# Psy 524 Lab #3

# Multiple Regression

## SPSS

**Instructions**: For SPSS, write any answers and paste any figures into this word document after the appropriate question and upload to Canvas.

### Standard (Simultaneous) Regression (forclass)

1. Open up the “**forclass.sav**” data set in SPSS.

1.a. Go to **Analyze** 🡪 **Regression** 🡪 **Linear**.

1.b. Move *soitot* into [Dependent:] and *a*, *e*, and *sos* into [Block 1 of 1] and leave the dropdown menu as Method: Enter.

1.c. Go to **Statistics** and include the defaults (estimates, Model fit) + “R squared change”, “Descriptives”, “Part and partial correlations”, “Collinearity diagnostics”. Click on **Continue**.

1.d. Go to **Plots** and create a plot of zpred (x) and zresid (y). Click on **Continue**.

1.e. Go to Save and select “Mahalanobis” under Distances. Click on **Continue** and **OK**. Copy, Paste, Annotate, and Interpret (**CPAI**) the output below.

HIGHLIGHT HERE AND PASTE THE OUTPUT FOR #1

### User-defined Forward Sequential Regression (forclass)

1. Do a user defined sequential analysis using the block function.

2.a Move *soitot* into [Dependent:] and *a* into [Block 1 of 1] and click on **Next**, move *e* into [Block 2 of 2] and click on **Next**, and move *sos* into [Block 3 of 3]. Leave the dropdown menu as Method: Enter in each block.

2.b. Go to **Statistics** and include the default selections + “R squared change”. Click on **Continue** and **OK**. CPAI the results below.

HIGHLIGHT HERE AND PASTE OUTPUT FROM #2

2.c. In the space below, write an APA style results section summarizing the results (refer to the end of chapter 5 and the class webpage for a couple of samples). Make sure to write the results so that anyone reading it can understand it (make it as clear as possible and in very simple language, explaining all technical terms). Include: 1 APA style table and 1 APA style figure.

HIGHLIGHT HERE AND WRITE THE RESULTS SECTION.

### Statistical Forward Regression (forclass)

1. Do a statistical forward regression.

3.a. Move *soitot* into [Dependent:] and move *a*, *e*, and *sos* into [Block 1 of 1] and change the dropdown menu to Method: Forward.

3.b. Go to **Statistics** and include the default selections + “R squared change”. Click on **Continue** and **OK**. CPAI the results below.

HIGHLIGHT HERE AND PASTE OUTPUT FROM #3

### Stepwise Regression (forclass)

1. Do a stepwise regression.

45.a. Move *soitot* into [Dependent:] and move *sos*, *ego*, *n*, *e*, *o*, *a* and *c* into [Block 1 of 1] and change the dropdown menu to Method: Stepwise.

4.b. Go to **Statistics** and include the defaults (estimates, Model fit) + “R squared change”, “Descriptives”, “Part and partial correlations”, “Collinearity diagnostics”. Click on **Continue**.

4.c. Go to **Plots** and create a plot of zpred (x) and zresid (y). Click on **Continue**.

4.d. Go to Save and select “Mahalanobis” under Distances. Click on **Continue** and **OK**. Copy, Paste, Annotate, and Interpret (**CPAI**) the output below.

HIGHLIGHT HERE AND PASTE OUTPUT FROM #4

### Model Generalizability (forclass)

1. Create 2 random samples from the data and fit the same model to both halves.

5.a. Go to **Data** 🡪 **Select Cases** 🡪 **Random Sample of Cases** 🡪 **Sample**. Choose approximately 50%. **Continue** 🡪 **OK**.

5.b. Go to **Transform** 🡪 **Compute Variable**. Put in [set]= [filter\_$]. Click on **OK**.

5.c. Fit a simultaneous regression with *a*, *e*, and *sos* predicting *soitot* (see #2 above).

HIGHLIGHT HERE AND PASTE ONLY THE “COEFFICIENTS” TABLE FROM #5.c.

