**Conclusion**

    My results did not entirely support my hypothesis; I had predicted that memory would be most impaired after the rats were deprived of half their sleep. However, according to my results, the rats' performance varied most from the control group and their original time after they were deprived of 10 hours of sleep, or 5/8 of their sleep. However, I must stress that the results are not significant, as the response times in the maze after the 10 hours deprivation do not reflect similar or worsened memory encoding. REM periods lengthen as the amount of sleep progresses in humans, and this can be inferred about rats as well. Although human sleep cycles differ in length, with human cycles about 90 minutes long and rodent cycles about 10 minutes long, REM sleep constitutes 25% of each species' entire night sleep. Some of the longest human REM periods occur within the 4th through 8th hours of sleep, so my prediction was that reducing the recommended amount of sleep for a human or a rodent by half would leave the subject without those valuable, longer REM periods. However, the variables and inconsistencies that I found with my rats, along with all the uncertainties about human and rodent sleep, resulted in an understandable, though disappoiting outcome.

    Much of my insight about the rat's behavior after the sleep deprivation is based on observations. The rats definitely seemed more hesitant in the maze after six, eight, ten, twelve and fourteen hours. As I noted in my observations, they were especially hesitant in the maze after eight hours deprivation. However, strangely, the rats responded well to the maze after 16 hours of deprivation, which, combined with their eight hours of active time during dark hours, was almost an entire twenty-four hour period without sleep.

    The results of my experiment, though limited, do offer intrigue to further research possibilities on the subject. I would love to have performed this project with more advanced 'equipment', such as brain monitors and human subjects.The brain, memory and sleep are all mysterious yet engaging topics, and more is being learned about them each and every day. I think that it would be both interesting and beneficial to pursue an exact answer to my question: What level of sleep deprivation leaves the memory most impaired? Sleep deprivation is a problem that accumulates with time; a more significant project would need to look at the level of the memories impairment after consistent nights of 1/2 or 5/8 of the subject's needed amount of sleep.

    If this experiment were to be performed again using rodents as subjects, I would change several things. Never having worked with rats before, I learned many valuable things during the process of the experiment - I only wish I had known them before starting. If it had been possible, I would have liked to use laboratory animals, so that the health and intelligence of the feeder rats was not another variable. With feeder rats, the pet store does not care if a mother breeds with her son to produce a new litter; this in-breeding creates rats that definitely are not the most intelligent nor the most healthy. In addition, I wish I had known what methods to use in motivating the rats to travel through the maze. Ideally, I would have a set-up that allowed the rat to reach her cage at the end of the maze. The rats liked being safe in the clean cages; therefore, this would have been great motivation for remembering the configuration of the maze. Lastly, if this experiment was being repeated, I would definitely find an alternative method for depriving the experimental group of sleep. The massaging pad worked well for awhile, but after 8 - 10 hours, the rats dozed off to sleep anyway, even with the pulse on. Additionally, this particular 'massager' had a handset, and the button for the pulsing beat had to be pushed every 15 minutes. This provided quite a challenge, as I had to arrange for myself or someone in my family to be home for hours on end to "push the button" every few minutes.

    To anyone planning to redo an experiment of this kind or any experiment involving rodents, I recommend that you purchase young rats of the same sex. All of my rats were female, as they are the smarter and less competitive and territorial than males. Other students who have worked with mice have had to deal with deaths and pregnancies; I attribute my baby/death free experience to luck (!!) and the fact that the rats were very young when I purchased them - four weeks old. At four weeks, they had just reached sexual maturity, so were unlikely to be pregnant as they left the pet store. In general, I think that rats are more durable than mice, which is perhaps why none of them became ill. In addition, the pet store clerk advised me that rats are generally smarter than mice as well, and they tend to stink less - two more factors to consider when choosing rodents.

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