The Relationship Between Lifestyle Factors and Academic Performance Among College Students

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Introduction

The National College Health Assessment (NCHA), compiled by the American College Health Association, is a nationally recognized research survey that assists colleges and universities in collecting precise data about students' health habits, behaviors, and perceptions. Many current health surveys of college students only focus on a single topic area. The NCHA is unique because it collects data about students' smoking habits, contraception use, mental health issues, relationship difficulties, sexual behaviors, exercise habits, preventive health practices, and perceptions of drug and alcohol use all in one convenient survey.

Going to college is a dramatic life change no matter the circumstances. For some students, it's the first time that they've lived on their own with the responsibility of their own well-being and for others it is an added commitment to an already busy life. The courses are challenging, leading to late nights of studying and a lot of stress. It's easy for new college students to feel overwhelmed and pick up some unhealthy lifestyle habits. This study aims to evaluate the relation between lifestyle factors and and how they contribute to a college student's academic performance.

Methodology

Data Description

The survey, conducted in 2015, includes data around the themes of: alcohol, tobacco, and other drug use, sexual health**,** weight, nutrition, and exercise**,** mental health and personal safety and violence. There was a total of 229 observations with all participants attending Winston-Salem State University. Table 1 displays the sample of variables from the survey we used for analysis in this data project.

Table 1: Variables Used for the Analysis

Variable Name	**Description**
NQ63	Categorical variable for approximate grade point average.
NQ46	Quantitative variable for age in years.
NQ26	Categorical variable for how participant describes their weight.
NQ50	Quantitative variable for weight in pounds.
NQ51	Year in school.
RNQ47C	Gender Identity.
NQ54A	Race Variable: White
NQ54B	Race Variable: Black
NQ54C	Race Variable: Hispanic or Latino/a
NQ54D	Race Variable: Asian or Pacific Islander

NQ54E	Race Variable: American Indian, Alaskan, or Hawaiian
NQ54F	Race Variable: Biracial or Multiracial
NQ27	Are you trying to lose weight?
NQ28	Number of servings of fruits and vegetables a day
PAREQ	Indicates whether or not the students meet the US recommended level of physical activity, based on responses to nq29a and nq29b.
NQ38A	Exercise to lose weigh in the last 30 days
NQ38B	Diet to lose weight in the last 30 days
NQ56	Relationship status
NQ19	Number of sexual partners in the last 12 months
NQ45C8	Relationship difficulties effect on academic performance
NQ45A1	Alcohol use effect on academic performance
BAC	Based on the reported number of drinks consumed the last time they "partied" or socialized (nq10), their approximate length of time of consumption (nq11), sex (nq46), weight (nq50), and an average rate of ethanol metabolism.
NQ45B6	Drug use effect on academic performance
NQ13	5 or more drinks in one sitting in the last 2 weeks
NQ45D6	Sleep difficulties effect on academic performance
NQ42	How many days did you get enough sleep in the last 7 days?

Statistical Analysis

To begin the analysis, we used descriptive statistics to characterize the sample. Then, we gathered graphical displays such as bar charts and histograms to visually display the data for easier interpretation. We decided to focus on each lifestyle factor individually and how it possibly effects a student's GPA. We began with the lifestyle factors of weight, nutrition, and exercise. To characterize weight among the sample, we found the average weight and displayed a histogram of all weights. Next, we wanted to examine the frequency of how students felt about their weights and if they wanted to change it. We performed two t-tests to compare the mean weight of students who did or did not exercise and to compare the mean weights of students who did or did not diet. Finally, we preformed chi-squared analyses to determine a relationship

between diet, exercise, and GPA. The next lifestyle factor we studied were relationships and sexual health. We gathered data on student's relationship status, the number of sexual partners they had in the last 12 months, and if they felt relationship issues contributed to their academic performance. We conducted a chi-squared test to see if relationship status had an association with average GPA. Third, we focused on alcohol and drug use. We characterized the sample by gathering data on the frequency of alcohol use, the average blood alcohol concentration (BAC), and how student's felt drug use impacted their academic performance. We also conducted a chi-square test to determine if students who consumed 5 or more drinks in one sitting in the last 2 weeks influenced their approximate GPA. Finally, we examined the effects of sleep habits on GPA. To determine this, we conducted chi-squared tests and gathered information on how students felt sleep difficulties effected their academic performance.

