



What is the impact of the training regime on task learning in mice?

Project presented by:

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(The Jimmy Jabs)



INTERNATIONAL
BRAIN
LABORATORY

Immediate Goal-:

- We were interested in looking at the effect of training schedule ('Fixed' v/s 'Flexible', time of the day) on learning in mice.

Overall Goal-:

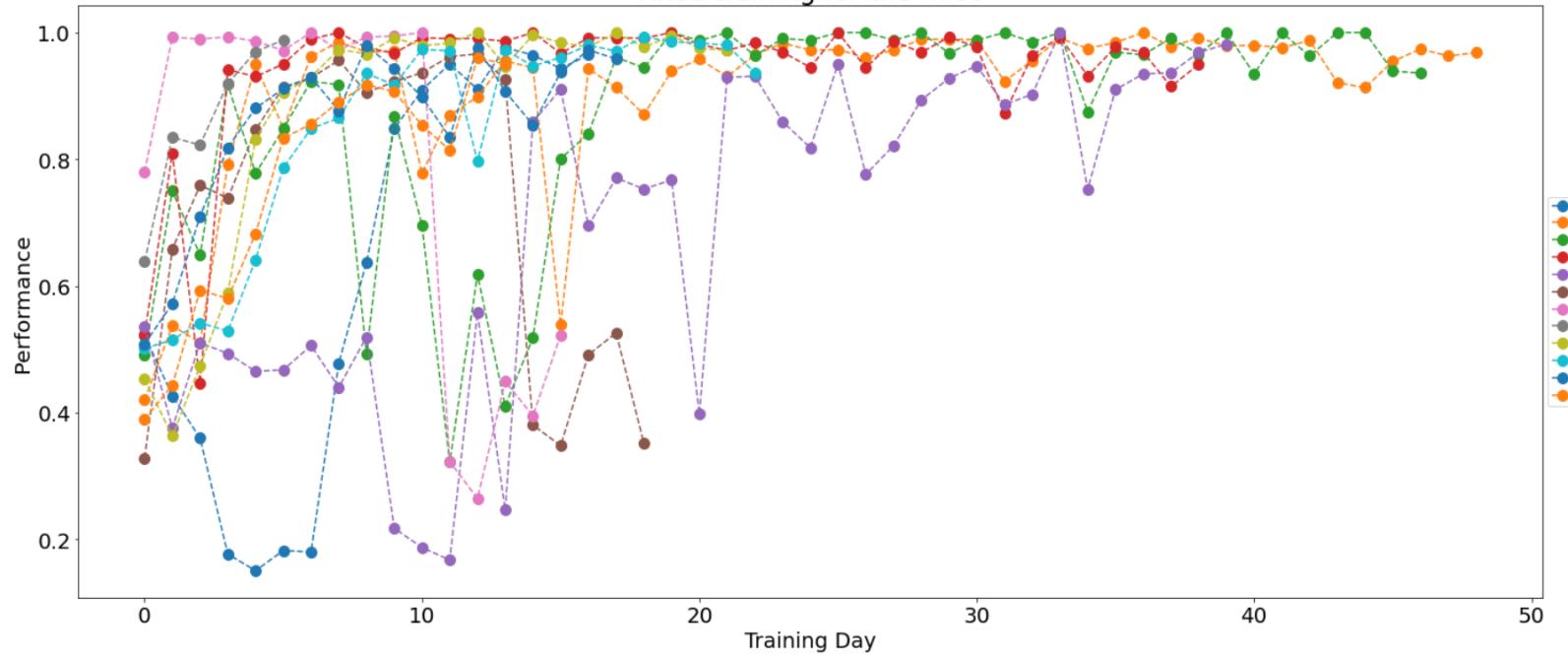
- Impact on cognitive performance. And, can we derive an optimal schedule for any animal based on certain known pointers about their routine?

