Terrell: Hello everyone, I'll get started in about 2 minutes.
DaveM: Good evening
Terrell: OK - sorry for the delay, let's get started.
Terrell: I want to give an overview of the next two assignments - the one-sample t test due on 3/21 and the instrumentation assignment due 3/28.
Terrell: As we're doing that or afterwards, you can ask any questions you might have.
Terrell: What I've got to say is fairly short so the length of tonight's session is going to be primarily based on any questions you might have.
Terrell: I want to make sure you understand exactly where you're going, especially with the t test assignment.
Terrell: The instrumentation assignment is fairly simple.
Terrell: Before I get started, any questions?
Terrell: Ok - let's talk just a bit about the instrumentation assignment (Task 5).
Eydie: I am one of the people with the alternate instrumentation assignment and I find it scary
Terrell: OK - hold that thought, we'll get right to it.
Terrell: Dr. Gay set up this assignment in 1) a very ingenious manner and 2) in a dumb manner!
Terrell: I hope her ghost doesn't come visit me tonight!
Terrell: The way she set it up, she allows the student researcher to look for any instrumentation they might need for their given project.
Terrell: It allows them to see that there are, generally speaking, many instruments that might be used for the same purpose.
Terrell: It also allows the student to learn about and understand the ideas of validity and reliability in an applied fashion.
Terrell: As I've said, her "target audience" was masters level research students, the large majority of whom are teachers.
Terrell: Because of that, she makes the assumption that students are measuring a construct or content area where instrumentation has been developed.
Terrell: Unfortunately, she didn't foresee classes such as ours. Some of you do not need to measure a content area or construct - you might be dealing with nominal data such as the count of some event. Others might be looking at processing speeds or something
Terrell: else that's measured with some type of measuring instrument.
Terrell: Because of that, you need to 1) be able to measure what you need to measure (hi John) as well as understand the ideas behind instrumentation.
Terrell: Usually this is a fairly easy assignment for folks who have a clear cut content area or construct they want to measure.
Terrell: They usually go to TIP (tests in print) or to one of the publishers and find the information they need.
Terrell: Again, for those who desire to measure something where an instrument doesn't exist, you're usually required to develop one. In instances where you might be measuring speed or the count of something, you don't need an instrument at all.
Terrell: Because of that, I sent you out an e-mail detailing two options for those of you whose study would not call for an instrument.
Terrell: First, you can identify a content area or construct that you might want to measure that's outside of the realm of the paper you're writing for this class.
DaveM: If we are creating our own do we need to justfy how it was developed?
Terrell: If you were doing it outside of this class you would - in this class, I don't want you developing anything. I want you to understand and describe the process you would go through.
Terrell: Anyway, back to the idea of the alternate assignment.
Terrell: Like I said, if you want, you can use this as an opportunity to identify an instrument for a class or whatever you want to -- it doesn't have to be within the realm of your study.
Terrell: If you chose to do this, you would follow the same guidelines in the book; you would just be using the content area or construct you have identified.
Terrell: OK - I'm back - the first session for cluster is next week.
Terrell: I always open the "classes" to both groups but discuss the topic for the particular group.
Terrell: Anyway, many people choose this option for Task 5 if their study doesn't call for a specific tool.

Terrell: At the same time, another option is to describe the developmental process of an instument you might use.
Eydie: I would like to relate the alternate to my proposed study but based on a different hypothesis but will still have to develop an instrument
Terrell: I think this is where Eydie said she's concerned but there's no need to be!
Terrell: If you look at Chapter 5, you can see it focuses on instrumentation at a very high level.
Terrell: What you would need to do in this case is describe the type of test (achievement, aptitude, etc).
Terrell: You would then use the material on pages 135 to 140 to talk about how you would establish the validity of your test.
Terrell: You would then describe the establishment of reliability using the material on page 140 thru the end of the chapter.
Terrell: It's like I said, this doesn't need to be more than 2 to 3 pages, whichever option you choose.
Terrell: The key to the assignment is to understand a) there are multiple ways of measuring things, especially when you're dealing with a specific construct, b) validity is critical and c) reliability is essential.