Results

There was a total of 229 participants in the sample. Among the participants, 13.10% identify as male, 86.90% identify as female and the mean age was 25 years old (SD=9.64). Figure 1 shows the distribution of age among the sample. 47.37% of students self-reported a B Grade Point Average (GPA). Figure 2 represents the distribution of GPA among the entire sample. In the sample, the distribution of undergraduate students was almost even among the years in school with 18.86% 1st year students, 17.11% 2nd year students, 21.49% 3rd year students and 19.74% 4th year students. The rest of the sample included 9.65% 5th or more year students, 10.53% graduate or professional students, and 2.63% of students doing other things. Race/Ethnicity of the complete sample was 154 Black participants, 56 White participants, 8 Hispanic/Latino participants, 13 Multi-Racial participants, 7 American Indian/Alaskan/Hawaiian participants and 4 Asian/Pacific Islander participants.

Figure 1: The distribution of age among the sample.

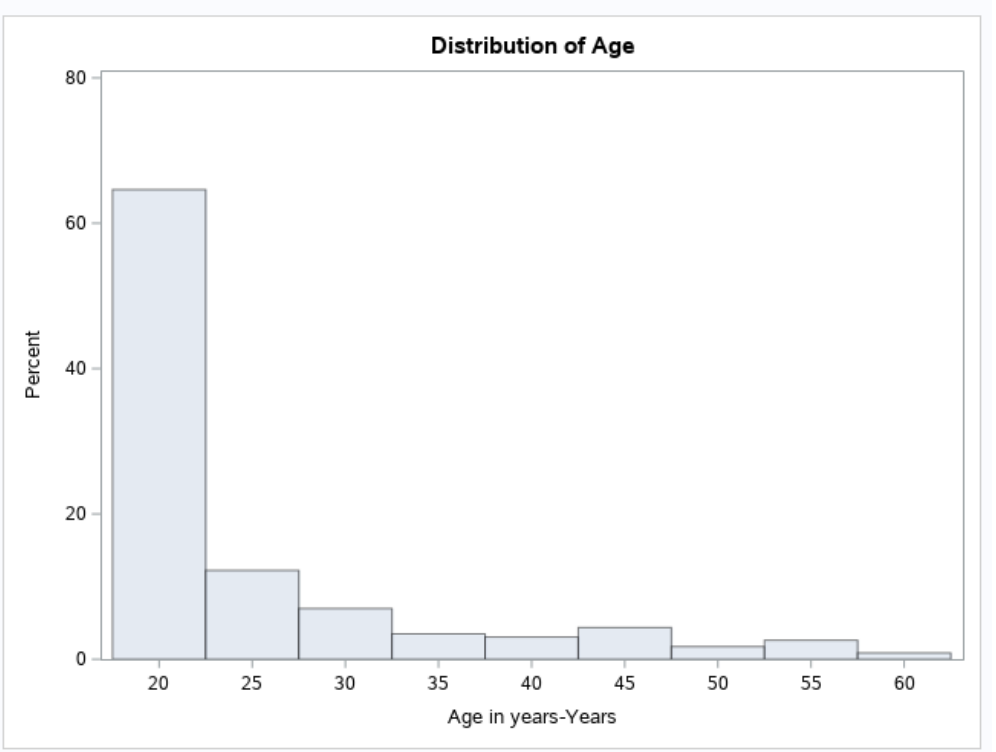
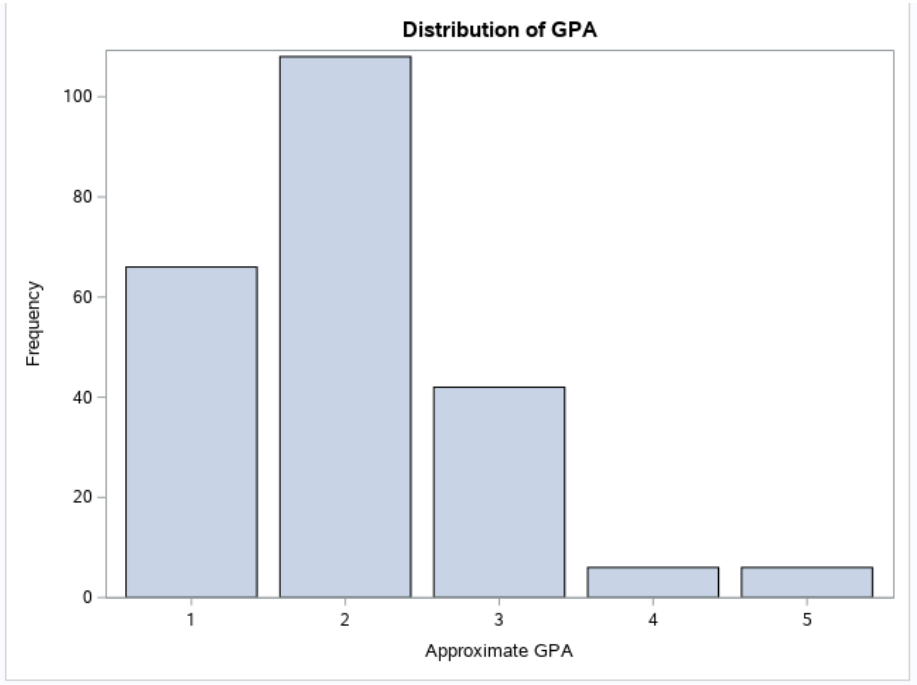


