



**CALIFORNIA STATE SCIENCE FAIR
2005 PROJECT SUMMARY**

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Project Title
Does a Mouse Rely More on His Spatial Memory or Vision? A Study on Effects of Reflective Objects on Maze Performance

Abstract

Objectives/Goals
 The purpose of this project is to find out if mice rely more on spatial memory or sight; also to learn the affect of reflective objects on mice performance in a maze.

Methods/Materials
 I put a mouse in a maze with solid wood walls, then removed the wood walls and replaced certain oncoming walls with mirrors.
 Testing Mice For First Run: Mice were conditioned in different mazes for 3 days before actually testing. I tested mice at 2:00 p.m. and 4:00 p.m. At 2:00 p.m. they were tested with wood then reflective objects. Next hour (4:00 p.m.) the order of the type of walls was changed.(Mirrors first, wood next.)Time between testing was to keep them from remembering the maze, and to see if they have a short term memory. The stimuli used was, peanut butter, oatmeal and mouse food. The number of errors and the maze time were recorded. This completed the first test. Test Two -24 hours later:I reversed the order of the mazes and I also changed the setup of the maze walls. There were new turns and different possible errors. They were timed and scored in the same manner. There were three days of testing using a different maze each day. This is a total of 120 tests, over a three day period, two times a day. 10 mice were tested.-(3 weeks old, feeder mice)

Results
 Time without reflective objects: Time with reflective objects:
 2:00 p.m. / 0.299 min. 2:00 p.m. / 1.33 min.
 4:00 p.m. / 0.678 min. 4:00 p.m. / 1.11 min.
 The reflective objects increased maze time accordingly:
 2:00 p.m. : 1.031 minutes 4:00 p.m. : 0.432 minutes.
 Average difference in number of errors: 2:00 p.m. / 3 4:00 p.m. / 2

Conclusions/Discussion
 Mice do rely more on vision than spatial memory in the maze. Because the mouse had memorized the wood maze, his vision confused his spatial memory when I put him in the reflective maze. My conclusions about the mouse's spatial memory are based on research about rats. Using cognitive maps, the mice either respond to stimuli (vision, smell or taste) which is called a strip map, or he ignores some of the stimuli and uses a comprehensive map. An animal with a strip map in its head follows a narrow path in solving a problem. If he had a comprehensive map he'd view the maze in a more general way and would change his path easily. But when the problem changes somewhat, a narrow strip map proves

Summary Statement
 This project proves that mice use vision more than spatial memory to navigate through a maze of reflective objects.

Help Received
 Thank you to my sister Audrey for helping me with this project. Thanks to my Mom for typing my report and to my Dad for making the box and pieces for my maze.