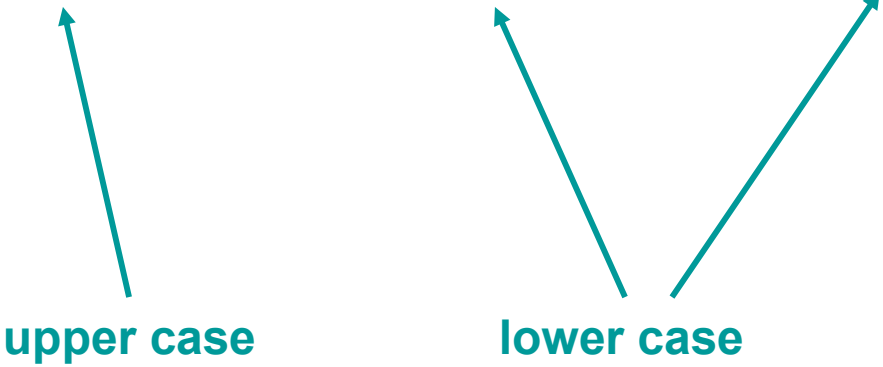
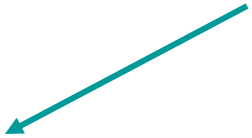
Figures, tables, and equations

How to write scientific names

Marmota monax woodchuck



underlined



Marmota monax

Scientific and common names

***Ursus americanus*, black bear**

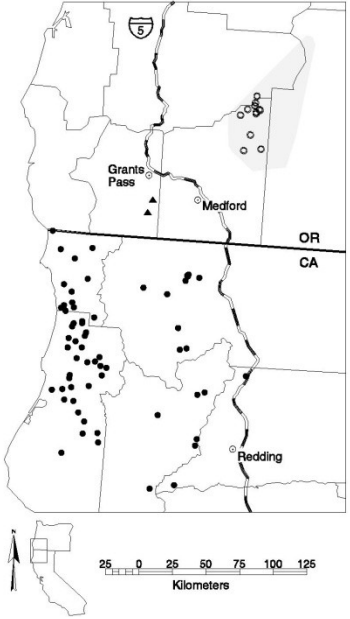
Ursus americanus, black bear

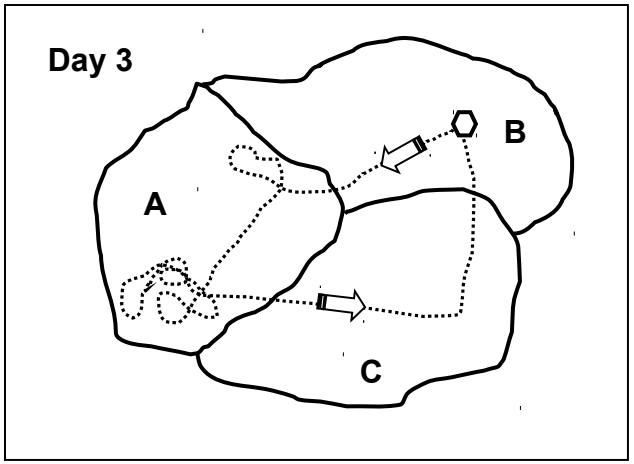
For animals, the genus is capitalized, the species name is not, and both are underlined or italicized (NOT BOTH). For mammals, the common name is capitalized or not, depending on whether a proper noun.

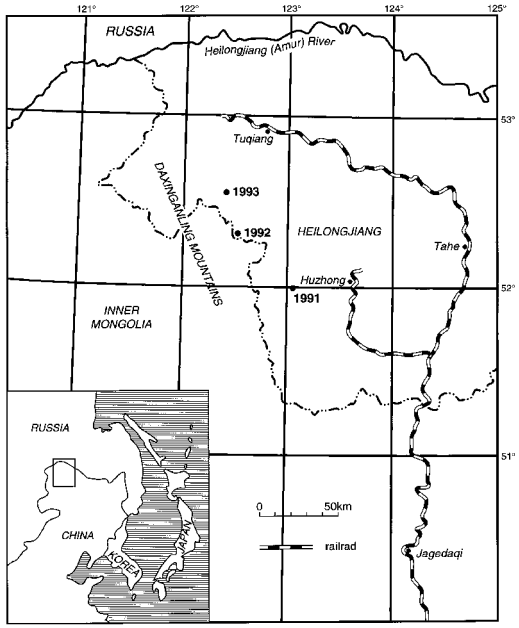
Why italics?

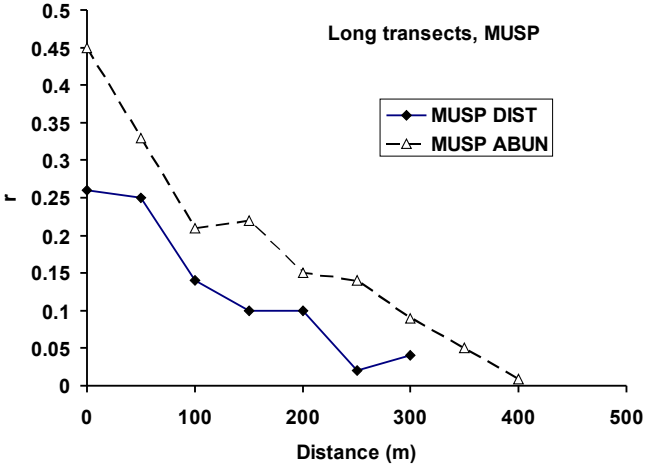
- **Carl von Linné (Carolus Linnaeus) was the father of taxonomy**
- **He wrote *Systema Naturae* in Latin, so all scientific names were in Latin.**
- **genus and species names are in Latin by definition**

