Frequency Distributions and Graphs

Assignment

G&W, Chapter 2

Terms you should know.

Frequency Distribution

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. . . .
. . . .

Grouped Frequency Distribution

. . . .
. . . .
. . . .

Cumulative Frequency
Distribution

. . . .
. . . .
. . . .

Limits

Real Limit

. . . .
. . . .
. . . .

Apparent Limit

. . . .
. . . .
. . . .

Real Upper Limit

. . . .
. . . .
. . . .

Real Lower Limit

. . . .
. . . .
. . . .

Proportion

. . . .
. . . .
. . . .

Percent

. . . .
. . . .
. . . .

Percentile

. . . .
. . . .
. . . .

Cumulative Percent

. . . .
. . . .
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Graphs

Histogram

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Bar Chart

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Frequency Polygon

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Ogive

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Stem and Leaf Display

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Box Plot

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Distributions

Normal distribution

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Skewed distribution

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Positive skew

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Negative Skew

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Bimodal distribution

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Multimodal distribution

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Formulas and Symbols You Should Know.

f

. . . .
. . . .
. . . .

N

. . . .
. . . .
. . . .

P_N

. . . .
. . . .
. . . .

Computations You Should be Able to Perform.

1. The following data represent reposes to the raw scores on a personality test. This scale measures a construct called Calmness. The simple frequency distribution is shown below.

Raw Score	Frequency	Percent	Cumulative Percent
18	14	.4	100.0
17	58	1.6	99.6
16	84	2.3	98.0
15	109	3.0	95.7
14	150	4.1	92.7
13	185	5.1	88.6
12	235	6.5	83.5
11	297	8.2	77.0
10	297	8.2	68.8
9	344	9.5	60.6
8	341	9.4	51.1
7	353	9.7	41.7
6	327	9.0	32.0
5	243	6.7	23.0
4	198	5.5	16.3
3	158	4.4	10.9
2	111	3.1	6.5
1	76	2.1	3.4
0	49	1.4	1.4

a. What score falls at P_{32}?

b. Approximately how many people fall between a score of 11 and 15?

c. What percent of the people fall between a score of 5 and 9?

d. On the next page draw and label a simple histogram using the frequency data.

e. How would you characterize the shape of this curve?

Psychological Statistics
Frequency Distributions and Graphs
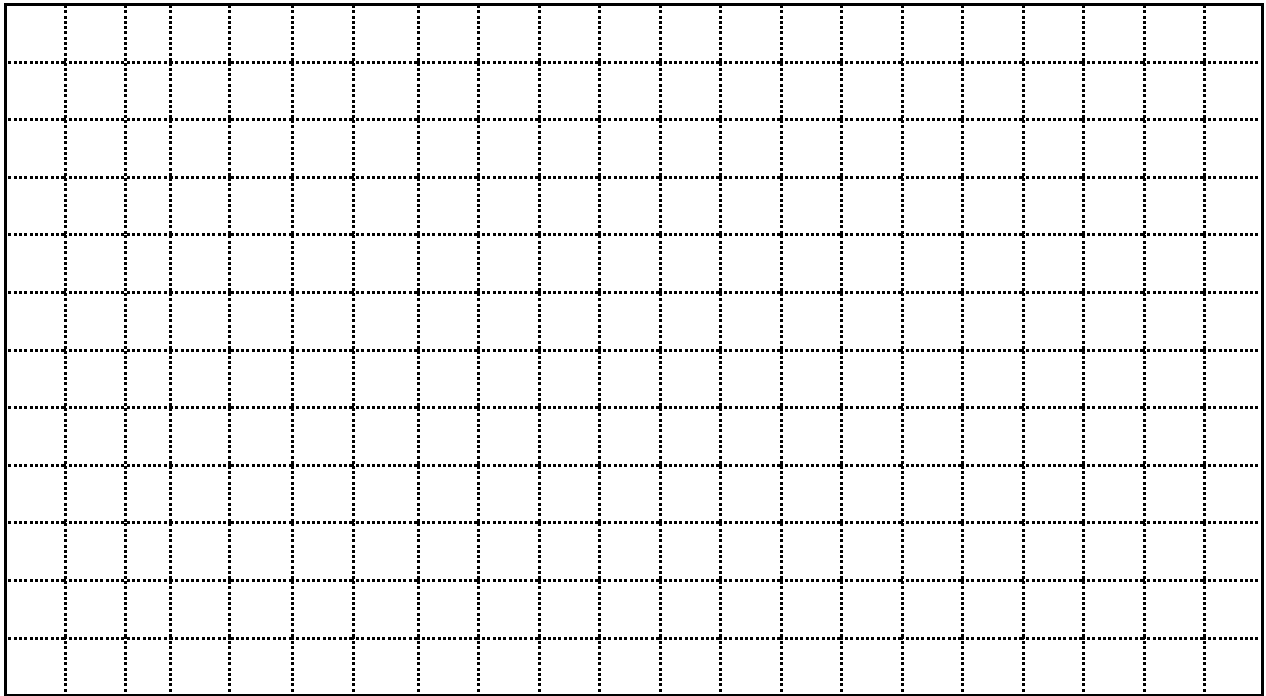
Concepts and Interpretation

1. For each of the following class intervals identify any shortcomings.

A	B	C
50 and up	20 - 25	5 - 9
44 - 49	14 - 19	10 - 14
38 - 43	8 - 13	14 - 19
26 - 31	0 - 7	21 - 25

A.

