§9.3: *t* Test for Means

Skills

- Conduct a one sample *t*-test for means

Step 1

$H_0: \mu = \mu_0$
$H_a: \mu \ |?| \ \mu_0$

This calls for a one sample *t*-test for means

Step 2

This requires

- The sample was obtained randomly (a random sample or a randomized experiment)
- The sample size is not larger than 10% of the population size
- The sample size should be greater than 30, or the sample distribution should be free from strong skew and outliers

Step 3

$$t = \frac{\bar{x} - \mu}{\frac{s}{\sqrt{n}}} \qquad df = n - 1$$

We find the probability much like we did last semester...

Step 4

If [null hypothesis is true] then I can expect to find [probability statement] in approximately [p-value] of samples.
Since [p-value] [< / >] [α], this [is / is not] significant; I [reject / fail to reject] the null hypothesis.
[now with context...evidence or no evidence of the alternate]

Example

A study was conducted to determine if playing the piano helped improve children's spatio-temporal reasoning

The data are the changes (post – pre) in test scores

Do the data suggest that playing the piano led to improved scores?

2	4	3	4	1	6	7	4
5	5	4	6	0	4	3	3
7	2	3	7	2	6	9	7
−2	9	4	−2	7	0	−1	−3
4	3						

Remember that the connection between tests and intervals still holds!
(*in fact, it is stronger for means that for proportions*)

...now try some problems!