Transformations

Psychology 3256

Introduction

- Sometimes we look at our data with EDA, see what looks like a difference, we run the ANOVA and we get nothing!

- perhaps a violation of an assumption

- maybe the variances are way too different

What can be done?

- Well, we can transform our data

- through some sort of mathematical operation

- "That's not fair"

- is so…

- Just changing the units

Log transformation

- Taking the logarithm of a number will pull down big ones much more than small ones

- exponential curves, like reaction time

- If you have a negative value, add a constant

  - log(x+k)

Square Root

- Used with counted data

- when the means are proportional to the variances

- take the square root of the original number, or add a constant first

Reciprocal

- Just take the reciprocal

- makes the range smaller, so the variance is smaller

- great with latencies

  - turning time into speed really

Arcsine

- Used with proportions

- stretches out both tails

$$2\arcsin(\sqrt{x})$$

When do you transform?

- Well, not every opportunity that you get

- If the variances are messy

- Use these rough guidelines to pick a transformation

- If your data do not violate assumptions, do not transform

- Present untransformed data