

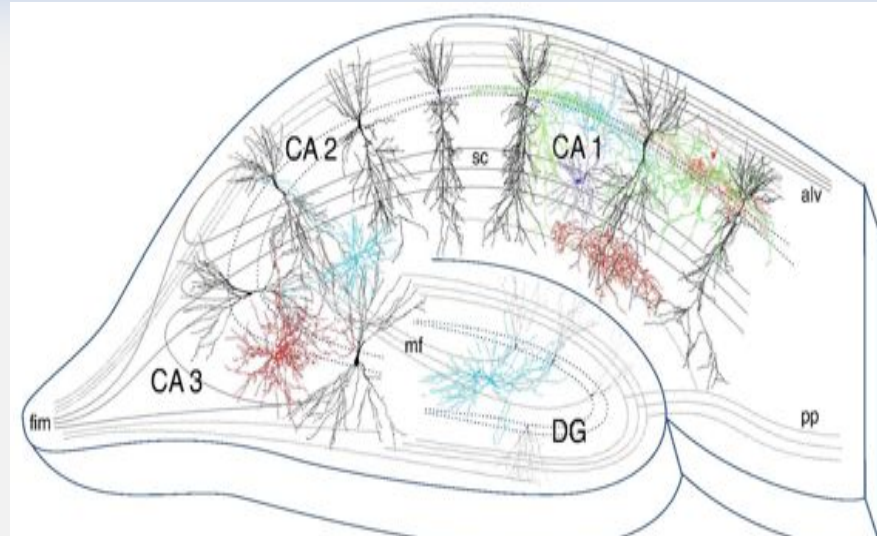


Role of estrogen in pattern changes

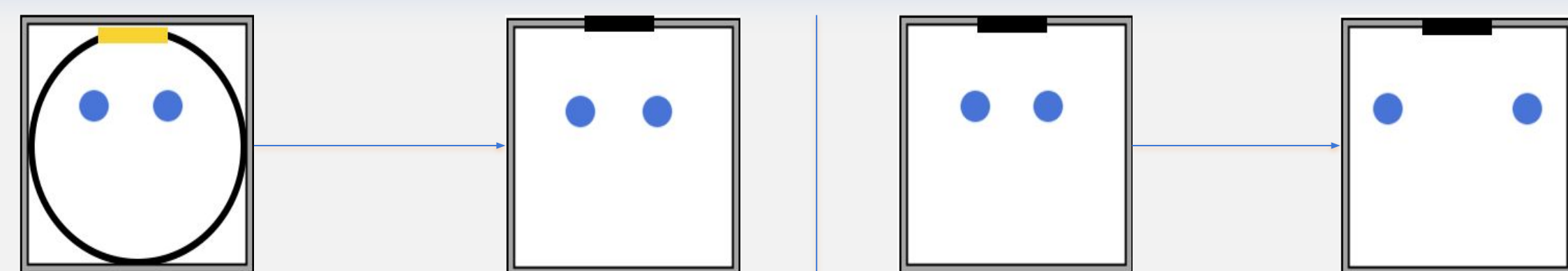
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INTRODUCTION

- The Dentate gyrus (DG) is part of the hippocampus and is involved in pattern separation processing. Dendritic spines are the sites of synaptic plasticity. They increase the surface area of neurotransmission and allow the brain to collect new information. Learning and memory are related to a type of synaptic plasticity called long term potentiation (LTP). LTP means that a stronger communication of neurons results in better learning.
- Estrogens modulate hippocampal function. High expression of estrogen receptors in DG suggests estrogen control of region. b-Estradiol E2 is the main human estrogen.



MATERIALS AND METHODS



Subjects: Eighteen animals, adult Sprague-Dawley rats from Taconic Biosciences Inc., weighing about 160-200 grams will serve as subjects. Experiments were carried out during light portion of the 12-h light-dark cycle.

