*APA Tutorial (from Chapter 3* MacKinnon, D.P. (2008). Introduction to statistical mediation analysis. Mahwah, NJ: Erlbaum.)

*Single mediator model example – SAS*

This handout provides the SAS syntax and output for the single mediator model water consumption example in Chapter 3.

Four variables are defined: (a) subject ID #, (b) room temperature, or subject

score on X, (c) reported thirst, or subject score on M, and (d) water consumption, or subject score on Y.

**Syntax:**

title 'Chapter 3 Analysis Example- Single Mediator Model';

\* The following program code reads in the dataset for the

single mediator model water consumption example in Chapter 3;

\* Four variables are defined: (a) subject ID#, (b) room

temperature, or subject score on X, (c) reported thirst,

or subject score on M, and (d) water consumption, or subject

score on Y;

**data** a;

input id x m y;

cards;

1 70 4 3

2 71 4 3

…put data here……

49 72 4 5

50 70 2 2

;

\* The following commands run the three mediation regression

equations outlined in Chapter 3 for the water consumption

example;

/\* Equation 3.1:

Regress the outcome variable on the IV. That is, regress

water consumption on room temperature. \*/

**proc** **reg**;

model y=x;

/\* Equation 3.2:

Regress the outcome variable on the IV and the

mediator. That is, regress water consumption on room

temperature and thirst. \*/

**proc** **reg**;

model y=x m;

/\* Equation 3.3:

Regress the mediator on the IV. That is, regress thirst

on room temperature. \*/

**proc** **reg**;

model m=x;

**run**;

**Output:**

Chapter 3 Analysis Example- Single Mediator Model 1

The REG Procedure

Model: MODEL1

Dependent Variable: y

Number of Observations Read 50

Number of Observations Used 50

Analysis of Variance

Sum of Mean

Source DF Squares Square F Value Pr > F

Model 1 8.23076 8.23076 7.20 0.0100

Error 48 54.88924 1.14353

Corrected Total 49 63.12000

Root MSE 1.06936 R-Square 0.1304

Dependent Mean 3.24000 Adj R-Sq 0.1123

Coeff Var 33.00487

Parameter Estimates

Parameter Standard

Variable DF Estimate Error t Value Pr > |t|

Intercept 1 -22.05049 9.42792 -2.34 0.0236

x 1 0.36037 0.13432 2.68 0.0100

Y = -22.05 + .360 X

(.134)



i1

Chapter 3 Analysis Example- Single Mediator Model 2

The REG Procedure

Model: MODEL1

Dependent Variable: y

Number of Observations Read 50

Number of Observations Used 50

Analysis of Variance

Sum of Mean

Source DF Squares Square F Value Pr > F

Model 2 17.49805 8.74903 9.01 0.0005

Error 47 45.62195 0.97068

Corrected Total 49 63.12000

Root MSE 0.98523 R-Square 0.2772

Dependent Mean 3.24000 Adj R-Sq 0.2465

Coeff Var 30.40836

Parameter Estimates

Parameter Standard

Variable DF Estimate Error t Value Pr > |t|

Intercept 1 -12.71288 9.19691 -1.38 0.1734

x 1 0.20765 0.13326 1.56 0.1259

m 1 0.45104 0.14597 3.09 0.0034

Y = -12.713 + .208 X + .451 M

(.133) (.146)



i2



Chapter 3 Analysis Example- Single Mediator Model 3

The REG Procedure

Model: MODEL1

Dependent Variable: m

Number of Observations Read 50

Number of Observations Used 50

Analysis of Variance

Sum of Mean

Source DF Squares Square F Value Pr > F

Model 1 7.26620 7.26620 7.66 0.0080

Error 48 45.55380 0.94904

Corrected Total 49 52.82000

Root MSE 0.97419 R-Square 0.1376

Dependent Mean 3.06000 Adj R-Sq 0.1196

Coeff Var 31.83613

Parameter Estimates

Parameter Standard

Variable DF Estimate Error t Value Pr > |t|

Intercept 1 -20.70243 8.58885 -2.41 0.0198

x 1 0.33859 0.12237 2.77 0.0080

M = -20.702 + .339 X

(.122)

i3



Rmediation for Distribution of the Product Confidence Intervals

For RMediation go to <https://rdrr.io/cran/RMediation/man/medci.html>. The Rmediation program will give confidence intervals based on the distribution of the product. These confidence intervals are more accurate than normal theory confidence intervals. The coefficients and standard errors for the water consumption example are shown below, where mu.x is the a coefficient and mu.y is the b coefficient. The estimate is .153, standard error of .076 (using the second order standard error), with a lower confidence interval of .03 and an upper confidence interval of .325.

(res <- [medci](https://rdrr.io/cran/RMediation/man/medci.html)(mu.x=.33859, mu.y=.45104, se.x=.12237, se.y=.14597, rho=0, alpha=.05, [type](https://rdrr.io/r/base/typeof.html)="prodclin", [plot](https://rdrr.io/r/graphics/plot.html)=[**TRUE**](https://rdrr.io/r/base/logical.html), plotCI=[**TRUE**](https://rdrr.io/r/base/logical.html)) )