

Question A

1. Between-plants

Pulse Codes:

	<u>3 Day</u>	<u>9 Day</u>	<u>21 Day</u>
P1	-1	0	1
P 2	-1	2	-1

Species Codes:

	<u>Wheatgrass</u>	<u>Sagebrush</u>	<u>Rabbitbrush</u>
S1	-1	1	0
S 2	-1	-1	2

Interactions:

$$P1S1 = P1 * S1$$

$$P1S2 = P1 * S2$$

$$P2S1 = P2 * S1$$

$$P2S2 = P2 * S2$$

Within-plant

Season Variable:

$$W_0 = LE + LM + LL$$

$$W_1 = LL - LE$$

$$W_2 = 2*LM - LL - LE$$

proc reg;

model W₀ = β₀ + β₁P1 + β₂P2 + β₃S1 + β₄S2 + β₅P1S1 + β₆P1S2 + β₇P2S1 + β₈P2S2/ss2 pcorr2;

model W₁ = β₀ + β₁P1 + β₂P2 + β₃S1 + β₄S2 + β₅P1S1 + β₆P1S2 + β₇P2S1 + β₈P2S2/ss2 pcorr2;

model W₂ = β₀ + β₁P1 + β₂P2 + β₃S1 + β₄S2 + β₅P1S1 + β₆P1S2 + β₇P2S1 + β₈P2S2/ss2 pcorr2;

run;

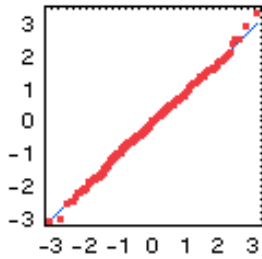
2. A: $W_1 = \beta_0 + \beta_1 P1 + \beta_2 P2 + \beta_3 S1 + \beta_4 S2 + \beta_5 P1S1 + \beta_6 P1S2 + \beta_7 P2S1 + \beta_8 P2S2 + \epsilon_i$
C: $W_1 = \beta_0 + \beta_1 P1 + \beta_2 P2 + \beta_3 P1S1 + \beta_6 P1S2 + \beta_7 P2S1 + \beta_8 P2S2 + \epsilon_i$

3 A. $W_0 = \beta_0 + \beta_1 P1 + \beta_2 P2 + \beta_3 S1 + \beta_4 S2 + \beta_5 P1S1 + \beta_6 P1S2 + \beta_7 P2S1 + \beta_8 P2S2 + \epsilon_i$
 β_1 in the W_0 regression.

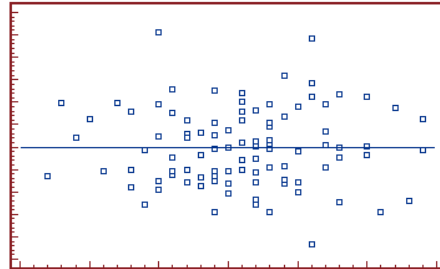
B. $W_1 = \beta_0 + \beta_1 P1 + \beta_2 P2 + \beta_3 S1 + \beta_4 S2 + \beta_5 P1S1 + \beta_6 P1S2 + \beta_7 P2S1 + \beta_8 P2S2 + \epsilon_i$
 β_0 in the W_1 regression.

C. $W_0 = \beta_0 + \beta_1 P1 + \beta_2 P2 + \beta_3 S1 + \beta_4 S2 + \beta_5 P1S1 + \beta_6 P1S2 + \beta_7 P2S1 + \beta_8 P2S2 + \epsilon_i$
 β_6 in the W_0 regression.

4. (Examples of plots)



Normal-Quantile plot: points don't deviate too far from the line



Residuals Against Predicted Values plot: cloud-like with no pattern

5. A. The dependent variable is a count of the number of leaves produced, so you would expect the error distribution to be positively skewed because counts cannot be less than 0. Thus, the appropriate value of the power would be less than 1.
- B. We didn't cover the Shapiro-Wilks statistic, so you don't have to try this question.