5.d. Go back to **Data** 🡪 **select cases** 🡪 **If condition satisfied** 🡪 **If**. Type in **set** = **0**.

5.e. Fit the exact same regression equation and compare the two outputs. Are the two outputs the same? Can you generalize the equation?

HIGHLIGHT HERE, PASTE THE “COEFFICIENTS” TABLE FROM #5.e AND ANSWER THE QUESTION.

### Matrix Functions (social2)

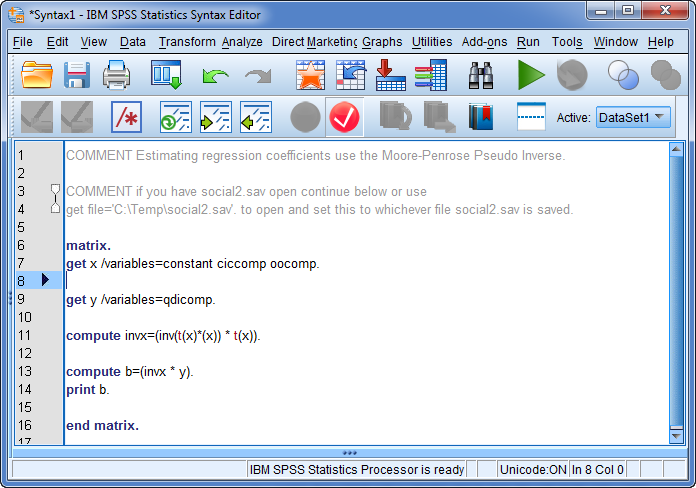
1. **Finding estimates of B using matrix command in SPSS**

6.a. Open the “**social2.sav**” data set from the web so that everyone has the same version.

6.b. Go to **transform** 🡪 **compute variable** and enter [constant] = [1].

6.c. Open SPSS and go to **File** 🡪 **New** 🡪 **Syntax**

6.d. Type into the window (anything after COMMENT are notes or instructions):



HIGHLIGHT HERE AND PASTE THE OUTPUT FOR #6.d.

* 1. What do the values above mean? (consider the first few commented lines in syntax).

### Centering and Interactions (social2)

1. Let’s center all relevant variables and create cross multiplied interaction terms.

7.a. Creating meaningful zero value for categorical variables: Create a new variable *female* that is a 0/1 coded version of *gender*. Go to **Transform** 🡪 **Compute variable** and enter [*female*] = [*gender* - 1]. Click on **OK**.

7.b. Center both *ciccomp* and *oocomp* separately using “Aggregate…” function:

7.b.i. Go to **Data** 🡪 **Aggregate…** and move *ciccomp* and *oocomp* into the [Summaries of Variable(s)] box under Aggregated Variables. By default they should both be using the MEAN function. Click on **OK**.

7.b.ii. Go to **Transform** 🡪 **Compute variable** and enter [*ciccent*] = [*ciccomp* - *ciccomp\_mean*]. Click on **OK**.

7.b.iii. Go to **Transform** 🡪 **Compute variable** and enter [*oocent*] = [*oocomp* - *oocomp\_mean*]. Click on **OK**.

7.c. Predict **oocent** with **female** and **ciccent** and CPAI (don’t forget to interpret the intercept since it is meaningful).

HIGHLIGHT HERE AND PASTE THE OUTPUT FOR #7.c.

7.d. Create interaction terms by multiplying

7.d.i. Cross multiply *female*(0 and 1) and *ciccent* to make a new variable *fem\_cic*. Go to **Transform** 🡪 **Compute Variable** to enter [*fem\_cic*] = [*female* \* *ciccent*]. Click on **OK**.

7.d.ii. Using a simultaneous regression, predict *oocent* [Dependent:] by *female*, *ciccent* and *fem\_cic* [Block 1 of 1]. CPAI and compare to the output in #7.c.

HIGHLIGHT HERE AND PASTE THE OUTPUT FOR #7.d.

