

Structure of a 2-sample t-test in R

```
t.test(percent.surv ~ brook.trout.PRES.ABS, data = salmon)
```

The **test statistic**.

Relates to a **sampling distribution**

Degrees of freedom. Determined by the number of independent datapoints & the type of t-test.

The **p-value**. This is a function of the t-statistic and the df

This is **Ha**, so **Ho** is that the difference is **0**.

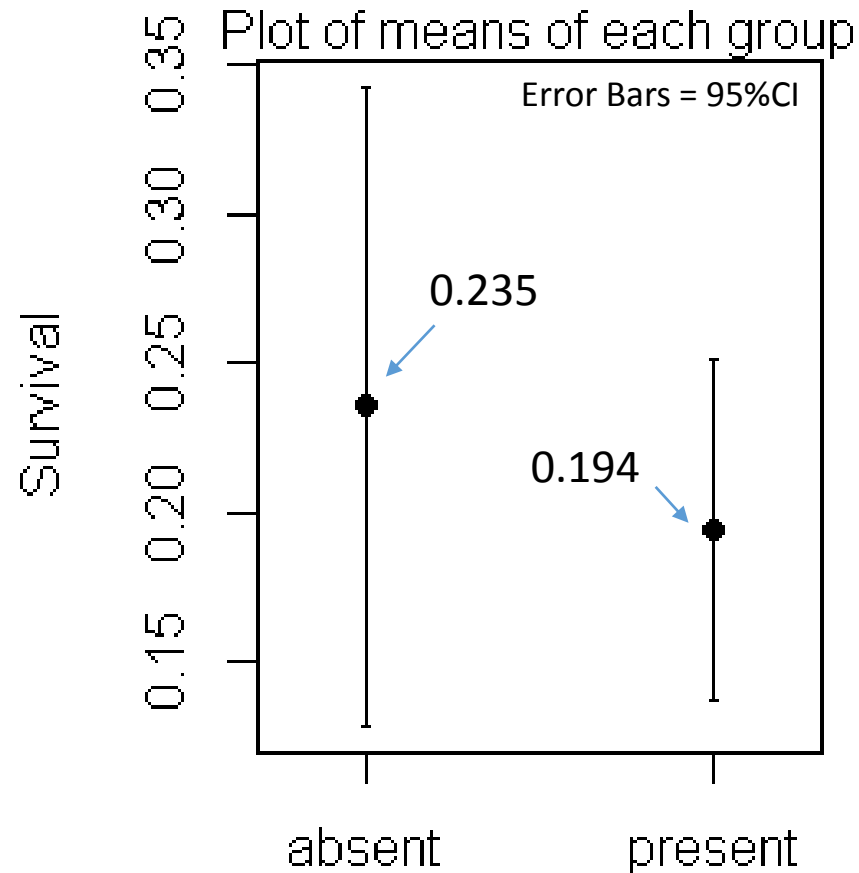
Confidence interval for the DIFFERENCE between the 2 means. If the confidence intervals cross 0 we cannot reject the null.

Means for each group

Welch Two Sample t-test

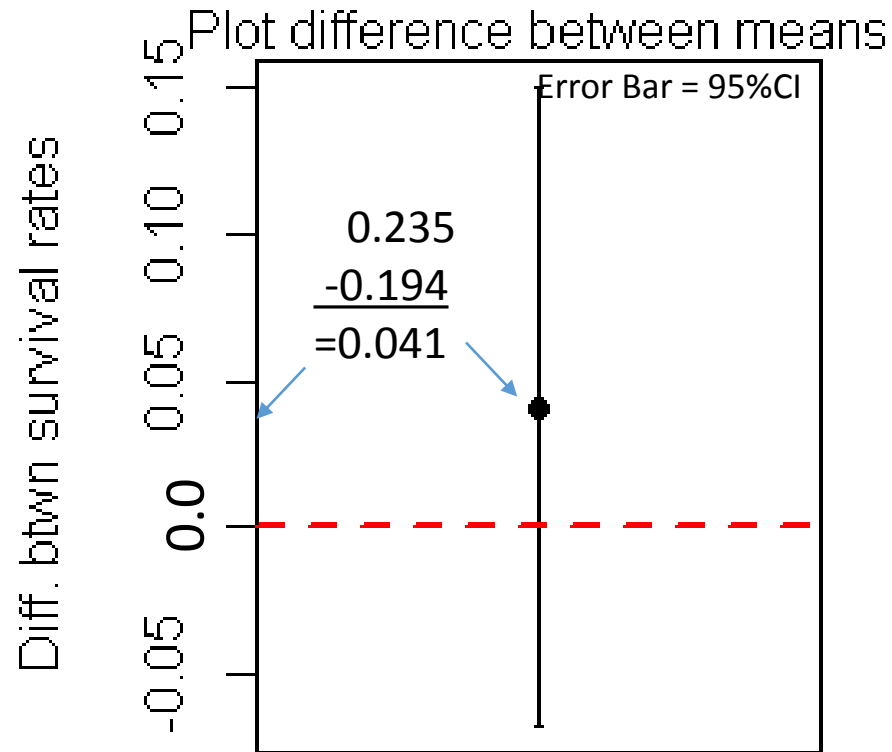
```
data: percent.surv by brook.trout.PRES.ABS
t = 0.93521, df = 5.8196, p-value = 0.3868
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -0.06739746  0.14977890
sample estimates:
mean in group absent mean in group present
      0.2352653      0.1940746
```

How we plot means vs. how a t-test works



NOTE: y axis is from 0.15 to 0.35

When we plot grouped data, we calculate the means and standard errors and plot them. We can approximate “by eye” what a t-test does by examining the overlap between the error bars and the points



NOTE: y axis is from -0.05 to 0.15

What a t-test is doing is specifically asking “is the difference between the two groups equal to zero.” If the two groups have the same mean, then their difference should be zero. If they