The Statistics Behind Common Ideologies of Sleep Patterns

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INTRODUCTION

There are many theories about why humans have to sleep. It seems like an unanswerable question. Scientists report different answers. One of the first theories was the inactivity theory that suggests inactivity at night was an adaptive quality (Quan. 2007p 1). This is the theory that humans sleep in order to remain out of harms way at a time when they are most vulnerable. Imagine humans as possums; they are asleep and avoid harm so the quality remains in use. That theory was replaced by the energy conservation theory, which suggests humans use sleep as a time to reduce energy expenditure. This theory is supported by scientists observations of the metabolism during sleep, which slows down significantly (Quan. 2007p 1). This leads into another theory referred to as the restorative theory, which states that sleep serves as a time for human bodies to “restore” themselves (Quan. 2007p 2). All of these theories lead scientists to believe that sleep is very important to the human body. Among these three theories the one that makes the most sense is the restorative theory. Humans tend to feel run down and unable to function without a good nights sleep, leading us to believe that sleep has restorative properties. It is established that sleep is important. It is also established that a lot people are not satisfied with the amount of sleep they are getting. In a recent Gallup poll, adults ages 30 to 49 reported their feelings on the amount of sleep they were getting. Of those survey, 46% were satisfied with the amount of sleep they were getting and about 52% would feel better getting more sleep at night (Jones. 2013). Unfortunately there has been little research done to figure out what factors play a role in total amount time spent asleep.

Time may be the most valued commodity perhaps it is a factor. We spend large portions of our life figuring out how to manage our time. According to Meddis, we have a natural instinct inside of us to spend large portions of our time sleeping (Meddis. 1977 p. 5). In fact, we will spend about a third of our lives asleep. Most Americans don’t realize that sleep is just important, if not more important, than diet and exercise. Studies have shown that people in the western world are largely sleep deprived. According to a National Sleep Foundation survey, 21% of Americans report getting 6 hours or less of sleep per night. Previous studies have indicated that lack of sleep is due to lack of time to sleep and the change in
culture around sleep (National Sleep Foundation. 2013. p 7). Some of the facts above may be factors that play into the lack of sleep.

This study will examine whether the amount of sleep is affected by the total number of years of education. It will also look at the influence of hourly wage on total time spent asleep. The link between amount of education and amount of sleep has not been studied enough. It is unclear the impact that education has on amount of sleep, which is why it needs to be studied more. Hourly wage, however, has an impact on the amount of sleep a person gets. According to the gallup poll of the people who were reported $75,000 or more annually 34% reported getting six hours or less of sleep and 66% reported getting 7 hours or more of sleep a night (Jones. 2013). It is important to understand the impact that wage and years spent in education have on sleep.

**DESCRIPTIVE STATISTICS**

In order to analyze how education and hourly wage influence sleep, data was taken from the “Sleep and the Allocation of Time” study by J.E. Biddle and D.S. Hamermish in 1990 who had collected their data from the Time Use Study of 1975-76 (1990 p. 926). Biddle and Hamermish do not use the total number of respondents that the Time Use Study had made. The Time Use Study had a total of 1,519 people keep journals over a time span of four days in total, “the days were at 3-month intervals, with two being weekdays, one a Saturday, and the fourth a Sunday” (Biddle & Hamermish, 1990 p. 926). This helped them synthesize the rest of the week; the rest of the sleep allocation was an estimate. They then got rid of a total of 813 individuals worth of data due to inconsistencies, age extremes, and/or missing data (Biddle & Hamermish, 1990, p. 926). Of the usable 706 individuals, on average, people reported that they received a total of 54.94 hours of sleep with a standard deviation of 7.41 hours over a span of one week.

The first hypothesis is based on whether a person has received any higher education, anything over twelve years, or an average education, anything up to or equal to twelve years. Using education as an independent variable, the amount of sleep one receives a night would then be dependent on whether or not they received more than 12 years of education or less than or equal to 12 years. Those surveyed had an average of 12.78 years of education with a standard deviation of 2.78 years. Of the 706 surveyed
individuals, 425 of them had the equivalent of a high school education or less, and they collectively had
an average of 3281.29 minutes or 54.69 hours of sleep per week with a standard deviation of 466.08
minutes or 7.77 hours. There is 281 individuals that have 13 or more years of education, with an average
of 3243.77 minutes (54.06 hours) of sleep per week and a standard deviation of 409.25 minutes (6.82
hours).

The population distribution is unknown, but the sample size is large enough to satisfy the Central
Limit Theorem, which allows us to calculate confidence intervals. Confidence intervals are a range of
minutes of sleep that will estimate the population parameter in which the population average should exist.
A 95% confidence interval means that there is 95% confidence that the average of the population will
exist in the interval provided. A 95% confidence interval of 54.39 to 55.49 hours exists for all 706
individuals.