Terrell: Now, having said that, what's your questions.
Terrell: I must have been very clear - I've impressed myself!
Terrell: If there aren't any questions, let me say a few things about the one sample t test.
jrogate: when you get a chance....this is a chat, but i only see Dr. Terrell's responses...do not see others conversations...do i have to turn something on or is this the way it is
Eydie: your explanation was a big help
DaveM: Actually that clarifies the email you sent earlier
Terrell: OK, perfect. John, did you just see these responses?
Terrell: The one sample t test is nothing but an extension of the z test.
jrogate: i just saw this...but up to when i made the question, i did not see anyone else
Terrell: that's ok, there weren't too many responses to that point - I was just writing away.
Terrell: Back when we used the z test, we saw we could find out how close to the center of a dataset a given datapoint was by computing a z score.
Terrell: We saw, using the empirical rule, that about 68% of all values fell within +/- 1 standard devation; about 95% between +/- 2 std, and nearly all (i.e., 99.7%) between the mean +/- 1 standard devation.
Terrell: We represented these standard deviations with z scores. In short, we said a value that was one standard deviation above the mean had a z score of 1; 2 standard deviations had a z score of 2, etc.
Terrell: We basically do the same thing with t scores.
Terrell: We use our data (the mean, the observed value and the standard error of the mean) to compute a t score.
Terrell: The t score, just like it's z score cousin, is used to denote just how far away from the mean of a dataset that given value is.
Terrell: The primary difference is that the t table changes based on the number of items in a given sample.
Terrell: We saw, with the z table, that it always stayed the same because we were always assuming we were looking at a population or had a large sample.
Terrell: When we have small samples (i.e., < 30) we have to compensate for how the shape of the distribution would change with fewer and fewer values in the dataset.
Terrell: That's easy to do, though, the table is set up for us; all we have to do is read it.
Terrell: The key to remember is that testing a hypothesis with a t score is very simple. You simply compute a t score based on your data; determine the appropriate critical value of t you're going to compare it to; make the comparison and then decide, based on
Terrell: the comparison, whether to reject or fail to reject the null hypothesis.
Terrell: Let me walk you though an example.
Terrell: Let's walk through an example where we would use the one-sample t test.
Terrell: First, keep in mind the purpose for this test.
Terrell: We're going to compare the mean of a SINGLE sample to a known value to determine if

the mean of the sample is significantly different (i.e., different due to reasons other than chance)
Terrell: Let's say we're going to use the IQ of the winter institute class and we want to know if it's significantly higher than the national average.
Terrell: Actually, let me rephrase that - let's simply test to determine if the class average is significantly different (i.e., non-directional); let's not get into a directional discussion.
Terrell: So, our research hypothesis is that the average IQ of our research class is not equal to 100 (i.e., the national average).
Terrell: The null hypothesis is that the average IQ is equal to 100 (i.e., our score (100) minus the national average (100) would equal zero or null).
Terrell: Now, all we're saying is that we want to compare our mean, whatever it is, to the national average and see if it's different due to reasons other than chance.
Terrell: For this examle, let's say that the mean score for our class is 115, the standard error of the mean is 5 and we have 20 students in our class.
Terrell: In order to compute our t scores, we would subtract the national average from our average (115-100 = 15) and then divide that by the SEM (i.e., 15/5 = 3). This means our computed value of t is 3.
Terrell: Now, all we have to do is figure out the critical value of t and compare our computed value to it.
Terrell: In order to do that, all I have to do is use our critical value of t table (page 270 in my book) and compare our value to it.
Terrell: If we look at the table on page 270, we have to know two things in order to determine the critical value of t.
Terrell: First, we have to know the degrees of freedom for our test - this is nothing more than the number of people in our sample minus one.
Terrell: In this case, since we have 20 students, our DF would be equal 19.
Terrell: Now, we need to know our alpha value. In most social science / education studies, we set alpha equal to .05. This allows us to control for Type I and Type II errors to the best of our ability.
