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

1. What is the goal of central tendency? When there is a single value that attempts to describe a set of data by explaining the central position within that set of data.

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

1,2,3,4,5,5,5,7

Mean: 1+2+3+4+5(2) +7= 32/8= 4 Median: 4+5=9/2= 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

3,3,3,5,5,7,7,8,9

Mean: 3(3) +5(2) +7(2) +8+9= 50/9= 5.5 Median: 5 Mode: 3

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

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

| X | f |
|---|---|
| 6 | 1 6 |
| 5 | 2 10 |
| 4 | 2 8 |
| 3 | 2 6 |
| 2 | 2 4 |
| 1 | 5 5 |

Mean: 1(5) +2(2) +3(2) +4(2) +5(2) +6(1) = 39/14= 2.7 Median: 2+3=5/2= 2.5 Mode: 1

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

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

| X | f |
|---|---|
| 8 | 1 8 |
| 7 | 1 7 |
| 6 | 2 12 |
| 5 | 5 25 |
| 4 | 2 8 |
| 3 | 2 6 |

Mean: 3(2) +4(2) +5(5)+6(2)+7+8= 66/13= 5.0 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?
The median is the best measure because it is less affected by the outliers or non-symmetric distributions.

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: 2+4(2) +5+6(3) +7+9+11(2) +13+17+19+23 = 143/15= 9.5

   Calculate mean treat treatment 2: 1(2)+2+3+6(3)+7+8+9+10+10+11+11+12 = 103/15= 6.8

   Calculate the median for treatment 1: 7

   Calculate the median for treatment 2: 7

   Calculate the mode for treatment 1: 6

   Calculate the mode for treatment 2: 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: 1+2(2)+3(2)+4(3)+5(4)+6(4)= 67/16= 4.1

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

   Mean for non-humorous group: 1(2) +2(4) +3(5)+4(2)+5(2)+6= 49/16= 3.0

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

Do the data suggest that humor helps memory? Answer "yes" or "no" and why:
Yes! Because happy people got the mean of 4.1 which is greater than what non-happy people got 3.0

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: Students selected from Caldwell University

Name the sample: Sample of students selected (randomly selecting students)

How many participants are in the sample? 37

What is the scale of measurement? Ratio because there is 0

Is the scale continuous or discrete? Continuous it is measuring time.

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

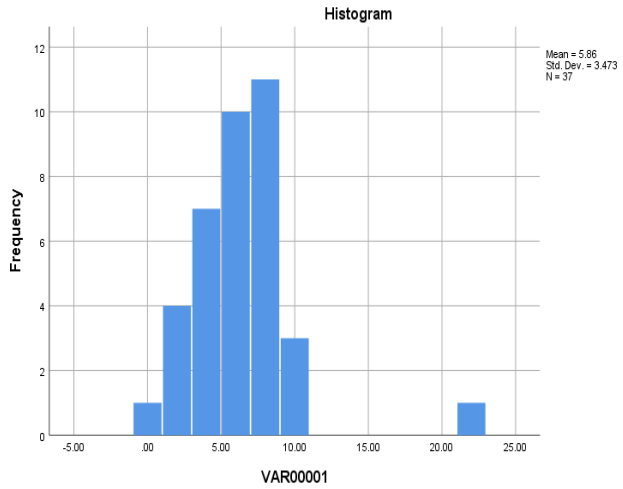
-generate a frequency table
-the appropriate graph
-mean
-median
-mode

PASTE your SPSS results here:

**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 | |




## Statistics

VAR00001

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

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

What is the mean? 5.86 What is the mode? 7.00 What is the median? 6.00

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

Which is the "best" measure of central tendency for these data? The Median because the mean has high scores with little outliers and the tail is more towards the left. Also, the median is less affected by the lying numbers.

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?

    Because all three measures have the same values, and all three measures must be present so we can find the middle, average, or the set of a data. Whereas, if it was just the Mode, then we could then only find the most repeated number.

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

Once there are too many numbers that are lying in the data distribution, then the mean would not be needed because everything will be too skewed, which means that it will be difficult to get the best result.

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

    In a symmetrical distribution because everything will be 50/50

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: Same 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: Vincent, Linda, Brandon

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: Dan, Luci, Stephen

**True / False Questions**

*Please type "T" is 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 | 4 |
| 3 | 4 | 12 20/7=2.8 |
| 2 | 2 | 4 |

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.

F 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.