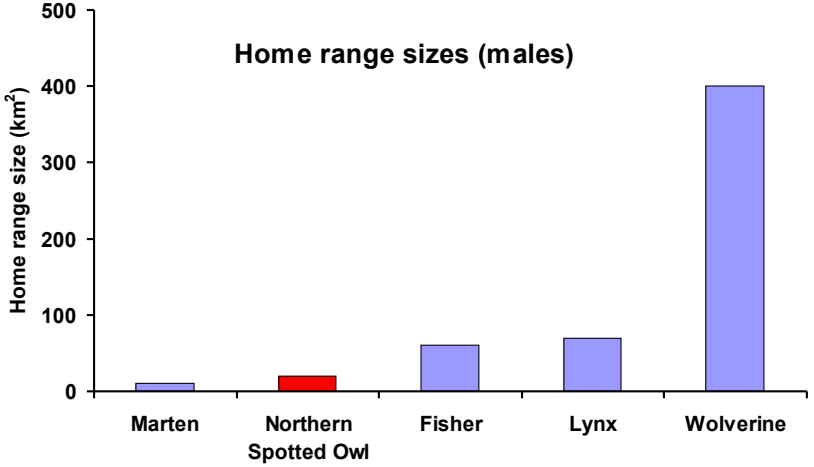
Figures


Grants Pass
Medford
OR
CA
Redding
25 0 25 50 75 100 125
Kilometers


Day 3
A
B
C


121°
122°
123°
124°
125°
RUSSIA
Heilongjiang (Amur) River
53°
Tuqiang
1993
1992
DAXINGANLING MOUNTAINS
HEILONGJIANG
Tahe
Huzhong
1991
52°
INNER MONGOLIA
RUSSIA
CHINA
NORTH KOREA
0 50km
railrad
Jagedaqi
51°


Long transects, MUSP
MUSP DIST
MUSP ABUN
r
0.5
0.45
0.4
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
0
100
200
300
400
500
Distance (m)


Home range sizes (males)
Home range size (km2)
500
400
300
200
100
0
Marten
Northern Spotted Owl
Fisher
Lynx
Wolverine

Tables

Table Example 1.