Surgery and injections: All animals ovariectomized 10d before experiment. All rats anesthetized 20% isoflurane. Animals then returned to their home-cage and given week recovery period. Then injected 1 mL of estrogen or oil for four days. Assigned to group random. Test begin following day.

Environmental change: Animals were placed on the middle of black circled arena w two objects placed 30 cm apart in quadrants I and III. 3 trials of 5 minutes for examination on circled arena with the objects unchanged. There was 3 minutes resting interval between trials. Box wiped down and cleaned between trials with 70% alcohol to remove leftover odors. After animals completed 3 trials of habituation, circled arena was removed from squared arena. The distance between objects remained unchanged. Now animals placed on the middle of gray squared arena with objects at 30cm. Animals were again given five minutes to explore the new environment.

Metric change: The metric change test consisted of a change in the location of the objects. This test was performed two hours the after the first experiment and only the gray squared arena was used on this task. This test will be the same until the fourth trial. In the fourth trial the metric change occurred and the 30 cm distance between the objects became 50 cm. Each object being moved 10 cm away from the other. Then, the animals were given five minutes to explore.

Data analysis: While the rats were exploring their environments, they were being recorded with an overhead camera Logitech webcam Pro 9000, and the data was recorded onto a computer program ANY-Maze. At the same time we manually recorded the zone crossings on a data sheet we made. We also manually recorded the rearings of the rats and the exploration of the objects.

HYPOTHESIS

The E2 rats will have more rearings and object explorations in the fourth trial than the oil because while the oil-group's hormonal levels are impaired the E2-group's hormonal levels have been restored.

