

HW 2.

2(a)

use a two-sample t-test
power of $\underbrace{\hspace{2cm}}$ assumes normality

location-scale

$$Y_i = \overset{\downarrow}{\mu} + \overset{\downarrow}{\sigma} Z_i$$

power
- simulation

3cd).

- Assumptions for randomization test
- What have you assumed about the observed treatment assignment?
 - $Y(0) = Y(1) = Y^{\text{obs}}$
 \rightarrow only thing observed

$\underbrace{\hspace{2cm}}$ assumed basically, H_0

An example code (randomization test) is week 2 fertilizer example.

STA305/1004 - Class 11

Analysis of Variance

ANOVA

February 22, 2016

Comparing more than two treatments

3 pairs !

A vs B

B vs C

C vs A

If interest is in designing an experiment to compare more than two treatments then the previous designs will need to be modified.

- ▶ A clinical trial comparing three drugs A, B, C to reduce duration of intubation for patients on mechanical ventilation.
- ▶ Coagulation time of blood samples for animals receiving four different diets A, B, C, D.

What are the null and alternative hypotheses in these two scenarios?

Treatment (1 factor)

4 levels (A, B, C, D)

3 levels (A, B, C)

(look at this, 4 level similarly)

at least one
diff $\mu_i \neq \mu_j$,
 $i \neq j$

want to compare
them all

$H_0: \mu_A = \mu_B = \mu_C$
mean duration for
intubation in patients
receiving treatment

H_A : means not all the same

Blood Coagulation Study

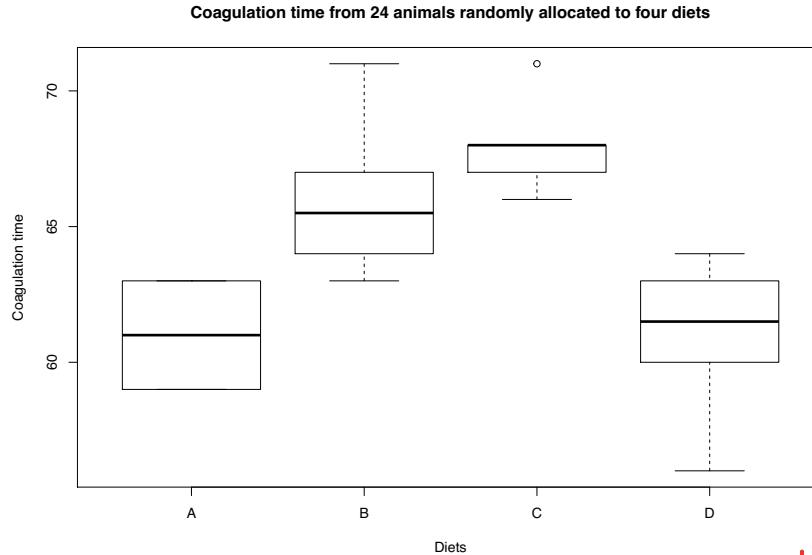
Coagulation times for blood samples drawn from 24 animals receiving four different diets A, B, C, and D.

	A	B	C	D
	60	65	71	62
	63	66	66	60
	59	67	68	61
	63	63	68	64
	62	64	67	63
	59	71	68	56
Treatment Average	61	66	68	61
Grand Average	64	64	64	64
Difference	-3	2	4	-3

variation
within each diet

← compare these
numbers for
between diets

Blood Coagulation Study



Do the **boxplots** show evidence of a difference between diets?

Yes !

But are they statistically significant?



Analysis of Variance (ANOVA)

An idea due to Fisher is to compare the variation in mean coagulation times *between* the diets to the variation of coagulation times *within* a diet. These two measures of variation are often summarized in an analysis of variance (ANOVA) table.

— The statistical procedure enables experimenters to answer several question at once.
(two-factor ANOVA)

Treatment - factor 1
Sex - factor 2

END