

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

score=41

1. What is the goal of central tendency?

To find the “middle” of a distribution. A measure of central tendency identifies one single measure that best describes a set of data. There are 3 measures of central tendency: mean, median, and mode. Each of these measures is considered an average, but they are *very different averages*.

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 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: 5.555555556 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
5	2
4	2
3	2
2	2
1	5

Mean: 2,7857142857 Median : 4 Mode : 5

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

<u>X</u>	<u>f</u>
8	1
7	1
6	2
5	5
4	2
3	2

Mean: 5.0769230769 Median: 5 Mode: 5

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

because it is unaffected by extreme outliers or non-symmetric distributions of scores.

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

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

Calculate mean for treatment 1 and put your answer here: 9.5333333333

Calculate mean treat treatment 2 and put your answer here: 6.8666666667

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

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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: 7.5625 Mean for non-humorous group: 3.0625

Do the data suggest that humor helps memory? Answer “yes” or “no” and why? Yes, the fact is, people remember better if a subject is presented with humor, or if they are impacted with some type of emotion. The funnier the joke, the more activity there is in your brain’s pleasure centers.

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
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Name the population: students

Name the sample: Students from Caldwell University

How many participants are in the sample? 37

What is the scale of measurement? Interval

Is the scale continuous or discrete? Continuous scale

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:

Based on you

Statistics

VAR00001

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

r SPSS results

		VAR00001			
		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	

, please answer the following questions:

What is the mean? 5.8649 What is the mode? 7.00 What is the median? 6.0000

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

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

Why?

The best measure is the MEAN because a data set can only have one possible answer, that best represents all of the scores

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 no one measure is always the best representative measure for a given set of data. At times, the case becomes that one or another measure of central tendency **cannot** be used for a particular data set.

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

When the data is very high or the data is very low the mean is not inappropriate measure of central tendency, example runs scored in an athlete.

12. Name a situation where only the mode could be used as a measure of central tendency

In scenarios where the **data is categorical** or ranked it's not even possible to calculate the median or the mean, so the mode is the only measure of central tendency we can use. The mode can also be used for numerical data, like we saw in the above example with baseball players.

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 They are equally balanced scores.

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: Luci Stephen 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 $M = 3$.

X	f
4	1
3	4
2	2

T 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.

F 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.