**Data & Observations**

**Notes**

**-the rats lived in identical conditions inside my house (approx. 65� F) on a 12 hour light/12 hour dark cycle**

**-both groups were fed the exact same amounts at the same time every evening, and their cages were cleaned daily**

**-the control group was never intentionally deprived of sleep; the "\_\_ hrs of sleep deprivation" at the top of every chart refers to the amount of sleep that was deprived from the experimental group ONLY**

**-both groups of rats seem to sleep from approximately 5 AM to 9 PM, and are awake from 9 PM until 5 AM. They do wake up sometimes during the day, and nap during the night, but in general, since they are nocturnal, they are in a deep sleep during "light hours". Based on these behavioral observations, I attempted to test the rats in the maze at as close to 9:00 PM as was possible with my schedule.**

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| *Test of Memory Under Normal Conditions (No Sleep Deprivation)*  (9:30 PM  1/25/03) | | | | | |
| **Control** | 1st food |  | 2nd |  | 3rd |
| Red | 8:00 |  | 10:00 |  | n/a |
| Orange | 6:15 |  | 8:15 |  | 10:40 |
| Yellow | 4:00 |  | 4:35 |  | 6:00 |
| Green | 1:30 |  | 3:23 |  | 4:16 |
|  |  | Average 1st - 2nd=  **1:37** | | Average 2nd - 3rd = **1:32** | |
|  |  |  |  |  |  |
| **Experiment** | |  |  |  |  |
| Light Blue | 4:30 |  | 5:45 |  | n/a |
| Dark Blue | 2:05 |  | 2:45 |  | 3:15 |
| Purple | 3:00 |  | 5:10 |  | 6:00 |
| Black | 2:45 |  | 4:45 |  | 5:20 |
|  |  | Average 1st - 2nd= **1:31** | | Average 2nd - 3rd = **:38** | |

* The rats from both groups responded moderately well to the maze, after I learned what they were most interested in as an incentive at the end of the maze. After trying peanut butter, cheese, and simply the appeal of fresh air, sunflower seeds from the food were simply the best option. In order to be motivated to go through the maze, the rats had to be somewhat hungry; I began feeding them once a day, not twice, when I realized this.
* I feel that marking the rats' tails with a color will be helpful in monitoring individual ability and intelligence, despite the fact that all the times will be averaged.

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| *Test of Memory After 2 Hrs. Sleep Deprivation*  *(9:00 PM  1/27/03)* | | | | |  |
| **Control** | 1st food |  | 2nd |  | 3rd |
| Red | 1:50 |  | 3:45 |  | 7:30 |
| Orange | :20 |  | 4:05 |  | 9:22 |
| Yellow | :32 |  | 2:42 |  | 4:07 |
| Green | 1:05 |  | 5:05 |  | 7:15 |
|  |  | Average 1st - 2nd=  **2:43** | | Average 2nd - 3rd = **4:32** | |
|  |  |  |  |  |  |
| **Experiment** | |  |  |  |  |
| Light Blue | 1:30 |  | 2:08 |  | 4:15 |
| Dark Blue | 1:18 |  | 1:40 |  | 2:48 |
| Purple | 2:20 |  | 9:30 |  | 10:45 |
| Black | :16 |  | :52 |  | 1:26 |
|  |  | Average 1st - 2nd= **2:12** | | Average 2nd - 3rd = **1:16** | |

* The experimental group was deprived of sleep from 3:00 to 5:00 PM today.
* The sleep deprived rats responded with the same approaches to the maze; they did not seem affected at all by the two hours of deprivation. However, the control rats seemed confused and disoriented in the maze, like they did not remember it at all. Since they were not sleep deprived, I have to attribute this to the many other variables that can come into play when dealing with live subjects: general health, hunger at the time, ect.

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| *Test of Memory After 4 Hrs. Sleep Deprivation*  *(8:00 PM  1/29/03)* | | | | |  |
| **Control** | 1st food |  | 2nd |  | 3rd |
| Red | :50 |  | 1:18 |  | 1:55 |
| Orange | 7:15 |  | 7:45 |  | 9:20 |
| Yellow | 2:15 |  | 2:35 |  | 3:25 |
| Green | 2:30 |  | 3:55 |  | 4:55 |
|  |  | Average 1st - 2nd = **:40** | | Average 2nd - 3rd = **1:00** | |
|  |  |  |  |  |  |
| **Experiment** | |  |  |  |  |
| Light Blue | :17 |  | 1:16 |  | 2:23 |
| Dark Blue | :51 |  | 1:06 |  | 2:32 |
| Purple | :20 |  | 1:39 |  | 6:36 |
| Black | :18 |  | :35 |  | 1:26 |
|  |  | Average 1st - 2nd = **1:50** | | Average 2nd - 3rd = **2:53** | |

* The experimental group was deprived of sleep from 12:30 to 4:30 PM today.
* The control group took a while to get going, meaning that they were not feeling very comfortable in this maze when I dropped then in. However, once they found their first seeds, they quickly remembered their routes for seconds and thirds.
* The experimental group, on the other hand, found the food piles immediately, but then were slower in their responses for additional seeds. I attribute their quick 1st feedings to the fact that they are bigger rats, and therefore more hungry than the other group. Their slightly slower averages could be the effects of the four hours of sleep deprivation.