B.

C.

2. The following questions relate to this distribution of scores.

Class Interval	f	Cum f	%	Cum %
90 - 99	6	C	12.24	100.00
80 - A	8	43	16.33	E
70 - 79	12	35	24.49	71.43
60 - 69	10	23	D	46.94
50 - 59	7	13	14.29	26.53
40 - 49	6	6	12.24	12.24
	B		F	.

a. What figure goes at each of the following letters?

A. ___   B. ___   C. ___

D. ___   E. ___   F. ___

b. What symbol is used to indicate the figure that goes at B?   ___

3. What information can you get from a frequency distribution that you cannot get from a histogram or bar chart?

4. What are the problems with interpreting percentiles when the distribution of the test scores is not symmetrical?

5. The following questions refer to this stem and leaf display.

4	023
5	2389
6	2334579
7	123456779999
8	023467
9	3359
10	2338
11	23

a. How many people got a score of 99?

b. How many people got a score of 44?

c. What is the most frequently occurring score?

6. The chart on the next page was developed from data that was collected from a survey that was given to 74 female independent business owners and 66 female students. They were asked to rank the importance of twenty life values.   This table summarizes the results for nine of these items.

The female entrepreneurs ranked which value as the most important?

For which value is there the greatest difference between the students and the entrepreneurs?

What value did the students find least important?

For which value is there the greatest agreement between the students and the entrepreneurs?

Median Rankings for Female Entrepreneur and Students
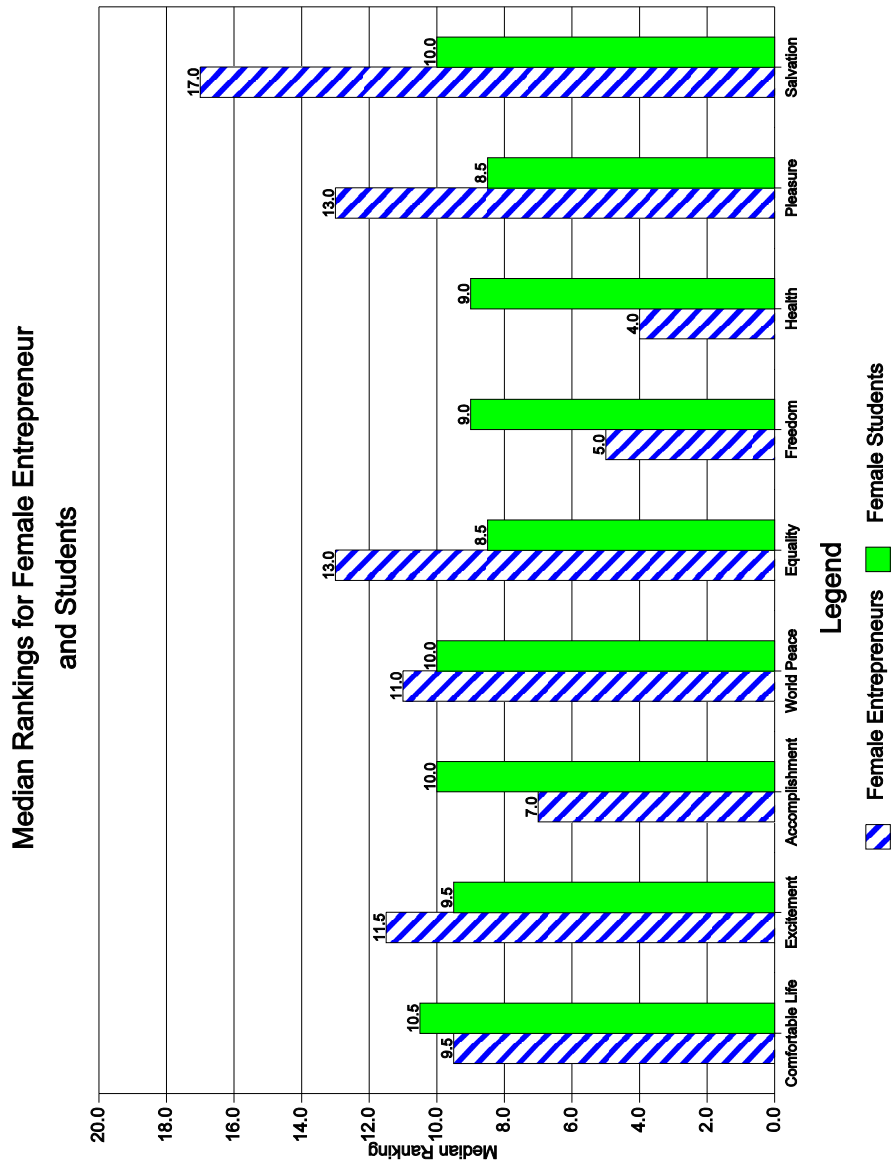
Measures of the Middle

Assignment

G&W, Chapter 3

Terms you should know.

