

Bootstrap Lab #4

1 Initialize R

Enter the following commands in R:

```
> source(url("http://www-rcf.usc.edu/~rwilcox/Rallfun-v9_2"))
> load(url("http://psycserv.mcmaster.ca/bennett/rdata/trackboxList.Rdata"))
> load(url("http://psycserv.mcmaster.ca/bennett/rdata/possum.Rdata"))
```

2 Trackbox data

“Discovery Day” is a day set aside by the United States Naval Postgraduate School in Monterey, California, to invite the general public into its laboratories. On Discovery Day, 21 October 1995, data on reaction time and hand-eye coordination were collected on 118 members of the public who visited the Human Systems Integration Laboratory. The age and sex of each subject were also recorded. Visitors were mostly in family groups.

A rotary pursuit tracking experiment was done to examine motor learning and hand-eye coordination. The equipment was a rotating disk with a 3/4” target spot. In the “Circle” condition, the target spot moved at a constant speed in a circular path. In the “Box” condition, the target spot moved at various speeds as it moved along a box-shaped path. The subject’s task was to maintain contact with the target spot with a metal wand. Trials were conducted for 15 seconds at a time, and the total contact time during the 15 seconds was recorded. Four trials were recorded for each of 108 subjects. The data from the Box condition are stored in the list `trackbox`, which contains the dependent variable, the amount of time the subject maintained contact with the target on each trial, for each of four trials. Every subject participated in all four trials.

Tasks:

- Use the `boxplot` function to display the four sets of data.
- Use `rmanova` and `rmanovab` to evaluate the null hypothesis of no difference among group *means*.
- How do the analyses performed by `rmanova` and `rmanovab` differ?
- Would it be appropriate to use `oneway.test` to analyze these data? Explain.
- Use `rmanova` and `rmanovab` to evaluate the null hypothesis of no difference among group 20% trimmed means.

3 Possum Data

This section is based on the `possum` data frame, which is part of the `DAAG` package. From the help page for `possum`:

The `possum` data frame consists of nine morphometric measurements on each of 104 mountain brushtail possums, trapped at seven sites from Southern Victoria to central Queensland.

The variables `chest` and `belly` contain, respectively, the girth (in cm) of the chest and belly. The data are from Lindenmayer et al (1995; Australian Journal of Zoology, 43: 449-58).

Tasks:

- Determine if there is a significant correlation between $Y = \text{belly}$ and $X = \text{chest}$. Compare the results obtained with r and at least one more robust measure of correlation.
- Compute the linear regression of $Y = \text{belly}$ onto $X = \text{chest}$. Use a bootstrap procedure to evaluate the significance of the intercept and slope. How do these significance tests differ from the ones shown in the regression table?