

Code ▼

R Notebook

This is an R Markdown (<http://rmarkdown.rstudio.com>) Notebook. When you execute code within the notebook, the results appear beneath the code.

Try executing this chunk by clicking the *Run* button within the chunk or by placing your cursor inside it and pressing *Cmd+Shift+Enter*.

Hide

```
#1. Is the power to accuracy relationship mediated by slope?
model.0 <- lm(accuracy ~ t_band_power, data = mydata)
summary(model.0)
```

Call:

```
lm(formula = accuracy ~ t_band_power, data = mydata)
```

Residuals:

Min	1Q	Median	3Q	Max
-1.30266	-0.77827	-0.04977	0.65498	1.76142

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	1.537e-17	1.284e-01	0.000	1.000000
t_band_power	-5.551e-01	1.299e-01	-4.274	0.000112 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.8418 on 41 degrees of freedom

Multiple R-squared: 0.3082, Adjusted R-squared: 0.2913

F-statistic: 18.26 on 1 and 41 DF, p-value: 0.0001117

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```
model.M <- lm(slope ~ t_band_power, data = mydata) # mediator model
summary(model.M)
```

```
Call:
lm(formula = slope ~ t_band_power, data = mydata)

Residuals:
    Min       1Q   Median       3Q      Max
-1.6592 -0.6169  0.1487  0.5860  2.4163

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  1.101e-16  1.431e-01   0.000  1.0000
t_band_power -3.754e-01  1.448e-01  -2.593  0.0131 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.9381 on 41 degrees of freedom
Multiple R-squared:  0.1409,    Adjusted R-squared:  0.1199
F-statistic: 6.724 on 1 and 41 DF,  p-value: 0.01312
```

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```
model.Y <- lm(accuracy ~ t_band_power + slope, data = mydata)
summary(model.Y)
```

```
Call:
lm(formula = accuracy ~ t_band_power + slope, data = mydata)

Residuals:
    Min       1Q   Median       3Q      Max
-1.63508 -0.61174  0.04605  0.53424  1.82982

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) -1.725e-17  1.227e-01   0.000  1.00000
t_band_power -4.439e-01  1.339e-01  -3.314  0.00196 **
slope        2.964e-01  1.339e-01   2.213  0.03267 *
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.8045 on 40 degrees of freedom
Multiple R-squared:  0.3836,    Adjusted R-squared:  0.3528
F-statistic: 12.45 on 2 and 40 DF,  p-value: 6.26e-05
```

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```
results1 <- mediate(model.M, model.Y, treat='t_band_power', mediator='slope',
                    boot=TRUE, sims=5000)
summary(results1)
```

Causal Mediation Analysis

Nonparametric Bootstrap Confidence Intervals with the Percentile Method

	Estimate	95% CI Lower	95% CI Upper	p-value
ACME	-0.1113	-0.2320	-0.01	0.042 *
ADE	-0.4439	-0.6695	-0.24	<2e-16 ***
Total Effect	-0.5551	-0.7824	-0.34	<2e-16 ***
Prop. Mediated	0.2004	0.0116	0.42	0.042 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Sample Size Used: 43

Simulations: 5000

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```
#2. Is the power to accuracy relationship mediated by sampEn?
model.0 <- lm(accuracy ~ t_band_power, data = mydata)
summary(model.0)
```

```
Call:
lm(formula = accuracy ~ t_band_power, data = mydata)

Residuals:
    Min       1Q   Median       3Q      Max
-1.30266 -0.77827 -0.04977  0.65498  1.76142

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  1.537e-17  1.284e-01   0.000 1.000000
t_band_power -5.551e-01  1.299e-01  -4.274 0.000112 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.8418 on 41 degrees of freedom
Multiple R-squared:  0.3082,    Adjusted R-squared:  0.2913
F-statistic: 18.26 on 1 and 41 DF,  p-value: 0.0001117
```

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```
model.M <- lm(sa_ent ~ t_band_power, data = mydata) # mediator model
summary(model.M)
```

```
Call:
lm(formula = sa_ent ~ t_band_power, data = mydata)

Residuals:
    Min       1Q   Median       3Q      Max
-2.68712 -0.37779 -0.05297  0.33249  3.03613