Table X

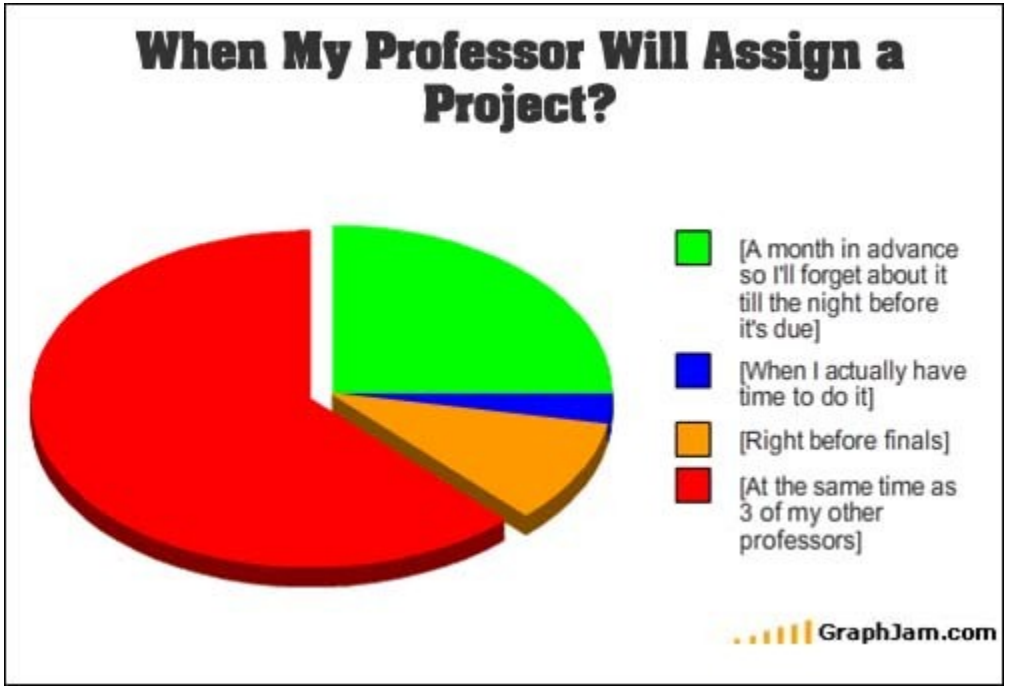
Error Rates of Older and Younger Groups

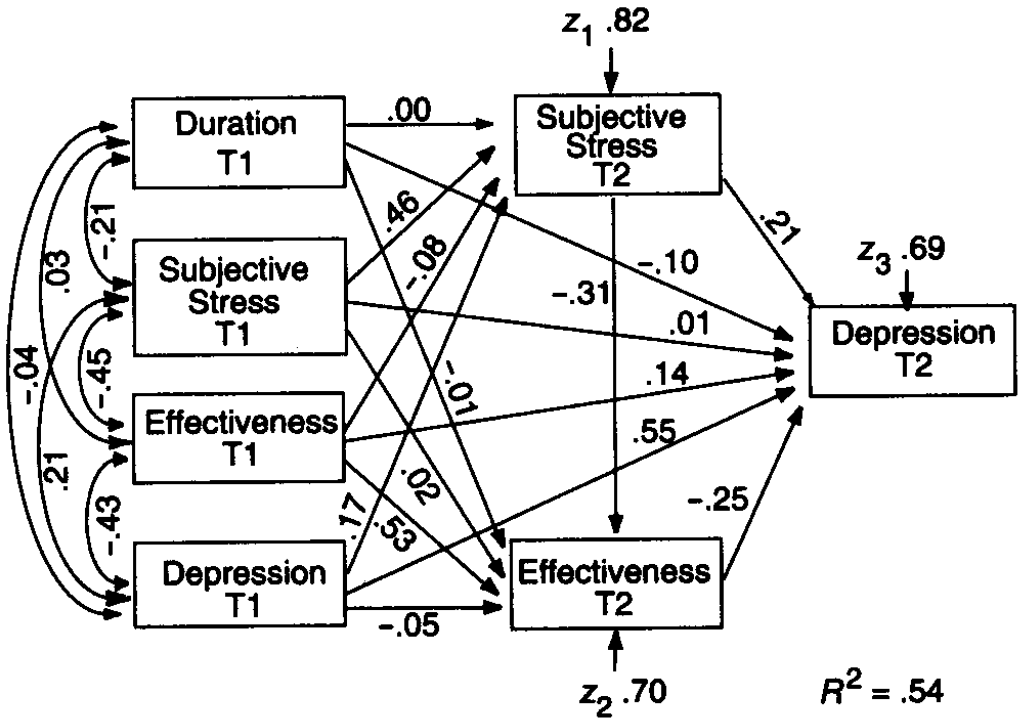
Level of difficulty	Mean error rate		Standard deviation		Sample size	
	Younger	Older	Younger	Older	Younger	Older
Low	.05	.14	.08	.15	12	18
Moderate	.05	.17	.07	.15	15	12
High	.11	.26	.10	.21	16	14

Charts

Pie charts

Flow charts





Equations

The formula relating instantaneous growth rate to population size and carrying capacity is

$$\frac{dN}{dt} = rN\left(\frac{K-N}{K}\right)$$

$$\lambda = P_A + bP_j\left[1-\left(1-e\right)\hat{p}^m\right] = 1.0$$

Figure Legends

Complete enough that they can be understood, even if the figure or table were separated from the ms.

What (all studies), where and when (field studies). Interpretation, methods (depending on publication).

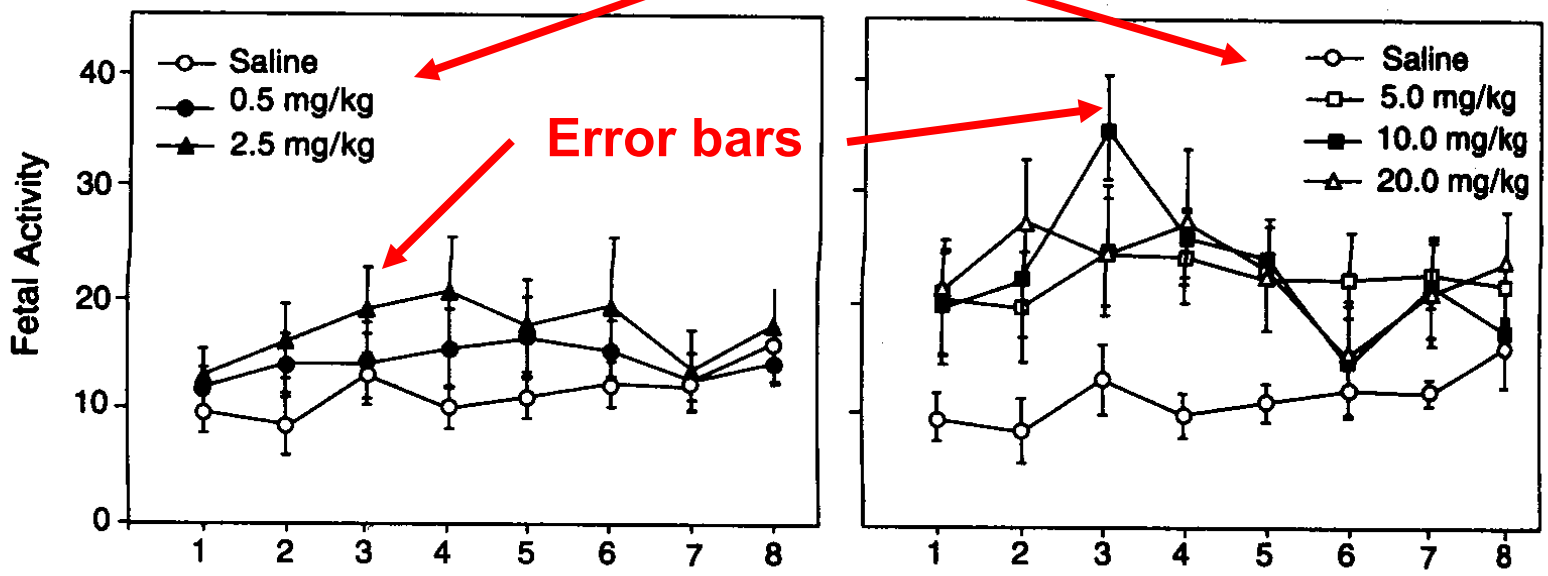


Figure X. Overall motor activity during the first 8 min of the observation session of E21 (Embryonic Day 21) rat fetuses treated with isotonic saline or varying dosages of cocaine. Cocaine groups in the left panel did not differ significantly from the saline-treated control group; cocaine groups in the right panel exhibited significantly elevated activity compared with the control group. Points represent the mean number of movements per minute; vertical lines depict standard errors of the means.

