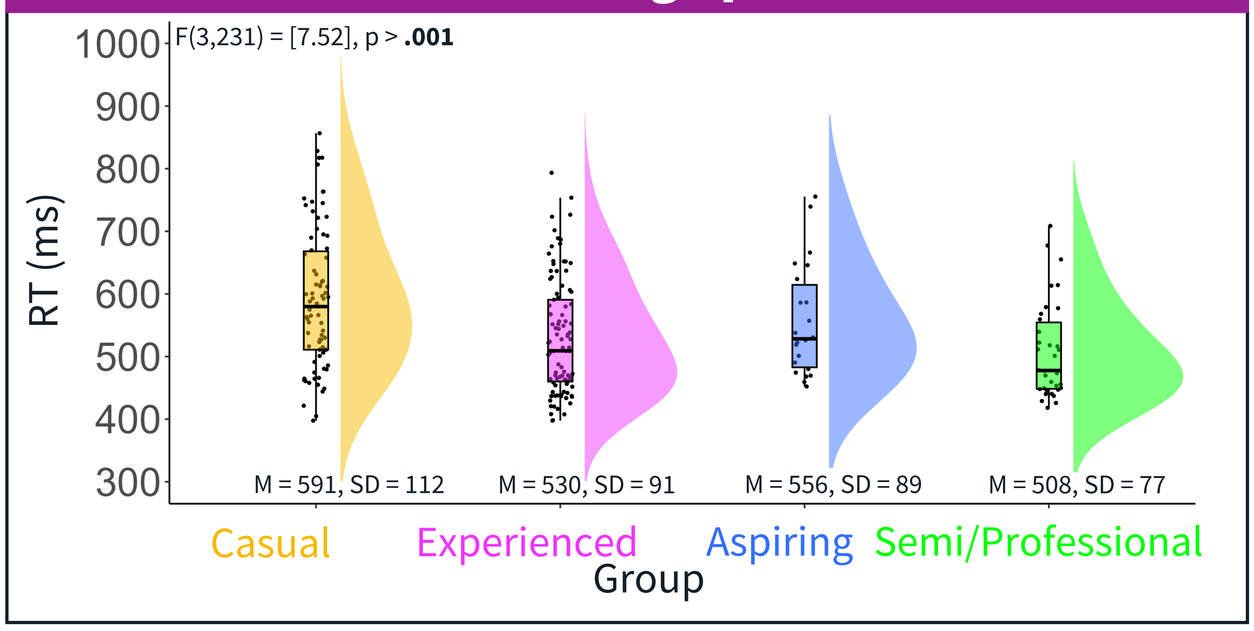
Total hours playtime
Weekly hours playtime
Self-rated expertise
Current ranking

K-Means Clustering



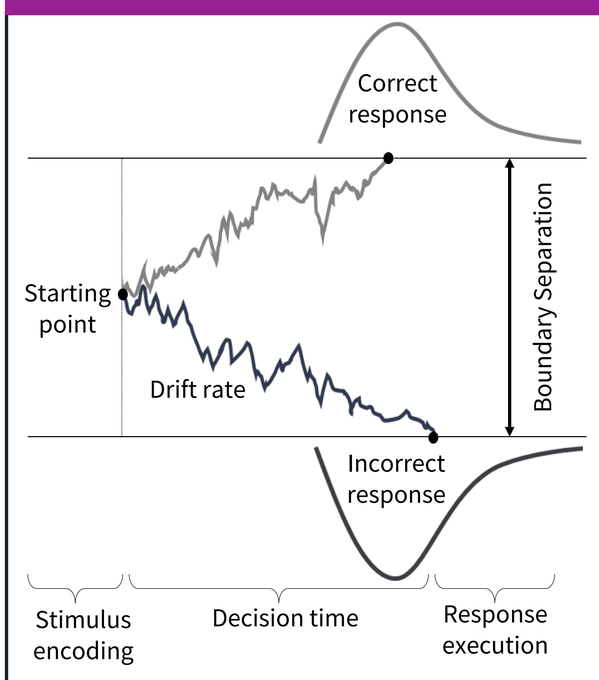
Casual N = 78 Experienced N = 101 Aspiring N = 22 Semi/Professional N = 34

