

## Exam II – Take Home

### First Year College Student Nutrition Study

The data for your project comes from a nutritional study conducted at Youngstown State University during 1997-1998. Forty four subjects completed the study in which body measurements and nutrition data was collected at the beginning of the Fall semester and then again in the Spring semester. A portion of that data appears in the data file nutri1b.xls which is available at <http://csuohio.edu/holcombj/mth147/exam2.htm> Note that some variables may not be used for this assignment, but may be used for the take-home Final Examination.

Variable guide:

<b>studynum</b>	An identifying number to keep track of subjects
<b>gender</b>	0=male, 1=female
<b>residenc</b>	0=on-campus, 1=off-campus
<b>athlete</b>	0=non-athlete, 1=athlete
<b>heights</b>	Height in cm in the Spring semester
<b>weightf</b>	Weight in kg in the Fall semester
<b>weights</b>	Weight in kg in the Spring semester
<b>bmispring</b>	Body Mass Index in the Spring semester
<b>weightch</b>	Change in Weight from Fall to Spring (weights-weightf)
<b>wt10</b>	0=no, 1=yes for weight change over 10lbs.
<b>bmi25s</b>	0=no, 1=yes, for bmi over 25 in the Spring

The main purpose of the study was to examine weight and nutrition characteristics in the college first year population. One the variables examined was the change in weight from the fall to the spring. The variable **weightch** above is a variable that indicates whether the student gained more than 10 lbs during the first year (**weightch=1**) or did not (**weightch=0**).

Body Mass Index is a variable that is calculated by taking the weight in kg and dividing by height squared (note height must be in meters). Generally a BMI between 20 and 25 is considered good. BMI is a variable that indicates a person might be at risk for potential obesity. It does not apply in all situations, since many athletes might have a high BMI index as a result of a great amount of muscle mass. For the Spring semester, the variable **bmi25s=1** indicates a student has a BMI over 25, and **bmi25s=0** indicates a person has a BMI 25 or less.

Begin your report by providing a summary of the discrete variables (raw numbers and percents), and a table summary of the continuous variables of **heights**, **weights**, and **bmispring** (5 number summary and histogram). Determine the shape of the histograms and comment on whether the mean or median is a better measure of center.

Create a 2x2 contingency table of **residenc** vs. **wt10**. Let A be the event of being an on-campus resident and B be the event of gaining 10 or more pounds during the first year. Determine the following:

1.  $P(A)$
2.  $P(B)$
3.  $P(A \cap B)$
4.  $P(A \cup B)$
5.  $P(B|A)$
6.  $P(B|A')$

Now we will consider being an on-campus resident (A) as a risk factor and gaining more than ten pounds as the disease (B). Calculate the relative risk and interpret its meaning.

Create a 2x2 contingency table of **athlete** vs. **bmi25s**. Let A be the event of being an athlete and B be the event of having a BMI over 25 during the fall semester. Determine the following:

1.  $P(B)$
2.  $P(A \cap B)$
3.  $P(A \cup B)$
4.  $P(B|A)$
5.  $P(B|A')$

Now we will consider being an athlete (A) as a risk factor and having a BMI greater than 25 the disease (B). Calculate the relative risk and interpret its meaning.

Write a summary paragraph of at least five sentences that reports any of the findings that you find interesting or surprising. Also propose two additional variables that could have been measured with this study and describe how the measurement would have taken place.

