Basic Course on R: Distribution-Free ANOVA Practical

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1 Dogs

1. In an experiment to study the way in which different anesthetics affect plasma epinephrine concentration, ten dogs were selected and concentration was measured while they were under the influence of the anesthetics isoflurane, halothane, and cyclopropane. Test at level 0.05 to see whether there is an anesthetic effect on concentration.

Dog	1	2	3	4	5	6	7	8	9	10
Isoflurane	0.30	0.53	1.02	0.41	0.31	0.38	0.34	0.71	0.19	0.35
Halothane	0.32	0.41	0.65	0.40	0.23	0.90	0.41	0.53	0.34	0.44
Cyclopropane	1.09	1.37	0.71	0.30	1.26	1.55	0.51	0.58	1.04	0.32

Read in the data "dogs.csv" with a header. Assign it to the object `doggies` and allow strings be converted to factors. Attach the data to the environment.

2. Answer the following questions using the dog data:

   (a) We're going to use Friedman's test. Which factor represents the blocks and why?

   (b) Make a boxplot of the concentration grouped by anesthetic. Which anesthetic do you think might be different from the others?

   (c) Perform the appropriate Friedman's test in R.

   (d) What do you conclude about the effect of anesthetics on plasma epinephrine concentration (use a significance level of 0.05)?

2 Moms

3. The data in "moms.csv" on cortisol level was reported in a research paper. Experimental subjects were pregnant women whose babies were delivered between 38 and 42 weeks gestation. Group 1 individuals elected to deliver by Caesarean section before labor onset, group 2 delivered by emergency Caesarean during induced labor, and group 3 individuals experienced spontaneous labor.

   Read in the data "moms.csv" with a header. Assign it to the object `mommies` and allow strings to be converted to factors. Attach the data to the environment.

4. Answer the following questions using the mom data:

   (a) Test at significance level 0.05 for equality of the three population centers (use the Kruskal-Wallis test).

   (b) Make a boxplot of the cortisol level grouped by C-section groups. Use it to explain why we didn't use an F test (regular one-way ANOVA).