Question B

1. The odds ratio is significantly different than 1, because 1 lies outside its confidence interval.

Assuming the researchers are predicting that the individual *has* initiated alcohol use, the odds ratio of having initiated alcohol use is 1.51 times greater for the C/WI group than for the A-A group.

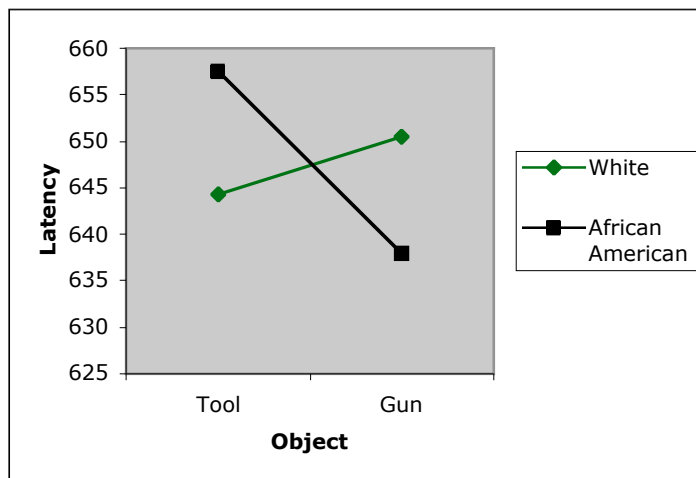
2. A: $\text{LOGIT} = \beta_0 + \beta_1\text{ETHNICITY} + \beta_2\text{USE} + \beta_3\text{ETHNICITY} \times \text{USE} + \epsilon_i$
C: $\text{LOGIT} = \beta_0 + \beta_1\text{ETHNICITY} + \beta_2\text{USE} + \epsilon_i$
3. It is better to use a transformation than to use a median split. Categorizing data using a median split method is not beneficial (and is "evil" according to Gary) because it will most likely reduce the variability of the predictor (and therefore SSX). Remember that SSX is inversely related to the size of the confidence interval, which means that decreasing SSX will widen your confidence interval, or in other words, decrease power. So, using the median split method reduces power in detecting effects.

Question C

1. A: $WWAXGT = \beta_0 + \beta_1 \text{GENDER} + \varepsilon_i$
C: $WWAXGT = 0 + \beta_1 \text{GENDER} + \varepsilon_i$
PRE = .18
 $F(1,58) = (3.573)^2 = 12.77$
pa-pc = 1
n-pa = 58
p < .01

Controlling for gender, the interaction between ethnicity of prime and type of object is significant.

2.



The interaction between ethnicity of prime and type of object reflects the fact that when primed with a White face, participants tended to identify tools faster than guns; however, when primed with an African-American face, participants tended to identify guns faster than tools (again, controlling for gender).

3. A: $WWAXGT = \beta_0 + \beta_1 \text{GENDER} + \varepsilon_i$
C: $WWAXGT = \beta_0 + \varepsilon_i$
PRE = .0068
 $F(1,58) = (.63)^2 = .396$
pa-pc = 1
n-pa = 58
p = .53

The evidence does not suggest that gender moderates the interaction between ethnicity of prime and type of object.

4. The intercept is, on average, twice the difference in mean latency for guns and for tools. The significance of the intercept indicates that, on average, participants identified guns (644.201) more quickly than tools (650.92).

5. The interaction of type of object and gender indicates that the difference in mean latency for tools and for guns depends on gender, such that men tended to identify guns more quickly than tools, whereas women tended to identify guns and tools with similar speed.

6. Controlling for gender, as prejudice increases, the effect of ethnicity of prime on object identification becomes stronger.

7. Errors are probably not normally distributed because latency cannot be less than 0, but they can be very high. So, you would expect a positively skewed distribution. A log transform would be appropriate in this case (or a power transform with $p < 1$).