

Mapping Out Learning: How Aerobic Exercise, Sex and Alzheimer's Disease Impact Learning

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Main research questions

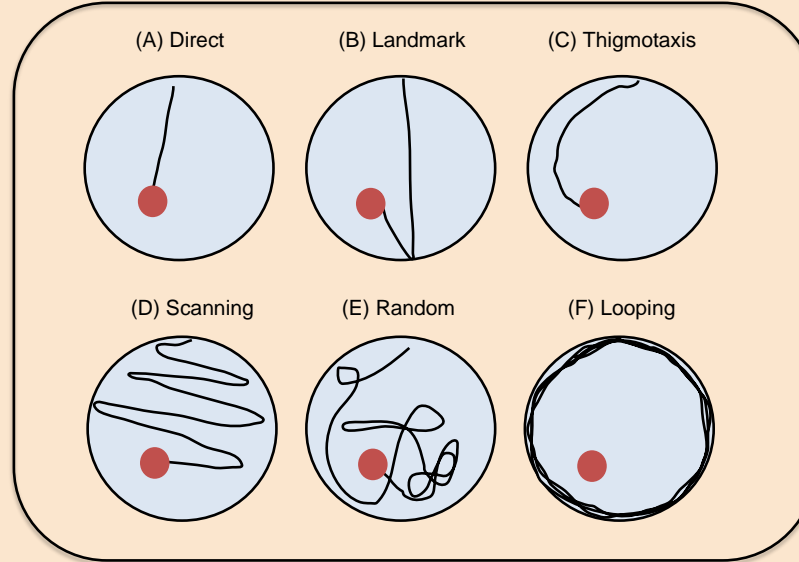
1. To what extent aerobic exercise might ameliorate the learning and memory deficits of Alzheimer's Disease (AD)?
2. To what extent is the Morris Water Maze (MWM), a learning and memory task, hippocampally-dependent?

Benefits of exercise on brain

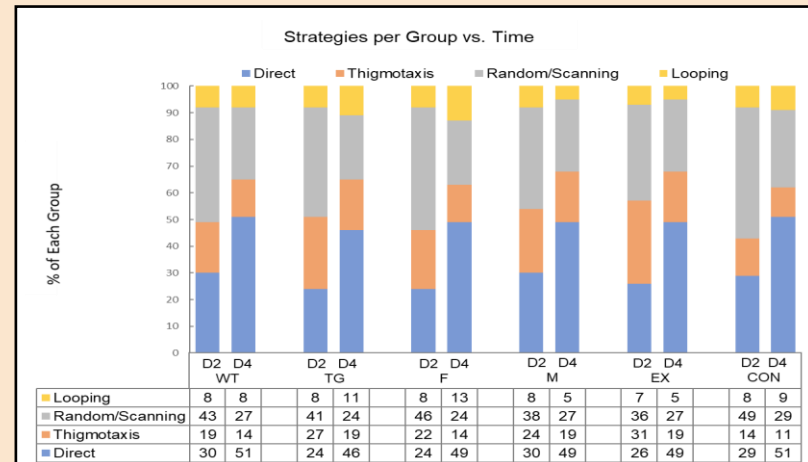
Increased brain derived neurotropic factor + increased glial cell proliferation + increased neurogenesis and plasticity + increased functionality of LTP = **these components, and more, have a positive impact on learning and memory.**

What is the Morris Water Maze?

The MWM is a maze designed to assess spatial learning and memory. In a pool filled with opaque water, mice swim around, seeking an escape from the stressful event of swimming. Eventually, they will find a platform submerged in water that provides reprieve. After many trials, the mice should ultimately learn where the platform is.



I mapped out the processes of learning by categorizing how each mouse solved the maze.



Main findings

- Only around half of mice by the end of testing even used a strategy requiring the hippocampus
- Around 20% of mice used a strategy not requiring the hippocampus but that was just as efficient as strategies requiring the hippocampus.

Conclusions of this study

- Exercise still presents a myriad of positive effects on the brain.
- The MWM is only hippocampally-dependent if a hippocampally-dependent strategy is used.
- We must think more critically about the claims we make about the hippocampus while using the MWM as a measurement.

Acknowledgements

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