

Measuring Reaction Times of McPherson Football Players on the Basis of Sleep

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ABSTRACT

Sleep has been studied for many of years since 1896. Sleep has been shown to be an important human physiological process that helps with recovery of the body and mind. Sleep has many affects on one's personality and performance. The current study is to see if sleep had an effect on audio and visual reaction times of McPherson College Football players and to see if offensive players had a faster audio reaction time than defensive players and if defensive players had a faster visual reaction time than offensive players. With a sample size of 34, subjects were asked to take an audio and a visual reaction time test on a computer. Their average times were recorded as with the number of hours of sleep. A repeated measure of ANOVA was what determined the effect significance of sleep having on reaction times. The audio test showed a P-value of 0.291, while the visual test showed a P-value of 0.5934. A two tailed P-value for the audio test was 0.647 and for the visual test the P-value was 0.260. The tests showed sleep had no significant effect on reaction times. Offensive players' audio times were not significantly different from defensive players' audio times, and offensive players' visual times were not significantly different from defensive players' visual times.

Keywords: *Reaction times, sleep, football, sports*

INTRODUCTION

As a college student or as a working adult it is hard to get the recommended eight hours of sleep with studies, athletics, and work. Sleep is an important physiological process for humans to function as it helps with recovery of the body and mind. Patrick and Gilbert (1896) showed that individuals who stayed awake for ninety hours demonstrated decreases in sensory acuity, motor speed, ability to memorize, and had visual hallucinations. Since then there has been a gradual increase in interest in sleep deprivation by psychologist, physiologist, and psychiatrist (Qi, 2010). Sleep deprivation is defined as a sufficient lack of restorative sleep over a cumulative period so as to cause physical or psychiatric symptoms and affect routine performances of tasks (Miao, 2009). People who are sleep deprived show sleepiness in a subjective form such as dozing off in a freshman biology class, or being sluggish at a 5:00 AM football practice.

Sleep deprivation can cause a decrease in reaction time. Reaction time is defined as the interval between the onset of a signal and the initiation of a response (Magill, 2007). Total sleep loss involves a completely missed nocturnal sleep opportunity resulting in a continuous wakefulness for greater than twenty four hours. Partial sleep loss occurs when sleep is obtained within a twenty four hour period, but in an amount that is less than physiologically required (Davenne, 2008). Partial sleep loss is a common source of stress in athletes and non-athletes (Tu, 2010).

Sleep deprivation produces many effects associated with being drunk such as lack of coordination and judgment, and longer reaction time

(Phillip, 1999). An athlete's performance is based off how fast they react to an opponent or situation. A coach can't expect his players to perform at their best and counter their opponent's actions with their reactions if they're not getting adequate sleep. It's not just sports that deal with reaction times, everyday situations deal with reaction times. While driving a car a person depends on their reaction time to stop at the right time or go at the right time to keep themselves from getting in a wreck. The effects of sleep deprivation are important for health and public safety reasons.

In the present study I am going to be measuring reaction times of McPherson football players using a computerized test which will test their audio and visual reaction times. I will then be taking the average of both audio and visual reaction times and do a linear regression to see if there is a direct correlation between sleep and reaction times.

MATERIALS AND METHODS

All of the participants are McPherson College football players that played different positions. Reason for all the participants to be football players was because it was thought that football players do not get much sleep due to morning practices. The audio cue is a beep that comes randomly from a web site (<http://cognitivefun.net/test/16>). Once the participant hears the beep he will press the space bar. There are 5 beeps and the averages of the 5 beeps were taken. The participant will do the same procedure for the visual cue that comes from a different website (<http://getyourwebsitehere.com/jswb/rttest01.html>).

The visual cue is similar to a stop light; the participant will look at the light until it turns green. Once the light turns green the participant will tap the space bar. This was done five times and the average was taken. The participants were watched as they took the two test and the averages were recorded. The participants were asked how much they slept the night before to the closest 15 minute interval. The participants were tested three times a week on Mondays, Wednesdays, and Fridays for three weeks for three different trials.

The data analysis that was used was a t-test and repeated measures of ANOVA to find a correlation between sleep and visual and auditory reaction times. The program that was used to produce these two tests was Microsoft Excel®.

RESULTS

From the reaction time testing procedure, 17 out of the 34 individuals had at least one reaction time response in three separate time groups (4-5 hours, 6-7 hours, and 8-10 hours). These individuals’ reaction times both audio and visual were evaluated to see if sleep time had an effect on an individual’s reaction times. Also of the 34 individuals 25 of them being offensive players and 9 of them being defense, reaction times were evaluated to see if offensive players had a faster audio time than defensive players and if defensive players had a faster visual reaction time as compared to offensive players.

