

## AS1 (Assignment 1, Unit 2): Central Tendency and Shapes of Distributions

1. What is the goal of central tendency?

A measure of central tendency aims to find the "middle" of a distribution.

2. Find the mean, median, and mode for the following sample of scores: 5, 4, 5, 2, 7, 1, 3, 5

Mean \_\_\_\_\_ 4 \_\_\_\_\_      Median \_\_\_\_\_ 4.5 \_\_\_\_\_      Mode \_\_\_\_\_ 5 \_\_\_\_\_

3. Find the mean, median, and mode for the following sample of scores: 3, 5, 7, 3, 9, 8, 3, 7, 5

Mean \_\_\_\_\_ 5.556 \_\_\_\_\_      Median \_\_\_\_\_ 5 \_\_\_\_\_      Mode \_\_\_\_\_ 3 \_\_\_\_\_

4. Find the mean, median, and mode for the scores in the following frequency table.

<u>X</u>	<u>f</u>	
6	1	6
5	2	10
4	2	8
3	2	6
2	2	4
1	5	5
39	14	

1,1,1,1,1,2,2,3,3,4,4,5,5,6

5. Find the mean, median, and mode for the scores in the following frequency table.

<u>X</u>	<u>f</u>	
8	1	8
7	1	7
6	2	12
5	5	25
4	2	8
3	2	6
66	13	

3,3,4,4,5,5,5,5,5,6,6,7,8

6. Explain why the median is often preferred to the mean as a measure of central tendency for a skewed distribution?

The median is preferred to the mean for a skewed distribution because outliers will pull the mean towards the outlier number (whether higher or lower), giving a misleading average or 'middle' of the dataset. Meanwhile, the median is typically not affected in this way by outliers.

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7. A researcher conducts a study comparing two different treatments with a sample of participants divided into 2 treatments. The study produced the following data:

Treatment 1: 6, 7, 11, 4, 19, 17, 2, 5, 9, 13, 6, 23, 11, 4, 6

2, 4, 4, 5, 6, 6, 6, 7, 9, 11, 11, 13, 17, 19, 23

Treatment 2: 10, 9, 6, 6, 1, 11, 8, 6, 3, 2, 11, 1, 12, 7, 10

1, 1, 2, 3, 6, 6, 6, 7, 8, 9, 10, 10, 11, 11, 12

Calculate mean for treatment 1 and put your answer here 9.533

Calculate mean treat treatment 2 and put your answer here 6.867

Calculate the median for treatment 1 and put your answer here 7

Calculate the median for treatment 2 and put your answer here 7

Calculate the mode for treatment 1 and put your answer here 6

Calculate the mode for treatment 2 and put your answer here 6

8. Schmidt (1994) conducted a series of experiments examining the effects of humor on memory. In one study, participants were shown a list of sentences of which half were humorous and half were non-humorous. Schmidt then measured the number of each type of sentence recalled by each participant. The following scores are similar to the results obtained in the study:

Humorous	Non-humorous
4 5 2 4	5 2 4 2
6 6 6 6	2 3 1 6
2 5 4 3	3 2 3 3
1 3 5 5	4 1 5 3

Mean for humorous group: 4.1875 Mean for non-humorous group: 3.0625

Does the data suggest that humor helps memory? Answer “yes” or “no” and why:

Yes. The data seems to suggest that there is a possible correlation with humor (in this case humorous sentences) and memory because the mean score for the humorous group is higher than the non-humorous group.

9. A researcher measured the time that a sample of students selected from Caldwell University spent studying on a given week during a semester. Here are the data in hours:

4, 6, 5, 4, 5, 7, 8, 6, 5, 7, 8, 9, 9, 1, 0, 2, 3, 5, 6, 4, 3, 7, 8, 4, 5, 6, 7, 8, 7, 6, 21, 7, 8, 9, 2, 3, 2

ANSWER the following questions based on the information given in question #9

Name the population: all students from Caldwell University

Name the sample: the students from Cadwell University who were selected for the study

How many participants are in the sample? 37

What is the scale of measurement? hours spent studying

Is the scale continuous or discrete? discrete

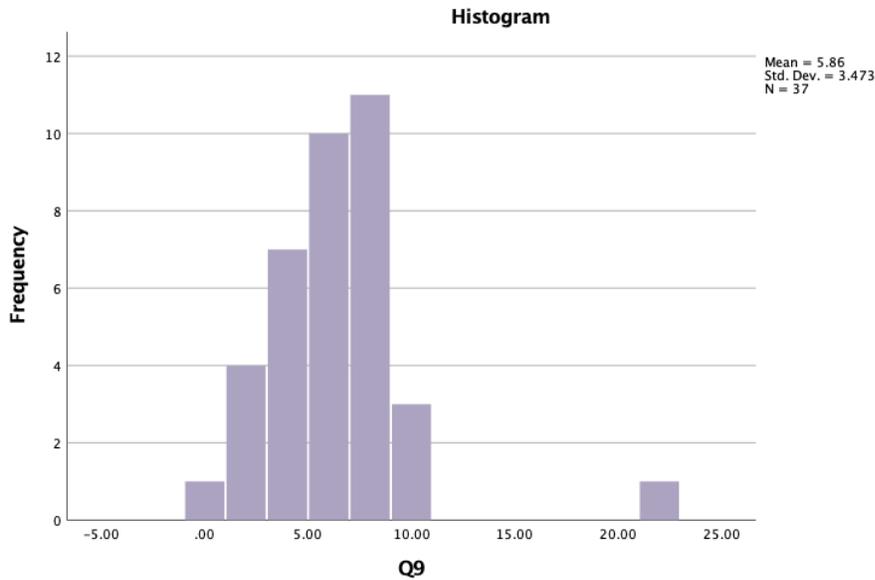
9a. Use SPSS to compute the following (using the data from question 9):

