

Good essay about impacts of sleep deprivation on cognition

[Health & Medicine](#), [Stress](#)



Introduction

This research paper looks at the effects of sleep deprivation on cognition, derived from the research methodologies and findings described in three published papers utilized as source information, as follows:

Matthew P. Walker: Cognitive consequences of sleep and sleep loss

K. Ahrberg et al.: The interaction between sleep quality and academic performance

Hee Jin Kim et al.: A survey of sleep deprivation patterns and their effects on cognitive functions of residents and interns in Korea.

All three papers covered sleep deprivation and its consequences, although the Ahrberg paper focused on sleep quality, but in the event that was related to shorter sleep duration, so was essentially sleep deprivation, too.

The Research

Walker (2008) discusses the possible purposes of sleep and its roles in human physiology and notes that its importance is shown by the fact that depriving an individual of sleep markedly affects their metabolic functions. However, he chooses to investigate the hypothesis that sleep is important for learning, for memory and for plasticity of the brain. In terms of the effect of sleep on memory and learning, he reports that numerous studies over the last decade have supported the view that memory functions are better after a night's sleep, although he concedes that because precise definitions of "sleep" and "memory" are complex there are various interactions that can be explored. In this case he chooses to focus on REM (rapid eye movement) and

NREM (non-rapid eye movement) sleep types and the effect they each have on the “ acquisition/encoding and consolidation of episodic and procedural memory.” Walker’s article relies on various studies by others, and includes examining sleep patterns before and after learning. Overall, he concludes that sleep is a critical requirement, both before and after learning, which Walker sees as highly significant as we live in an age when our cognitive requirements and hours worked are on the increase, while a good night’s sleep is rare and for many of us sleep patterns have changed and total sleep time has decreased.

Ahrberg et al. (2012) looked specifically at how the quality of sleep affects cognitive performance, and how the quality of sleep can be affected by various factors including stress, making the comment that people such as medical students are the subjects of both sleep deprivation and stress just when they should be maximizing their learning. Their research focused on 144 medical students in Munich, Germany, who were asked to respond to a survey examining their sleep quality and stress levels at three different time points: during the semester and immediately before and after their pre-clinical board examinations. The results of the study showed that sleep quality and stress level immediately prior to the exams are linked to academic performance, and showed a direct correlation with grades achieved in the exams. However, sleep quality and stress at the other two time points in the study did not influence exam grades.

Kim et al. (2011) surveyed the sleep patterns of 58 Korean residents and interns in Seoul, Korea, in order to investigate the effects of chronic sleep deprivation on their work performance, their health and their cognition. Each

subject completed a “ sleep diary” over a two-week period, followed by various evaluation tests. The results showed that over 70 percent of the subjects were sleep-deprived, having a mean sleep duration of about five hours per night coupled with a circa 15 hour working day. Those subjects who were severely sleep-deprived (mean sleep time under four hours) showed greater sleepiness during the day and higher stress levels, plus greater difficulty in learning and a higher incidence of attention deficit problems. In analyzing the results, the researchers concluded that sleep-deprivation not only affected the work performance of the residents studied, but could also affect their health which in turn might influence the quality of care afforded to their patients, although the researchers conceded that their work performance could be maintained by brain mechanisms that compensate.

Discussion

These three informative and most useful articles include some fairly predictable outcomes, in that one would expect that people deprived of sleep would be less efficient in the workplace the following day, as many parents with a young baby could testify. However, Walker’s paper found that there were differences in memory and learning functions between the situations where the sleep-deprivation was before or after the learning time, which is interesting and merits further research to investigate the neural and other mechanisms that might be involved. Similarly, whilst basic logic might suggest that prolonged or repeated sleep-deprivation could adversely affect physical health, it would be useful to be able to determine exactly why that

is. Both the Ahrberg and Kim papers make the point that medical students and residents are typically sleep-deprived and overworked at a time when their learning potential should be maximized, and that this should be a matter of concern for the medical profession as a whole. This aspect makes the topic especially interesting.

Conclusions

It was interesting to see the suggestion made that chronic sleep-deprivation can affect physical health, although “common sense” would lead one to the conclusion that the immune system’s resistance could be lowered by lack of sleep, making the subject more susceptible to infections, etc, so making that connection is not really surprising.

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References:

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