

4.6: Choosing a Measure of Variability

The ranges, standard deviation, and variance are all options for summarizing variability of quantitative variables. Each differs in its utility and, thus, when it is most likely to be used.

Utility of Ranges

The ranges are the most basic and easiest forms of variability to calculate. They are best used when the aspect of variability of interest is simply how wide the distance between observed scores was. Typically, this is used when the mean is not of interest but may be used when a mode or median is of interest as a way to summarize central tendency. However, ranges can also be reported on their own without a measure of central tendency.

Utility of Standard Deviation

The standard deviation is the most complex measure of variability to compute of the options reviewed here. However, it is often used and is the measure of variability of choice to report when a mean is also being considered and/or reported. It adds important information about how close or far raw scores tended to fall from the mean. Where the mean offers simplicity in summarizing a score, the standard deviation adds specificity to the summary. Therefore, the standard deviation and mean are often reported together to provide a useful and balanced summary of a quantitative variable.

Utility of Variance

The variance is rarely reported because it is in squared units. Therefore, the standard deviation is often reported alongside the mean but the variance is not. This leaves us with the question of when variance would be used and why it matters. The main way we will see variance used is within other formulas when the concept of standard deviation is being used but the formula has other work to do before square rooting. Thus, the variance is used inside of other formulas which consider multiple things together which will be square rooted later. Basically, when that happens, we are saying we want to use the concepts of the standard deviation but are not ready to square root just yet. We will see this use of variance when we learn about the independent samples *t*-test in Chapter 8.

Reading Review 4.3

1. What distinguishes a variance from a standard deviation?
2. If a variance is known, what can be done to it to find its corresponding standard deviation?
3. What is the utility of the variance?

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