Example 1 fails the Independent Groups Assumption because the two groups represent the same people at different times. Since they are not independent, we can't add the variances to determine the standard error of the differences in means and thus we can't use the two-sample t methods. What should we look at instead?

Because it is the differences we care about, we'll treat them as if they were the data, ignoring the original two columns (groups). /* Show students L1 – L2 STO-> L3 */ Now that we have only one column of values to consider, we can use a simple one-sample t-test. Yes, it is that easy.

Unit VI-C	**Matched Pairs**
Paired data arise in a number of ways:	Compare subjects with themselves before and after a treatment. A form of blocking in a design experiment. A form of matching in an observational study (often less clear)
We need to determine ________ first and determine whether the data are paired at the ____ step, before ____________________.	the details of the study design Think performing any analysis.
Paired-*t* procedures are identical to_____________________ We simply apply those methods to ______________________	the one-sample *t*-procedures. the differences observed between the two measurements for each pair.
The sampling distribution of pairwise differences is, under appropriate assumptions, modeled by …	A Student's *t*-model with $n-1$ degrees of freedom: $\mu = \mu_d$ $\quad SE(\bar{d}) = \frac{s_d}{\sqrt{n}}$
Assumptions / Conditions for using a Student's *t*-model as the SDM for pairwise differences: *(Also confidence intervals and testing hypotheses)*	1. Paired Data Assumption – Justify based on study design (not Ind.) 2. Independence Assumption – Is there any reason to believe that the data values affect each other? So the differences are mutually independent. a) Randomization Condition – data from a randomly sampled survey (SRS) or suitably randomized experiment. b) 10% Condition – If sampling w/o replacement Then n ≤ 10% of the population. 3. Population of Differences Normal Assumption a) Nearly Normal Condition: The differences are unimodal and roughly symmetric. Make histogram / Normal probability plot and evaluate: If n < 15 Then needs to be closely Normal. If n > 40 Then even skewed data are OK. If outliers present Then analyze with and without.
Paired-*t* confidence interval	$\bar{d} \pm t^*_{n-1} \times SE(\bar{d})$ where $SE(\bar{d}) = \frac{s_d}{\sqrt{n}}$
Paired *t*-test	A test of the null hypothesis $H_0: \mu_d = \Delta_0$ where Δ_0 is almost always 0. by referring the statistic: $t_{n-1} = \frac{\bar{d} - \Delta_0}{SE(\bar{d})}$ where $SE(\bar{d}) = \frac{s_d}{\sqrt{n}}$ to a Student's *t*-model with *n*-1 degrees of freedom to find a P-value.