

# The effects of sleep deprivation on various

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Sleep deprivation is a common occurrence in modern culture. Every day there seems to be twice as much work and half as much time to complete it in.

This results in either extended periods of wakefulness or a decrease in sleep over an extended period of time. While some people may like to believe that they can train their bodies to not require as much sleep as they need, this belief is false. Sleep, by definition, is the natural periodic suspension of voluntary bodily functions and complete or partial suspension of consciousness, during which the powers of the body are restored (Ratcliff & Van Dongen, 2009).

Only in the last century have the psychological and scientific areas of study began to investigate and explore the nature, purpose, and properties of sleep. The purpose of this essay is to analyze the value and effect of sleep deprivation on cognition. The majority of articles describe partial sleep deprivation as having negative effects on cognitive, behavioural, physiological, and emotional measures. From this information, it is derived that various cognitive abilities will affect productivity and performance.

Therefore, it is hypothesized that sleep deprivation affects cognitive, behavioural, physiological and psychological measures because it increases and worsens stress, impairs cognitive function and emotional stability. How an individual responds to sleep loss, whether it is partial deprivation (sleeping less than 5 hours in one 24-hour period), short-term total sleep deprivation (no sleep for 24-48 hours), and long-term total sleep deprivation (no sleep for more than 48 hours) can vary. Ratcliff et al. 2009) indicate that sleep deprivation has been shown to impact negatively on a wide range of cognitive abilities, such as behavioural, physiological and emotional. For <https://assignbuster.com/the-effects-of-sleep-deprivation-on-various/>

example, mood changes including irritability, fatigue, difficulty in concentration, and disorientation to short-term memory alterations are due to decreased attention, concentration lapses, and decreased motivation. Similar results were published by Alhola & Polo-Kantola (2007). The study concluded that the person deprived of total sleep experiences negative mood, sleepiness, fatigue, and decline in alertness and performance.

Some sleep-deprived individuals report visual hallucinations or distortions and feelings of paranoia. Systematic studies of total sleep deprivation have revealed some temporary cognitive deficits but no permanent effects. Kloss, Szuba & Dinges (2002) discovered the most significant effect of sleep loss is the physiological sleepiness, or the tendency to fall asleep when there is a lack of stimuli. Sleepiness becomes extreme after the loss of a single night of sleep. Without competing stimuli, an individual lacking a night's sleep can fall asleep within 2 or 3 minutes the next day.

This can cause dramatic effects on productivity. After about 48 hours without sleep, microsleeps become increasingly more common even when participants are physically active (Kloss et al., 2002). Microsleeps are essentially several seconds of actual sleep with delta waves that interrupt the regular EEG of a person who is awake, which impairs his or her continuity of cognitive function (Kloss et al., 2002). Therefore, as sleepiness increases, an individual must increase effort to maintain a stable level of performance because microsleep generally happens directly before performance failure occurs.

In addition to the impairment of cognitive functions, adult symptoms of sleep deprivation may vary from those of a child. Yawning constantly, dozing off while watching a television show, poor concentration and grogginess while waking up are some of the symptoms adults display when they are deprived of sleep (Dahl, 1999). The symptoms of a sleep-deprived child include irritability, daytime naps, tantrums, hyperactive behaviour, and moodiness. Getting out of bed in the morning is a problem for children who experience sleep deprivation.

Adolescents also experience a change in their sleep patterns that their bodies want to stay up late and wake up later, which often leads to them trying to catch up on sleep during the weekend (Dahl, 1999). This sleep schedule irregularity can actually aggravate the problems and make getting to sleep at a reasonable hour during the week even harder. According to Dahl (1999), following sleep loss and hyperactive behaviour, changes in attention and performance also represent a complex area of investigation in children and adolescents.

Sleep loss is associated with brief mental lapses in attention during simple tasks that can be partially offset by increased effort or motivation. Sleep deprivation can sometimes mimic or exacerbate symptoms of Attention-Deficit Hyperactivity Disorder (ADHD), including distractibility, impulsivity, and difficulty with effortful control of attention. There is also emerging evidence that sleep deprivation has marked influences on the ability to perform complex tasks or tasks that require attention in two or more areas at the same time (Dahl, 1999).

Therefore, a teenager should try to go to bed at the same time every night and wake up at the same time every morning, allowing for at least 8 to 9 hours of sleep. On the other hand, many people are suffering from daytime sleepiness so pervasive that it interferes with their daily activities because they do not get the optimal amount of sleep they their bodies need. Lack of sleep and sleep problems can have serious, life-threatening consequences, as well as a significant impact on productivity (Alhola et al. , 2007).

Many people suffering from routine sleep loss are not even aware of it, and many who do realize they are not getting enough sleep are not aware of what it is costing them. Sleep loss creates sleepiness, which can be associated with decrements in vigilance, reaction time, memory, psychomotor coordination, information processing, and decision-making (Rosekind et al. , 1996). With increasing sleepiness, individuals demonstrate poorer performance despite increased effort, and they may report indifference regarding the outcome of their performance.

Even severely sleep deprived people are still able to perform to some degree on a verbal learning test. This implies that some other area of the brain must become active to compensate for the loss of temporal lobe functioning. Even though they can perform to some degree, sleep deprived people still do not perform as well on these tests as do fully rested subjects Rosekind et al. (1996) illustrate that not getting enough sleep affects the people in several ways, such as problem solving skills are impaired.

Sleep loss noticeably impairs our ability to comprehend apidly changing situations, increases the likelihood of distraction, makes us think more rigidly

and less flexibly, and reduces our ability to produce innovative solutions to problems. In addition, our communication skills also suffer because sleep loss reduces the words in vocabulary both verbally and in writing (Rosekind et al. , 1996). Learning and memory suffer as sleep loss diminishes scores on tests of memory, verbal fluency and overall creativity (Rosekind et al. , 1996). Therefore, if a person is not able to get a full night's sleep after learning something new, he will not remember the new knowledge well.