What

Interpretation

Error bars explained

Figure legends

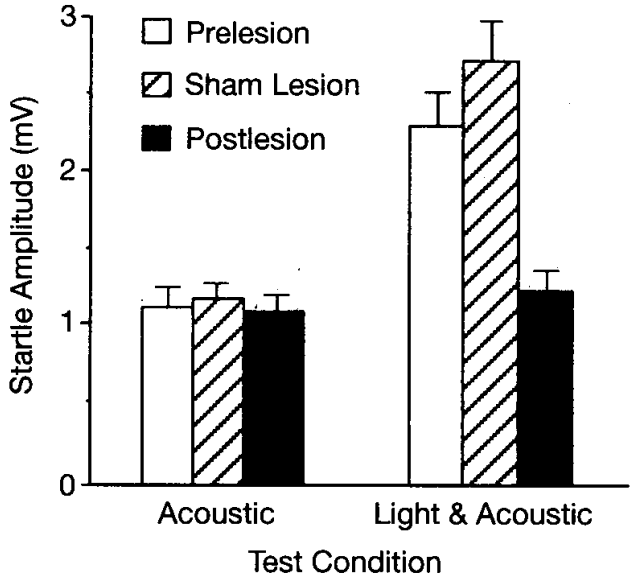
Figure X. Overall motor activity during the first 8 min of the observation session of E21 (Embryonic Day 21) rat fetuses treated with isotonic saline or varying dosages of cocaine. Cocaine groups in the left panel did not differ significantly from the saline-treated control group; cocaine groups in the right panel exhibited significantly elevated activity compared with the control group. Points represent the mean number of movements per minute; vertical lines depict standard errors of the means.

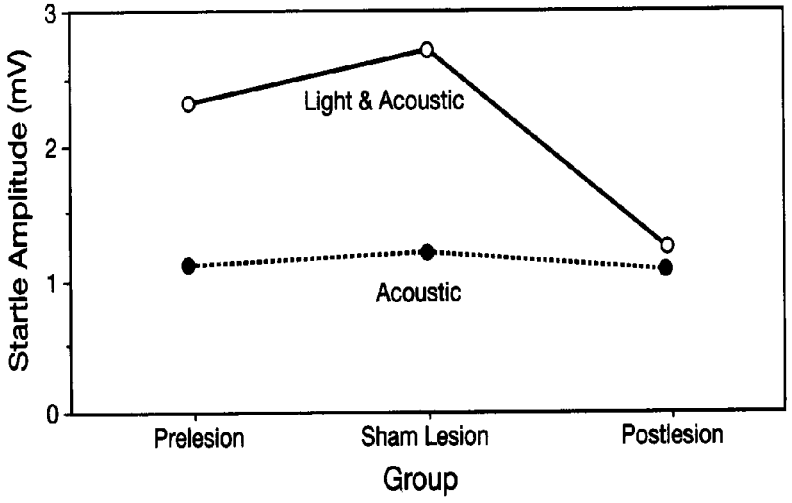
What (all studies), where and when (field studies).
Interpretation, methods (depending on publication).

Figure Legends

Fig. 1. Mean (sd) body weights of black-tailed prairie dogs, by age and sex, on the Murray Creek study area, southeastern Wyoming, July 1999-2002. Adults are heavier than juveniles; males are heavier than females. Weights are of live-captured animals, using spring scales.

Intuitive presentations – bar graph vs. line graph





Ordinal variable or higher

Variable types (measurement levels)

Categorical (nominal) – European, North American, South American, African

Ordinal (ranked) – small, medium, large

Interval – intervals are the same throughout the scale

Ratio – interval with a true zero

TABLE 6. Mean numbers and dry weights of individuals of four species of plants in 25 randomly chosen plots, each 30 × 30 cm^2, at a weedlot near St. James, Connecticut, August 15, 1994.

Species	Centaurea nigra	Conyza canadensis	Thlaspi arvense	Oenothera biennis
Count/plot	49.3	78.8	21.2	1.8
Dry wt/ indiv. (mg)	25.8	2.1	2.6	22.7

Rows vs. columns

TABLE 7. Mean numbers and dry weights of individuals of four species of plants in 25 randomly chosen plots, each 30 × 30 cm^2, at a weedlot near St. James, Connecticut, August 15, 1994.

Species	Count/plot	Dry wt/indiv. (mg)
Centaurea nigra	49.3	25.8
Conyza canadensis	78.8	2.1
Thlaspi arvense	21.2	2.6
Oenothera biennis	1.8	22.7

Equations – MS Equation Editor

Half sibs: $t_{(HS)} = \frac{\sigma_S^2}{\sigma_T^2} = 0.142$

Sire-component: $h^2 = \frac{4\sigma_S^2}{\sigma_T^2} = 0.57$

Dam-component: $h^2 = \frac{4\sigma_D^2}{\sigma_T^2} = 0.48$

Full sibs: $t_{(FS)} = \frac{\sigma_S^2 + \sigma_D^2}{\sigma_T^2} = 0.263$

Sire + Dam: $h^2 = \frac{2(\sigma_S^2 + \sigma_D^2)}{\sigma_T^2} = 0.53$

1 generation $V_{A1} = V_{A0}(1 + \frac{1}{2}m)$ (4) $V_{P1} = V_{P0}(1 + \frac{1}{2}mh^2)$ (6) $h_1^2 = h_0^2\left[\frac{1 + \frac{1}{2}m}{1 + \frac{1}{2}mh^2}\right]$ (8)

equilibrium $V_{A0} = V_A(1 - m)$ (5) $V_{P0} = V_P(1 - mh^2)$ (7) $h_0^2 = h^2\left[\frac{1 - m}{1 - mh^2}\right]$ (9)

Statistical results

Typically, report inferential statistic, number of degrees of freedom, *P* (probability of a Type I error)