- generate a frequency table
- the appropriate graph
- mean
- median
- mode

PASTE your SPSS results here:

Statistics		
Q9		
N	Valid	37
	Missing	0
Mean		5.8649
Median		6.0000
Mode		7.00
Std. Deviation		3.47341

Q9					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	.00	1	2.7	2.7	2.7
	1.00	1	2.7	2.7	5.4
	2.00	3	8.1	8.1	13.5
	3.00	3	8.1	8.1	21.6
	4.00	4	10.8	10.8	32.4
	5.00	5	13.5	13.5	45.9
	6.00	5	13.5	13.5	59.5
	7.00	6	16.2	16.2	75.7
	8.00	5	13.5	13.5	89.2
	9.00	3	8.1	8.1	97.3
	21.00	1	2.7	2.7	100.0
	Total	37	100.0	100.0	



Based on your SPSS results, please answer the following questions:

What is the mean? 5.8649 What is the mode? 7 What is the median? 6

What is the shape of this distribution? Answer= Negative Skewed

Which is the “best” measure of central tendency for these data?

There is no "best" measure of central tendency for a given set of data.

Why?

Each measure of central tendency has a distinct definition and selecting the appropriate measure of central tendency for a given set of data is critical.

Going on to a different set of questions, which have nothing to do with any of the above questions:

10. Why are there three measures of central tendency rather than just one?

There are three measures of central tendency because each method of measuring a data set's 'middle' can be useful in different situations and there's no 'one best way' to measure the central tendency for every situation.

11. Name a situation where the mean would NOT be an appropriate measure of central tendency. Do not use an example from class lecture

Run times by Emmeline Tantry to AU in 5 trips

19, 20, 22, 99, 24

12. Name a situation where only the mode could be used as a measure of central tendency  
Because it is impossible to calculate the median or mean when the data is categorical, the mode is the only measure of central tendency we can use. The mode is Action in this example.

<u>Favorite genre</u>	<u>Frequency</u>
Romcom	0
Horror	20
Action	35
K-drama	15
Mystery	5

13. If a distribution were perfectly symmetrical and Mary got an exam score that was equal to the median, and John got an exam score that was equal to the mean, what would you know about their scores?

Answer \_\_\_ \_Mary's score was the same as John's score\_\_\_\_\_

14. A professor gave a very, very difficult exam. Vincent scored at the mode, Brandon scored at the mean, and Linda scored at the median. Place the names in order from who got the highest exam score to who got the lowest exam score.

Answer: \_\_\_\_\_Brandon\_\_\_\_\_ \_\_\_\_\_Linda\_\_\_\_\_ \_\_\_\_\_Vincent\_\_\_\_\_

15. A professor gave a very, very easy exam. Dan scored at the mode, Luci scored at the median, and Stephen scored at the mean. Place the names in order from who got the lowest exam score to who got the highest exam score:

Answer: \_\_\_\_\_Stephen\_\_\_\_\_ \_\_\_\_\_Luci\_\_\_\_\_ \_\_\_\_\_Dan\_\_\_\_\_

### **True / False Questions**

*Please type "T" if the statement is true, and type "F" if the statement is false in the provided spaces*

- \_\_\_F\_\_\_ 16. A student takes a 10-point quiz each week in statistics class. If the student's quiz scores for the first three weeks are 2, 6, 5, and 10, then the mean score is  $M = 9$ .

- \_\_\_T\_\_\_ 17. A sample of  $n = 6$  scores has  $\Sigma X = 48$ . This sample has a mean of  $M = 8$ .

- \_\_\_F\_\_\_ 18. For the scores in the following frequency distribution table, the mean is  $M = 3$ .

<u>X</u>	<u>f</u>
4	1
3	4
2	2

- \_\_\_F\_\_\_ 19. The mean is considered to be the "balance point" for a distribution because exactly half of the scores are located above the mean and exactly half are below the mean.

\_\_\_T\_\_\_ 20. In a sample of  $n = 3$  scores, if two scores are each below the mean by 2 points, then the third score is above the mean by 4 points.

\_\_\_F\_\_\_ 21. A sample has  $n = 5$  scores: 2, 4, 5, 8, and 11. The median for the sample is 6.5.

\_\_\_T\_\_\_ 22. There are situations for which it is either impossible to compute a mean **or** the mean does not provide a central, representative value.

\_\_\_T\_\_\_ 23. A distribution of scores has a mean of 50, a median of 53, and a mode of 56. Based on this information, it appears that the distribution is negatively skewed.

\_\_\_T\_\_\_ 24. If a negatively skewed distribution has a mean of 50, then the median and the mode are probably both greater than 50.

\_\_\_T\_\_\_ 25. For a positively skewed distribution, the mean usually has a larger value than either the median or the mode.