Module 03 Lesson 06
VoiceThread: Standard Deviation
Transcript

If you remember the difference between what is a population and what is a sample, remembering that it's unlikely that you're ever going to sample the entire population, it becomes quite evident that a sample is very unlikely to reflect the population exactly in all respects. So there is always going to be a certain form of uncertainty as to how well the sample results reflect the population. So besides calculating the sample mean, there is a need to access the precision or spread of the data to determine whether the calculated sample mean is in fact an accurate estimate of the population mean. So, in other words, we need to get some kind of a measure of the variability in the sample data.

The standard deviation is one of the more common measures of variability. It's calculated using this following formula.

So, if we return to the exams and anxiety data sequence again remembering we had 11 individuals with a calculated mean of 15.2.

So, on the right hand side, we have X being a normal day value, M being a mean of 15.2. But then, subtract M from X and then we take this X minus M and we square it. Then using that formula that we've just seen for the standard deviation we take these X minus M squared values, add them together, divide them by the sample size of 11 minus 1, square root that, and we end up with a standard deviation value of 9.5.

So, for the normal day, we have a calculated mean of 15.2 and a standard deviation of plus and minus 9.5. If we had calculated the standard deviation the same way for the exam day values, we would have had the exam day mean of 21.6 plus or minus a standard deviation of 7.2.

So what the standard deviation value is telling us is just the variability in the observed values in relation to the calculated mean. So, in effect, what the standard deviation is telling you is that if the standard deviation is small it means that the observed values are all relatively close to the calculated mean. Whereas if the values are scattered quite far away from the calculated mean such as in a normal day values, the standard deviation in effect will be larger. So, in a nutshell, the smaller your standard deviation, the more confidence you can have in your calculated mean. And the larger the standard deviation, the less confidence you can have in your calculated mean.