Is there a Correlation between GPA and Study Hours?

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The first day of class, syllabus day, your instructor goes over the basic rules and concepts behind the course. Then, just like every other instructor, he/she continues with the expectations of the course and the suggested outside of class studying of two to three hours for each hour in attend class. Most students assume this concept is ludicrous, as for an average student with 15 credit hours, this means 30 to 45 hours to study outside of class. This makes school more than having a full-time job. So, each and every student ponders the concept; is this just a suggestion or is there a direct correlation between how many hours a student studies and achieving a higher GPA.

There have been numerous studies done on this topic in the past. Through research it has been found that there in fact is evidence to support both sides of the argument, depending upon the factors that are accounted for. The article, An Analysis of the Study Time-Grade Association, written by Orlando J. Olivares from the Department of Psychology at Bridgewater State College, discusses how study time and grades are inversely affected by one another. This translates to if a student studies a minimal amount and his/her GPA is low then more studying would be required to improve said GPA. However, if a student studies a minimal amount and his/her GPA is high enough to whatever his/her standard is, then it would not be necessary to make study habit change. As it has also been proven that too much studying can have a negative affect. The article presents important variables such as class difficulty, teacher type/personality, major and/or minor, et cetera, which all can skew the data for this study. This article points out specific issues that might arise within our study.

This specific study is to question; Is there a correlation between the amount of hours a student studies and his/her GPA? With this research question the null hypothesis is that there is no relation between the number of hours a student studies and his/her GPA. While the alternative

hypothesis states that there is a positive relation between the number of hours a student studies and his/her GPA. Researching this question begins with gathering information for our specific study and was accomplished through an electronic survey of five questions created through Google Quizzes. The survey was then forwarded to Appalachian State University students via social media. There were 171 students who anonymously participated with this study. The students at Appalachian State University that participated in this study already add a type of bias to the data. However, the students ranged from Freshmen to Seniors (Freshmen: 13.6%, Sophomores: 24.3%, Juniors: 36.1%, and Seniors: 26%) with all types of GPA's (Below 2.0: 0.6%, 2.0-2.5: 7%, 2.6-3.0: 25.1%, 3.1-3.5: 40.9%, and 3.6-4.0: 26.3%), showing much variance with a wide range of data. With all the collected data, analysis has to be conducted in order to determine whether or not there is a significant correlation.

Linear regression is the best method to determine if there is a positive correlation between studying for more hours a week and higher GPA's. The excel data from the survey was inputted into R-Studio to calculate and graph the results. Starting the analysis the outliers were excluded from the data, then with the Q-Q Plot of GPA to Study Hours, it revealed completely random and scattered data points with seemingly no relation, as seen below.

```{r}
attach(StatsProject1)
gpa<-GPA[-117]
StudyHours<-StudyHrs[-117]
plot(gpa,StudyHours)
```
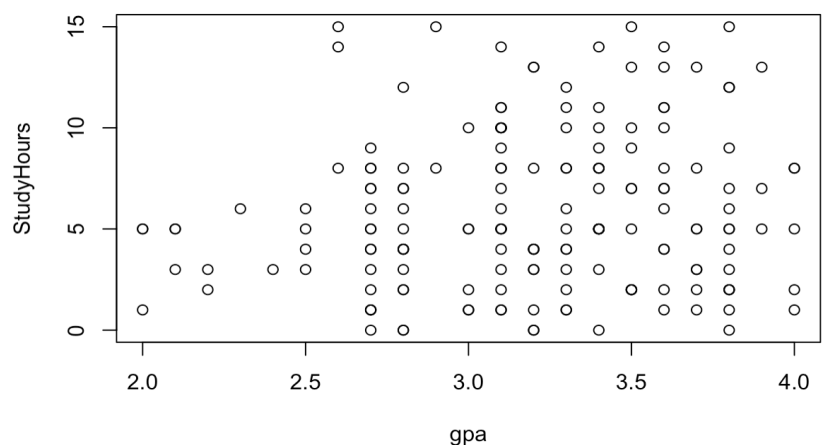
The data was then split to create two separate groups that could be compared; A: which consisted of the GPA's of students who study less than or equal to five hours a week and B: the GPA's of students who study more than five hours a week. To show the range of data histograms were created of each group, shown below. These histograms show a wide range of data with no sort of concentrated skewing, just scattered data.

```r
A<-GPA[which(StudyHrs <= 5)]
B<-GPA[which(StudyHrs > 5)]
hist(A)
hist(B)
```