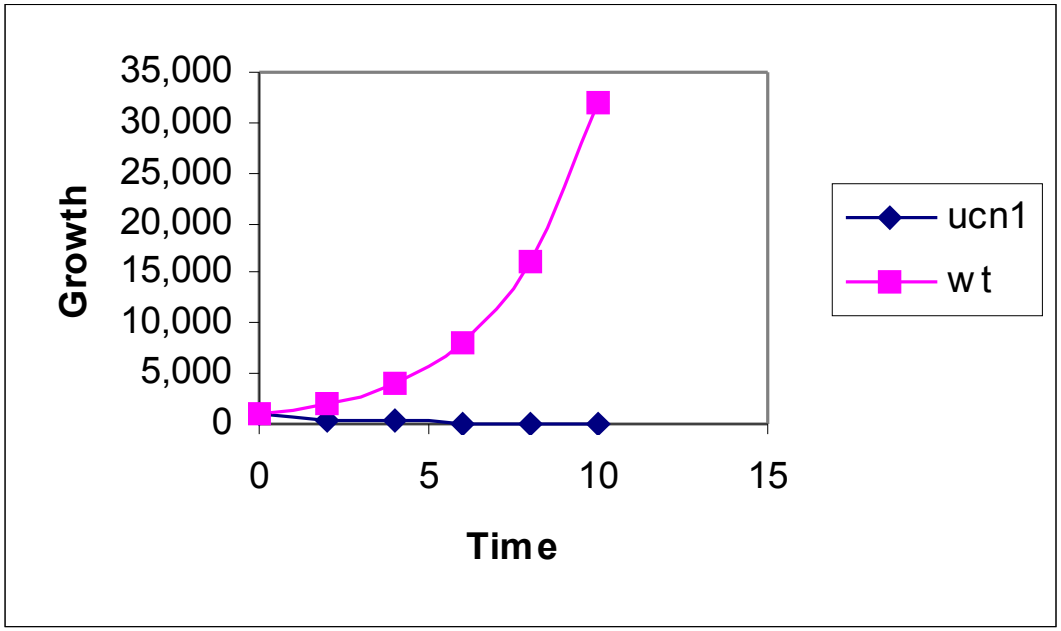
($\chi 2 = 8.7$, df = 4, P = 0.02)

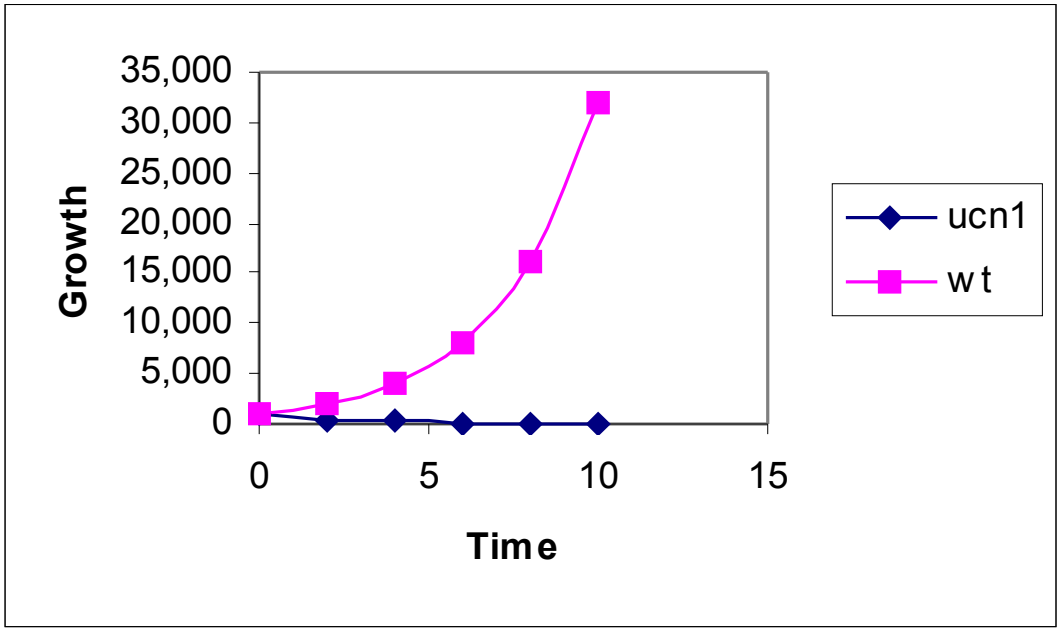
P is usually reported only to 1-2 significant figures (not *P* = 0.3486), regardless of the precision of the original data. *P* is interesting only to order of magnitude (1, 0.1, 0.01, 0.001).

So how do you write a figure legend?

Every figure legend should be written to answer the What-Why-What questions.

What is it?
Why did you do it?
What were the results?

