

The Usefulness of Video Games in Human Cognition Research

A Dual Visualization - Depicting the Potential of this Methodological Shift and an Outline of a Systematic Game Selection Process

The Drosophila of Cognitive Science?

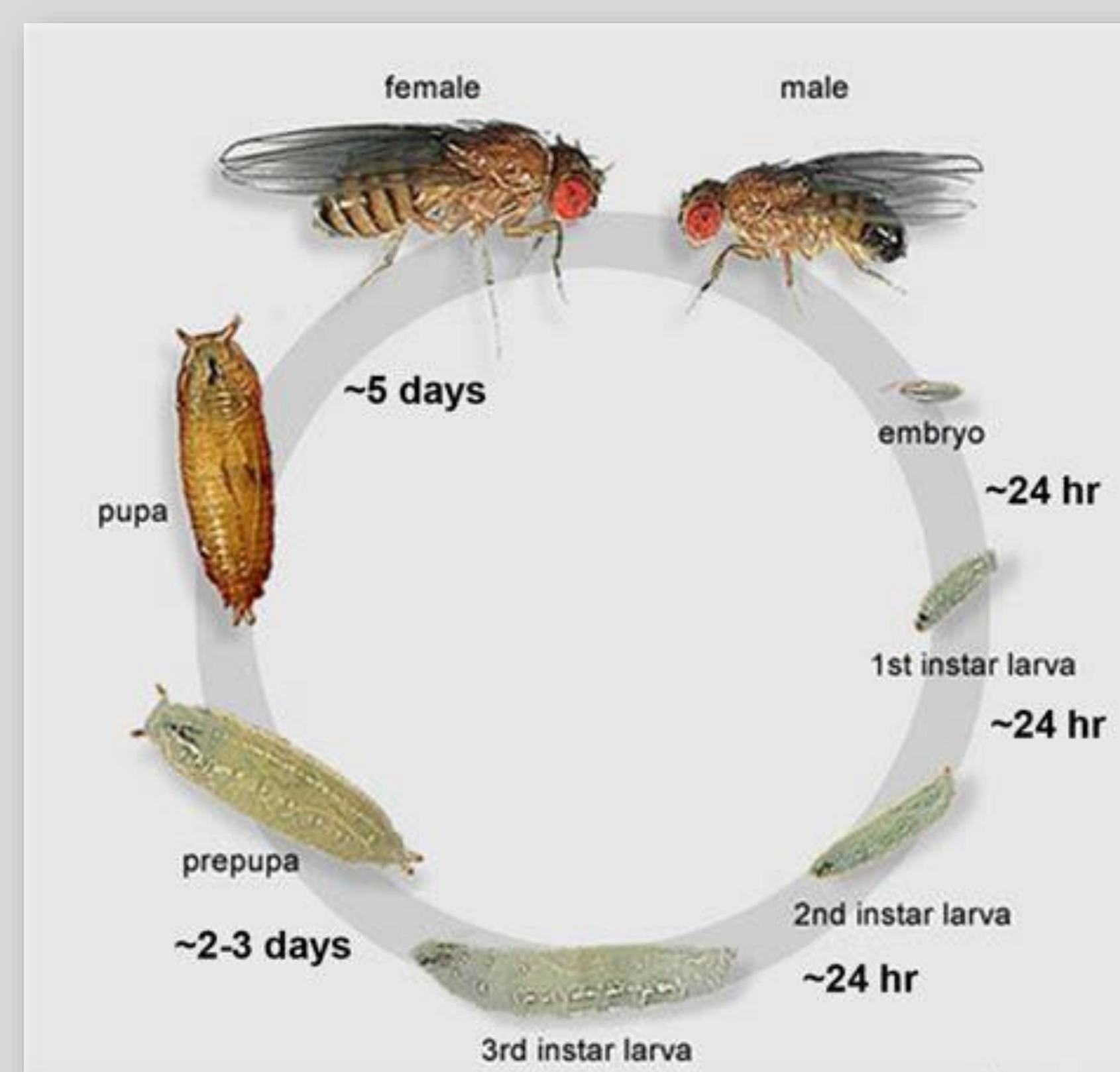
Comparing Video Games to a Transformative Research Methodology

