

# 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 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**?