Mean

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Median

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....
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Mode

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Formulas and Symbols You Should Know

X

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....
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Mo

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....
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Mdn

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P_{50}

....
....
....

$\bar{X}$ or M

....
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$$\frac{\Sigma X}{N}$$

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....
....

μ

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Concepts and Interpretation

1. What would wrong with each of the following?

    a. A distribution with a Mean of 60 a Median of 70 and a Mode of 40.

    b. $\Sigma(X-M)=-7$

2. When we refer to the Mean as being a *"measure of central tendency"*, to what *"center"* is this referring?

Measures of Differences

Assignment

G&W, Chapter 4

Terms you should know.

Range

. . . .
. . . .
. . . .

Deviation Score

. . . .
. . . .
. . . .

Variance

. . . .
. . . .
. . . .

Standard Deviation

. . . .
. . . .
. . . .

Unbiased estimate

. . . .
. . . .
. . . .

Biased estimate

. . . .
. . . .
. . . .

Sum of Squares

. . . .
. . . .
. . . .

Degrees of Freedom

. . . .
. . . .
. . . .

Formulas and Symbols You Should Know

σ ....

σ^2 ....

s ....

s² ....

SD ....

sd² ....

SS ....

$$\frac{\Sigma(X-M)^2}{N}$$

....

$$\sqrt{\frac{\Sigma(X-M_X)^2}{N}}$$

....

$$\sqrt{\frac{\Sigma(X-M_X)^2}{N-1}}$$

....

$$\frac{SS}{df}$$

....

Computations You Should be Able to Perform.

X	X - Mx	(X - Mx)²	Y	Y - My	(Y - My)²	Z	Z - Mz	(Z - Mz)²
40			43			55		
40			42			50		
40			41			45		
40			40			40		
40			39			35		
40			38			30		
40			37			25		

1. Just glancing at each of these distributions, which do you think has the largest standard deviation?

2. Compute the deviation scores for each of these distributions.

   a. What is $\Sigma(X - Mx)$? _____

   b. What is $\Sigma(Y - My)$? _____

   c. What is $\Sigma(Z - Mz)$? _____

   d. Why did these scores turn out the way they did?

3. Compute the standard deviation for each of these distributions.

   a. What is the standard deviation for group x? _____

   b. What is the standard deviation for group y? _____

   c. What is the standard deviation for group z? _____

Concepts and Interpretation

1. Suppose you were asked to teach a class in statistics, and you were given a choice of one of three classes. The classes were given a standardized test of knowledge of math and algebra. The national average on this test is 50, and the national standard deviation is 10. All you know about the classes are the scores on the tests. These scores are shown below.

	Class A	Class B	Class C
N	25	27	24
Mean Test Score	45	55	50
Standard Deviation	6	19	12

    d.   Which of the three classes would you prefer to teach? Why?

4. Why do you divide the sum of squares by N-1 instead of N?

5. The following questions refer to this frequency distribution.

	Score	f
B	77	4
C	78	8
D	79	11
E	80	18
F	81	12
G	82	9
H	83	3
I	84	2
J	135	1

    a.   What happens to the Range when row J is eliminated?

          (Do the computation)

    b.   What will happen to S^2 and S and when row J is eliminated?

          You need not do the computation, just tell what will happen.

    c.   If you were summarizing the variability of this data set in a psychological report, how would you do it? (Why?)

6. When we refer to the SUM of SQUARES, what is squared? Why?

7. The variance is referred to as the average squared deviation. What does this mean?

8. Is it possible to have negative sum of squares? Explain your answer.

9. When we refer to *deviation scores*, what is deviating from what?

SPSS Assignment #1.

NAME: _____

1. Using SPSS, compute the mean of a set of scores.

50	40	55	57	59	42	44	44
39	36	42	31	52	50	40	43
39	35	48	57	49	57	60	55
51	50	40	37	42	52	62	50

   a. What is the mean of this distribution?

   b. What is the mode?

   c. What is the median?

   d. Suppose that we added 4 points to each of the scores.

      i. What would the new median be?

      ii. What would the new mean be?

      iii. What would the new mode be?

      iv. What would the new standard deviation be?

2. Using the SPSS data set perform the following.

   a. For the variable RACE
      i. Calculate a frequency distribution.
         (1)   What percent of the sample is Hispanic?

         (2)   Which race had the fewest number of participants?

      ii. Calculate a graph for this variable.

b. For the AGE

 i. Calculate and label a frequency distribution.

  (1) What is the most frequent age?

  (2) What is the least frequent age?

  (3) If you were putting this table in a psychological paper what changes would you make?

 ii. Compute the descriptive statistics including the Mean, Median, Mode, Standard Deviation and Variance.

 iii. Prepare and label a graph of this variable.

  (1) What is the shape of this distribution?

  (2) Why do you think this distribution is shaped the way it is?