# **Written Assignment - Unit 2**

Computer Science, University of the People

PSYC 1504-01 Introduction to Psychology - AY2024-T4

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**The Impact of Sleep Deprivation on Cognitive Functions and Daily Activities**

**Introduction**

The lack of sleep or sleep deprivation is a growing problem in the modern world and has long been known to negatively affect our higher cognitive functions that are crucial for our daily activities. This paper references and reviews a real and very interesting study done by Van Dongen et al. (2003), which provides a very complete and detailed analysis of the effects of cumulative sleep deprivation on subject’s cognitive performance.

**Methods**

The study was run and used a controlled laboratory setting and involved 48 participants that were divided into four test groups. Each group was allotted a set amount of sleep hours, the first was 8 hours, the next was 6 hours, the third was 4 hours, and the final one had total sleep deprivation. The study was done over 14 days, the participants were given daily psychomotor vigilance tasks (P.V.T) and cognitive throughput tests to measure and monitor changes in reaction time and the number of lapses in attention.

**Results**

The results from the study demonstrated that the participants six or less hours of sleep per night showed a the most significant cognitive decline and performance, which only became more apparent over a longer period. On top of these results, the subjects in the group that was totally sleep-deprived had the most severe performance decrements, this became clear already after the first 24 hours. What seemed most interesting was that the group with 6 hours of sleep did not experience any immediate major impairments but did show substantial change for the worse by the end of the two-week study, making them almost the same as the group who were completely sleep deprived. This shows that there is an accumulative nature to the sleep deprivation.

**Discussion**

The big conclusion of Van Dongen et al.’s study is that sleep deprivation leads to a significant cognitive performance deficit, particularly in sustained attention and reaction time, which can severely affect our daily routine and function. This finding is crucial for fields that require extreme alertness and quick decision-making capabilities, such as healthcare gives that need to make split second decisions about how to care for a patient or surgeons that need a steady hand and near perfect hand-eye coordination, police – that are constantly walking into situations that need split second decisions in order to both protect and save lives, and vehicle operation – where a simple bus driver if not fully alert could crash the vehicle into oncoming traffic. The study also suggests that even the smallest reductions in nightly sleep duration are accumulative and could eventually lead to a more significant cognitive decline in the long term.

**Limitations**

The main issue in this study is that its set and run in a laboratory setting, which might not perfectly simulate real-world conditions and because of that the results might be biased or inaccurate when translated into the real world. Future studies should and might involve more ecological validation to see how these findings hold up in a more natural and everyday environment more authentic to the applicant’s daily lifestyle. On top of that, individual differences in vulnerability to sleep loss were not extensively explored, which could be a focus for further studies. Along with a larger test pool and a more granular and long term test period.

**Personal Reflection and Conclusion**

After reading this study, I have noticed and found similar effects of sleep deprivation within my own history and experiences, for example, during high stress and intense periods of work where I needed to work more hours and had less time to sleep led to a noticeable decrease in my cognitive abilities and temperament. In a work colleague’s case, insufficient sleep led to him making multiple errors during critical project phases, which were resolved easily once we addressed his lack of sleep issues. This emphasizes the practical and real-world needs of the research, showing the importance of prioritizing sleep to maintain cognitive function and overall productivity. Since in the long run the drop in cognitive function only adds to the big picture issues and does not really help to solve or benefit the goals.

This study by Van Dongen et al. is eye opening and helped me understand the dangers of simple and chronic sleep deprivation, and its impact on daily lives, it provided a strong argument and convince me of the need to prioritize a healthy sleep life in both personal and professional contexts.

## References

* Van Dongen, H. P., Maislin, G., Mullington, J. M., & Dinges, D. F. (2003). The cumulative cost of additional wakefulness: Dose-response effects on neurobehavioral functions and sleep physiology from chronic sleep restriction and total sleep deprivation. Sleep, 26(2), 117-126. (<https://pubmed.ncbi.nlm.nih.gov/12683469/>)
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