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  6.090e-17  1.415e-01   0.000   1.000
t_band_power -3.992e-01  1.432e-01  -2.788   0.008 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.928 on 41 degrees of freedom
Multiple R-squared:  0.1594,    Adjusted R-squared:  0.1389
F-statistic: 7.774 on 1 and 41 DF,  p-value: 0.007999
```

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```
model.Y <- lm(accuracy ~ t_band_power + sa_ent, data = mydata)
summary(model.Y)
```

```
Call:
lm(formula = accuracy ~ t_band_power + sa_ent, data = mydata)

Residuals:
    Min       1Q   Median       3Q      Max
-1.1939 -0.6906 -0.1132  0.6483  1.7175

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)  2.269e-18  1.263e-01   0.000 1.00000
t_band_power -4.692e-01  1.393e-01  -3.367  0.00169 **
sa_ent       2.152e-01  1.393e-01   1.544  0.13037
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.828 on 40 degrees of freedom
Multiple R-squared:  0.3471,    Adjusted R-squared:  0.3145
F-statistic: 10.63 on 2 and 40 DF,  p-value: 0.000198
```

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```
results2 <- mediate(model.M, model.Y, treat='t_band_power', mediator='sa_ent',
                    boot=TRUE, sims=5000)
summary(results2)
```

Causal Mediation Analysis

Nonparametric Bootstrap Confidence Intervals with the Percentile Method

	Estimate	95% CI Lower	95% CI Upper	p-value
ACME	-0.08592	-0.28278	-0.01	0.030 *
ADE	-0.46923	-0.70596	-0.18	0.002 **
Total Effect	-0.55514	-0.78195	-0.34	<2e-16 ***
Prop. Mediated	0.15477	0.00955	0.57	0.030 *

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Sample Size Used: 43

Simulations: 5000

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```
#3. Is the slope to accuracy relationship mediated by sampEn?
model.0 <- lm(accuracy ~ slope, data = mydata)
summary(model.0)
```

```
Call:
lm(formula = accuracy ~ slope, data = mydata)

Residuals:
    Min       1Q   Median       3Q      Max
-1.5305 -0.7196 -0.1556  0.6223  2.0143

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) -6.142e-17  1.368e-01   0.000  1.00000
slope        4.630e-01  1.384e-01   3.345  0.00177 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.8971 on 41 degrees of freedom
Multiple R-squared:  0.2144,    Adjusted R-squared:  0.1952
F-statistic: 11.19 on 1 and 41 DF,  p-value: 0.001769
```

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```
model.M <- lm(sa_ent ~ slope, data = mydata) # mediator model
summary(model.M)
```

```
Call:
lm(formula = sa_ent ~ slope, data = mydata)

Residuals:
    Min       1Q   Median       3Q      Max
-2.54393 -0.59775  0.09565  0.48081  2.49513

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) -1.464e-17  1.265e-01   0.000      1
slope        5.729e-01  1.280e-01   4.476 5.95e-05 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.8296 on 41 degrees of freedom
Multiple R-squared:  0.3282,    Adjusted R-squared:  0.3118
F-statistic: 20.03 on 1 and 41 DF,  p-value: 5.946e-05
```

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```
model.Y <- lm(accuracy ~ slope + sa_ent, data = mydata)
summary(model.Y)
```

```
Call:
lm(formula = accuracy ~ slope + sa_ent, data = mydata)

Residuals:
    Min       1Q   Median       3Q      Max
-1.3247 -0.6353 -0.1288  0.5974  1.9148

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) -5.843e-17  1.360e-01   0.000  1.0000
slope        3.459e-01  1.679e-01   2.060  0.0459 *
sa_ent       2.044e-01  1.679e-01   1.217  0.2307
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.8919 on 40 degrees of freedom
Multiple R-squared:  0.2424,    Adjusted R-squared:  0.2045
F-statistic:  6.4 on 2 and 40 DF,  p-value: 0.003877
```

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```
results3 <- mediate(model.M, model.Y, treat='slope', mediator='sa_ent',
                    boot=TRUE, sims=5000)
summary(results3)
```

Causal Mediation Analysis

Nonparametric Bootstrap Confidence Intervals with the Percentile Method

	Estimate	95% CI Lower	95% CI Upper	p-value
ACME	0.11708	-0.03302	0.37	0.1396
ADE	0.34593	0.00115	0.67	0.0492 *
Total Effect	0.46300	0.23038	0.73	0.0004 ***
Prop. Mediated	0.25286	-0.06333	1.00	0.1400

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Sample Size Used: 43

Simulations: 5000

Add a new chunk by clicking the *Insert Chunk* button on the toolbar or by pressing *Cmd+Option+I*.

When you save the notebook, an HTML file containing the code and output will be saved alongside it (click the *Preview* button or press *Cmd+Shift+K* to preview the HTML file).