

Serial Mediation Analysis R - Part 2

Notes

1. The author accepts no responsibility for the topicality, correctness, completeness, or quality of the information provided.
2. This pdf is part of a YouTube tutorial: <https://youtu.be/GBBbx9Pnses>
3. This pdf is for your own personal use only. Please do not distribute further!

Step 1

```
library(boot)
```

```
## Warning: package 'boot' was built under R version 4.1.3
```

```
Serial_Mediation_function<-function(data_used,i)
{
  # Sample a data
  data_temp=data_used[i,]

  # a path
  result_a<-lm(M1~X, data = data_temp)
  a_0<-result_a$coefficients[1]
  a_1<-result_a$coefficients[2]

  # d path
  result_d<-lm(M2~M1+X, data = data_temp)
  d_0<-result_d$coefficients[1]
  d_1<-result_d$coefficients[2]
  d_2<-result_d$coefficients[3]

  # b path
  result_b<-lm(Y~M2+M1+X, data = data_temp)
  b_0<-result_b$coefficients[1]
  b_1<-result_b$coefficients[2]
  b_2<-result_b$coefficients[3]
  c_1_apostrophe<-result_b$coefficients[4]

  #calculating the indirect effect
  indirect_effect<-a_1*d_1*b_1
  return(indirect_effect)
}
```

Step 2

```
Mediation_data <- read.csv("https://raw.githubusercontent.com/tidydatayt/serial_mediation_R/main/df_serial.csv")
head(Mediation_data)
```

	##	X.1	X	M1	M2	Y
## 1	1	1.6589330	3.230957	11.99716	46.35009	
## 2	2	3.5024245	6.178766	28.37735	104.33976	
## 3	3	2.5283077	7.051897	23.85784	88.20432	
## 4	4	2.5421914	6.072521	21.20176	77.93777	
## 5	5	1.8633266	4.127025	17.10519	62.61427	
## 6	6	0.8632661	2.548584	10.36870	37.60888	

Step 3

```
set.seed(123)

# use boot() to do bootstrapping mediation analysis
boot_mediation <- boot(Mediation_data, Serial_Mediation_function, R=5000)

# print out confidence intervals
boot.ci(boot.out = boot_mediation, type = c("norm", "perc"))

## BOOTSTRAP CONFIDENCE INTERVAL CALCULATIONS
## Based on 5000 bootstrap replicates
##
## CALL :
## boot.ci(boot.out = boot_mediation, type = c("norm", "perc"))
##
## Intervals :
## Level      Normal      Percentile
## 95%   (15.75, 18.93 )   (15.79, 18.92 )
## Calculations and Intervals on Original Scale
```

Step 4

Print out all 5000 indirect effects. Note that, this step is not really needed. The only reason of this step is to show you that: yes, indeed, there are 5000 indirect effects generated from the `boot()` function.

```
boot_mediation$t
```

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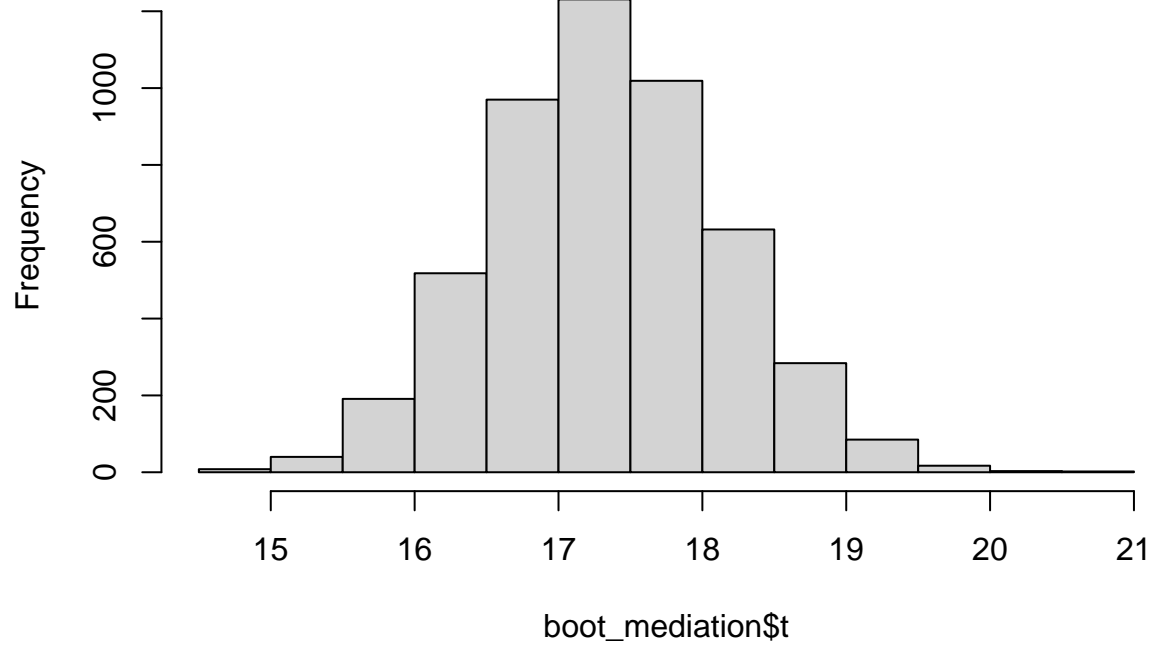
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```

Histogram plotting

```
hist(boot_mediation$t)
```


Histogram of boot_mediation\$t



Step 5

```
# print out confidence intervals
boot.ci(boot.out = boot_mediation, type = c("norm", "perc"))

## BOOTSTRAP CONFIDENCE INTERVAL CALCULATIONS
## Based on 5000 bootstrap replicates
##
## CALL :
## boot.ci(boot.out = boot_mediation, type = c("norm", "perc"))
##
## Intervals :
## Level      Normal      Percentile
## 95%   (15.75, 18.93 )   (15.79, 18.92 )
## Calculations and Intervals on Original Scale
```

```
# Normal CI:
bias<-mean(boot_mediation$t)-boot_mediation$t0
print(boot_mediation$t0-bias + c(-1, 1) * 1.96 * sd(boot_mediation$t))
```

```
## [1] 15.75196 18.92601
```

```
# Percentile CI:
quantile(boot_mediation$t, c(0.025, 0.975))
```

```
##      2.5%      97.5%
## 15.79676 18.91476
```