Answers for Test

Sum of count	gender		
	0	1	Grand Total
Total	18	26	44

Sum of count	athlete		
	0	1	Grand Total
Total	31	13	44

Sum of count	residenc		
	0	1	Grand Total
Total	32	12	44

Sum of count	bmi25s		
	0	1	Grand Total
Total	31	13	44

Sum of count	wt10		
	0	1	Grand Total
Total	33	11	44

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*heights*

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Mean	170.7905
Standard Error	1.252515
Median	168.915
Mode	171
Standard Deviation	8.308246
Sample Variance	69.02696
Kurtosis	-0.56172
Skewness	0.575361
Range	32.3
Minimum	157.5
Maximum	189.8
Sum	7514.78
Count	44

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*weights*

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Mean	69.84773
Standard Error	1.898805
Median	67.9
Mode	58.2
Standard Deviation	12.59525
Sample Variance	158.6402
Kurtosis	1.10777
Skewness	1.010204
Range	57.2
Minimum	48.3
Maximum	105.5
Sum	3073.3
Count	44

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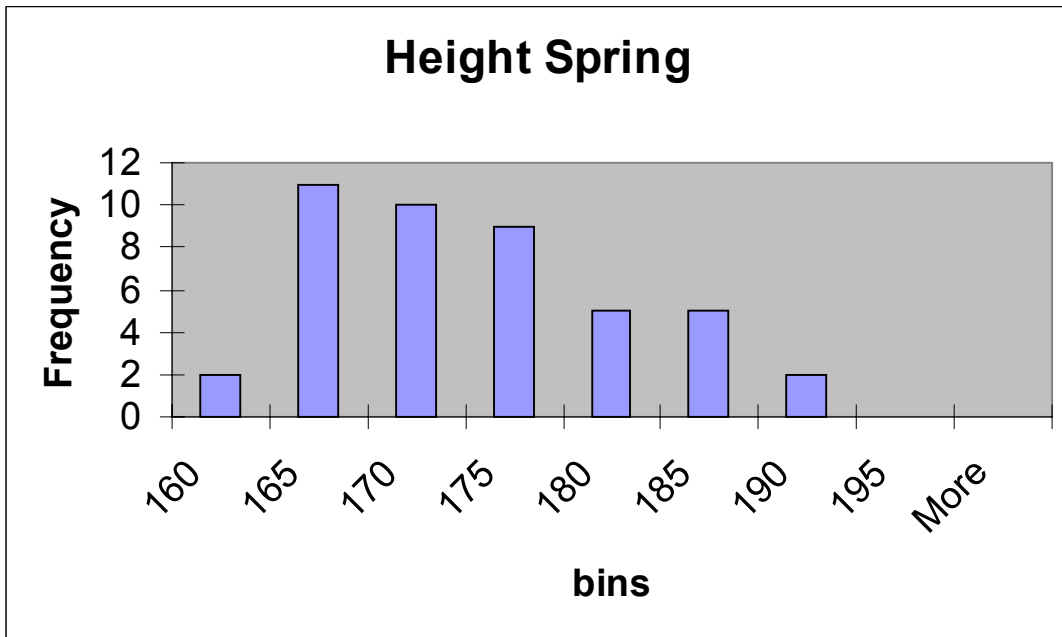
*bmispring*