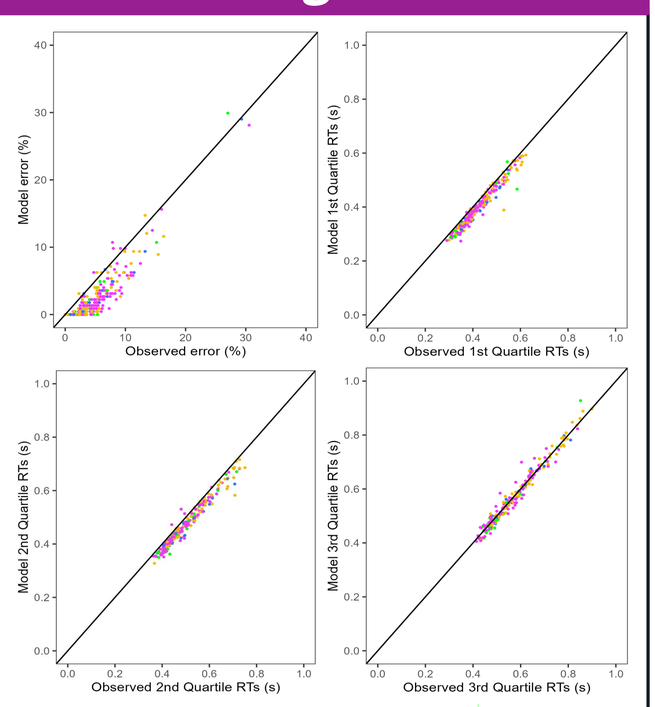
Processing Speed

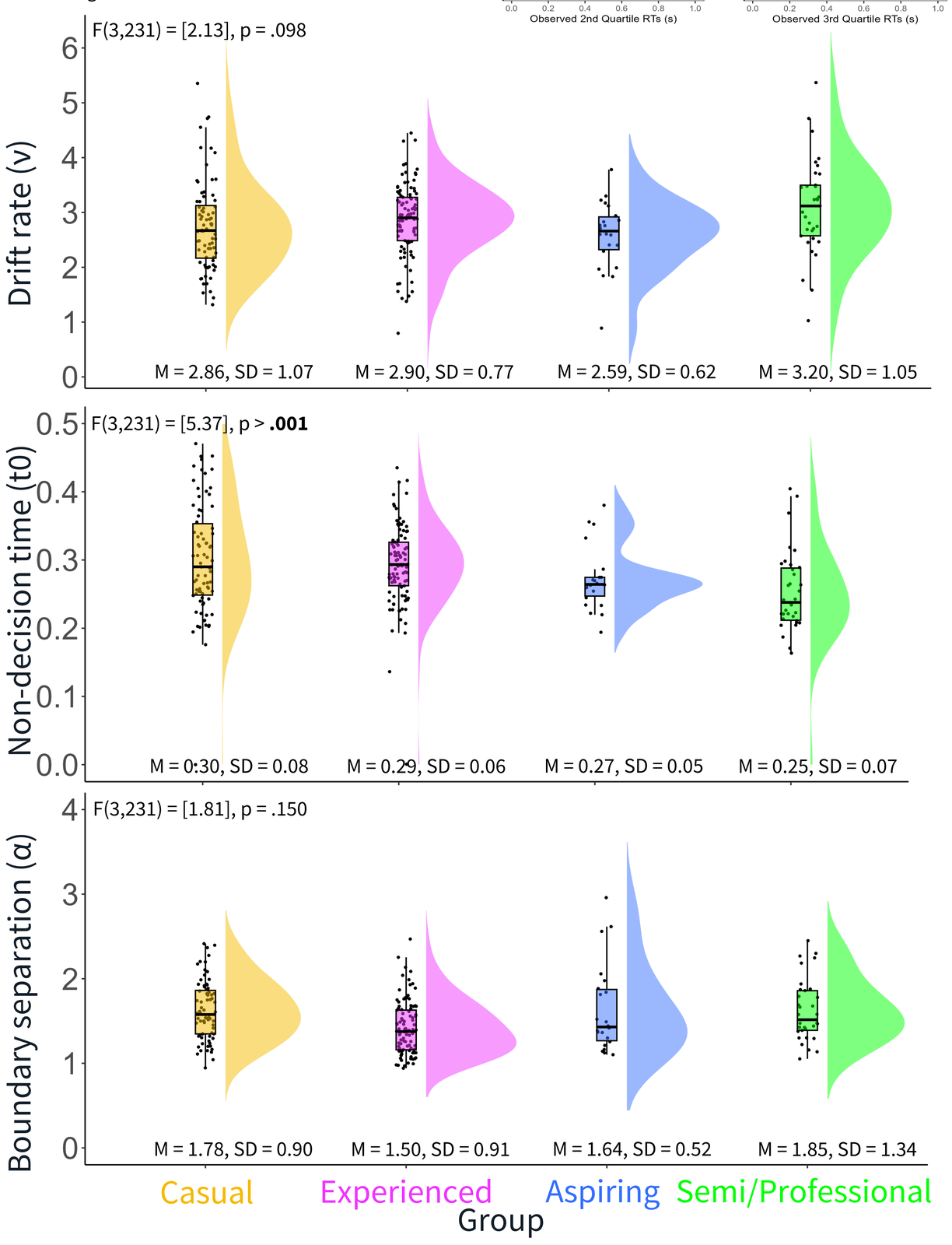


Scan for references and additional figures

Drift-Diffusion Modelling







Results

- Clustering is a viable method of identifying expertise groups in CS:GO players.
- High expertise CS:GO players demonstrate **faster processing speed** in terms of faster RTs in a Choice RT task, with no differences in accuracy.
- **DDM** suggests that RT differences were mainly due to **faster non-decision times (t0)**.

Take Home Message

1. AVG expertise is a multi-dimensional construct that should be captured by a range of measures.
2. Highly expert AVG players show advantages in processing speed, encoding and response execution – showing transfer from a video game to a cognitive task.