### Mediation using regression (social2)

1. Perform a Baron and Kenny style mediational analysis using *oocent* as the predictor, *ciccent* as the mediator and *qdicomp* as the outcome.

8.a. Predict **outcome** [Dependent:] with the **predictor** [Block 1 of 1].

HIGHLIGHT HERE AND PASTE THE “COEFFICIENTS” TABLE FROM #8.a

8.b. Predict the **mediator** [Dependent:] with the **predictor** [Block 1 of 1].

HIGHLIGHT HERE AND PASTE THE “COEFFICIENTS” TABLE FROM #8.b

8.c. Predictor the **outcome** [Dependent:] with both the **predictor** and **mediator** [Block 1 of 1].

HIGHLIGHT HERE AND PASTE THE “COEFFICIENTS” TABLE FROM #8.c

8.d. According to Baron and Kenny is there mediation? Is it full or partial mediation? How do you know?

HIGHLIGHT HERE AND ANSWER THE QUESTIONS FROM #8.d

8.e. By hand: Test for a significant indirect effect using the 3 tables above and the Sobel test.



HIGHLIGHT HERE AND SHOW YOUR WORK AND EXPLAIN YOUR ANSWER FOR #8.e

## R-studio

### Setting up a Notebook file, Installing/Loading Packages, and Loading Data

1. Open a new R notebook

9.a. **File** 🡪 **New File** 🡪 **R Notebook**

9.b. Clear everything from the new notebook.

9.c. Add to the file the following and run the chunks:

---

title: "Psy524 Lab #3 R code"

author: "Your Name"

output:

word\_document: default

html\_notebook: default

---

# Psy524 Lab #3 R Syntax

```{r Packages}

#install.packages("foreign")

library(foreign)

```

```{r Loading Data}

forclass <-read.spss("https://github.com/AndrewAinsworth/psy524/raw/master/LabAssignments/Lab03/forclass.sav",

use.value.label=TRUE,

to.data.frame=TRUE)

names(forclass) <- tolower(names(forclass))

```

### Standard Regression in R

1. Paste the chunk below and run it. Interpret the output in the R notebook.

## Standard Regression in R

```{r Standard Regression}

mod1 <- lm(soitot ~ a + e + sos, data = forclass)

summary(mod1)

plot(mod1)

```

### User-defined forward sequential in R

1. Paste the chunk below and run it. Interpret the output in the R notebook.

## User Defined Forward Regression in R

```{r Standard Regression}

#First predictor

mod2a <- lm(soitot ~ a, data = forclass)

summary(mod2a)

rsq1 <- summary(mod2a)$r.squared

#Add second predictor

mod2b <- lm(soitot ~ a + e, data = forclass)

summary(mod2b)

anova(mod2b,mod2a)

rsq2 <- summary(mod2b)$r.squared

rsq2 - rsq1

#Add third

mod2c <- lm(soitot ~ a + e + sos, data = forclass)

summary(mod2c)

anova(mod2c,mod2b)

rsq3 <- summary(mod2c)$r.squared

rsq3 - rsq2

```

### Statistical forward, backward and stepwise regression in R

1. Paste the chunk below and run it. Interpret the output in the R notebook.

## Forward, Backward and Stepwise Regression in R

```{r Statistical Sequential}

#define intercept-only model

intercept\_only <- lm(soitot ~ 1, data=forclass)

#define model with all predictors

all <- lm(soitot ~ sos + ego + n + e + o + a + c, data=forclass)

#Forward statistical regression

mod3a <- step(intercept\_only, direction='forward', scope=formula(all), trace=0)

mod3a$anova

mod3a$coefficients

#Backward statistical regression

mod3b <- step(all, direction='backward', scope=formula(all), trace=0)

mod3b$anova

mod3b$coefficients

#Stepwise (both directions) regression

mod3c <- step(intercept\_only, direction='both', scope=formula(all), trace=0)

mod3c$anova

mod3c$coefficients

```