Data set: The International Brain Laboratory (IBL)

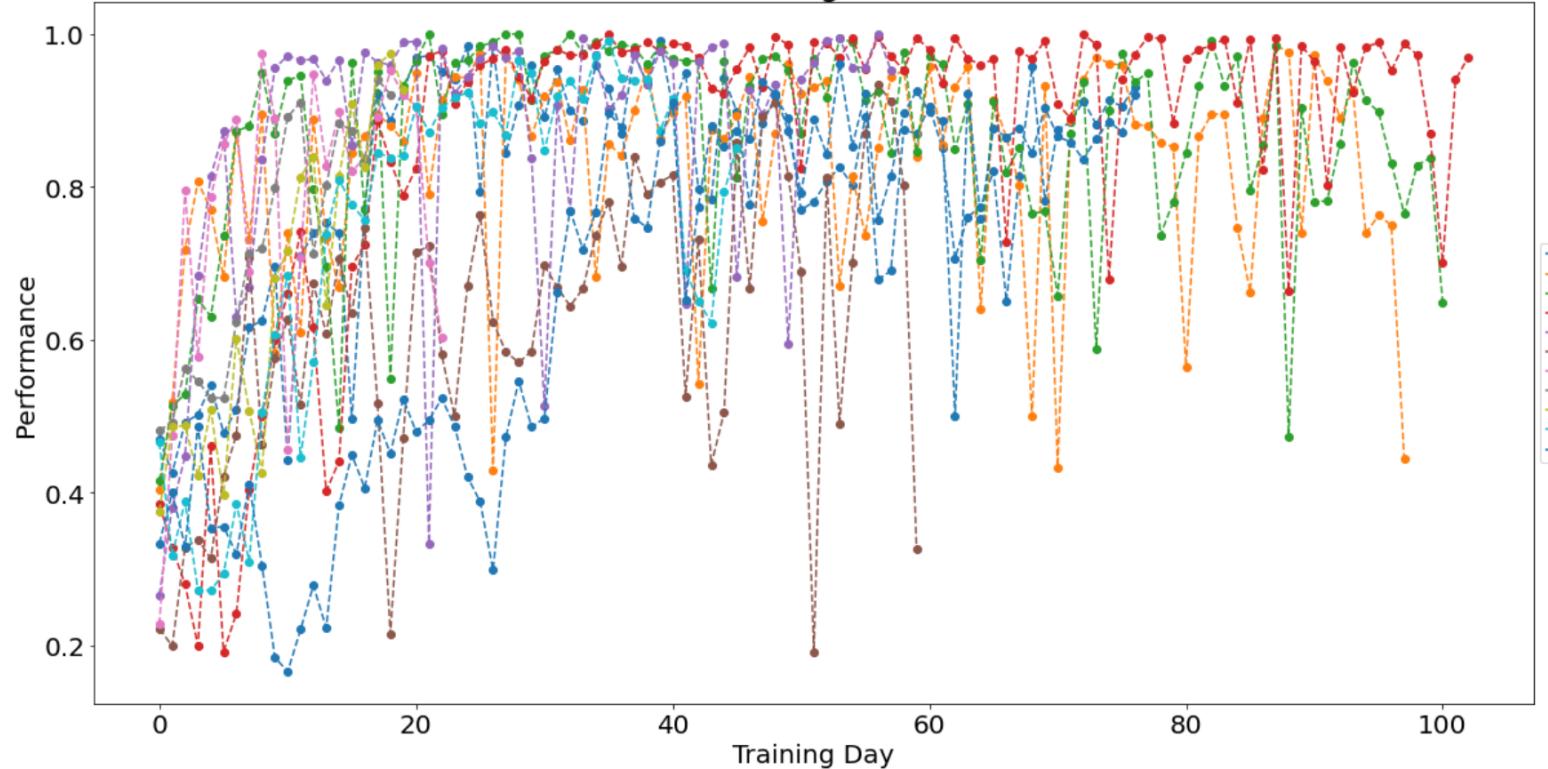
Methodology

- Sorting into ‘Fixed’ and ‘Flexible’.
- Sorting based on the average time of the day.
- Defining the learning rate.
- Plotting the learning curves.
- Comparison.

Fixed training for the mice



Flexible training for the mice



What was inspiring?

