

What happens when
children do not get
enough sleep?



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Introduction Sleep is extremely important for humans, but is of particular value to children (Dahl 2007). The duration of sleep that is recommended for children differs with respect to their age, ranging from twelve to fifteen hours during infancy to nine to ten hours in teenagers (NHS 2017). The importance behind this variation in sleep duration is founded in increased rates of brain development during infancy (Dahl 2007). While there is a large body of research regarding the need for sleep, its true physiological function is somewhat unknown (Dahl 1996). We do, however, know that it is universal and occurs across all species, highlighting its immense value (Dahl 1996). In recent years, we have slept less than ever before, yet our knowledge on how this will affect us is in its infancy (Cline 2010). This states the importance of this essay. Sleep, or lack of, in childhood has life-long implications, and as such, past and future research in the field is highly important. In this essay, I will evaluate the short and long-term implications of not getting enough sleep from a physiological, psychological and mental health standpoint, to elucidate the importance of sleep and sleep hygiene. This will help me to formulate the argument that children who do not get enough sleep face serious negative consequences in many aspects of their lives. Why do we Sleep? There are 2 main stages to sleep; rapid eye movement (REM) and non-rapid eye movement (NREM) (Carley and Farabi 2016). REM sleep is known as the deeper sleep when one is dreaming and is associated with consolidating learnt tasks (Smith 2001). NREM is known as the slow wave sleep, which plays a major role in consolidating memories (De Andrés et al. 2011). Sleep also affects us physiologically which I will discuss further in the essay. Psychologists have tried to explain why we sleep. Oswald (1966) proposed a restoration theory, stating that sleep existed in order for the <https://assignbuster.com/what-happens-when-children-do-not-get-enough-sleep/>

body to restore the chemicals it used during the day (Oswald 1966). REM sleep was for revitalising the brain's processes through protein synthesis and NREM sleep was to restore the body's biological processes. Oswald's argument is strengthened by the fact that we experience the most REM sleep during the first five years of life (Smith 2001). This is also the period where our brain develops the most requiring the most protein synthesis (Dahl 2007). However, the reparation of cell and body tissue happens constantly and is not selectively whilst we're asleep. Physiological Effect Obesity & Metabolism - Short Term Sleeping less than the recommended amount has been associated with contributing to childhood obesity in preschool children (Mullins et al. 2017). Ten preschool children were required to follow a strict 5-day sleep schedule prior to the study. They then had one day to collect their baseline sleep and then a day where their sleep was restricted. To restrict their sleep they weren't allowed to nap and they were found to have slept around 3 hours less than on the baseline day. The findings showed that acute sleep loss caused them to consume 21% more kilocalories than on the day of the baseline and 14% more kilocalories on the day after the sleep restriction. The p value for the results was below 0.05, meaning that if there were no association between sleep restriction and overeating then the results seen would only occur in less than 5% of the studies due to study error (Perneger and Combescure, 2017). This also means that we can reject the null hypothesis, which states that there is no association between sleep disruption and overeating (Perneger and Combescure, 2017). The results are therefore scientifically significant. The study was very thorough in the way that it measured the children's sleep. If a child deviated > 15 minutes away from this strict sleep schedule, their <https://assignbuster.com/what-happens-when-children-do-not-get-enough-sleep/>

assessment was postponed for 5 days so that their baseline could be achieved again. This ensured that the only sleep variable was the restricted night's sleep, strengthening the findings of this study. With such a small cohort for the study it is not possible to have the diversity of the global child population. Which affects the application ability of the results. The study should be replicated, as a very small sample size can give false positives (Faber et al. 2014). However, the study is scientifically significant and therefore can be used to compare with other studies. This study can be explained by looking into the effect that sleep has on the hormones associated with appetite. Short sleep duration is widely associated with low leptin and high ghrelin levels in the blood (Taheri, S. et al. 2004). Leptin is a hormone that is responsible for long-term energy balance and therefore making you feel full (Klok et al. 2007). Contrastingly, ghrelin is responsible for making you want to eat in order to gain energy (Klok et al. 2007). Having low levels of leptin and high levels of ghrelin will have a combined effect, leading to excess calorie consumption (Taheri, S. et al. 2004). This study shows the *short-term* implications that *not getting enough sleep* has on children's eating habits. Which can be hypothesised if it were to continue, the excess calorific consumption would lead to obesity (Camacho et al. 2017). Obesity & Metabolism - Long Term Differing to the preschool study, a 32-year prospective birth cohort study found that not getting enough sleep in childhood had long-term ramifications also linked to a high body mass index (BMI)(Landhuis et al. 2008). Parental reports of their child's time spent sleeping were collected in assessment days at ages 5, 7, 9 and 11 and were used to estimate their child's sleep time during childhood. The results showed a clear link between sleep and obesity at 11 years old, but at no