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| *Test of Memory After 6 Hrs. Sleep Deprivation*  *(10:00 PM  1/31/03)* | | | | |  |
| **Control** | 1st food |  | 2nd |  | 3rd |
| Red | :41 |  | 1:31 |  | 2:26 |
| Orange | 2:18 |  | 3:21 |  | 4:11 |
| Yellow | 2:18 |  | 3:10 |  | 4:22 |
| Green | 2:43 |  | 3:31 |  | 6:48 |
|  |  | Average 1st - 2nd = **:54** | | Average 2nd - 3rd = **1:49** | |
|  |  |  |  |  |  |
| **Experiment** | |  |  |  |  |
| Light Blue | :42 |  | n/a |  | n/a |
| Dark Blue | 1:06 |  | 2:03 |  | 3:28 |
| Purple | 1:10 |  | 2:42 |  | 4:43 |
| Black | :27 |  | 1:40 |  | 2:28 |
|  |  | Average 1st - 2nd = **1:13** | | Average 2nd - 3rd = **1:24** | |

* The experimental group was deprived of sleep from 12:30 to 6:30 PM today.
* All the rats moved quickly and swiftly through the maze tonight.
* The pink rat from the experimental group simply camped out and ate all the seeds, so I was unable to record her second and third helpings.
* The light blue rat from the experimental group seemed to be especially cautious and took time to explore the maze, something he had never done before.

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| *Test of Memory After 8 Hrs. Sleep Deprivation*  *(8:00 PM  2/2/03)* | | | | |  |
| **Control** | 1st food |  | 2nd |  | 3rd |
| Red | 2:52 |  | 4:32 |  | 5:55 |
| Orange | n/a |  | n/a |  | n/a |
| Yellow | 1:32 |  | 3:38 |  | 4:44 |
| Green | 7:51 |  | n/a |  | n/a |
|  |  | Average 1st - 2nd = **1:48** | | Average 2nd - 3rd = **1:15** | |
|  |  |  |  |  |  |
| **Experiment** | |  |  |  |  |
| Light Blue | 1:04 |  | 2:37 |  | 4:10 |
| Dark Blue | 12:00 |  | n/a |  | n/a |
| Purple | 4:55 |  | 9:15 |  | 11:36 |
| Black | :29 |  | 1:15 |  | 2:43 |
|  |  | Average 1st - 2nd = **2:13** | | Average 2nd - 3rd = **2:47** | |

* The experimental group was deprived of sleep from 10:30 to 6:30 PM today.
* The rats from both cages seemed especially hesitant in this maze. It seemed as if they were very frightened by the particular configuration of this maze. The orange and dark blue rats were not cooperating, and neither would move throughout the maze; they simply froze and sat hunched in a corner.
* Based solely on observations, I think that the deprivation may be starting to effect the experimental group. They seemed disoriented when I put them into the maze tonight, even though they demonstrated that they knew the maze from last night.
* In my hypothesis, I predicted that the rats would begin to have diminishing memory ability at this point - with half of their sleep gone. The results show from this test, although they are very slight, support my hypothesis.

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| *Test of Memory After 10 Hrs. Sleep Deprivation*  *(8:30 PM  2/4/03)* | | | | |  |
| **Control** | 1st food |  | 2nd |  | 3rd |
| Red | 1:08 |  | 2:27 |  | 4:11 |
| Orange | 2:51 |  | 4:58 |  | 9:04 |
| Yellow | 1:11 |  | 6:36 |  | 7:45 |
| Green | :56 |  | 3:07 |  | 5:09 |
|  |  | Average 1st - 2nd = **2:58** | | Average 2nd - 3rd = **2:15** | |
|  |  |  |  |  |  |
| **Experiment** | |  |  |  |  |
| Light Blue | 1:42 |  | 14:47 |  | 16:55 |
| Dark Blue | 6:31 |  | 8:40 |  | 10:22 |
| Purple | :26 |  | 3:27 |  | 5:13 |
| Black | :22 |  | 3:25 |  | 4:47 |
|  |  | Average 1st - 2nd = **5:20** | | Average 2nd - 3rd = **2:00** | |

* The experimental group was deprived of sleep from 5:30 AM to 9:30 AM and 1:00 PM to 7:00 PM today.
* While two of the rats from the experimental group seemed to remember the maze very well, the green and light blue rats had considerable difficulty in remembering the configuration of the maze and the path to the seeds. Perhaps some are better able to cope with the sleep deprivation than others.