He will not fully assimilate the new ideas or task until he is able to go through a complete night of uninterrupted sleep cycles. In relation to our communication and memory skills, being sleepy on the job, whether the cause is simple sleep deprivation or an undiagnosed or untreated sleep disorder, can also have a vital impact on how well workers can do their job. For example, night-shift workers have poorer daytime sleep, reduced nighttime alertness and performance, and an increased accident rate (Williamson & Feyer, 2000).

Since sleep deprivation causes individuals to feel so sleepy during the day, their concentration and performance suffer significantly. For example, sleep deprivation often leads to an increase in the incidence of motor vehicle accidents. One study found that individuals suffering from fatigue due to sleep apnea are six times more likely to have a motor vehicle accident than persons who are not suffering from fatigue (Williamson et al. , 2000). This is partly due to the person being groggy or sleepy due to lack of rest.

It is also partly due to the fact that sleep deprived people tend to fall into sleep for very brief periods at unforeseen times. They also are more

disposed to industrial accidents than non-apnea workers (Kloss et al. , 2002). Therefore, there is a direct connection between sleepiness and impaired hand-eye coordination. The degree of impairment has led researchers to compare it in severity to drunkenness and this can be represented by having an untreated sleep disorder such as insomnia, narcolepsy, or sleep apnea significantly increases the risk of having a motor vehicle accident.

Since sleep deprivation increases the likelihood of having a motor vehicle accident, sleep is needed to regenerate certain parts of the body, especially the brain, so that it may continue to function optimally (Landsness et al. , 2009). After periods of extended wakefulness or reduced sleep neurons may begin to malfunction, visibly affecting a person's behaviour. Some organs, such as muscles, are able to regenerate even when a person is not sleeping so long as they are resting (Landsness et al. , 2009). This could involve lying awake but relaxed within a quite environment.

Different parts of the brain are rested and regenerated during different phases of sleep. During some phases of sleep, the neurons in the cerebral cortex regenerate (Landsness et al. , 2009). If sleep is interrupted so that this regeneration cannot occur, speech may be affected, since the temporal lobe of the brain is what controls speech (Alhola et al. , 2007). People who do not get enough sleep often have slurred speech. There is also measurably less activity in their temporal lobes than in those of well-rested people (Alhola et al. , 2007).

During Rapid Eye Movement (REM) sleep, memories are consolidated and categorized by the brain (Ellenbogen, 2010). New synaptic connections are

also formed during REM sleep, aiding learning. If REM sleep is cut short, long-term memory may be affected and new knowledge might not be retained (Ellenbogen, 2010). Conversely, short-term memory might be better in the sleep deprived person because the part of the brain that controls short-term memory contains memories that are still fresh. In order to counteract sleep deprivation effects, the brain works harder but the effectiveness is low.

There is a drop in the concentration level and it affects memory too (Lim & Dinges, 2010). The effects of sleep deprivation include slurred and fragmented speech and slowing down of mental reaction time. Problem solving and decision making abilities of the brain are affected. Due to rigid thought patterns of the brain, new problem solving ideas do not get generated, and hallucinations are common for people who have insufficient rest (Kloss et al. , 2002). Sleep deprivation causes deterioration in emotional mood of human beings.

Irritability and short temper are two common symptoms of sleep deprivation (Dahl, 1999). Consequently, emotional outbursts and even violence are noticed among people who are deprived of sleep because of a loss of emotional control (Dahl, 1999). Sleepiness leads to rise in stress and anxiety levels of these individuals. Stress and anxiety in turn will lead to insomnia and this kind of vicious cycle will lead to anxiety disorders and depression, if left unchecked. Our emotional moods are affected by exhaustion and fatigue.

This condition in turn will lead to pessimism, sadness, stress and anger (Jennings et al. , 2003). To function effectively, the frontal cortex of our brain



needs sufficient sleep. The ability to control speech, problem solving and accessing memory is all controlled by the frontal cortex and if there is not enough rest, these abilities are affected (Landsness et al. , 2009). One thing is for certain, that chronic sleep loss may lead to deterioration of mood and motivation, decrease in attention, energy, and concentration.

It also causes an increase in fatigue, irritability, tension, anxiety, and depression (Jennings et al. , 2003). Any one of these consequences of sleep deprivation can seriously affect productivity and performance. There is no question about it that the problem of sleep loss and fatigue is one that impacts significantly on the professional and personal lives of all humans. In association to all these studies, the purpose of this essay was to analyze the importance of sleep deprivation on cognition.

There is considerable evidence to support the hypothesis that sleep deprivation has negative effects on neurobehavioural (sustained attention, reaction time, and vigilance) and cognitive (memory and reasoning) performance in humans (Rosekind et al. , 1996, Williamson et al. , 2000, Kloss et al. , 2002 & Alhola et al. , 2007). In some ways, sleep deprivation studies help us to study and understand the relationship between the brain and behaviour in a very unique way by observing how a person's behaviour changes as the brain shuts down. Just like a person cannot jog for three continuous days, a person's brain cannot operate without rest breaks.

Since different regions of the brain rest during different stages of the sleep cycle, sleep cannot be cut short (Landsness et al. , 2009). Therefore, too little sleep can influence our intellectual capabilities, emotions, and motor

performances, which creates major issues for sleep deprived drivers because they are falling asleep at the wheel. To reduce our behaviour in sleep deprivation, it is important for us to manage our activity so that we have more time to sleep. So, to have a good quality and quantity of sleep, time management is the key.