“...we propose that RTS games can serve cognitive science as a ‘standard task environment’, as drosophila have served biology.” – Thompson, J. J., Blair, M. R., Chen, L., & Henrey, A. J. (2013). Video game telemetry as a critical tool in the study of complex skill learning. *PLoS One*, 8(9). DOI:10.1371/journal.pone.0075129

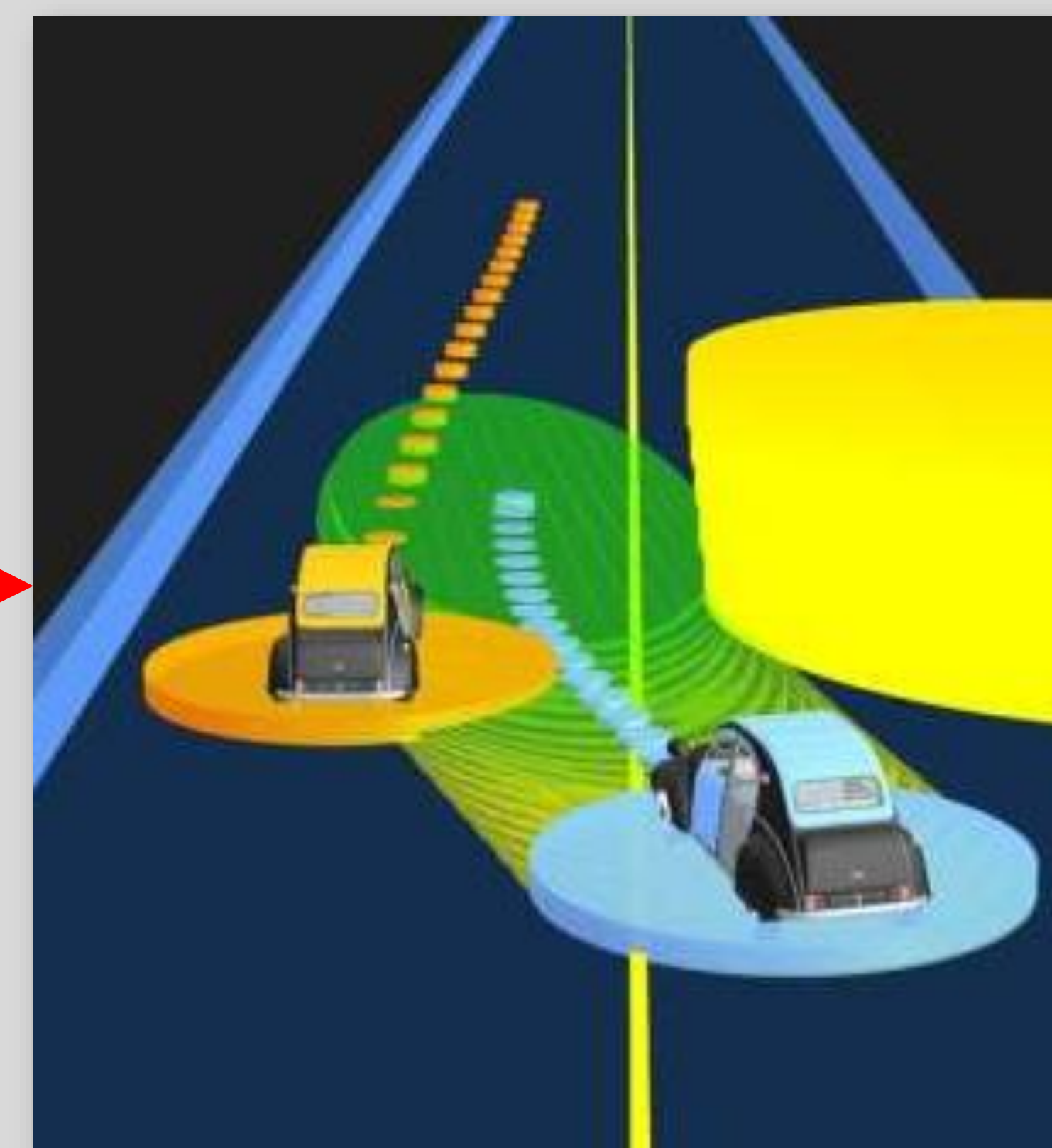
Drosophila, often referred to as the fruit fly, has been a cornerstone of biological research since 1910, providing invaluable insights due to its genetic simplicity, rapid reproduction, and the ease of observing behavior stimulus response patterns. This methodological shift produced breakthroughs in neurobiological research, increasing our understanding of learning, memory, and sleep.