Figure 2: The distribution of GPA among the complete sample.



To begin studying the effects of weight, diet, and exercise on academic performance, we visualized the distribution of weight among the sample, shown by figure 3. The average weight of a student was approximately 174 pounds (SD=48.3). We also wanted to examine how students felt about their current weight and if they wanted to change it. Majority of students felt that they were about the right weight at 43.29% or slightly overweight at 37.89%. A considerable number of students felt that they were very overweight at 14.98%. Following these findings, we discovered that 62.11% of students were trying to lose weight and 21.15% were trying to maintain. A t-test was performed to compare the weight of students who did or did not exercise to lose weight in the last 30 days. The test showed that the mean weight of students that exercised in the last 30 days was approximately 189 pounds and the students who did not exercise was around 170 pounds. The test concluded that there was enough evidence to show that there is a difference in means (p=.0001). Another t-test was performed to compare the weight of students who did or did not diet to lose weight in the last 30 days. The test showed that the mean weight of students that dieted in the last 30 days was approximately 191 pounds and the students who did not diet was around 161 pounds. The test concluded that there was enough evidence to show that there is a difference in means (p=.0002). The outputs are shown by figures 4 and 5. A chi-squared test was performed to determine the student's diet effect on their average GPA. The contingency table for the test is shown by table 2. We hypothesized that students who consume a larger number of servings of fruits and vegetables would have a higher approximate GPA. The test concluded that there was not enough evidence to show a relationship between diet and GPA (p=.0584). Lastly, we performed a second chi-squared test to determine how exercise effects GPA. The contingency table is shown by table 3. We hypothesized that more exercise would lead to a higher average GPA. The test concluded that there was not enough evidence to show a relationship between exercise and approximate GPA (p=.5269).

Figure 3: The distribution of weight among the complete sample.