Histogram of A

Histogram of B
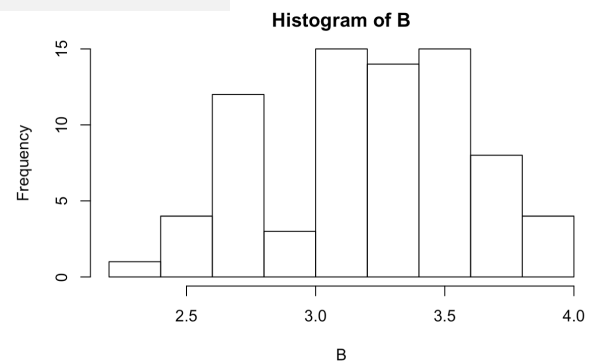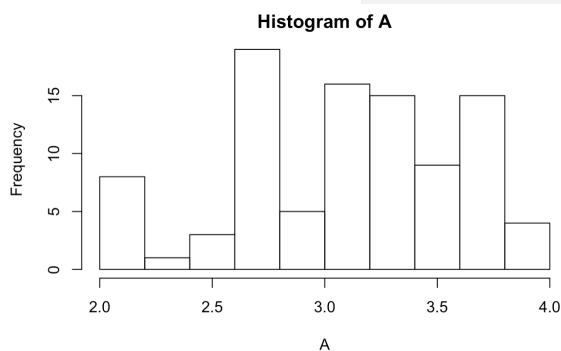
The next step in the data analysis process is to compare the two groups with side-by-side box plots and calculate the means to compare. The box plots shows that the data collected is all very similar, which is determined by the spread. The spread of students who study less than or equal to five hours a week is 0.7, while students who study more than five hours a week is 0.625. This confirms that the data is all very similar, with a small spread. The mean GPA's are both very similar, students who study less than or equal to five hours a week is 3.14, while the students who study more than five hours a week have a slightly higher GPA of 3.26.

```
boxplot(A,B)
summary(A)
summary(B)
```
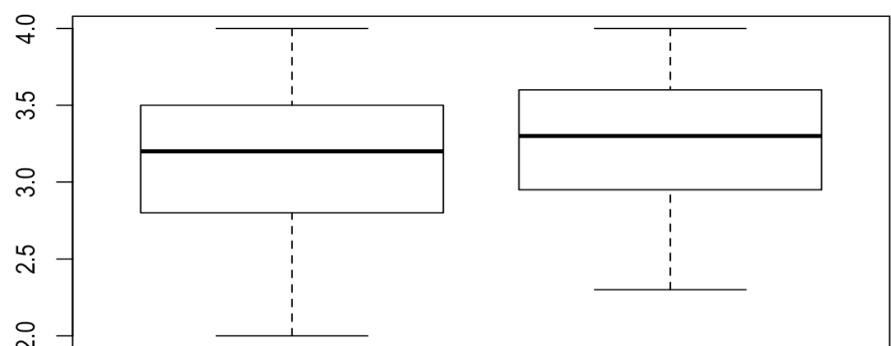
0.36 was calculated. This P-value is not significantly close to the level of significance of 0.05, therefore, we fail to reject the null hypothesis.

In conclusion, according to the data collected, there is no statistical correlation between the hours a student studies and his/her GPA. There could be many reasons as to why the data concludes no relation between the two because it is assumed that there should have been some sort of correlation, even if it was minimal. The variables discussed previously from the other studies, found above, that affect the results of such research could have played a role in this data. For instance, the data collected for this specific study, contained students from various majors, which relates to different course loads that could be more difficult or less difficult depending upon the individual student. For example, a student with primarily general education courses would spend less time studying, yet still be able to obtain a high GPA, as these courses are not designed to be extremely difficult. While, the opposite would occur with a student who is enrolled in multiple high level courses that are designed to be difficult and could struggle more but still continue to study the same amount.

Another major variable could be that the students are of multiple grade levels. This made the data versatile, however, added factors that could skew it. A way to avoid such issues in the future for additional research would be to only survey students from the same major and grade level, which creates a more specific population and allows for more control of the variables. For the data presented within this research study it is concluded that despite the set guidelines that a student should study x amount of hours in relation to his/her courses in order to maintain a "good" GPA, this study shows no correlation between the two.