**Transcript: Interpreting One-Sample *t* Test Output**

In this video, we're going to go over how to interpret the output for our one-sample *t* test from both R Commander and SPSS. As you can see here, we have on the left our output from R Commander and on the right our output from SPSS for the same test, which was testing whether coma survivors have performance IQ scores that are significantly lower from the population mean of 100.

So, the first thing that we want to look at is the actual mean of the population IQ scores within this sample. We can find this in R commander, right at the very bottom, “mean of x”. It gives us a value of 87.55589. Within SPSS we can find it here at the top under “One-Sample Statistics”, where the mean is 87.56. So, the same value, just rounded to two decimal places instead of five. So right away here we can see that this value is lower than 100 by a substantial amount, by more than 12 points.

What we really want to look at though is our *t* test, indicating that this is a significant difference. The next thing that we want to see is our actual *t* value. You can find the *t* value here in R Commander, -14.962. As well as here in SPSS. This is a *t* value that if you were doing this by hand, you would look up in a table of *t* distributions based on the degrees of freedom. In this case, we can find our degrees of freedom directly next to the *t* value, both in SPSS here and in R Commander over here. So again, if we were doing this by hand, we would go to our table for a *t* distribution with the degrees of freedom of 330 and we would see whether the *t* value of negative 14.962 falls outside or inside of the critical value.

Because we're doing this in R Commander and in SPSS, we don't need to go look things up in a table. We actually get our *p* value right here in the output. In R Commander, our *p* value is displayed as less than 2.2 to the negative 16th power. You can remember from the video of basics in R Commander that R Commander will display very, very small numbers in scientific notation. Which means that this is 2.2 with a decimal point moved back 16 places, so 15 zeros before the two, and then two twos. The specific value isn't really important here. What is important is that it's a very, very small number and that it's less than .001. SPSS, on the other hand, is going to display our *p* value here as simply less than .001. As you can see, SPSS gives us both a “One-Sided *p*” and a “Two-Sided *p*”. This is because it doesn't allow you to specify when you're doing the analysis, whether you want your hypothesis to be one-sided or two-sided. In R Commander we specified it that we wanted a directional hypothesis and we get a single *p* value. In SPSS, we get two *p* values for one-sided and two-sided. In this case, the values are the same; they're both less than .001, but if they weren't, you would want to report the one that that fits with your hypothesis. In this case, we had a one-sided hypothesis that performance IQ would be significantly less than 100, and so we would want to look at this “One-Sided *p*” value.

From this output, because we have a *p* value of less than .05, which is our alpha level, we can conclude that we can reject the null hypothesis which was that coma survivors’ performance IQ scores are equal to or greater than 100. In more plain language, this means that we can conclude that people who have survived a coma have lower performance IQ scores compared to the mean in the general population, which is 100. And again, this is supported just from looking at the descriptive statistics here. Where the mean value is 87.56, which just eyeballing it looks considerably lower from the population mean of 100.

Now we've looked at our first one-sample *t* test, and we can move on to the second. You'll notice that in both of the outputs you get a little bit more information than we're going over here. All of those are things that you can ask your TAs or your instructor about if you're curious, but for the sake of this course, what's important are the *t* value, the degrees of freedom, the *p* value, and the descriptive statistics for the sample. So yeah, we're going to look at the verbal IQ *t* test. This time the output looks identical. We just have some different values. In this case we can see that our mean is 94.96 here, and here in SPSS. Just eyeballing it, it looks like you know this is much closer to 100, but it's still lower. So, we'll have to look at our *t* test to see whether it's a significant difference.

In this case, our *t* value is - 6.52, which we can find here, and here. Our degrees of freedom are still 330, and our *p* value, once again, is less than .001. You can see again the scientific notation here, but again, it's just a very, very small number. It's less than .001, which is all we need for APA. In this case again, we can reject the null hypothesis that coma survivor's verbal IQ scores are equal to or greater than 100. In more plain language, again, this indicates that coma survivors have verbal IQ scores that are significantly lower than 100.

So that concludes our video on how to interpret the output of a one-sample *t* test. You can proceed to the next section of the lab to learn how to report these results in APA format.