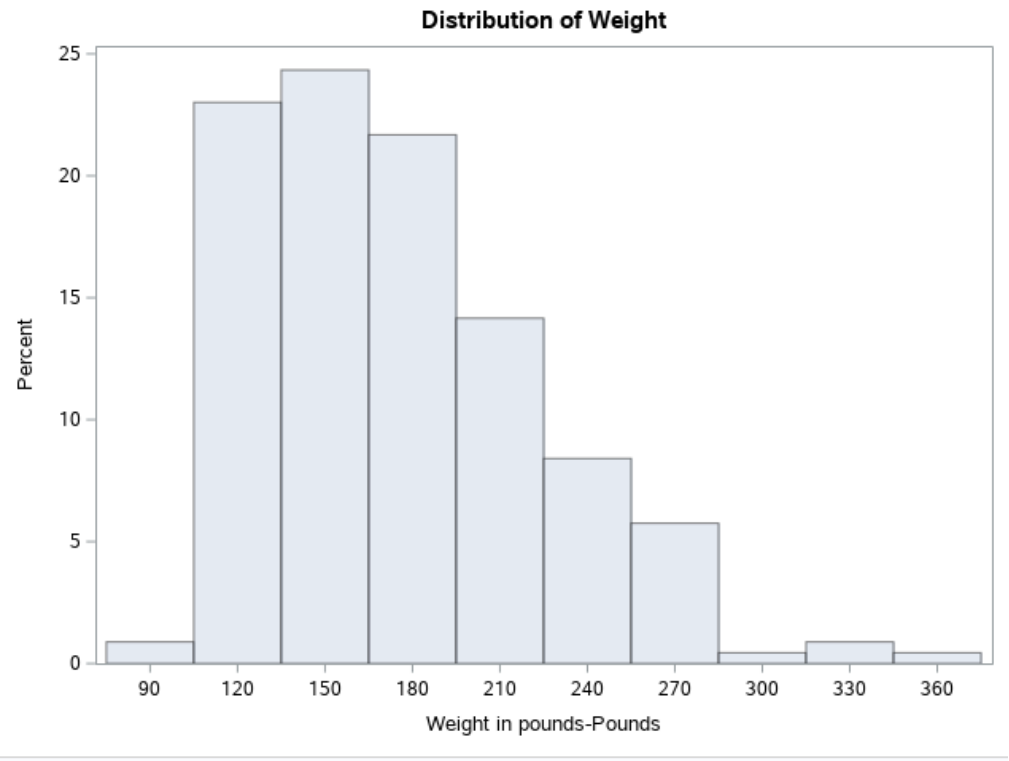


Figure 4: T-Test of NQ38A vs NQ50

NQ38A	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
1		130	163.9	43.4941	3.8147	95.0000	332.0
2		95	188.6	51.3167	5.2650	116.0	360.0
Diff (1-2)	Pooled		-24.7257	46.9507	6.3372		
Diff (1-2)	Satterthwaite		-24.7257		6.5017		

NQ38A	Method	Mean	95% CL Mean		Std Dev	95% CL Std Dev	
1		163.9	156.3	171.4	43.4941	38.7726	49.5355
2		188.6	178.2	199.1	51.3167	44.9132	59.8667
Diff (1-2)	Pooled	-24.7257	-37.2142	-12.2371	46.9507	42.9683	51.7532
Diff (1-2)	Satterthwaite	-24.7257	-37.5540	-11.8973			

Method	Variances	DF	t Value	Pr > |t|
Pooled	Equal	223	-3.90	0.0001
Satterthwaite	Unequal	182.04	-3.80	0.0002

Equality of Variances				
Method	Num DF	Den DF	F Value	Pr > F
Folded F	94	129	1.39	0.0815

Figure 5: T-Test of NQ38B vs NQ50

NQ38B	Method	N	Mean	Std Dev	Std Err	Minimum	Maximum
1		151	165.7	45.8917	3.7346	95.0000	315.0
2		71	190.5	45.4196	5.3903	120.0	332.0
Diff (1-2)	Pooled		-24.7345	45.7420	6.5822		
Diff (1-2)	Satterthwaite		-24.7345		6.5577		

NQ38B	Method	Mean	95% CL Mean		Std Dev	95% CL Std Dev	
1		165.7	158.4	173.1	45.8917	41.2341	51.7449
2		190.5	179.7	201.2	45.4196	38.9832	54.4216
Diff (1-2)	Pooled	-24.7345	-37.7068	-11.7622	45.7420	41.8380	50.4559
Diff (1-2)	Satterthwaite	-24.7345	-37.7006	-11.7684			

Method	Variances	DF	t Value	Pr > |t|
Pooled	Equal	220	-3.76	0.0002
Satterthwaite	Unequal	138.45	-3.77	0.0002

Equality of Variances				
Method	Num DF	Den DF	F Value	Pr > F
Folded F	150	70	1.02	0.9396

Table 2: Chi-Squared Analysis of NQ63 and NQ28

Table of NQ63 by NQ28					
	NQ28(Usual number of fruits/vegtables per day)				
NQ63(Approximate GPA)	1	2	3	4	Total
1	4 1.76 6.06 13.33	40 17.62 60.61 27.97	16 7.05 24.24 34.78	6 2.64 9.09 75.00	66 29.07
2	19 8.37 17.76 63.33	65 28.63 60.75 45.45	23 10.13 21.50 50.00	0 0.00 0.00 0.00	107 47.14
3	5 2.20 11.90 16.67	31 13.66 73.81 21.68	5 2.20 11.90 10.87	1 0.44 2.38 12.50	42 18.50
4	1 0.44 16.67 3.33	3 1.32 50.00 2.10	1 0.44 16.67 2.17	1 0.44 16.67 12.50	6 2.64
5	1 0.44 16.67 3.33	4 1.76 66.67 2.80	1 0.44 16.67 2.17	0 0.00 0.00 0.00	6 2.64
Total	30 13.22	143 63.00	46 20.26	8 3.52	227 100.00
Frequency Missing = 2					