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<th>All</th>
<th>More than 12 Years</th>
<th>12 Years or Less</th>
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<tbody>
<tr>
<td>95% Confidence Interval</td>
<td>3263.54 ~ 3329.18</td>
<td>3198.58 ~ 3291.74</td>
<td>3236.86 ~ 3325.72</td>
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<tr>
<td>99% Confidence Interval</td>
<td>3253.19 ~ 3339.53</td>
<td>3225.33 ~ 3337.25</td>
<td>3180.64 ~ 3306.90</td>
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The second hypothesis proposed is that there is a negative correlation of time spent working to minutes
spent working in a career. This is based off the belief that those who work more would have less private
time to oneself and therefore would spend less time sleeping due to a need to perform necessary habits.
On average, individuals spent an average number of 2122.92 minutes per week working.

HYPOTHESES TESTING

This group study hypothesizes that years of education influence how much sleep an individuals
receives per week. The first hypothesis test is based on what children are told at a young age in order to
commit them to go to college; if one goes to college, you able to get a better job and therefor not worry as
much about finances compared to those who didn’t go to college. They might live a more enjoyable and
stress free life, which in return will allow them to get more sleep per week.
In order to find this hypothesis we are going to use the traditional hypothesis test; this is a conjecture about a population parameter, and the conjecture may or may not be true. We are finding the average minutes of sleep of those who get 12 years or less compared to 13 years or more of education and the amount of sleep they get in a week.

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<th>Traditional Hypothesis</th>
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<td>Probability of type 1 error:</td>
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<td><strong>T Test</strong></td>
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<td>Critical t Value:</td>
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<td>d.f.</td>
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<td><strong>T test value:</strong></td>
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</table>

The second hypothesis proposed is that there is a negative correlation of time spent working to minutes spent working in a career. This is based off of the belief that those who work more would have less time to do their necessary habits in a day and will reflect their sleep.

In order to find this hypothesis we are going to use the correlation and regression analysis; this deals with the relationship between two variables. We are trying to determine if the amount of minutes worked in a week will affect the minutes of sleep. We have data that shows the minutes of work in week among 706 people. The independent variable is the total minutes of work per week and the dependent variable is the total minutes of sleep in a week.
FINDINGS AND DISCUSSION

The first hypothesis test we found that the level of education does affect the amount of sleep one will get. There was enough evidence to reject the hypothesis that they got the equal amount of sleep. With this information we are able to determine that people with higher education will get more amount of sleep. It is not proven, but most likely the case is that they got a well paying job and are working less hours, this will give them more time to do the thing that need to be done in day, besides work and sleep. We hope that people can get a better understanding now on why education plays a big role in everyone’s day-to-day lives.

In the second hypothesis that we did, over the amount of minutes worked in a week is conflicted with the amount of sleep on gets in week, we found that it is another major factor on why people can’t get enough sleep. We found that the minutes of sleep does not equal the amount of minutes worked in a week. There was enough evidence to support the claim. Finding a job that will work someone less in a week is better and possible they will perform better. With this evidence we hope that people will try to find jobs that have less amount of hours in week and also that businesses see this and will cut back overtime so that the people working for them will perform better. Even though that isn’t proven, perform better with less hours, it is a factor that many people believe in.
CONCLUSION

Finding this information about sleep is a good thing for the general public to know, it can help them decide on the level of education and whether or not to take longer hour shifts. It seems reasonable for a general worldly population, yet may need modification for specific community populations. By understanding that there is a negative correlation in total number of minutes spent sleeping and amount of time spent working, it may help people and businesses determine the hours that they work so that they will perform better. It could also explain why number of hours is legally capped at 40 hours a week before overtime pay needs to be implicated.

The data that we have might not give an individual the right statistics they are looking for, but it is large enough that we were able to do a statistical analysis being that there was 706 people and across more than one country. It would make some people more interested if it was based on the country they are from, or the country that they might go work at. On the other hand it gives information about how it doesn't matter where someone is from or planning to work, but a mass area in general. This study is also limited because there are many other factors that may affect sleeping patterns, like being married, having kids or someone having a sleep disorder. The public should also note that people spending time in a job only shows a factor with the amount time sleeping; a number of minutes spent working will not cause an individual to get a specific amount of sleep per week.

Based on the results of this study and finding that a negative correlation in the number of minutes worked per week and amount of sleep a person receives is supported, it would be interesting to look into how relationships affect sleeping patterns. A common adult will not only spend their days in a career, but they will spend time with the people that mean the most to them. Those who spend time working and have families on top of that would probably have an even lower total number of minutes a week spent sleeping than people who live on their own. It would also be interesting to look at how employers would rate the productivity of their employees based on how much sleep their employees received in order to find a number of minutes of sleep required a night for optimal work productivity.
Works Cited