RESULTS

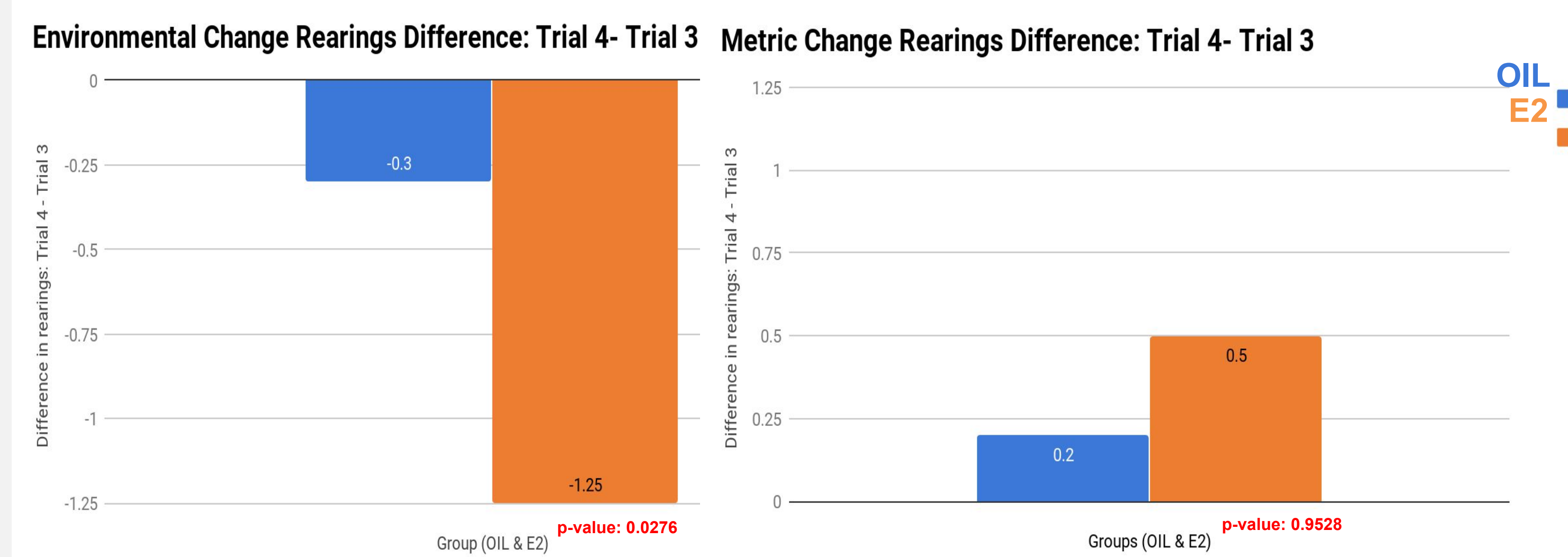


Fig 1.
METRIC & ENVIRONMENTAL Object Rearings difference:
Trial 4- Trial 3

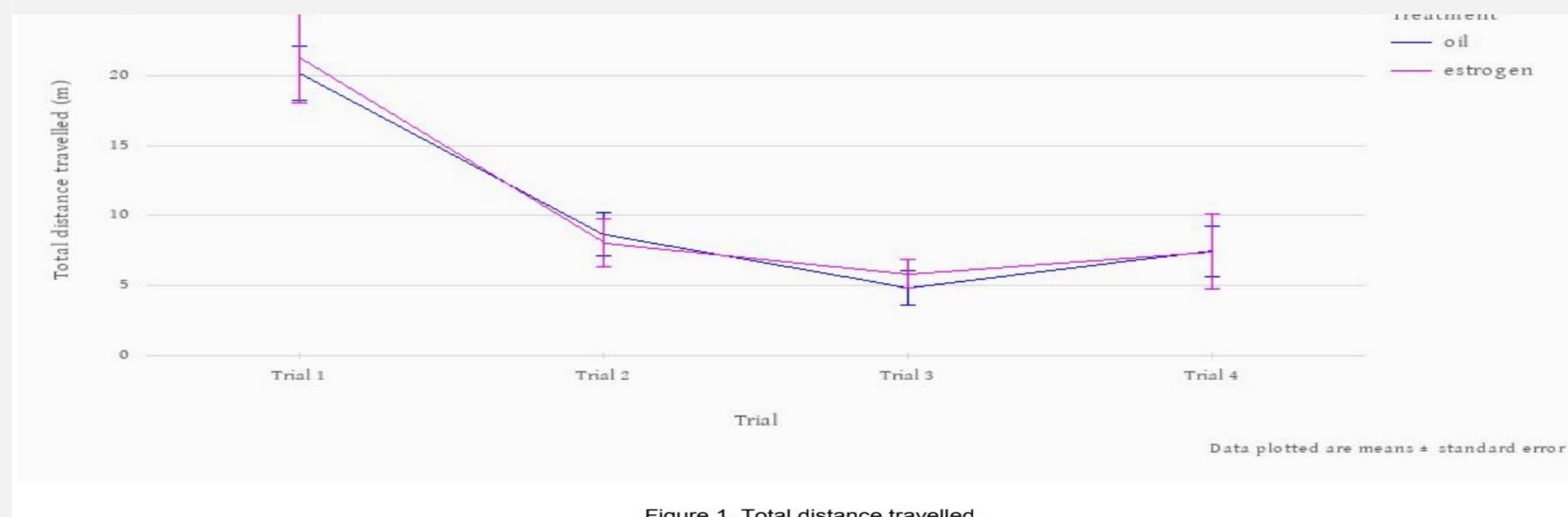


Fig 2.
Total Distance Traveled by treatment.
ENVIRONMENTAL CHANGE

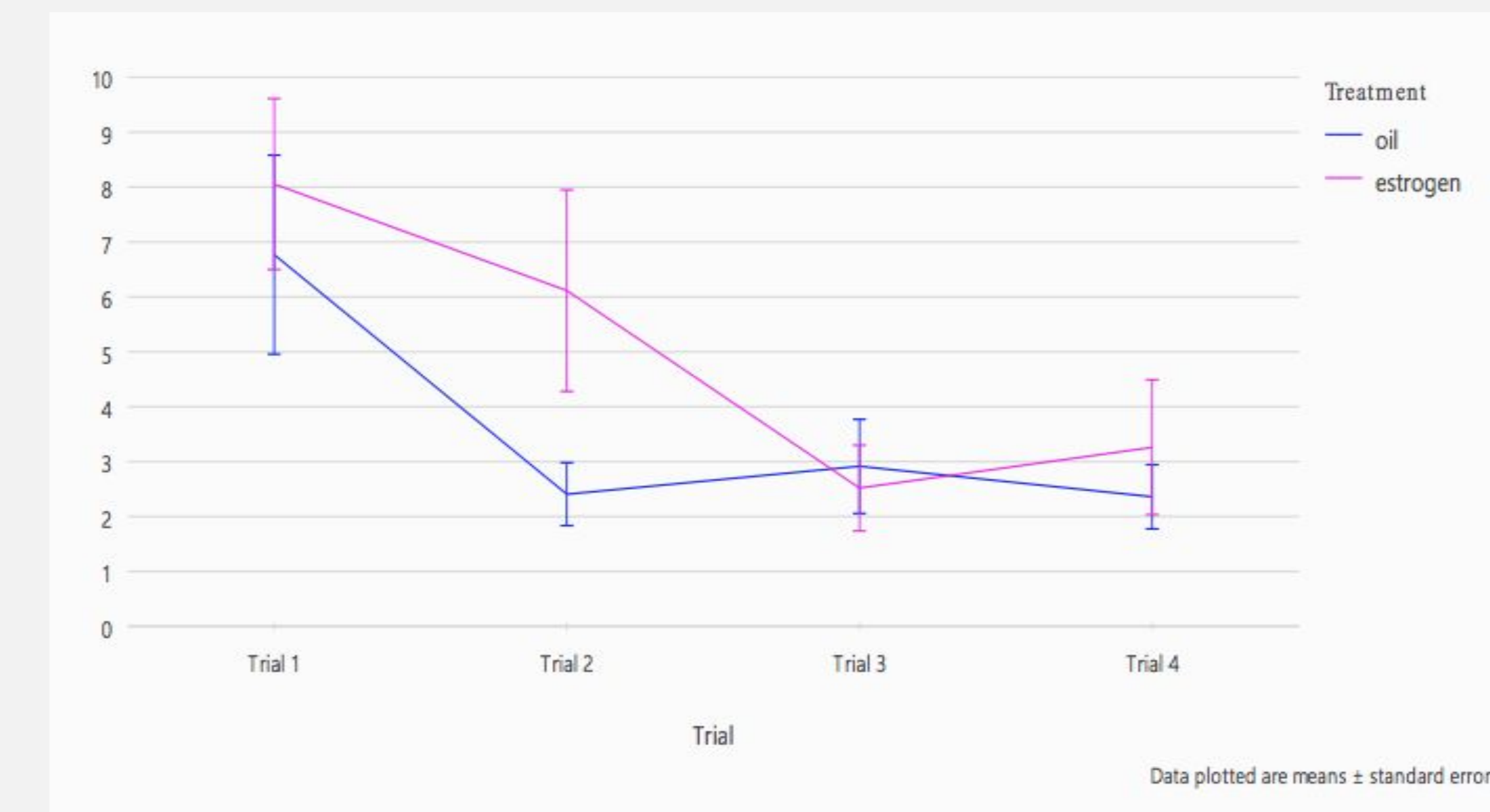


Fig 3.
Total Distance Traveled by treatment.
METRIC CHANGE

CONCLUSIONS

- The E2 group noticed the EC more than OIL → E2 modulates dg-mediated learning
- MC should be redone: animals used to “novel environment” because EC done on same day
- Future: Increase n and finish EC/MC. Then redo MC on its own day w new animals.

ACKNOWLEDGEMENTS

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