Table 3: Chi-Squared Analysis of NQ63 and PAREQ

Table of NQ63 by PAREQ			
	PAREQ(PHYSICAL ACTIVITY GUIDELINES NOT MET OR MET)		
NQ63(Approximate GPA)	0	1	Total
1	38 16.67 57.58 25.17	28 12.28 42.42 36.36	66 28.95
2	76 33.33 70.37 50.33	32 14.04 29.63 41.56	108 47.37
3	29 12.72 69.05 19.21	13 5.70 30.95 16.88	42 18.42
4	4 1.75 66.67 2.65	2 0.88 33.33 2.60	6 2.63
5	4 1.75 66.67 2.65	2 0.88 33.33 2.60	6 2.63
Total	151 66.23	77 33.77	228 100.00
Frequency Missing = 1			

To begin studying the effects of relationships and sexual health on academic performance, we found that 49.34% of students were not in relationships, 25.55% were in relationships but not living together, and 25.11% were in relationships and living together. The number of sexual partners per student ranged from 0 to 15 in the last 12 months with the average being 1.4 (SD=1.87). The distribution can be seen in the histogram labeled figure 6. The data indicated that 30 students (13.16%) felt relationship difficulties did not affect their academics, 9 students (3.95%) felt relationship difficulties made them receive a lower grade on an exam or project, 6 students (2.63%) felt relationship difficulties made them receive a lower grade in a course, and 2 students (.88%) felt relationship difficulties contributed to significant disruptions in thesis, dissertation, research, or practicum work. Finally, the chi-squared test determined that there was enough evidence to show an association between relationship status and average GPA(p=.0398). The contingency table is shown by table 4.

Figure 6: The distribution of sexual partners among the complete sample.

