Vocabulary

Term	Definition
One-sample *t*-interval	A one-sample *t*-interval for the population mean is *y bar* $\pm$ t_{n-1}* x *SE*(*y bar*) where *SE*(*y bar*) = *s* divided by the square root of *n*. The critical value t_{n-1}* depends on the particular confidence level, *C*, that you specify and on the number of degrees of freedom, *n* - 1.
One-sample *t*-test for the mean	The one-sample *t*-test for the mean tests the hypothesis H_0: $\mu = \mu_0$ using the statistic t_{n-1} = (*y bar* - μ_0)/*SE*(*y bar*). The standard error of *y bar* is *SE*(*y bar*) = *s*/square root of *n*.
Paired data	Data are paired when the observations are collected in pairs of the observations in one group are naturally related to observations in the other. The simplest form of pairing is to measure each subject twice - often before and after a treatment is applied. More sophisticated forms of pairing in experiments are a form of blocking and arise in other contexts. Pairing in observational and survey data is a form of matching.
Paired *t*-test	A hypothesis test for the mean of the pairwise differences of two groups. It tests the null hypothesis H_0: μ_d - Δ_0, where the hypothesized difference is almost always 0, using the statistic *t* = (*d bar* - Δ_0)/*SE*(*d*) with *n* - 1 degrees of freedom, where *SE*(*d*) = s_d/square root of *n*, and *n* is the number of pairs.
Paired-*t* confidence interval	A confidence interval for the mean of the pairwise differences between independent groups found as *d bar* $\pm$ t_{n-1}* x *SE*(*d*), where *SE*(*d*) = s_d/the square root of *n*, and *n* is the number of pairs.
* Pooled *t*-interval	A confidence interval for the difference in the means of two independent groups used when we are willing and able to make the additional assumption that the variances of the groups are equal. It is found as (*y bar*$_1$ - *y bar*$_2$) + t_{dt}* x SE_{pooled} (*y bar*$_1$ - *y bar*$_2$), where SE_{pooled} (*y bar*$_1$ - *y bar*$_2$) = the square root of ($s_{pooled}^2/n_1 + s_{pooled}^2/n_2$) = s_{pooled} times the square root of ($1/n_1 + 1/n_2$), and pooled variance is $s_{pooled}^2 = [(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2]/[(n_1 - 1) + (n_2 - 1)]$ and the number of degrees of freedom is $(n_1 - 1) + (n_2 - 1)$.
* Pooled *t*-test	A hypothesis test for the difference in the means of two independent groups when we are willing and able to assume that the variances of the groups are equal. It tests the null hypothesis H_0: $\mu_1 - \mu_2 = \Delta_0$, where the hypothesized difference, Δ_0, is almost always 0, using the statistic t_{dt} = [(*y bar*$_1$ - *y bar*$_2$) - Δ_0]/[SE_{pooled}(*y bar*$_1$ - *y bar*$_2$)], where the pooled standard error is defined as for the pooled interval and the degrees of freedom is $(n_1 - 1) + (n_2 - 1)$.

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Pooled-*t* methods	Pooled-*t* methods provide inference about the difference between the means of two independent populations under the assumption that both populations have the same standard deviation. When the assumption is justified, pooled-*t* methods generally produce slightly narrower confidence intervals and more powerful significance tests than two-sample *t*-methods. When the assumption is not justified, they generally produce worse results - sometimes substantially worse.
Pooling	Data from two or more populations may sometimes by combined, or *pooled*, to estimate a statistic (typically a pooled variance) when we are willing to assume that the estimated value is the same in both populations. The resulting larger sample size may lead to an estimate with lower sample variance. However, pooled estimates are appropriate only when the required assumptions are true.
Student's *t* / Degrees of freedom (df)	A family of distributions indexed by its degrees of freedom. The *t*-models are unimodal, symmetric, and bell shaped, but generally have fatter tails and a narrower center than the Normal model. As the degrees of freedom increase, *t*-distributions approach the Normal
Two-sample *t* methods	Two-sample *t* methods allow us to draw conclusions about the difference between the means of two independent groups. The two-sample methods make relatively few assumptions about the underlying populations, so they are usually the method of choice for comparing two sample means. However, the Student's *t*-models are only approximations for their true sampling distribution. To make that approximation work well, the two-sample *t* methods have a special rule for estimating degrees of freedom.
Two-sample *t*-interval	A confidence interval for the difference in the means of two independent groups found as ($y\ bar_1$ - $y\ bar_2$) $\pm$ t_{df}* x *SE* ($y\ bar_1$ - $y\ bar_2$), where *SE*($y\ bar_1$ - $y\ bar_2$) = square root of ($s_1^2/n_1 + s_2^2/n_2$) and the number of degrees of freedom is given by a special formula.
Two-sample *t*-test	A hypothesis test for the difference in the means of two independent groups. It tests the null hypothesis H_0: $\mu_1 - \mu_2 = \Delta_0$, where the hypothesized difference, Δ_0, is almost always 0, using the statistic t_{df} = (($y\ bar_1$ - $y\ bar_2$) - Δ_0) divided by *SE* ($y\ bar_1$ - $y\ bar_2$) with the number of degrees of freedom given be the special formula.