Reproduction Cycle



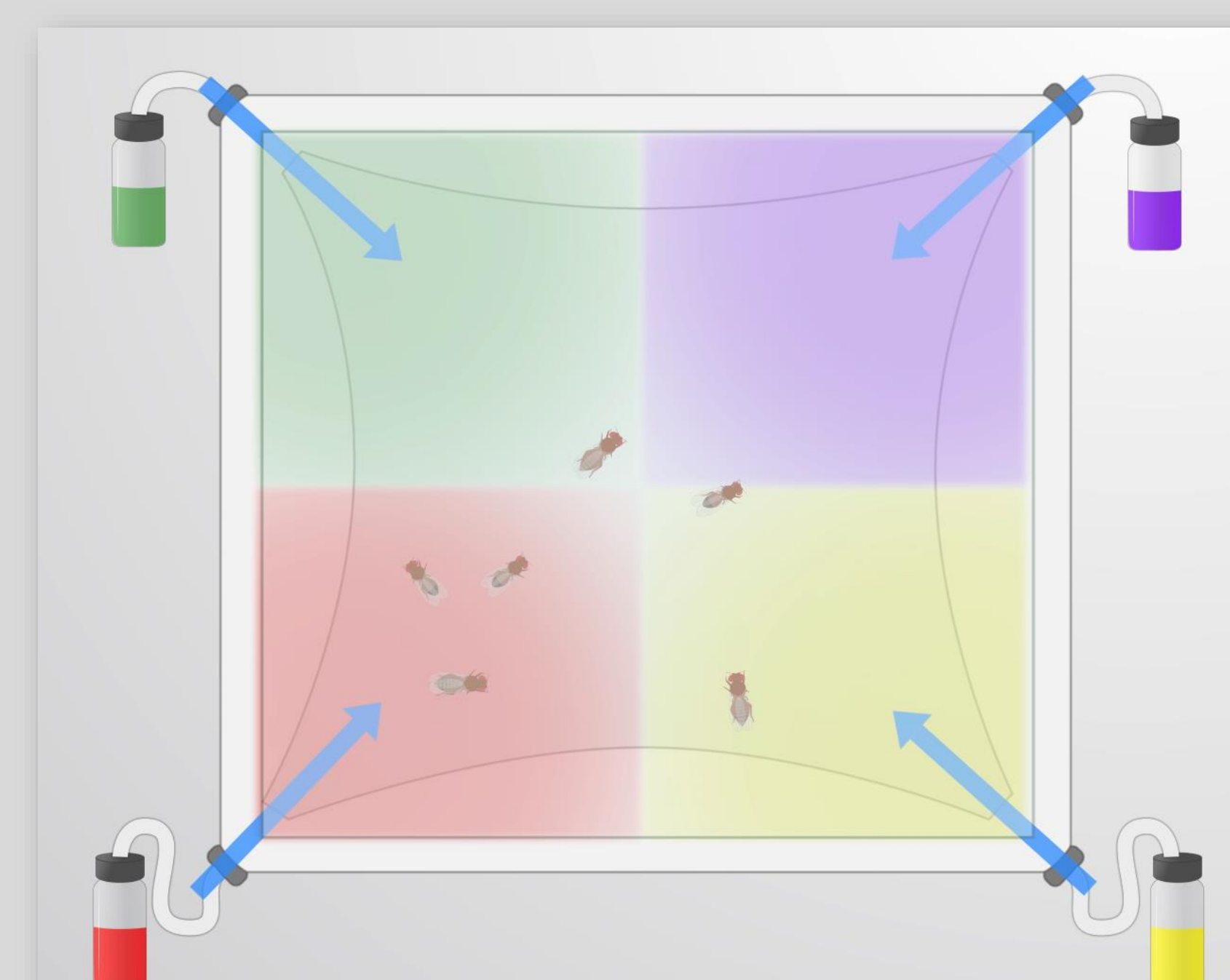
Virtual Space