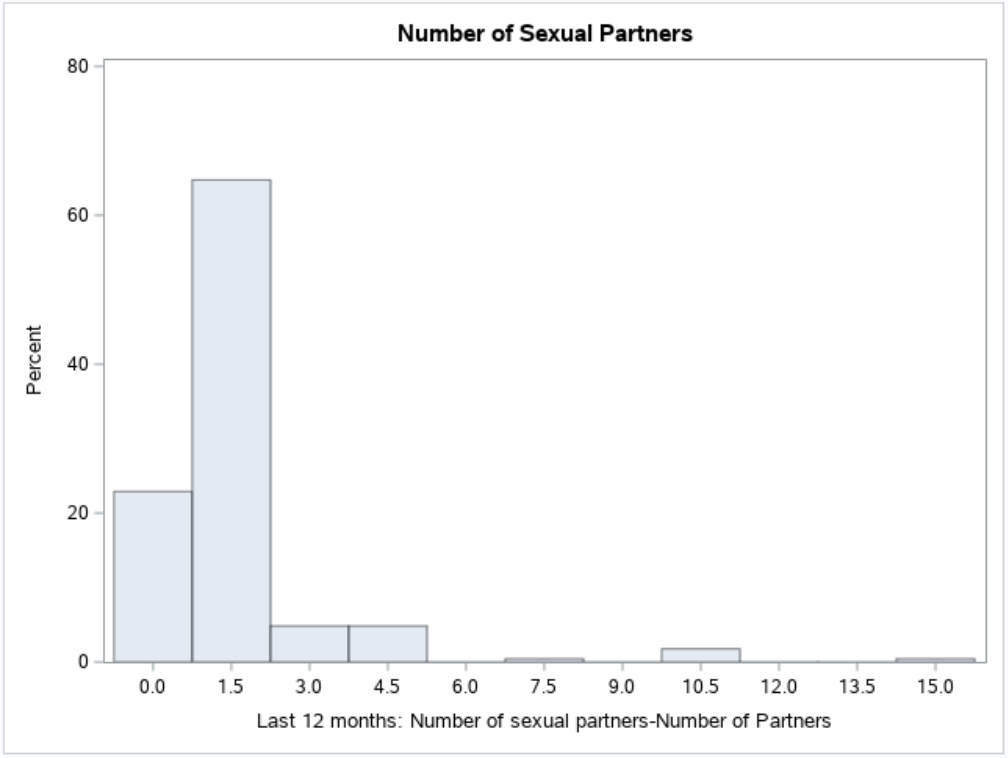


Table 4: Chi-Squared Analysis of NQ63 and NQ56

Table of NQ63 by NQ56				
	NQ56(Relationship status)			
NQ63(Approximate GPA)	1	2	3	Total
1	22 9.73 33.85 19.82	16 7.08 24.62 27.59	27 11.95 41.54 47.37	65 28.76
2	59 26.11 54.63 53.15	30 13.27 27.78 51.72	19 8.41 17.59 33.33	108 47.79
3	23 10.18 54.76 20.72	9 3.98 21.43 15.52	10 4.42 23.81 17.54	42 18.58
4	4 1.77 66.67 3.60	2 0.88 33.33 3.45	0 0.00 0.00 0.00	6 2.65
5	3 1.33 60.00 2.70	1 0.44 20.00 1.72	1 0.44 20.00 1.75	5 2.21
Total	111 49.12	58 25.66	57 25.22	226 100.00
Frequency Missing = 3				

To begin studying the effects of alcohol and drug use on academic performance, we found the average blood alcohol content ranged from 0 to .276. The average was approximately .023. The distribution can be seen in figure 7. The data indicated that 39 students (17.18%) felt that their alcohol use had no effect on their academic performance, 1 student (.44%) felt that their alcohol use made them receive a lower grade on an exam or project, and 2 students (.88%) felt that their alcohol use made them receive a lower grade in a course. For drug use, 6 students (2.63%) felt that it had no effect on their academic performance, 1 student (.44%) felt that it made them receive a lower grade on an exam or project, 2 students (.88%) felt that it made them receive a lower grade in a course, and 1 student (.44%) felt drug use caused them to drop a course or receive an incomplete. The chi-squared analysis was performed to determine a relationship between excessive drinking in the last 2 weeks and average GPA. Excessive drinking is defined as 5 or more alcoholic drinks in a sitting. The contingency table can be seen in table 5. The test determined that there was not enough evidence to show an association between excessive drinking and approximate GPA (p=.8505).

Figure 7: The distribution of BAC among the complete sample.