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other age. However, it is important to note that at 11 years old parents were asked what time their child *usually* went to sleep, but at 5, 7 and 9 parents were only asked to record the time their child went to sleep the night before the assessment. This change in question could perhaps explain the difference in results at 11 and those at earlier ages. Future studies would need to be carried out in order to validate these results. The study adjusted for some key confounders such as adult television viewing, which is known to be strongly associated with having a higher BMI (Salmon et al. 2000). This adjustment allows the study to remain significant. Interestingly, adult BMI is unaffected by sleep loss which occurs in adulthood, whereas sleep loss in childhood has an effect on an individual's BMI when they reach adulthood. This important association points to the significant developmental changes that take place in childhood, and persist into adulthood. This study therefore highlights the *long-term association between children not getting enough sleep and obesity*. Obesity can cause low self-esteem and many other psychosocial problems (Strauss 2000). These affect the child in the short term but can have long-term social implications with regards to socialising in groups (Onoda et al. 2010). Obesity also is a risk factor for cardiovascular disease (Xavier 2002), diabetes (Djalalinia et al. 2015) and depression (Luppino et al. 2010), therefore one could also hypothesise that children not getting enough sleep could put themselves at more risk of developing these diseases. This combined with the prospective birth cohort study emphasises the negative impact that *not getting enough sleep* has on children physiologically in the short and long-term . Psychological Effect Attention & School Performance Not getting enough sleep has been associated with poor attention and performance in tests and increased mistakes in tests (Lufi et <https://assignbuster.com/what-happens-when-children-do-not-get-enough-sleep/>

al. 2011). This was found by a study observing the effect of delaying the school start time on children in the school. Forty-seven children were randomly allocated into 2 groups, the experimental group and the control group. The experimental group were told to start school an hour later for the first week and then to return to their regular routine for the second week, whilst the control group maintained their same school starting schedule. On average, the members of the experimental group slept 55 minutes more than the control group for the 5 days in the first week. In order to assess the attention levels of the children they were tested with two tests twice. The first was the " Mathematics Continuous Performance Test" (MATH-CPT), which was used to determine the children's attention through simple mathematical problems. The second test carried out was the " d2 Test of Attention", where the consistency and accuracy of the work was combined with the number of mistakes made by the child to determine their attention levels. The experimental group outperformed the control group in both of the tests and made fewer mistakes whilst answering the questions. The findings have p values that are less than 0. 05 meaning that the association between the hour delay in school start time was significant in giving the experimental group an attentional advantage (Perneger and Combescure, 2017). The children were receiving on average six hours and a quarter of sleep, which isn't the nine hours that they should be receiving at fourteen years of age (NHS 2017). The increase in an hour had enough of a significant effect to show that the children who weren't getting enough sleep were at a disadvantage with regards to paying attention at school. This has been linked with school performance in adolescents (Dotterer et al. 2011). The children were sleeping at home throughout this study; therefore the major

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confounding factor, meaning what externally could be responsible for the results, would be whether they were actually getting the correct amount of sleep or not (Perneger and Combescure, 2017). Through the use of actigraphs that were given to each child, they were able to record the movements of the child's wrist and therefore know the amounts of time that they were sleeping for (Martin and Hakim 2011). This removed the response bias, which is bias that can be introduced when being asked to report about what you have done; one can fabricate the truth for reasons such as to make themselves seem better (Rosenman 2011) . This method of measuring the sleep strengthened this study. The seen effect was only noted for the first week of the experiment and by the second week, both of the groups were relatively equal again. This shows that *not getting enough sleep* does affect children's attention but only in the short term. Higher Functions Acute sleep restriction has been shown to affect higher cognitive functions such as verbal creativity and abstract thinking in a healthy child (Randazzo et al. 1998). For one night sixteen children were randomly allocated to either spend 11 hours in bed or 5 hours in bed. The next day, the children underwent four 1-hour testing periods, measuring abstract thinking, creativity, memory and learning. Statistically significant results were found whilst looking at abstract thinking and creativity. However, the results weren't significant whilst comparing the effect that reduced sleep had on memory and learning. The children were selected if they had said that they averaged 9 hours of sleep for the previous month. This strengthens the evidence, as it's possible to say with more confidence that the observed affect is due to the acute measured change in sleep duration and not due to previous inconsistent sleep durations. The children were also all made to wake up at the same time in <https://assignbuster.com/what-happens-when-children-do-not-get-enough-sleep/>