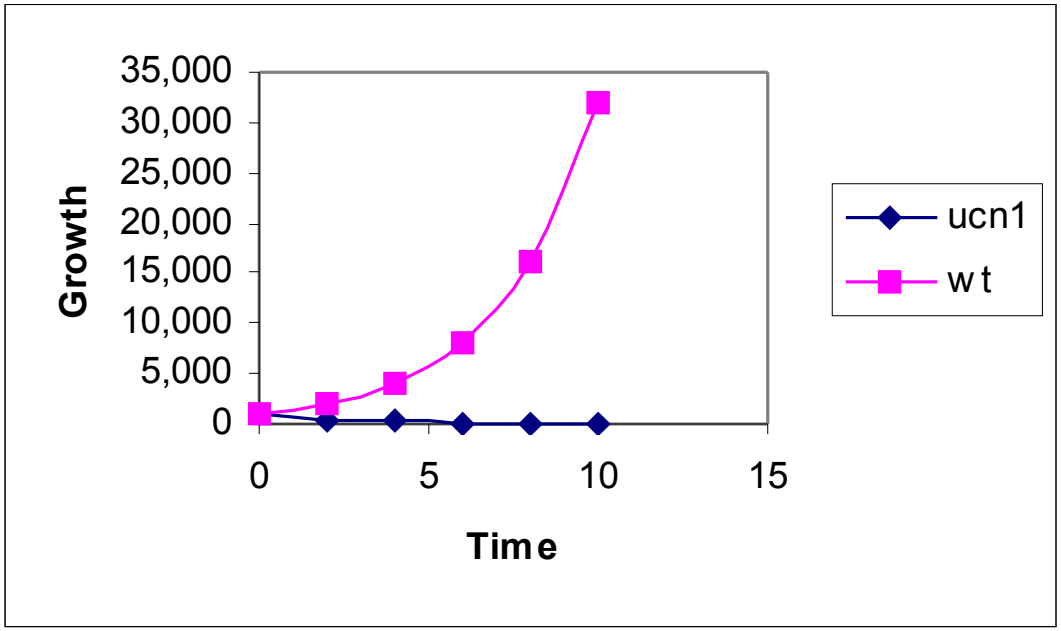

35,000
30,000
25,000
20,000
15,000
10,000
5,000
0
Growth
0
5
10
15
Time
ucn1
wt



Without a legend you have no idea:

What is growing: *ucn1*, wt-what are they? organisms? What are the time intervals? Why was this done? Is this normal?

To answer these basic questions, you need a solid figure legend.



First, you need a title.

Comparison of the ucn1 mutant to wild-type cells in 2% LiCl.
Notice how the title is not really a complete sentence, and only contains the most important information.
The rest of the information will be expanded upon in the actual legend.

So lets now work on the legend.
The experiment was performed on human neuron cells grown in culture and *ucn1* is a mutation in a gene that is necessary for growth in high lithium concentrations

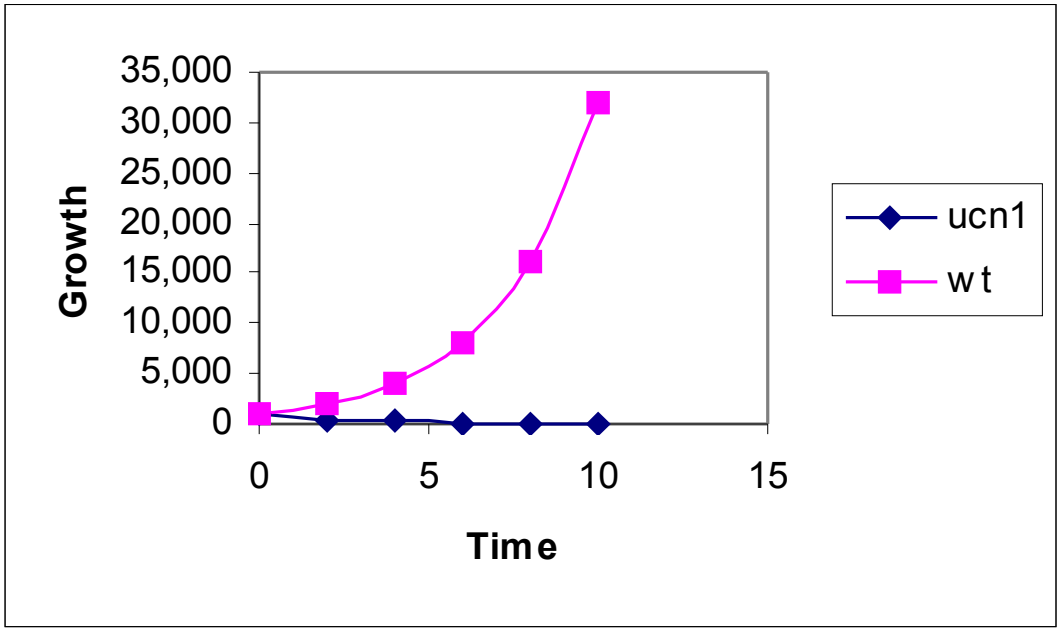
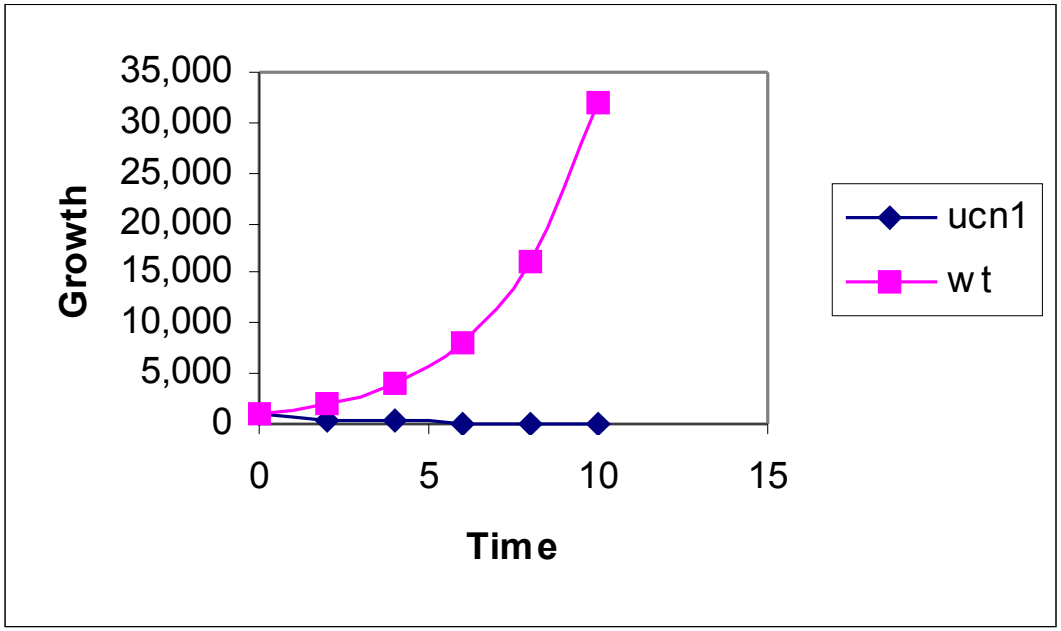


Figure 1: Comparison of the *ucn1* mutant to wild-type cells in 2% LiCl. To determine the effect lithium has on *ucn1* mutant cells, human neuron cells were cultivated in growth media amended with 2% LiCl. Both the wild-type control cells and the *ucn1* mutant cells were inoculated at concentration of 1,000cells/ml. Under normal growth conditions, Wild-type cells double every 2hrs; from $1x10^3$/ml to $3.2x10^4$/ml after 10 hours of growth. In comparison ucn1 mutants decreased by ½ every 2 hours; $1x10^3$/ml to 0/ml in 10 hours.