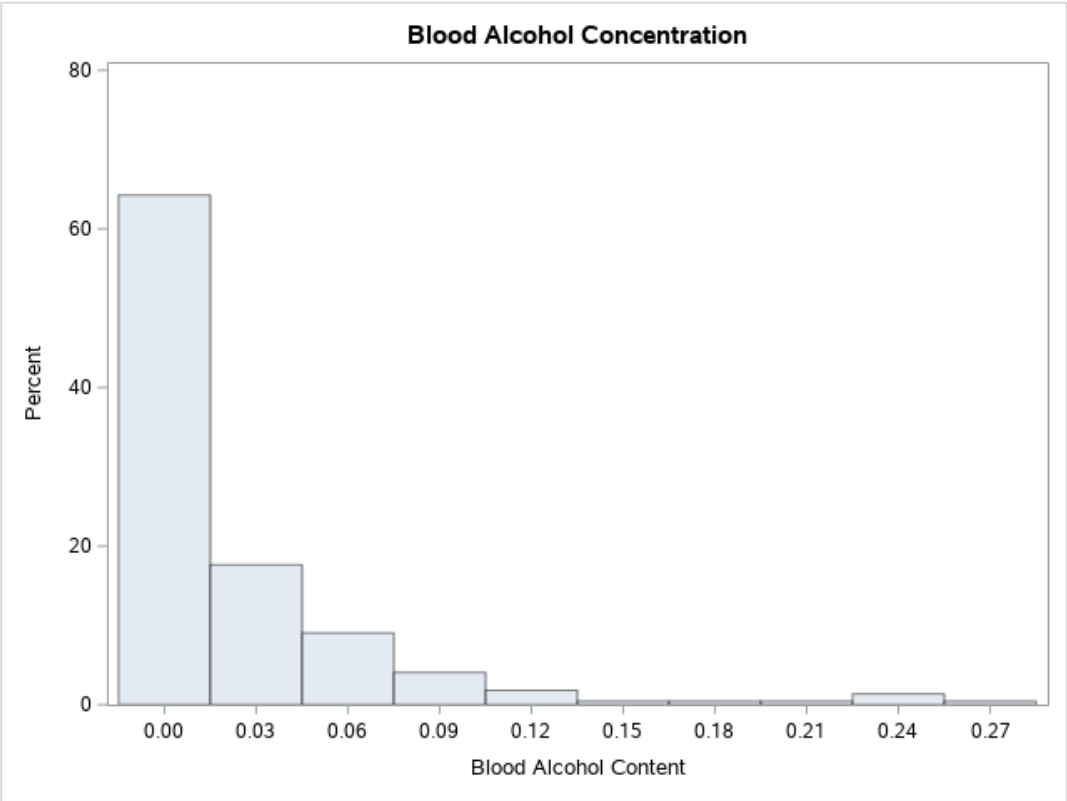


Table 5: Chi-Squared Analysis of NQ63 and NQ13

Table of NQ63 by NQ13										
	NQ13(Last 2 weeks: 5 or more drinks of alcohol at a sitting)									
NQ63(Approximate GPA)	1	2	3	4	5	6	7	8	10	Total
1	16 7.02 24.24 23.53	39 17.11 59.09 34.82	3 1.32 4.55 14.29	5 2.19 7.58 35.71	0 0.00 0.00 0.00	1 0.44 1.52 50.00	1 0.44 1.52 20.00	1 0.44 1.52 33.33	0 0.00 0.00 0.00	66 28.95
2	33 14.47 30.56 48.53	49 21.49 45.37 43.75	12 5.26 11.11 57.14	7 3.07 6.48 50.00	1 0.44 0.93 50.00	1 0.44 0.93 50.00	3 1.32 2.78 60.00	1 0.44 0.93 33.33	1 0.44 0.93 100.00	108 47.37
3	12 5.26 28.57 17.65	22 9.65 52.38 19.64	4 1.75 9.52 19.05	2 0.88 4.76 14.29	1 0.44 2.38 50.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.44 2.38 33.33	0 0.00 0.00 0.00	42 18.42
4	4 1.75 66.67 5.88	1 0.44 16.67 0.89	1 0.44 16.67 4.76	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	6 2.63
5	3 1.32 50.00 4.41	1 0.44 16.67 0.89	1 0.44 16.67 4.76	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.44 16.67 20.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	6 2.63
Total	68 29.82	112 49.12	21 9.21	14 6.14	2 0.88	2 0.88	5 2.19	3 1.32	1 0.44	228 100.00
Frequency Missing = 1										

To begin studying the effects of sleeping habits on academic performance we found that 54 students (23.79%) felt sleep difficulties had no effect on their academic performance, 26 students (11.45%) felt sleep difficulties made them receive a lower grade on an exam or project, 6 students (2.64%) felt sleep difficulties made them receive a lower grade in a course, 3 students (1.32%) felt that sleep difficulties made them drop a course or receive an incomplete, and 2 students (.88%) felt sleep difficulties contributed to significant disruptions in thesis, dissertation, research, or practicum work. We created a bar chart, shown in figure 8, to show how many days students felt they woke up rested in the past week. Majority of students recorded that they felt rested 4 days out of 7. Next, we used a chi-squared test to determine if a relationship between the number of days a student felt rested had a relationship with approximate GPA. The contingency table can be shown by table 6. We hypothesized that more rested days would lead to a higher GPA. The test determined that there was not enough evidence to show an association between playing number of days students got enough sleep and approximate GPA (p=.1775).

Figure 8: The number of days students got enough rest.

