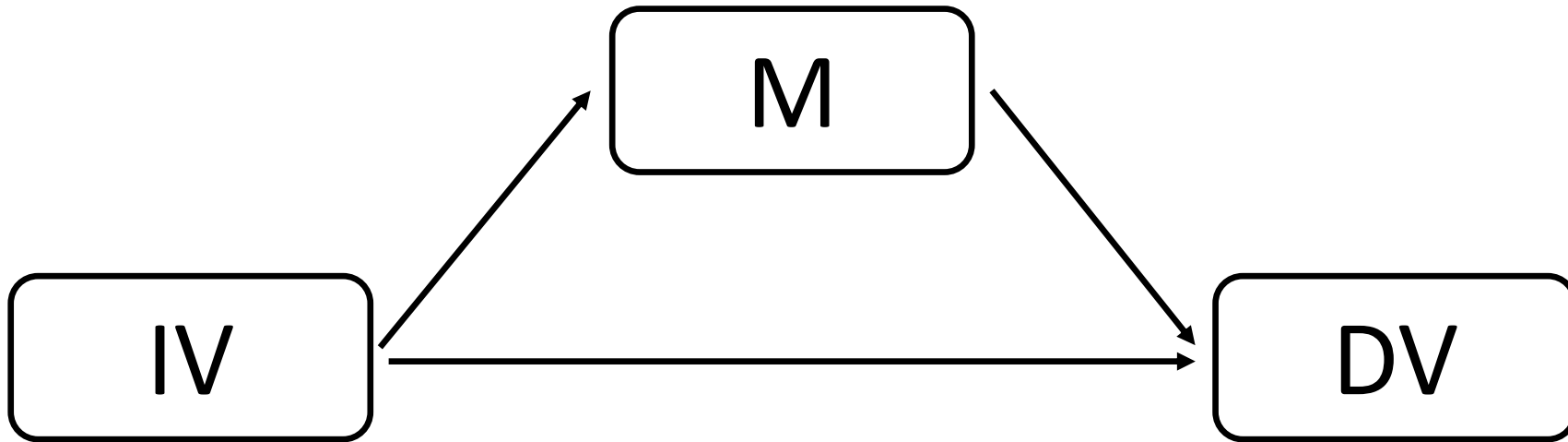


Mediation Analysis in R for Binary Outcome (PROCESS Method)



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/LBMznGHln_U
- 3. This pdf is for your own personal use only. Please do not distribute.

So far.....

- I have published a tutorial using the “mediation” package for mediation analysis in R for binary outcome.
- However, Hayes PROCESS can also do it, but it uses log odds ratio approach for b path.
- I have published a tutorial about it using SPSS.

**Often,
we use first partial derivatives to model
indirect effects.**

(Reference is provided in the video description.)

Mediation Analysis for Continuous Outcome

Mediation Analysis for Continuous Outcome

Sample Data:

- X (IV) is continuous.
- M is continuous.
- Y (DV) is **continuous**.

a and b paths:

- (1) $X \rightarrow M$ (**a path**)

$$M = a_0 + a_1 X$$

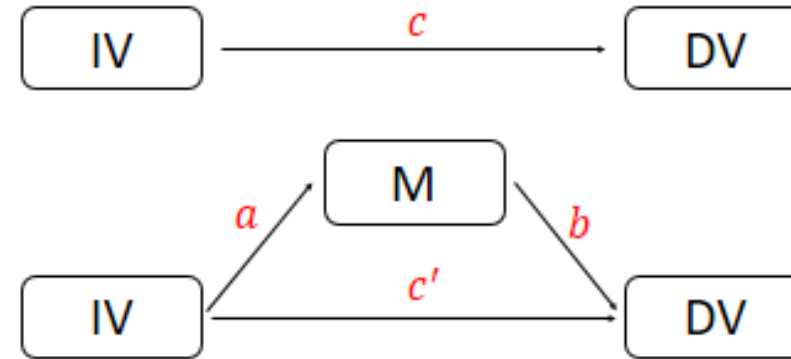
$$\frac{\partial M}{\partial X} = a_1$$

- (3) $X + M \rightarrow Y$ (**b path**)