the morning so that time spent awake prior to undertaking the test was also taken out as a confounder, also strengthening the results. The study included children from ages 10-14. This could be a limitation as a 14 year old is at a different stage of cognitive psychological development than a 10 year old (Eccles and Jacquelynne 1999). However, the children were randomly assigned within their respective Tanner groups. Meaning that they were matched with individuals who were at similar stages of their sexual development during puberty (Emmanuel and Bokor 2018). This therefore reduces the confounding in this study even more, strengthening it. This study only contained 16 individuals and more research needs to be done to solidify the findings. However, I believe that this is a strong piece of evidence showing the association that even in the *short term*, *not getting enough sleep* does affect higher functions in children. Memory Declarative memory, which is responsible for recalling events and facts (Squire et al. 1996), gets disrupted when children do not get enough sleep (Potkin et al. 2012). In one particular study, forty healthy adolescents were randomly assigned into two groups; sleep and non-sleep. They were tested using a paired-associate test, which is a highly recognised test of declarative memory (Diekelmann et al. 2009). Both groups were taught a list of words and were then tested on them twelve hours later. The sleep group were allowed to sleep in the 12 hours whereas the non-sleep group were not. The children were tested in their homes, which is a limitation as each child's home environment differs. It is therefore possible that some children were forced to undergo their tests with distracting noise in the background, which could have confounded for the results seen (Klatte et al. 2013). One explanation for the results is that the subjects who were allowed to sleep were allowed therefore to go into their

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NREM sleep. Declarative memory has been shown to benefit from NREM sleep (Plihal and Born 1997), allowing for memories regarding the paired-associate test to be laid down. This process wasn't possible for those who didn't sleep. This evidence has firm reasoning behind it stating that declarative memory suffers in the short term when *children do not get enough sleep*. Procedural memory is the other form of memory and is responsible for carrying out everyday commonly learned tasks (Squire et al. 1996). It has been linked with REM sleep (Smith 2001), however it was not affected in the higher function or declarative memory studies. Therefore, one could hypothesise that this type of memory isn't affected by sleep in children.

Mental Health The prevalence of nightmares and suicidal behaviour has been linked with a lack of sleep in adolescents (Liu 2004). 1, 362 adolescents filled out a questionnaire where they were asked; about their patterns of sleep, if they had any sleeping problems or suicidal behaviour, if they were having depressive symptoms and also general information regarding their family's demographic. The results showed that the prevalence of suicidal attempts was negatively correlated with duration of sleep. Adolescents who slept less than 8 hours a night were 3 times more likely to attempt suicide than adolescents who slept 9 hours or more. This remained even after accounting for possible confounders such as demographic variables. The limitation of the questionnaire is that it lacks details. It isn't possible to have individual inferences in it as the questions are closed and require the participant to select options such as "often", "sometime" or "never or rarely". This could result in some false allocation of people to certain groups, as there isn't a spectrum to place people on it. If someone noted that they often had difficulty in getting to sleep at night, they

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were classified as having insomnia, which doesn't allow for people with differing severity of insomnia. However, the questionnaire allows the study to measure a very large cohort, which makes the results more indicative of the population of adolescents and therefore more transferable to comparing with other populations of adolescents, which is one of its strengths. The research conducted had a mean age of 14.6 years. This could be seen as a limitation, as we know that suicide is uncommon under the age of 15 (Bertolote et al. 2002). However, as this study is not looking at figures of deaths but rather the prevalence of thoughts regarding suicidal behaviour. This could prove to be a strength, showing the thoughts of children before they reach the age of when suicide is most prevalent in adolescents. This could imply that these are long-term thoughts that are manifesting in children's heads many years prior to anything happening, showing the importance of receiving *enough* sleep from an early age. The research was conducted in a rural part of Shandong Province in the People's Republic of China. Therefore, one could say that the diversity in this sample group isn't very representative of the global population of adolescents. However, adolescent suicide is a very topical global issue. Research has shown that suicide is the most common cause of death in girls aged 15-19 years of age (Patton et al. 2009) and boys are 2.6 times more likely to die by suicide than girls of the same age (Wasserman et al. 2005). In turn, matching with the figures seen in the results.

This shows that this study has global relevance and can be used to say that this is a possible long-term affect of *children not getting enough sleep* .

Sleep Hygiene Building good sleeping habits and practises in order to go to sleep is what the idea of sleep hygiene is (Irish et al. 2015). Initiatives such as meditating before going to sleep have positive effects on sleep hygiene and have the same long-term benefits as sleeping well (Ravindra et al. 2012). However, the use of technology impairs this healthy sleep hygiene and is responsible for many sleep issues (Gradisar et al. 2013). Healthy practices should be encouraged to young people to ensure that children are getting the right amount of sleep. Conclusion In conclusion, the studies in this essay provide evidence for my thesis that there are many negative consequences when children do not get enough sleep. The results highlight the deleterious short and long-term effects psychologically, physiologically and with regards to mental health. From the evidence one can hypothesise that making small changes to general sleep patterns and hygiene in children could go a long way towards improving health care, which in turn could have global financial benefits. References:

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