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| *Test of Memory After 12 Hrs. Sleep Deprivation*  *(8:45 PM  2/6/03)* | | | | |  |
| **Control** | 1st food |  | 2nd |  | 3rd |
| Red | :40 |  | 2:27 |  | 3:12 |
| Orange | 3:12 |  | 4:38 |  | 4:57 |
| Yellow | 1:27 |  | 2:58 |  | 5:50 |
| Green | :32 |  | 2:41 |  | 6:57 |
|  |  | Average 1st - 2nd = **1:43** | | Average 2nd - 3rd = **2:00** | |
|  |  |  |  |  |  |
| **Experiment** | |  |  |  |  |
| Light Blue | 1:09 |  | 1:56 |  | 4:21 |
| Dark Blue | 2:29 |  | 4:54 |  | 6:26 |
| Purple | 1:27 |  | 9:04 |  | 12:40 |
| Black | :40 |  | 1:15 |  | 1:50 |
|  |  | Average 1st - 2nd = **2:58** | | Average 2nd - 3rd = **2:00** | |

* The experimental group was deprived of sleep from 5:30 AM to 5:30 PM today.
* There did not seem to be any glaring effects of the deprivation tonight. The experimental group's first average is slower than the control group's, but overall, all eight mice seemed to remember the maze relatively well.
* Although I am aware that there are many variables involved, I would have thought that with 3/4 of their sleep deprived, the rats would have responded with more hesitance.

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| *Test of Memory After 14 Hrs. Sleep Deprivation*  *(8:00 PM  2/8/03)* | | | | |  |
| **Control** | 1st food |  | 2nd |  | 3rd |
| Red | 1:26 |  | 5:04 |  | 5:49 |
| Orange | 4:56 |  | n/a |  | n/a |
| Yellow | 4:44 |  | 5:49 |  | 6:42 |
| Green | 1:12 |  | 1:39 |  | 2:36 |
|  |  | Average 1st - 2nd = **1:43** | | Average 2nd - 3rd = **:42** | |
|  |  |  |  |  |  |
| **Experiment** | |  |  |  |  |
| Light Blue | 1:08 |  | 1:29 |  | 3:14 |
| Dark Blue | 6:58 |  | 8:52 |  | 10:14 |
| Purple | 1:57 |  | 3:27 |  | 7:08 |
| Black | :20 |  | 3:54 |  | 5:03 |
|  |  | Average 1st - 2nd = **2:05** | | Average 2nd - 3rd = **1:59** | |

* The experimental group was deprived of sleep from 8:00 AM to 10:00 PM today.
* Once again, the orange rat failed to complete the maze tonight. I gave him until 12:00,but he sat frozen after eating his first and only seed.
* The rats responses to this maze clearly demonstrate that the experimental group, who was deprived of 14 of their usual 16 hours of sleep, was more impaired than the control group.

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| *Test of Memory After 16 Hrs. Sleep Deprivation*  *(10:00 PM  2/10/03)* | | | | |  |
| **Control** | 1st food |  | 2nd |  | 3rd |
| Red | :31 |  | 1:50 |  | 2:46 |
| Orange | 1:46 |  | 2:20 |  | 3:39 |
| Yellow | 3:19 |  | 4:53 |  | 5:55 |
| Green | 1:02 |  | 1:36 |  | 1:56 |
|  |  | Average 1st - 2nd = **1:43** | | Average 2nd - 3rd = **:42** | |
|  |  |  |  |  |  |
| **Experiment** | |  |  |  |  |
| Light Blue | :23 |  | 2:57 |  | n/a |
| Dark Blue | 6:58 |  | 13:35 |  | 18:20 |
| Purple | 1:05 |  | 4:16 |  | 5:44 |
| Black | :13 |  | 1:58 |  | 3:59 |
|  |  | Average 1st - 2nd = **2:05** | | Average 2nd - 3rd = **1:59** | |

* The experimental group was deprived of sleep from 6:00 AM to 10:00 PM today.
* The control group had normal times tonight, but seemed especially hungry for some reason, possibly because tonight I tested them a little bit later.
* The experimental group did not do as poorly as I had expected in the maze. The Dark Blue rat's slow response time greatly increased the average, while the Black rat had extremely fast times.
* Though the rats were supposed to be deprived of all of their sleep, the massager wasn't completely effective in keeping them awake the whole time. They would occasionally start to doze, and therefore probably experienced some REM sleep during the day.

[HOME](http://docs.google.com/index.htm)         [Graphs](http://docs.google.com/graphs.htm)          [Results of Preliminary Experiment](http://docs.google.com/prelim%20experiment.htm)