Terrell: That's not really important, right now, though - all we need to know is that our alpha value is .05.
Terrell: We also have to know that, since we have a two-tailed hypothesis, we have to divide the alpha value by 2 (i.e., .05 / 2 = .025).
Terrell: Now, all we need to do is use those two value, df = 19 and alpha = .025, to find our critical value of t.
Terrell: If we go into the table on page 270, we can see the critical value of t, for those parameters, is 2.093.
Terrell: If you are looking at my book and don't see how I got that value, please let me know.
Terrell: Now, in order to test my hypothesis, all I have to do is compare my computed value of t to my table (ie., critical value) and make the decision.
Terrell: You're paying closer attention than I am, anyway!
jrogate: it is too late to go any more than 2 decimal places anyway
Terrell: In this case, our computed value of t is 3.00 and our critical value is 2.093. Since our value is greater, we're saying that our t score is further away from the mean than would be expected for reasons other than chance so the difference must be
Terrell: significant.
Terrell: Given that, we would say that our class average of 115 is significantly higher than the national average of 100.
Terrell: Are there any questions as to how I got to this point before I show another example?
Eydie: OK
Terrell: OK, let's look at another one.
DaveM: Straight forward so far
Terrell: Let's say, this time, we're interested in comparing the height of the men in our class to the national average of 70 inches (I think that's the right value; we'll use it here).
Terrell: Our hypothesis would read, "there will be a significant difference in height between our class and the national average (ie, 70 inches).
Terrell: Let's suppose we measured our class and found that the average height is 68 inches -

that's shorter than average but is it significantly shorter?
Terrell: First, let's compute the t score for our class (we'll use an SEM of 2): 68 - 70 = -2. -2/2 = -1. Our computed t score is -1.
Terrell: We can immediately see that our average is smaller than the national average (obviously) because our t score is less than 0.
Terrell: Our question is, "is it significantly different or due to chance?"
Terrell: In order to find out, we need to find our critical value of t. If we use 26 as the number of folks in our class, we would have 25 degrees of freedom. Using that, along with an alpha value of .025 (remember, .05 / 2 since it's a two-tailed hypothesis),
Terrell: we wind up with a critical t value of 2.060. If you don't see that, let me know.
Eydie: would we not be comparing to the -2.060
Terrell: In this case, we're looking at a two tailed hypothesis so we know it's OK to have computed t values that are either greater than or less than 0. In this case, our t value is -1 so we're saying, "it's less than average but is it significantly less?"
Terrell: right - in order to use it, we would have to put a negative sign in front of it.
Terrell: then we're saying, "-1 is less than 0 but is it significantly less? Significantly less, in this case, is represented by -2.06).
Terrell: In this case, we can see our value is not less than -2.06 so we cannot reject the null hypothesis.
Terrell: We may be short but we're not significantly shorter than average.
Terrell: Now, if you don't understand how we got to this point, let me know.
Terrell: If you've followed me up to this point, you should have no trouble with the assignment.
Terrell: Just remember, if you have a one-tailed hypothesis, you follow the same procedure except you use the entire alpha value on one side of the mean or the other.
Terrell: For example, if we're testing a one-tailed hypothesis that is "greater than", we would use the entire alpha value to find a critical value of t greater than zero. If we're dealing with a "less than" one-tailed hypothesis, you would find that value and
Terrell: put a negative sign in front of it. In the first case you would be saying, "my value is significantly greater if my computed value of t is greater than the critical value of t".
DaveM: I have a question re: confidence levels
Terrell: In the "less than" scenario, you would be saying, "my value is significantly less if my computed value of t is less than the negative value of the critical value of t.
Terrell: Does everyone follow this?
Eydie: Yes
Terrell: I don't like these things to run more than an hour (my fingers give up) but I want to be clear up to this point before we quit. We can always follow-up on the forums.
Terrell: Ok - if there are no t test questions, are there any general questions?
DaveM: I have a question re: confidence levels
Terrell: I tell you what - let's discuss this on the forum so everyone can benefit, is that alright?