Outstanding Student-Experimental Study
Psychology 2314 MWF 12:00PM
Professor Hutchinson

“Emotional Expressiveness in Sleep-Deprived Healthy Adults”
Introduction:

In today’s society, sleep deprivation is an influential problem that many adults experience. Aside from psychiatric or medical problems, sleep can also be impaired from one’s surroundings and the lifestyle that they live. Previous studies have shown that inadequate sleep levels have many harmful effects on an individual’s behavior, attention, memory, and understanding. However, there has been very little research done to show the effects of sleep deprivation on emotions. Prior research suggested that sleep and affect’s close relationship should be spectated based on neuroimaging studies of mental tasks after sleep loss as well as clinical populations that exhibit sleep limitations being unable to be separated from other variables in the study. However, an assumption made in previous studies suggested that sleep deprivation can lead to the inability to suppress emotions due to its effects on a region in the brain that controls negative emotions. Very few experiments had been conducted with enough scientific data to suggest a relationship between emotional functioning and sleep loss, however it was shown that negative emotions can increase due to inadequate sleep levels. In addition, past researchers showed a change in pupil size in response to negative stimulus within sleep deprived participants. Sleep reduction in previous experiments also showed association between emotional arousal and desirable or undesirable events. Nevertheless, sleep deprivation is closely linked with emotional processes and can effect different regions in the brain. (Minkel, Htaik, Banks, Dinges, 2011)

The current study examines a previous hypothesis which suggested that sleep deprivation would be linked to emotional disinhibition, making extreme emotional responses more frequent. In opposition to an alternative theory that indicated that decrease in arousal due to loss of sleep would cause less extreme emotional responses. In this experimental study, researchers measured
the intensity of facial expressions as a reaction to both positive and negative stimuli, between two randomly assigned groups after a night of sleep deprivation or a normal sleeping conditions. The independent variable in this study was the sleeping conditions each participant was assigned to, leaving the dependent variable being the facial expressions measured in response to each type of stimuli after being in either the sleep deprived group or the control group. (Minkel et.al., 2011)

**Methods:**

Participants of this study included 23 healthy adults between the ages of 22 and 45 voluntarily chosen from the local community. Prior to the experiment participants completed a laboratory based protocol, provided informed consent, and were screened for medical and psychiatric disorders. It was necessary for each participant to be drug free and non-smokers with regular sleep patterns. Working regular nights, rotating shifts within the past 6 months, or traveling across another time zone was not permitted. Within a 7-14 day time period sleep was monitored by diary. Participants reported to have between 7 and 8 hours of sleep waking up every morning between 6:00AM and 9:00AM. Five participants were then removed for either being physically ill, because they had poor sleep the night before, or held a score of 14 or above on Beck’s depression inventory scale. (Minkel et.al., 2011)

Participants were then randomly assigned to either the sleep deprivation group or the control group, leaving 15 participants to complete the sleep deprivation procedures and 8 participants to complete the control procedures. There were more participants randomly assigned to the sleep deprivation group to strengthen the ability to compare each group. Both parties entered the laboratory around 9:00AM the following morning to complete the required procedures. Following the first day of testing, the sleep deprivation group was given no sleep
opportunity and the control group was given 9 hours of sleep opportunity from 11:00PM to 8:00AM. The participants were informed of their conditions around 8:00PM after testing had been completed. 10 hours of sleep opportunity was given to all participants after a second day of testing was completed. During scheduled wake times, both parties were kept awake under ongoing behavior monitoring. At scheduled sleep times all lights were to be turned off and participants were monitored by trained staff using infrared cameras. Connection to sleep condition was further proven by evaluating sleep in relation to movement. Both parties were required to stay in the laboratory throughout the full experiment period. (Minkel et.al., 2011)

During two back to back test days, both positive and negative emotions were triggered using 3 clips chosen from a library of previously investigated film clips. The clips were found to extract the objective emotions and one clip was chosen based on an expert’s suggestion. During the 1st day before all sleep manipulation had occurred, all participants viewed a clip from Bambi to trigger sad emotions, then later viewed a clip of Steve Martin from Saturday Night Live to produce pleasure or amusement. The second day, after the sleep manipulation occurred, participants watched a clip from The Champ to produce sad emotions, followed by a clip from When Harry Met Sally to induce amusement. While viewing the clips all participants were recorded, and were later scored by raters in randomized order. One of the two raters was blind to all conditions but both scored all videotapes on a global level using the FACES scoring system. The scale ranged from 1 to 5 showing all expressiveness for the entire clip with 1 being no emotion and 5 being large displays of emotion. Statistical analyses were recorded using the averages raters’ scores. Intensity, frequency, and the period of individual expressions were not recorded because they were little to no help when pilot testing was taking place. (Minkel et.al., 2011)
Discussion:

Researchers found that facial expressiveness was moderately lower in sleep deprived adults than the adults who were rested. The results highly favored the hypothesis that suggested that a decrease in arousal due to loss of sleep would cause less extreme emotional responses. This emphasized the importance of not only the prefrontal cortex in relation with emotions but many other areas in the brain as well. There is evidence that inhibitory control is weakened by sleep loss, and certain areas necessary for emotional regulation is modified. While the sleep deprived participants exhibited a reduction in facial expressiveness, there was no reports of an equal amount of reduction due to personal emotional experiences. Emotional responses that were self-reported from the sleep deprived group in reliance to the control group did not meet the required criteria for any significance statistically. However, being that the sample size was undersized, no strong conclusions could appear to be invalid. Nonetheless, suggestions showed that sleep deprivation had various effects on subjective responses, which also had relations to facial expressiveness. (Minkel et.al., 2011)

Questions may be brought up as to what kind of influence sleep deprivation has on emotions due to large responses of objective indicators of emotions in relation to subjective responses. In this case, it was important to remember that emotions are multisided which involve inseparable components of subjective feelings and emotional expressions. Both are components of emotional response however one exhibits a private experience and the other presents the public display. Previous studies have shown the difference between the two however the current study suggested that sleep deprivation can effect private and public emotional responses which can cause a person to appear less emotional than they really are. Sleep deprivation can have significant consequences decreases in emotional expressiveness. Many studies have been
conducted that emphasized the importance of emotional expression in a person’s everyday life. Thus, a reduction or no signs of emotional expression could have serious consequences on a person’s well-being or one’s ability to form relations with oneself and others. (Minkel et.al., 2011)

There were many limitations noted in the study, all which had effects on the outcome. The most important limitation noted was that the study had a relatively small sample size. With 14 male participants and 9 female participants, the study may not have accurately reflected the demographics of the population being that there were an uneven amount of each sex. However, high costs also played a role in the size of the sample that was taken. If the study was to be conducted again, polysomnography tests were suggested to be used instead of the actigraphy because total sleep time and sleep stages can be measured more efficiently. If a larger sample size was used, relationships between emotional functioning and sleep variables could have been investigated, however being that the sample size was rather small no relationships would have been found. Another suggestion was to analyze any additional variables that were related to facial expressiveness. The current study focused on overall expressions that were interpreted by human raters, however other methods such as electromyography could have been used to allow for a more detailed description of the influence that sleep deprivation had on emotional expressiveness. (Minkel et.al., 2011)
Reference