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 nutri1a.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:

studynum	An identifying number to keep track of subjects
gender	0=male, 1=female
residenc	0=on-campus, 1=off-campus
athlete	0=non-athlete, 1=athlete
heightf	Height in cm in the Fall semester
weightf	Weight in kg in the Fall semester
weights	Weight in kg in the Spring semester
bmifall	Body Mass Index in the Fall semester
weightch	Change in Weight from Fall to Spring (weights-weightf)
wt10	0=no, 1=yes for weight change over 10lbs.
bmi25f	0=no, 1=yes, for bmi over 25 in the Fall

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 Fall semester, the variable **bmi25f=1** indicates a student has a BMI over 25, and **bmi25f=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 **heightf**, **weightf**, and **bmifall** (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 **athlete** vs. **wt10**. Let A be the event of being an athlete 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 not being an athlete (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. **bmi25f**. 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) [note the change from above] 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	bmi25f		
	0	1	Grand Total
Total	34	10	44

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

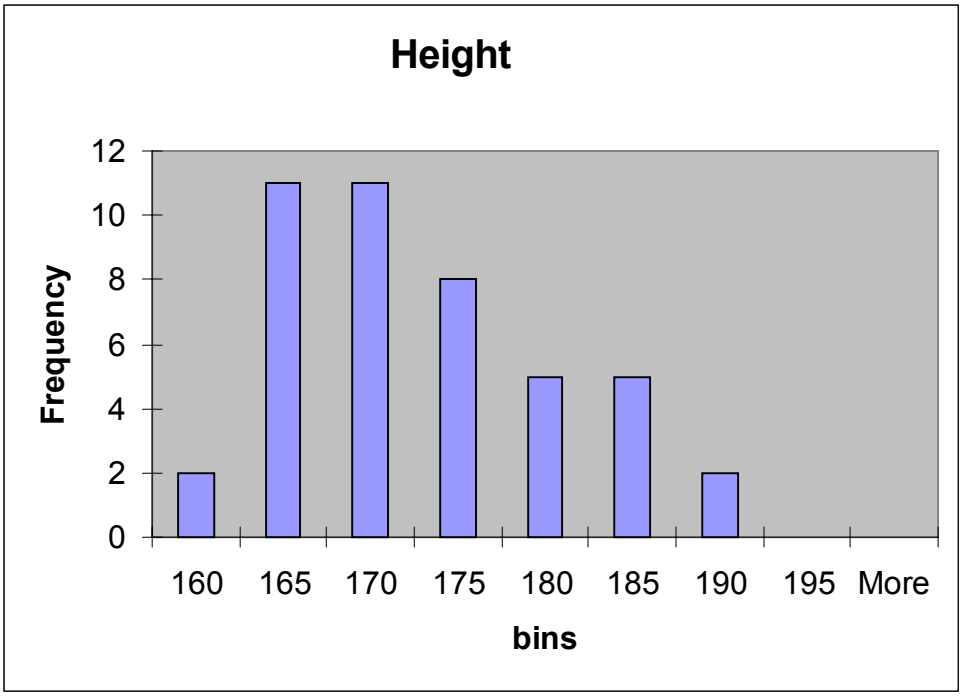
heightf	
Mean	170.4198
Standard Error	1.243183
Median	168.225
Mode	171
Standard Deviation	8.246346
Sample Variance	68.00222
Kurtosis	-0.55344
Skewness	0.583278
Range	32.51
Minimum	156.89
Maximum	189.4
Sum	7498.47
Count	44

weightf	
Mean	67.16364
Standard Error	1.819198
Median	65.5
Mode	67.9
Standard Deviation	12.0672
Sample Variance	145.6173
Kurtosis	1.111704
Skewness	1.075761
Range	52.1