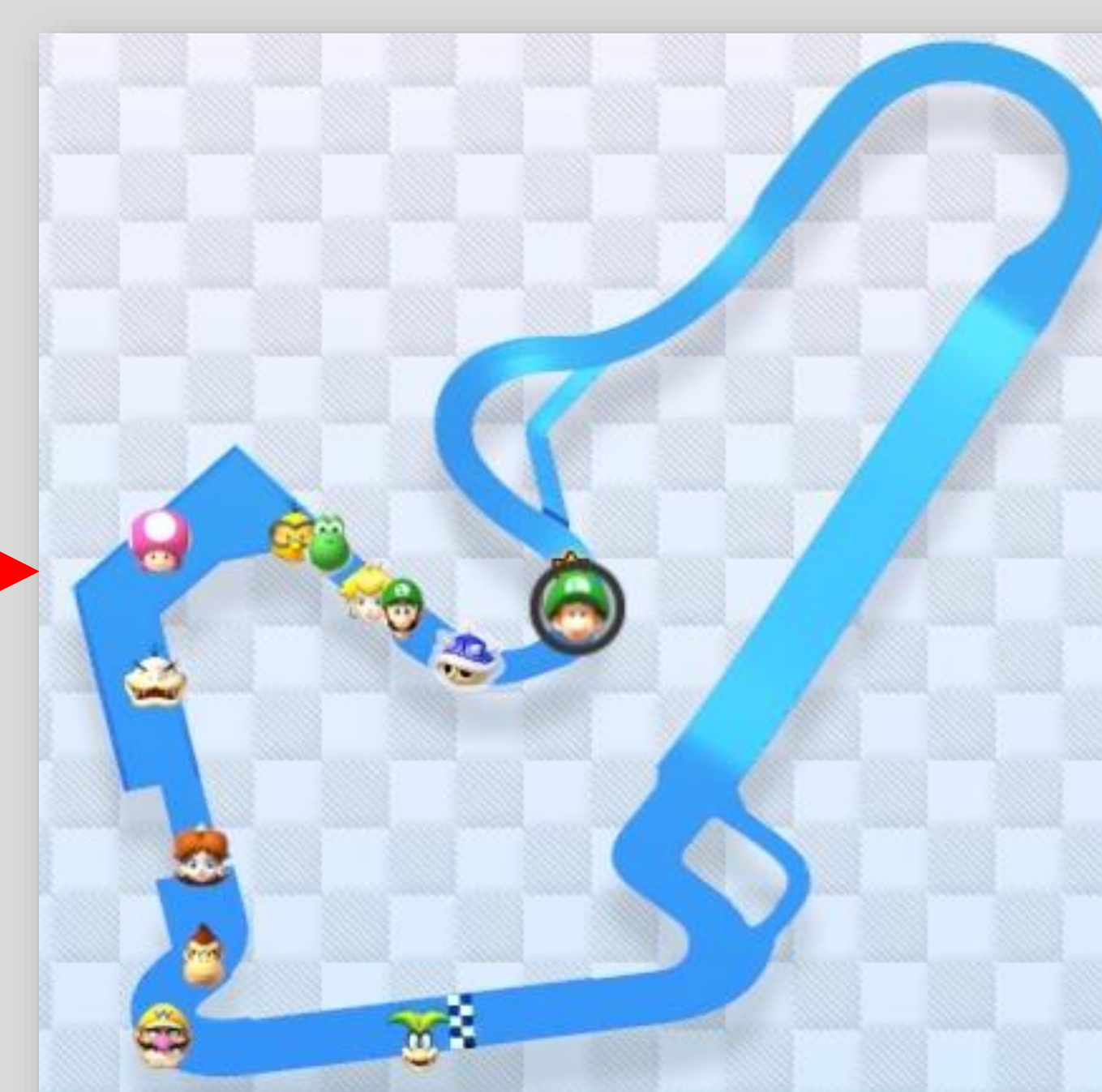
Virtual space like the fly reproduction cycle facilitates:

1. Longitudinal experiments
2. High degrees of repeatability
3. High resolution data collection measures
4. Many variables

Olfactometer Assay



Driving Tasks



Driving tasks resemble olfactometer assays in that they are:

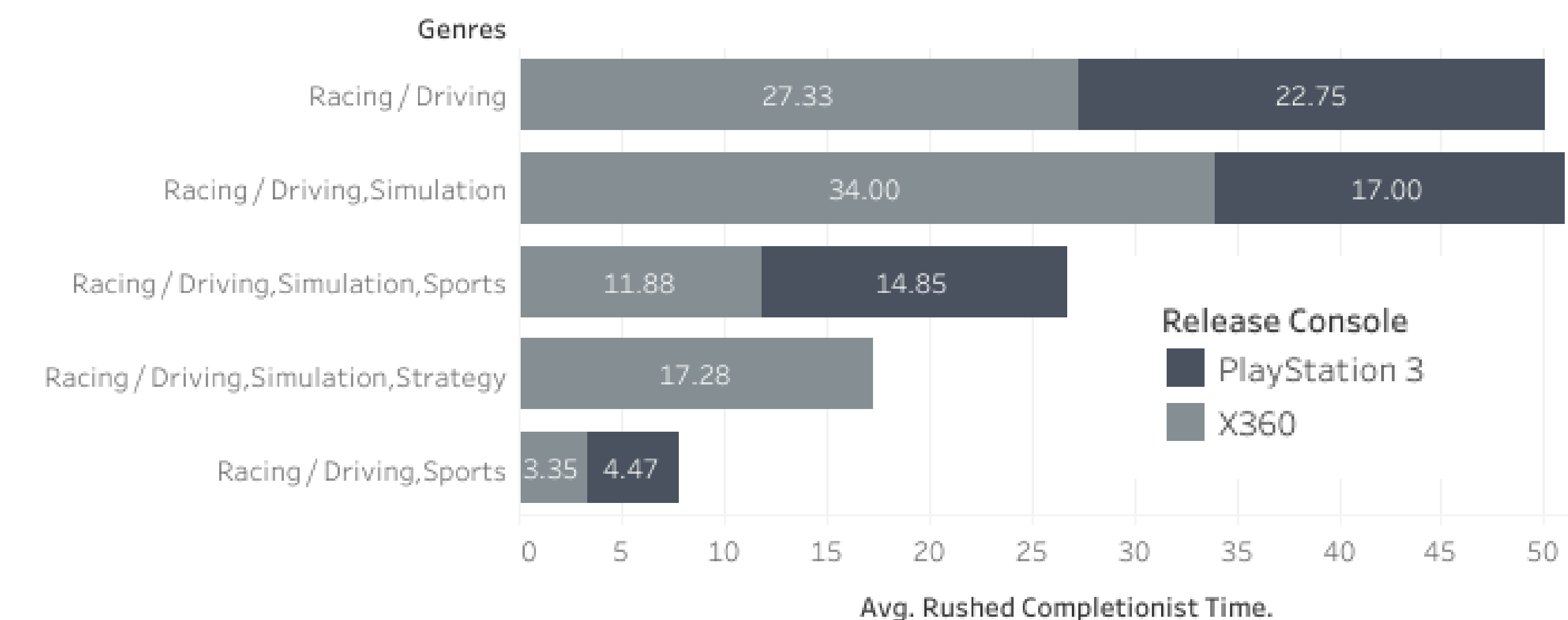
1. Controlled environment
2. Measure stimulus response
3. Showcase behavioral patterns