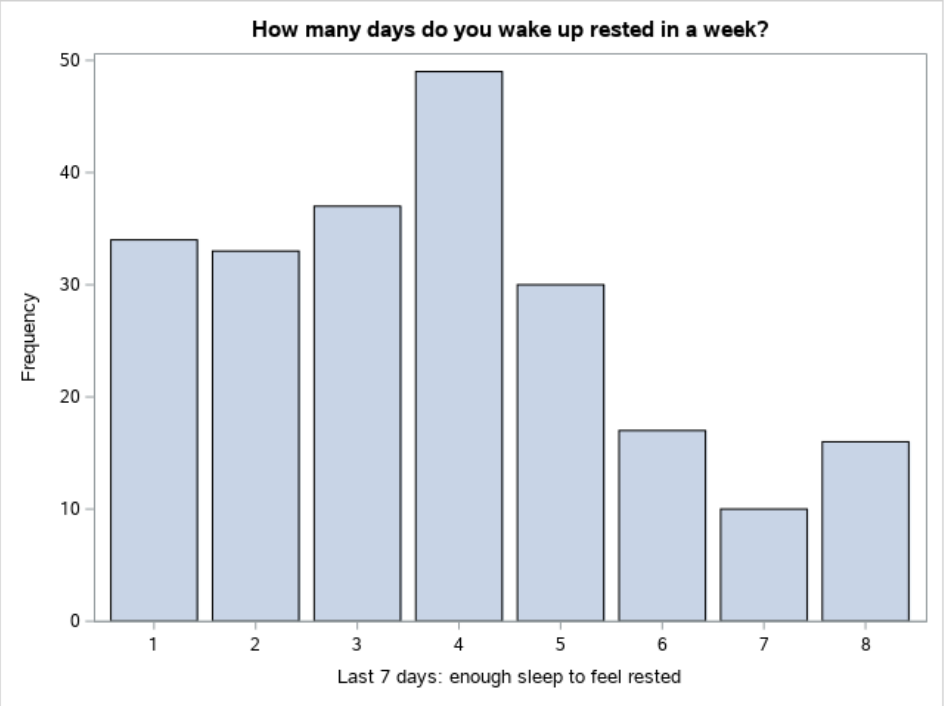


Table 6: Chi-Squared Analysis of NQ63 and NQ42

Table of NQ63 by NQ42

NQ63(Approximate GPA)	NQ42(Last 7 days: enough sleep to feel rested)								
	1	2	3	4	5	6	7	8	Total
1	7 3.10 10.77 20.59	7 3.10 10.77 21.21	16 7.08 24.62 43.24	12 5.31 18.46 24.49	8 3.54 12.31 26.67	8 3.54 12.31 47.06	3 1.33 4.62 30.00	4 1.77 6.15 25.00	65 28.76
2	16 7.08 14.81 47.06	19 8.41 17.59 57.58	11 4.87 10.19 29.73	27 11.95 25.00 55.10	14 6.19 12.96 46.67	7 3.10 6.48 41.18	6 2.65 5.56 60.00	8 3.54 7.41 50.00	108 47.79
3	8 3.54 19.51 23.53	5 2.21 12.20 15.15	10 4.42 24.39 27.03	8 3.54 19.51 16.33	5 2.21 12.20 16.67	1 0.44 2.44 5.88	0 0.00 0.00 0.00	4 1.77 9.76 25.00	41 18.14
4	3 1.33 50.00 8.82	2 0.88 33.33 6.06	0 0.00 0.00 0.00	0 0.00 0.00 0.00	1 0.44 16.67 3.33	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	6 2.65
5	0 0.00 0.00 0.00	0 0.00 0.00 0.00	0 0.00 0.00 0.00	2 0.88 33.33 4.08	2 0.88 33.33 6.67	1 0.44 16.67 5.88	1 0.44 16.67 10.00	0 0.00 0.00 0.00	6 2.65
Total	34 15.04	33 14.60	37 16.37	49 21.68	30 13.27	17 7.52	10 4.42	16 7.08	226 100.00

Frequency Missing = 3

Conclusion

Calculation of the descriptive statistics and usage of different statistical methods for categorical variables and continuous variables are just the first steps in any statistical analysis. Graphs and charts help with easier interpretation and assist with visualization of the evidence. The average age of students was high meaning there are possibly a considerable number of nontraditional students in the sample.

Students who dieted and exercised had a higher average weight than those who did not. However, we were unable to say whether there was an association between diet and exercise and GPA. Relationships and sexual health were the only lifestyle factor that showed a direct relationship with GPA. More students self-reported sleep difficulties as having an impact on the academic performance than any other lifestyle factor. Many of the chi-squared analysis concluded that there was not enough evidence to assume an association between the lifestyle factor and academic performance. This may be due to confounding variables that also play a part in the models.

In the future, we would like to get deeper into this study by including more continuous variables that would provide us the flexibility to use more statistical tests. We would also like to explore other lifestyle factors such as gambling, internet use, and mental health. There are endless opportunities to explore this data, if only time would permit.