

3.3.3: Measures of Central Tendency- Median

The **median** is the exact middle of the data. After all, we are asking about central tendency, so why not go to the center of the data and see where we are. What do you mean middle of the data? Let's look at these numbers:

Table 3.3.3.1- List of Numbers

Scores
1
5
4
3
6
7
9

Umm, OK. So, three is in the middle? Isn't that kind of arbitrary. Yes. Before we can compute the median, we need to order the numbers from smallest to largest.

Table 3.3.3.2- List of Numbers in Order

Scores
1
3
4
5
6
7
9

Now, five is in the middle. And, by middle we mean in the middle. There are three numbers to the higher than five, and three numbers lower than five. So, five is definitely in the middle.

OK fine, but what happens when there aren't an even number of numbers? Then the middle will be missing right? Let's see:

Table 3.3.3.3- List of Six Scores

Scores
1
2
3
4
5
6

There is no number between 3 and 4 in the data, the middle is empty. In this case, we compute the median by figuring out the number in between 3 and 4. So, the median would be 3.5:

$$\frac{3+4}{2} = 3.5$$

This calculation is a mean, which we'll talk more about soon, and for the rest of the semester!

Is the median a good measure of central tendency? Sure, it is often very useful. One property of the median is that it stays in the middle even when some of the other numbers get really weird. For example, consider these numbers:

Scores
1
2
3
4
4
4
5
6
6
6
7
7
1000

Most of these numbers are smallish, but the 1000 is a big old weird number, very different from the rest. The median is still 5, because it is in the middle of these ordered numbers. We can also see that five is pretty similar to most of the numbers (except for 1000). So, the median does a pretty good job of representing most of the numbers in the set, and it does so even if one or two of the numbers are very different from the others.

Finally, outlier is a term we will use to describe numbers that appear in data that are very different from the rest. 1000 is an outlier, because it lies way out there on the number line compared to the other numbers. What to do with outliers is another topic we discuss sometimes throughout this course.

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