What Games are Best Suited for Research?

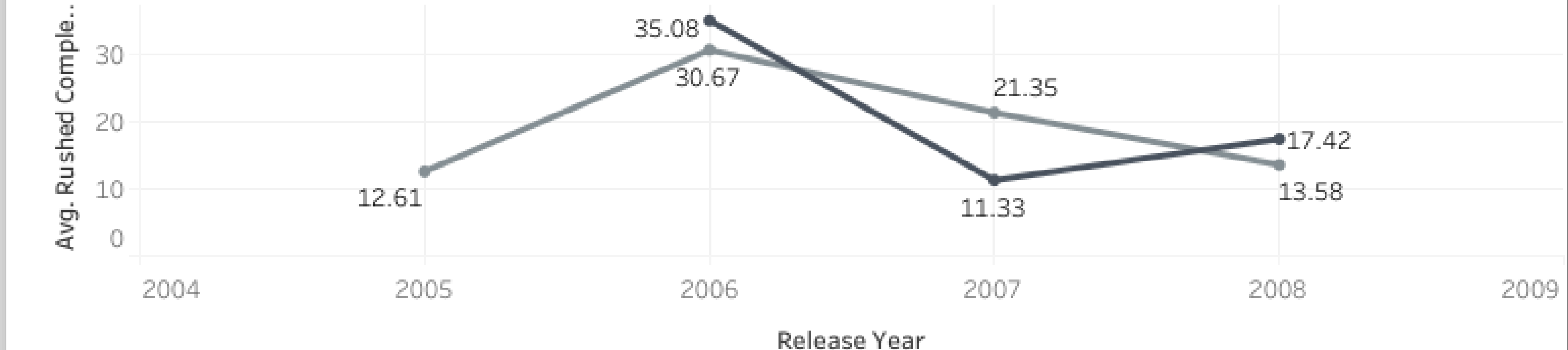
A Systematic Outline of a Dataset Exclusion Process

Dataset : The Corgis video game dataset was collected via phone interview and is comprised of self-reported game metrics on **1213** game titles from **48** unique genre combinations.

Bar Chart



Line Chart



Pie Chart



Exclusion Process

Bar Chart Exclusions :

- Non - Driving genres
- Rushed time above **25** hours.
- Handheld gaming consoles.
- **25** remaining titles

Line Chart Exclusions :

- Titles from **2005** and **2006**
- **7** remaining titles

Pie Chart Exclusions :

- Ratings other than E for everyone (verified)
- **2** remaining titles

Conclusion : There are two titles remaining at the end of the exclusion process. Both Ferrari Challenge Trofeo Pirelli and GRID are potential candidates for use as tasks in human cognition research. Like the fruit fly, video games are repeatable and highly controlled, as well as being dynamic, ecologically valid, and practically informative tasks. Due to their stationary nature paired with high complexity, they offer a way to study psychophysiology in real-time, allowing investigators to probe cognitive functions such as memory, spatial navigation, and decision-making across sessions and between participants.