- Variability detected in training duration, despite following standardized training protocols.
- Hypothesized that different training schedules for the mice might account for the variability.
- Planned to have both qualitative and quantitative analysis to support our claim.

What was challenging?

- Familiarizing with the data was time consuming.
- Data visualization took some time.
- Defining a suitable learning rate.
- Python unfamiliarity.
- Time constraints.

Future Goals:



Implications of circadian rhythm on cognitive learning.



Optimizing the training schedule to ensure rapid and accurate learning in mice.

Group Dynamics:



The Brainer - Yatin

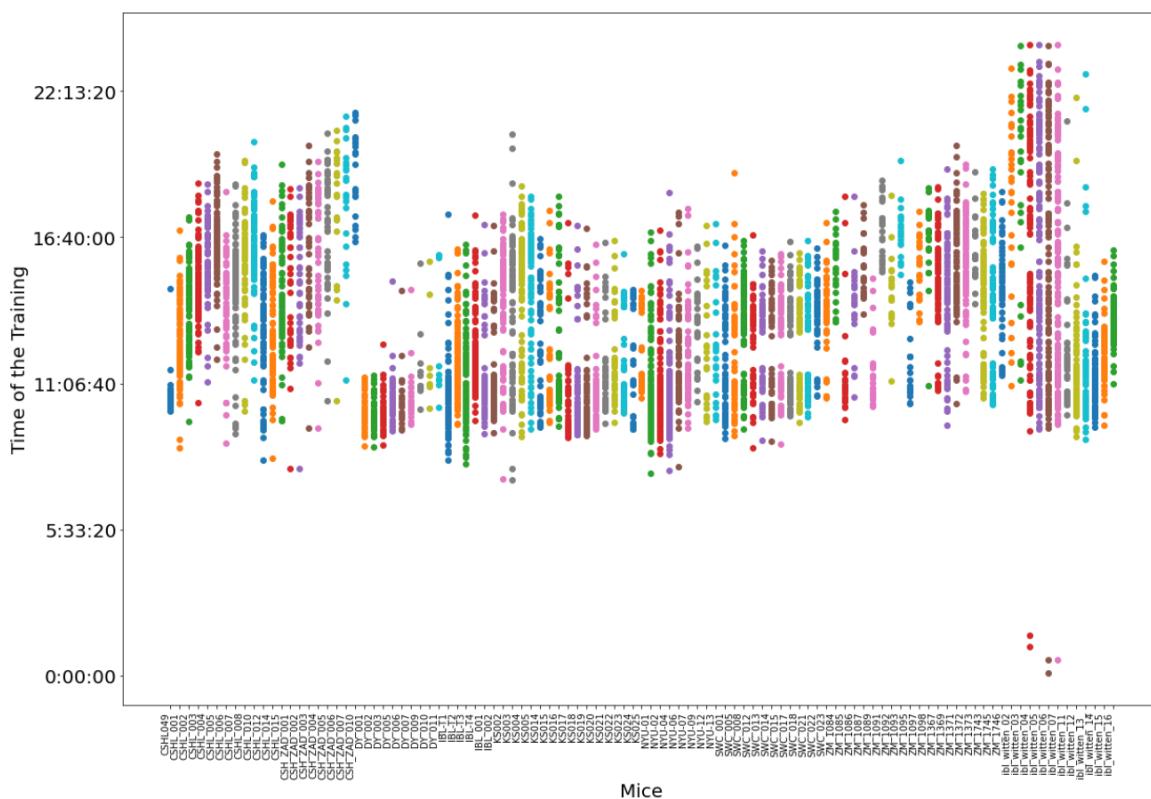


The Coder - Reema



The sangfroid - Vinse

Supplementary Figure





Teacher's Pets

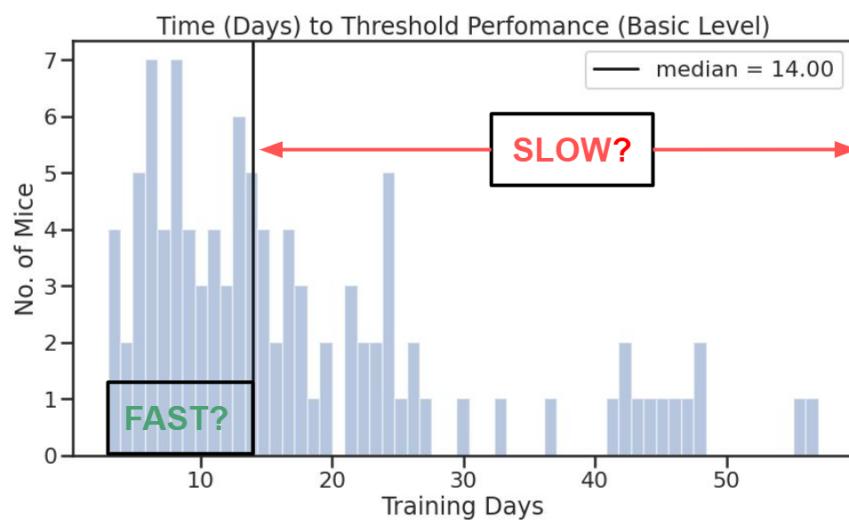
What makes some mice learn faster than others?



by Team Hebbian Yearning

All mice are NOT the same!

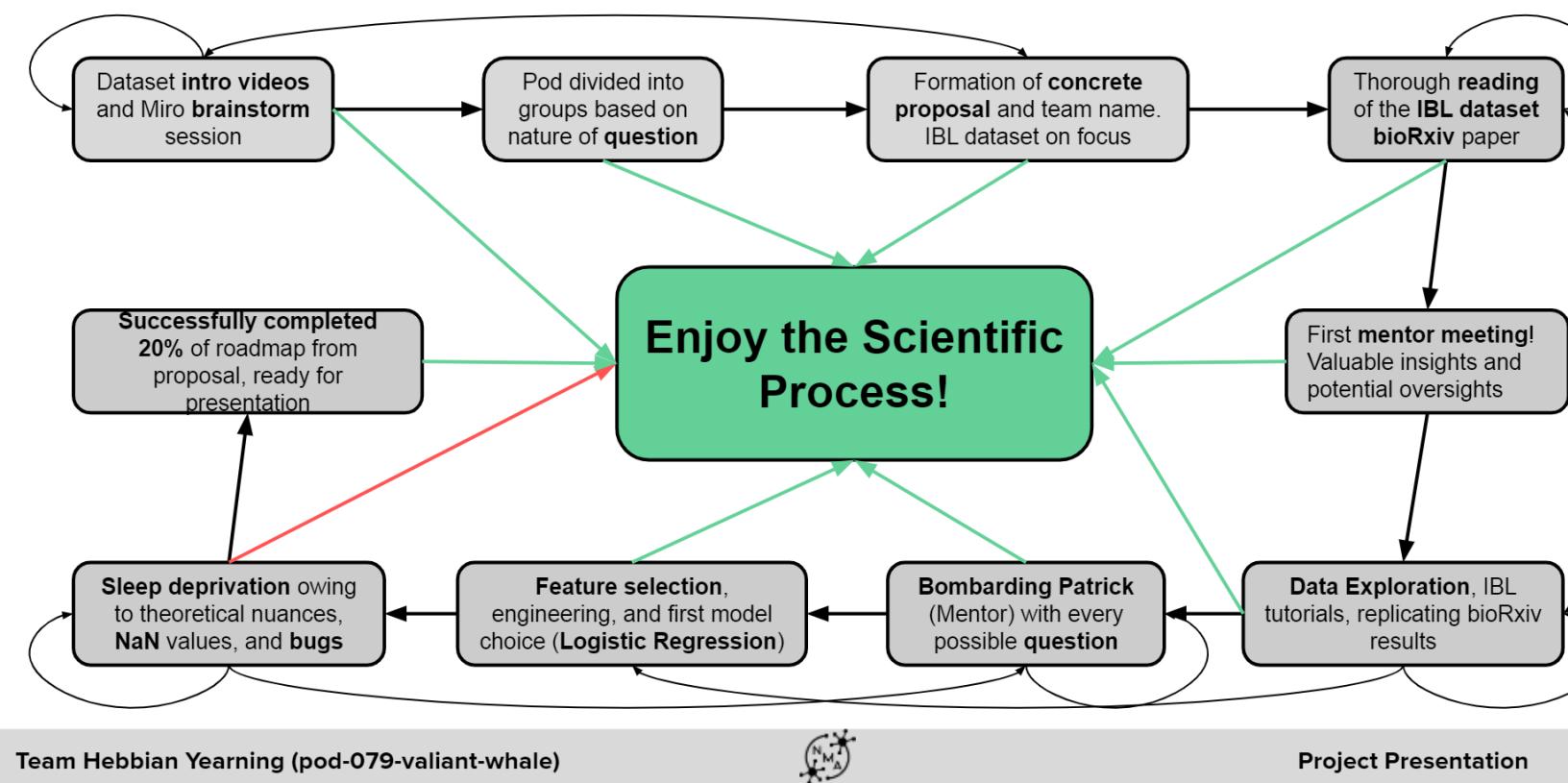
- The **Bottom 50%** of mice take **more than 75%** of total training time!
- A naturally expected divide?
- Needs investigation at the individual level
- Does **early performance** hold the key?
- The **IBL Behavioral Dataset¹** is the right choice!