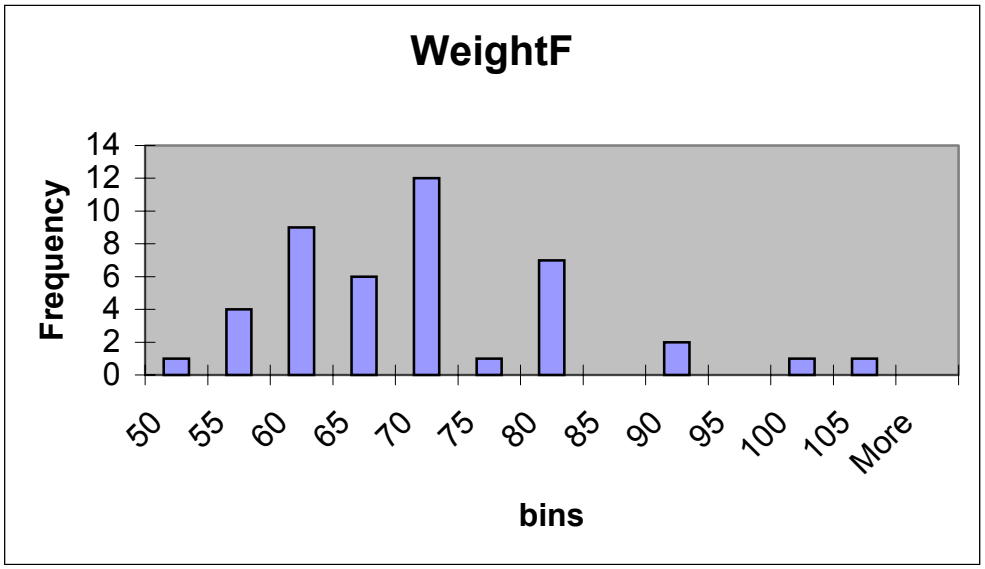
Minimum	49.2
Maximum	101.3
Sum	2955.2
Count	44

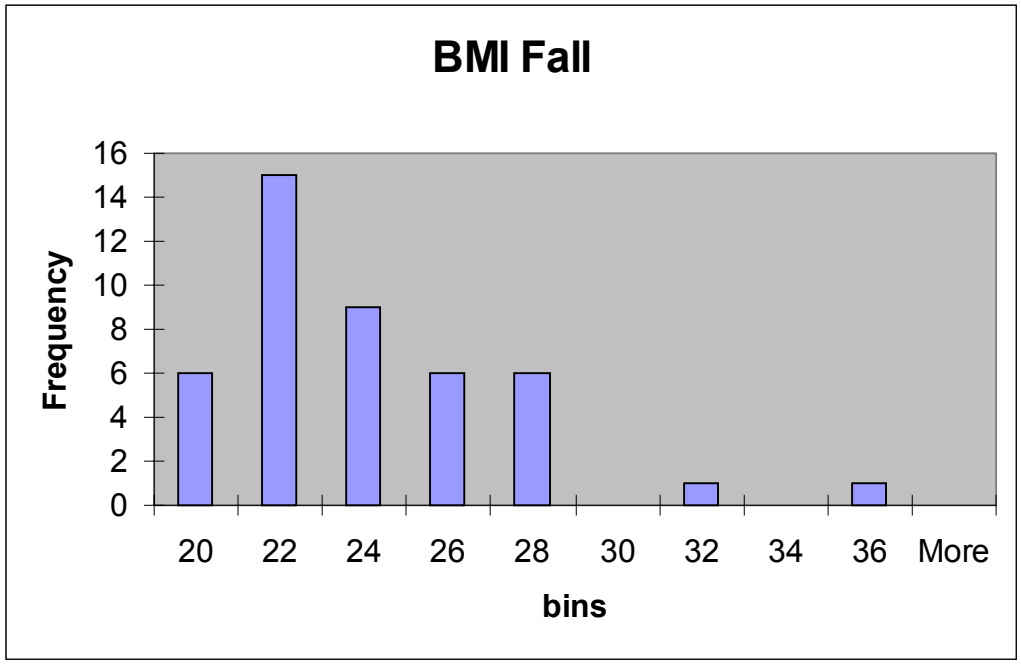
bmifall	
Mean	23.05227
Standard Error	0.506224
Median	22.2
Mode	21.7
Standard Deviation	3.357912
Sample Variance	11.27558
Kurtosis	2.499868
Skewness	1.300511
Range	16.9
Minimum	18.1
Maximum	35
Sum	1014.3
Count	44

Height



weightf


WeightF
Frequency
14
12
10
8
6
4
2
0
50
55
60
65
70
75
80
85
90
95
100
105
More
bins


BMI Fall
Frequency
16
14
12
10
8
6
4
2
0
20
22
24
26
28
30
32
34
36
More
bins

Sum of count	wt10		
athlete	0	1	Grand Total
0	23	8	31
1	10	3	13
Grand Total	33	11	44

Sum of count	bmi25f		
athlete	0	1	Grand Total
0	26	5	31
1	8	5	13
Grand Total	34	10	44