<u>Now lets examine this figure with the What-Why-What questions:</u>

What is it?

It is a comparison of the ucn1 mutant to wild-type cells in 2% LiCl.

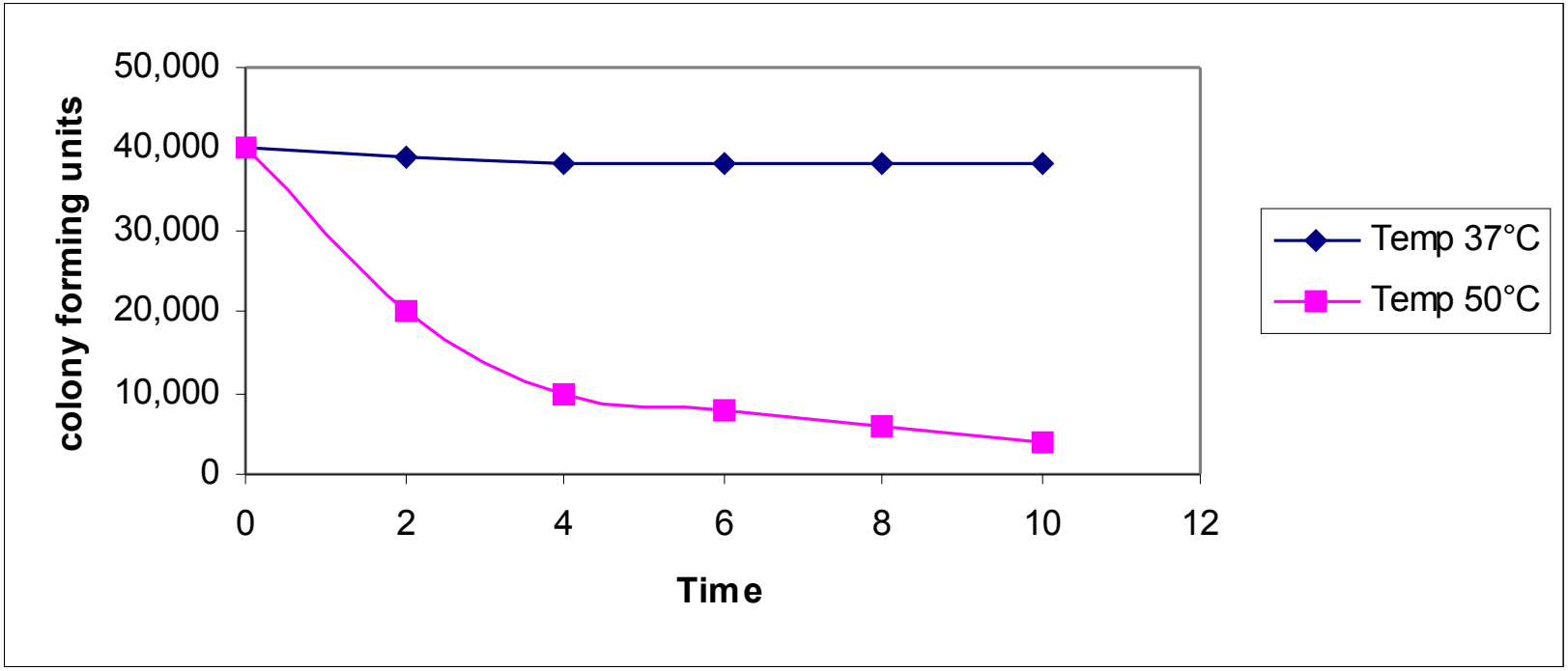
Why did you do it?

To determine the effect lithium has on the growth of ucn1 mutant cells.

What were the results?

When growth should double, it was in fact halved in the mutant

(Notice how in this part you gave actual numbers to show your answer)



What is it?