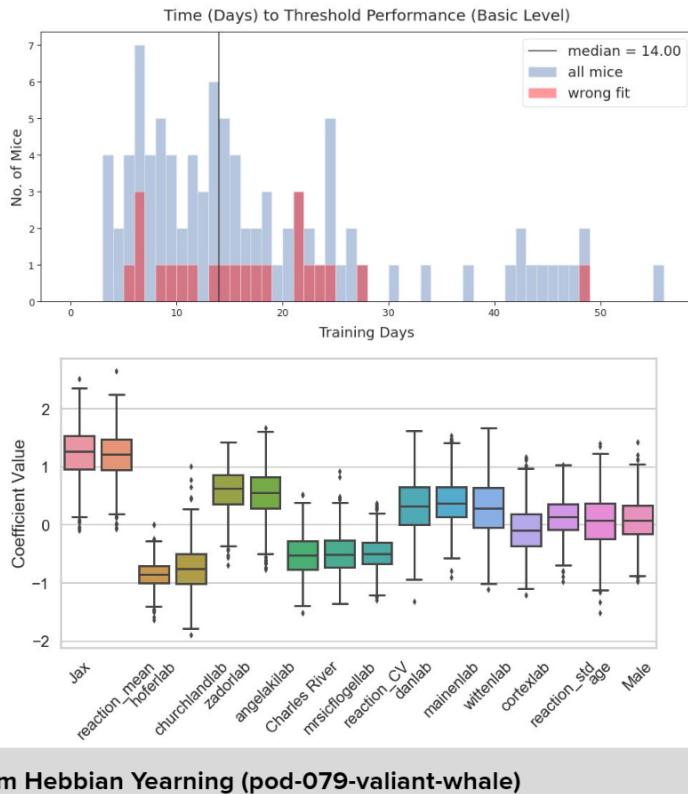
¹Laboratory, T. I. B., (2020). A standardized and reproducible method to measure decision-making in mice. *BioRxiv*, 2020.01.17.909838. <https://doi.org/10.1101/2020.01.17.909838>



6 students, 14 days, 101 mice... 1 goal!



Speed matters



- **Logistic regression** fits data with ~66% accuracy (chance baseline = 50%)
- **Jackson Lab Strain** mice have the highest coefficient
- Among other factors, **Mean reaction speed in early** (first 200) **trials** had the most weight
- Leads to **further questions**: confounders, traits of incorrectly classified mice, performance on biased stimuli
- **Longer term**: models that can finely reproduce this behavior



THANK YOU!

Mentor	TAs (pod-079-valiant-whale)	
		



Tanya



Sveekruth



Tanishta



Kinshuk



Kajal

TEAM HEBBIAN YEARNING