$$Y = b_0 + b_1 M + c' X$$

$$\frac{\partial Y}{\partial M} = b_1$$

Indirect effect: $a_1 * b_1$

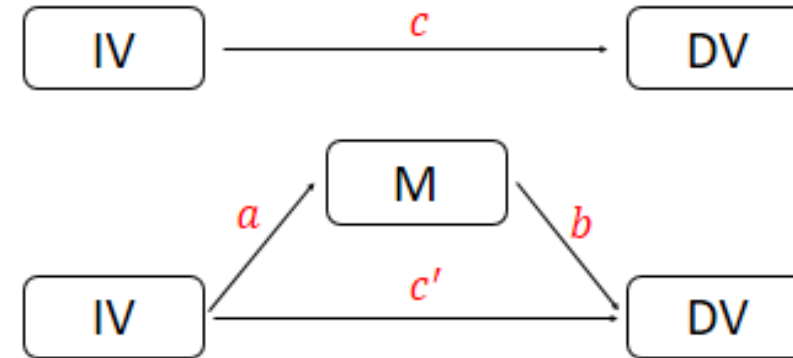


Mediation Analysis for Binary Outcome

Mediation Analysis for **Binary** Outcome

Sample Data:

- X (IV) is continuous.
- M is continuous.
- Y (DV) is **binary**.



a and b paths:

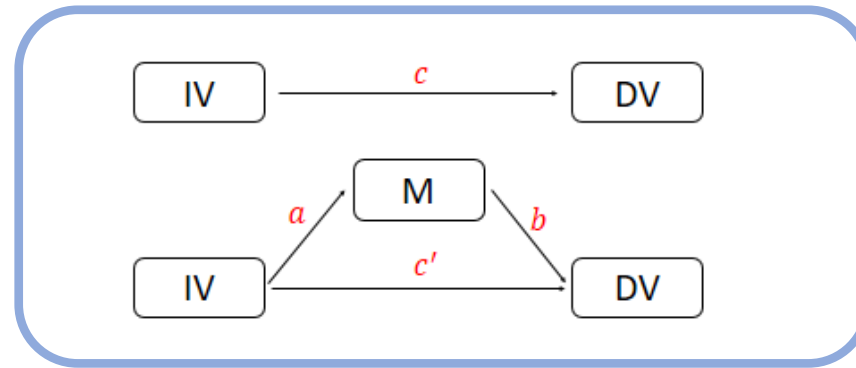
- (1) $X \rightarrow M$ (**a path**)

$$M = a_0 + a_1 X$$

$$\frac{\partial M}{\partial X} = a_1$$

- (3) $X + M \rightarrow Y$ (**b path**)

$$P(Y=1) = \frac{e^{(b_0 + b_1 M + c' X)}}{1 + e^{(b_0 + b_1 M + c' X)}}$$



Logistic Function (or, expit) Format

$$P(Y=1) = \frac{e^{(b_0 + b_1 M + c'X)}}{1 + e^{(b_0 + b_1 M + c'X)}}$$

$$\frac{\partial P(Y=1)}{\partial M} = \frac{b_1 e^{(b_0 + b_1 M + c'X)}}{(1 + e^{(b_0 + b_1 M + c'X)})^2}$$

Log odds (or, logit) Format

$$\log \frac{P(Y=1)}{1 - P(Y=1)} = b_0 + b_1 M + c'X$$

$$\frac{\partial \log \frac{P(Y=1)}{1 - P(Y=1)}}{\partial M} = b_1$$

PROCESS in SPSS calculates the indirect effect: $a_1 * b_1$

A side note:

For non-linear regression (a or b path), different packages in R might use different methods to calculate the indirect effect.