Week 7 Section

Contrast Coding Practice:

Dummy Coding

Continuous outcome of interest: Aggression
Categorical predictor variable: Music
      Levels: Pop, Classical, Metal

Create a matrix showing how you would **code contrasts** if we want to compare (C1) **Classical and Pop music,** (C2) **Classical and Metal music**.

```
Call: ***COMPLETELY MADE-UP DATA!!***
lm(formula = aggression ~ music)

Residuals:
   Min     1Q Median     3Q    Max
-31.84 -11.85  -0.37   8.63  43.11

Coefficients:
            Estimate    Std. Error   t value      Pr(>|t|)
(Intercept)    55.60         4.23     11.20      7.4e-15 ***
Clas_Pop        1.20         1.45     .827       0.2058
Clas_Met       10.02         2.19     2.88       1.3e-5  ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 11.4 on 57 degrees of freedom
Multiple R-squared:  0.666,  Adjusted R-squared:  0.547
F-statistic: 7.35 on 1 and 57 DF,  p-value: 0.0001
```

In the above output, how do we interpret…
    the intercept?

      Clas_Pop?

      Clas_Met?

What is the **regression equation** for this model?

Calculate the **sample means for the three groups** (e.g., mean aggression for someone listening to metal):

What is the **total number of participants** in this experiment?

There were 20 people in the metal group; what is **the standard error of the mean aggression score** for the **metal group**?

Week 7 Section

Effect Coding

Continuous outcome of interest: Happiness
Categorical predictor variable: Season
       Levels: Spring, Summer, Fall, Winter

Create a matrix showing how you would code contrasts if we want to compare **happiness in (1) spring, (2) summer, and (3) winter, to general year-round levels of happiness**

```
Call: ***COMPLETELY MADE-UP DATA!!***
lm(formula = happiness ~ season)

Residuals:
   Min     1Q Median    3Q    Max
-31.84 -11.85  -0.37   8.63  43.11

Coefficients:
             Estimate    Std. Error   t value     Pr(>|t|)
(Intercept)     34.89         3.56     9.80        6.4e-14 ***
Seasons1         3.74         1.38     2.71        0.0088 **
Seasons2         1.02         2.88     1.76        0.1238
Seasons3        -2.70         1.07     2.64        0.0210 *
---
```

In the above output, how do we interpret…

       ...the intercept?

       ...the Seasons1 line?

       ...the Seasons2 line?

       ...the Seasons3 line?

What is our **overall summary** of this output?

What is the **regression equation** for this model?

What is our **best prediction for someone's happiness in fall**?

Week 7 Section

Polynomial Trends with Orthogonal Contrast Coding

Continuous outcome of interest: Number of friends
Categorical predictor variable: Age group
Levels: Young Adult, Middle Aged, Elderly

Create a matrix showing how you would code contrasts if we want to test (1) a linear effect of age on the number of friends and (2) a quadratic effect of age on the number of friends.

```
Call: ***COMPLETELY MADE-UP DATA!!***
lm(formula = NumFriends ~ Age)

Residuals:
   Min     1Q Median    3Q    Max
-31.84 -11.85  -0.37   8.63  43.11

Coefficients:
            Estimate     Std. Error    t value     Pr(>|t|)
(Intercept)   27.88        3.56         9.80        6.4e-14 ***
AgeLin         5.74        2.38         2.74        0.0132 *
AgeQuad        8.02        2.85         4.78        0.0078 **
---
```

In the above output, how do we interpret…

> ...the intercept?

> ...the AgeLin line?

> ...the AgeQuad line?

What is our **overall summary** of this output?

What is the **regression equation** for this model?

What is our **best prediction** for how many friends…
> ...a young adult has?

> ...a middle-aged person has?

> ...an elderly person has?

Week 7 Section

Two Factors Coding

Continuous outcome of interest: Health
Categorical predictor variable 1: Smoke
      Levels: Yes, No
Categorical predictor variable 2: Exercise
      Levels: Light, Moderate, Intense

Create a matrix showing how you would code contrasts if we want to look at (1) **those who smoke (baseline) vs. not**, (2) **linear effect of exercise**, (3) a **quadratic effect of exercise**, and **interactions** between (4) 1 & 2 and (5) 1 & 3. Are these contrasts **orthogonal**?

```
Call: ***COMPLETELY MADE-UP DATA!!***
formula = health ~ smoke*exercise

Fixed effects:
                  Estimate     Std. Error    t value      Pr(>|t|)
(Intercept)       15.99        3.56          4.49         1.9e-05 ***
Yes_No            5.64         1.32          4.27         3.9e-05 ***
Exerlin           .767         1.08          .710         0.2403
Exerquad          3.67         1.23          2.64         0.0021 **
Yes_No: Exerlin   3.12         1.23          2.64         0.0072 **
Yes_No: Exerquad  1.26         1.07          2.64         0.1222 *
```

In the above output, how do we
      the intercept?

      Yes_No?

      Exerlin

      Exerquad

      Yes_No:Exerlin

      Yes_No:Exerquad

What is the **regression equation** for this model?

What **predicted value** would we have for a **smoker who does intense exercising**?