For the group of 17 individual seeing if sleep had an effect on reaction times both audio and visual a repeated measures of ANOVA was done. The data appeared normal for the audio but abnormal for the visual cue. Due to the abnormality the average visual times were taken to the 4th root to make the data seem normal, once this was done the repeated measures of ANOVA for the audio cue showed a P-value of 0.291 (Table 1) making the data insignificant. For the visual cue the test showed a P-value of 0.5934 (Table 2) again making the data insignificant.

Sleep Time					
Test	Value	Exact F	Num DF	Den DF	Prob>F
FTest	0.178947	1.3419	2	15	0.291

Table 1: Repeated measures of ANOVA audio cue.

Sleep Time					
Test	Value	Exact F	Num DF	Den DF	Prob>F
FTest	0.072068	0.5405	2	15	0.5934

Table 2: Repeated measures of ANOVA visual cue.

For the test to see if the offensive players had a faster audio cue than defensive players and if defensive players had a faster visual cue than an offensive player a t-test: two- sample assuming equal variances was done. From a graph view point it would be assumed that the defensive players had a faster reaction time for both but after the t-test it is shown that for the visual times a 2 tailed P-value of 0.268 (Figure 1) proved the data insignificant as with the audio times a P-value of 0.647 (Figure 2) also proved the data insignificant.

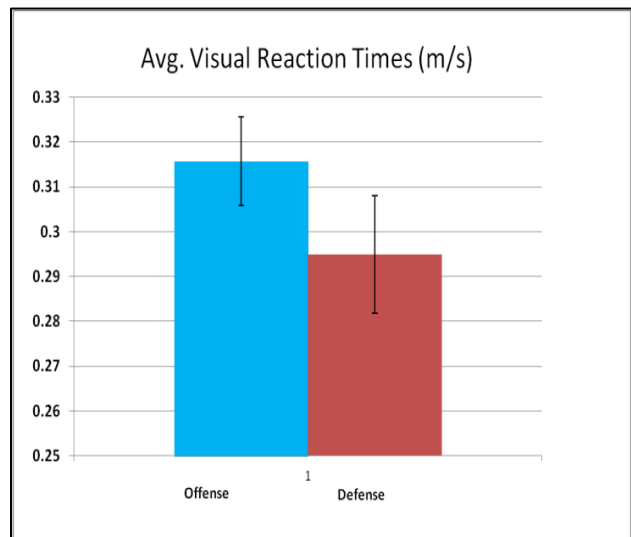


Figure 1: Shows average visual reaction times for both offensive and defensive players with standard errors.

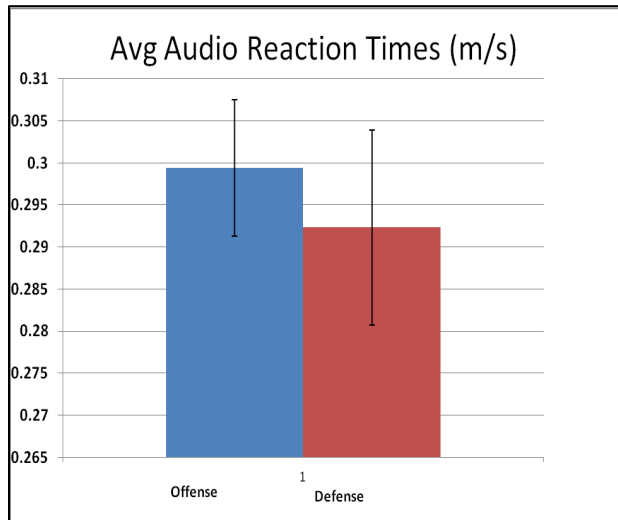


Figure 2 Shows average audio reaction times for both offensive and defensive players with standard errors.

DISCUSSION

The main objective of this study was to see if sleep had an effect on visual and audio reaction times on McPherson College football players and also to see if offensive players have a faster audio reaction time as compared to defensive players and that defensive players had a faster visual reaction time than that of offensive players.

The statistics showed that there was no effect on reaction times from sleep time and that offensive players did not have a faster audio time than defensive players and that defensive players did not have a faster visual time. These results do not agree with other studies shown but in other studies they kept subjects awake for more than twenty-four hours as in this test no subject was required to stay awake, only normal sleeping habits from the subjects were taken. Results might be different and be similar to other studies if the sample size was bigger. In order to get a significant difference from this experiment there would have to be 3512 subjects. That is close to about 40 college football teams. Variables that were not considered that could have affected results were subjects having sight problems or hearing problems. Whether or not subjects had contacts, wore glasses, or used hearing aids. Whether or not subjects were on medications for sleep or their level of football experience and how long they have played.

More research can be done to gain a further knowledge on the subject of sleep and how it can relate to reaction times and other sports related situations. Testing can be done on professional athletes on a larger scale while eliminating variables such as sight and hearing problems and use of

medications for sleep.

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