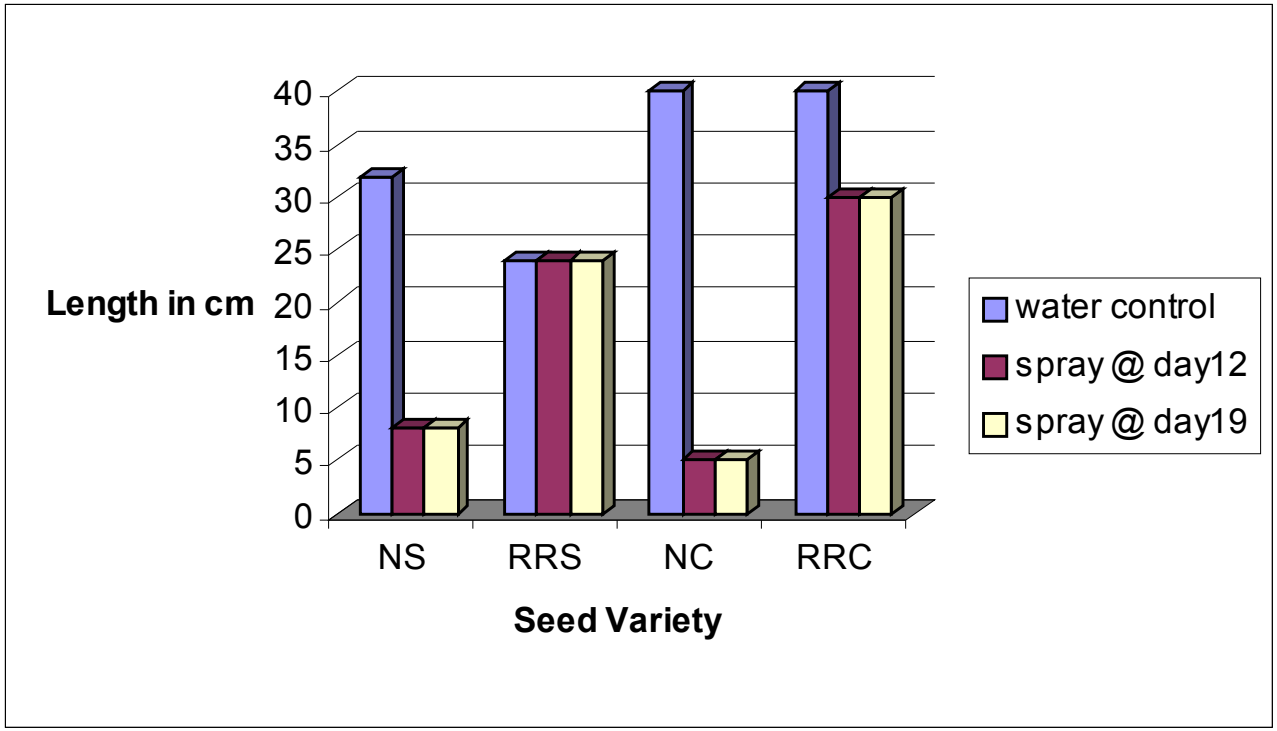
A comparison of growth rates at 37 v. 50 degrees Celsius

Why did you do it?

To examine the effect of increasing temp on the rate of cell death in a new mutant bacteria

What were the results?

Increasing temp to 50 results in a steady decrease in number of colony forming units over the first 4 hours while no effect is seen at 37

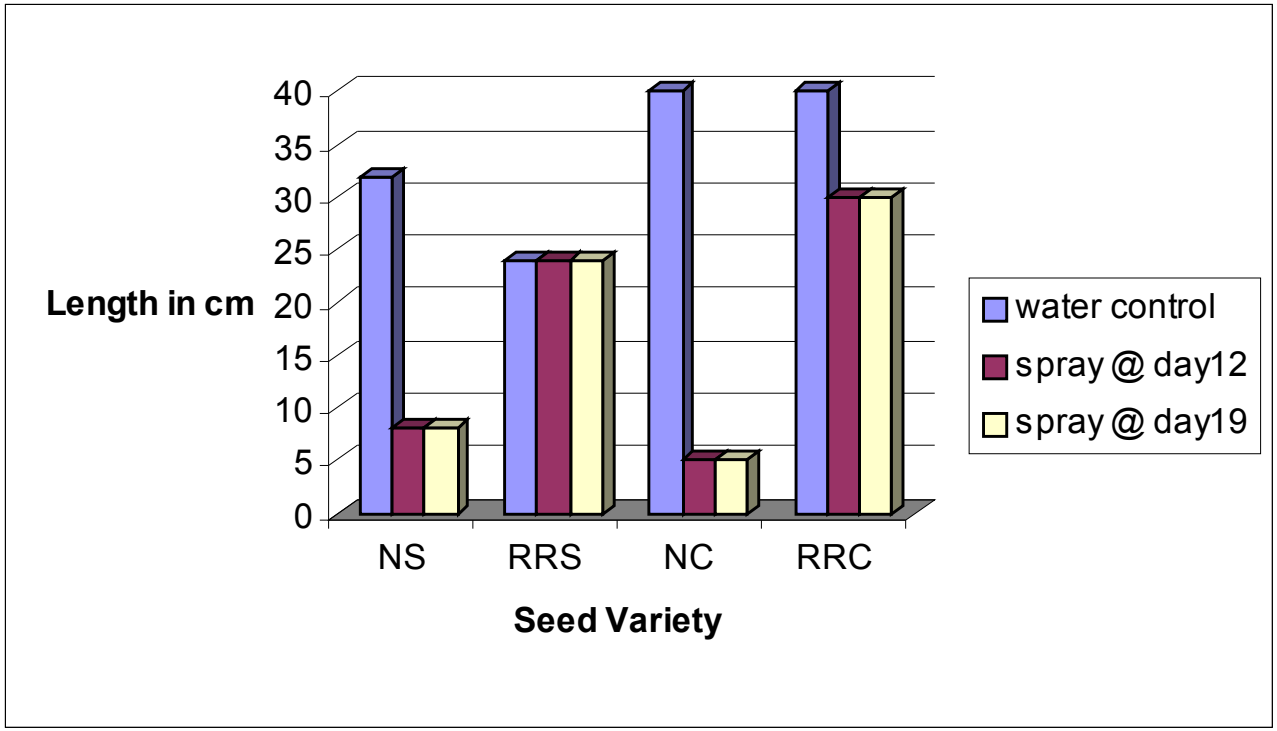


NS= normal soy; RRS= transgenic soy;
NC=normal corn RRC= transgenic corn
spray is 2% Glyphosate (round-up)

What is it?

Why did you do it?

What were the results?



NS= normal soy; RRS= transgenic soy; NC=normal corn RRC= transgenic corn spray is 2% Glyphosate (round-up)

What is it?

Examination of the effect of spraying on different seed varieties

Why did you do it?

To investigate if spraying normal vs. transgenic seeds results in changes in growth compared to water control

What were the results?

Spraying at either day 12 or 19 caused a decrease in length of plants from normal seeds; spraying at either day had no effect on transgenic seeds