Related Sample *t* Tests with R

The data for this lesson were collected as part of a research project at East Carolina University conducted by one of my best-ever doctoral students. All of the subjects had received an Implantable Cardioverter Defibrillator (ICD) between October of 2003 and August of 2006 and had scores on the IES-R that were equal to or greater than the clinical cutoff for a diagnosis of Posttraumatic Stress Disorder (PTSD) – it seems that getting sudden cardiac shocks is pretty stressful. The data that we shall use in this lesson are those for the subjects that had been randomly assigned to receive a psychological intervention designed to reduce the symptoms of PTSD.

For each subject we have two scores – a pretest score on the IES-R and a posttest score on the IES-R. The posttest score was obtained six months after completion of the intervention. The data are in a plain text file, blank spaces as delimiter, variable names on the first line.

Here is the R syntax and the output:

> **attach(icd)**

> **library(psych)**

> **describe(icd)**

```
      vars  n mean   sd median trimmed  mad  min  max range skew kurtosis   se
Pre      1 12 2.23 0.70   2.00    2.14 0.57 1.55 3.73  2.18 0.82    -0.67 0.20
Post     2 12 0.98 0.53   1.09    0.95 0.36 0.14 2.09  1.95 0.23    -0.56 0.15
```

> **t.test(Pre,Post,paired=TRUE**)

```
        Paired t-test

data:  Pre and Post
t = 5.9823, df = 11, p-value = 9.156e-05
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 0.7874739 1.7041928
sample estimates:
mean of the differences
               1.245833
```

As you can see, IES-R scores were significantly less after the intervention than before the intervention. By itself, this analysis should not convince you that the intervention was successful – there are serious threats to the internal validity of this analysis. Most importantly, because we selected those with high IES-R scores, regression to the mean might explain the pre-post change. There was, however, also a control group, which did not receive the intervention, and the pre-post change in the intervention group was significantly (and much) larger in the intervention group than in the control group.

- Wuensch's R Lessons