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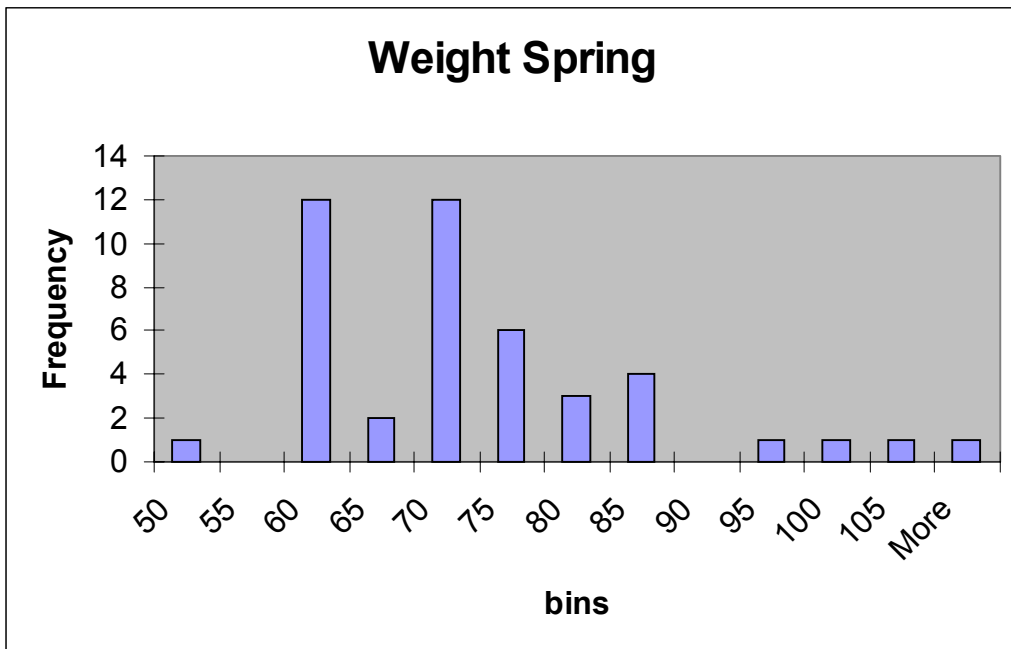
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Standard Error	0.543692
Median	23.1
Mode	20.8
Standard Deviation	3.606445
Sample Variance	13.00645
Kurtosis	2.360322
Skewness	1.205251
Range	18.3
Minimum	18.2
Maximum	36.5
Sum	1052.6
Count	44

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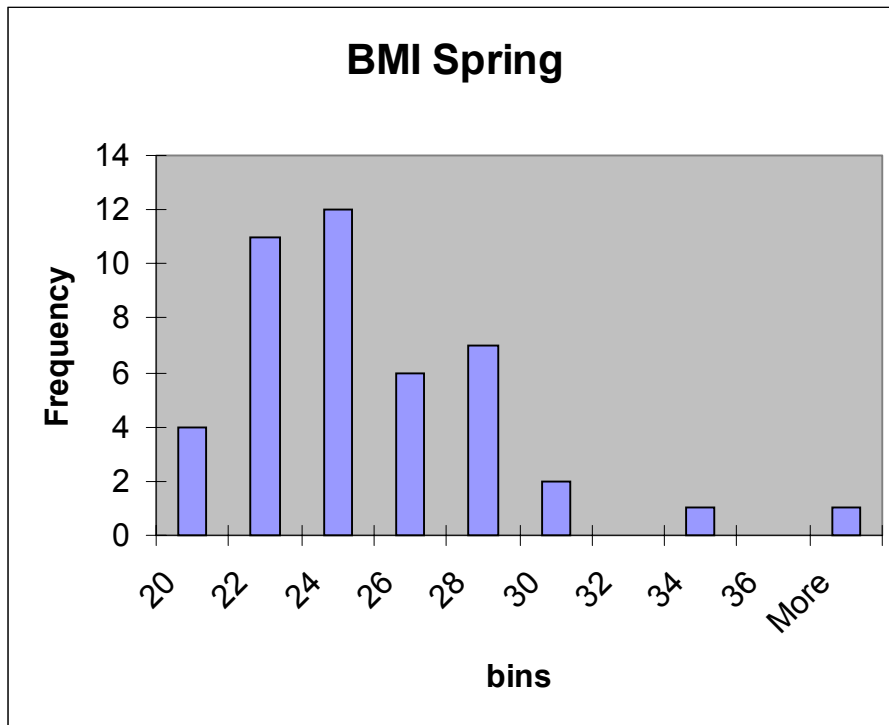
Height Spring



Weight Spring



BMI SPRING



Sum of count		wt10	
residenc	0	1	Grand Total
0	23	9	32
1	10	2	12
Grand Total	33	11	44

Sum of count		bmi25s	
athlete	0	1	Grand Total
0	24	7	31
1	7	6	13
Grand Total	31	13	44