**Interpret output for independent samples t-test**

Let’s interpret the results of our independent samples t-test that we obtained in the previous video. Now a t-test compares means and we’re comparing the mean total competency score of males to the mean total competency scores of females, and you can see from this table that the mean for females in certainly higher than the mean for males. Now the t-test helps us establish if this mean just happened by chance in our sample, or does this difference exist in the population? So all males and females, do females tend to have a higher average competency than men in the population. Our next column is standard deviation and this shows us the spread of the data so its shows how far on average are the total competency scores deviating from the mean, and we can see that the spread of the data is very similar for the males and females. Our next table are our t-test results. You can see here that we have two lines of results to choose from. We have equal variances assumed and we have equal variances not assumed, and we need to determine which line of results is most appropriate for us to read, and we do this using the means test quality of variances. Now this test is asking Is the variance of scores similar between our two groups? Basically, its saying Is the shape of the distribution competency scores from males similar in shape to the distribution of competency scores for females. Now just like any other statistical test, we’ve got a null hypothesis which is H0, and an alternate hypothesis, H1. We determine whether to accept H0, or reject it in favour of H1 using our p-value which is here in the sig column. H0 or our null hypothesis says that variances of the males and females are not different, so that would mean equal variances assumed. Our alternate hypothesis says that the variances of the males and females is significantly different, and if that’s true, we need to read equal variances not assumed. Now our p-value is .60, and we’re going to compare that to our alpha value. My alpha value that I have chosen is .05, but you can use whichever alpha value you’ve chosen such as .01. If our p-value is less than our alpha value, .05 in this case, we’re going to reject H0 and accept H1, which means the variances are different, so we’re not going to assume they’re equal. But for our case, p-value is greater than .05, so we’re going to accept that H0. This means our variances are not significantly different so we can assume they’re equal and we’re going to read off the line Equal Variances Assumed. If we go across this line, our t-statistic is -.838, with 68 degrees of freedom and our p-value is .405. You can also see the mean difference. This is obtained by taking the first group and subtracting the second group so 49.94 -43.69 and that will give us a -2.757, and if we look over to the far right, we have a confidence interval for the difference. This interval for this value here, which will be right in the middle of that confidence interval and it says that 95% of the time, the difference in scores will be between -9 and 3, which means sometimes men will be less than women, sometimes women will be less than men.

Now our sig value here, this is what we’re going to use to interpret our results, and we’re going to look at our t-test results. Now this is a table again I’ve added in, it doesn’t come out with SPSS. Just like with any other statistical tests, we’ve got a null hypothesis so there’s no difference and an alternate hypothesis which says there is a difference and we’re going to look at comparing our p-value to our alpha value, so if p is less than .05, we’re going to reject H0 and accept H1 so the means aren’t different from each other. But if it’s greater than 0.5, then we’re going to accept H0 and say the means are not significantly different. And if we look at our p-value its .405, so that is much bigger than .05 so we need to accept H0, the means are not significantly different so even though in our sample, the females tended to have a higher average competency, this just happened by chance and we cannot generalise this to the population.

You’ll notice here in the sig column is says two-tailed, and that means our p-values is only for a two-tailed test, so what do we do when we’ve got a one-tailed test. Well if we have a look here it depends on your hypothesis whether you do a two-tailed or one-tailed. Now two-tailed just says there’s a difference, so in our case males and females have different competency scores. For one-tailed tests, we’re making a specific claim about the difference, so in our case we would say something like females are more competent than males, and if we have a one-tailed alternate hypothesis what we need to do in our output is take this p-value and divide it by 2, so that would make our p-value about .2. It still is bigger than .05, so we’re still going to accept H0. But we would need to report the halved p-value of .2 instead of .405.

END.