Power Analysis and Sample Size Planning—On Demand

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Upcoming Seminar:
February 27-March 27, 2023, On Demand Seminar
Mediation and Conditional Process Analyses

- Major area of development over the last year
- Simple mediation
  - Up to four mediating variable and two predictors
- Serial mediation
- Conditional process models 7, 8, 14, and 15 (a.k.a. the only ones that anyone actually uses)
- All use the joint significance test (functionally equivalent in power to Bootstrapped Percentile CIs)
  - Working on adding the incrementally better Monte Carlo estimate
  - Major advance over first release of pwr2ppl
Data/Models for Single and Multiple Mediator Examples

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<thead>
<tr>
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<th>Neg. Contact</th>
<th>Anxiety</th>
<th>Real Threat</th>
<th>Symb. Threat</th>
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<td>Neg. Contact</td>
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<td>Anxiety</td>
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<td>Real Threat</td>
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<tr>
<td>Symb. Threat</td>
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<td>Attitudes</td>
<td>-.35</td>
<td>-.50</td>
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![Diagram](image-url)
pwr2ppl::medjs (one mediator)

medjs(rx1m1, rx1y, rym1, mvars, n, alpha)

rx1m1 is the correlation between the predictor variable (x) and the first mediator (m1). rx1y is the correlation between the 1st predictor variable (x1) and the outcome (y). rym1 is the correlation between the outcome variable (y) and the mediator (m1). mvars is the number of mediating variables. The function allows up to four. n is sample size and alpha defaults to .05. (Note: text uses med function – medjs is better)

medjs(rx1m1=.25, rx1y=-.35, rym1=-.5, mvars=1, pred=1, n=150)

## Sample size is 150
## Power is 0.884
pwr2ppl::medjs (three mediators)

rx1m1 is the correlation between the predictor variable (x) and the first mediator (m1). rx1y is the correlation between the 1st predictor variable (x1) and the outcome (y). rym1 is the correlation between the outcome variable (y) and the mediator (m1). mvars is the number of mediating variables. The function allows up to four. n is sample size and alpha defaults to .05.

medjs(rx1m1=.3, rx1m2=.3, rx1m3=.25, rx1y=-.35, rym1=-.5, rym2=-.5, rym3 = -.5, rm1m2=.7, rm1m3=.4, rm2m3=.4, mvars=3,pred=1,n=335)
## Sample size is 335
## Power for M1 0.904
## Power for M2 0.889
## Power for M3 0.999
Serial Mediation
Inputs follow figure notation. All tests use joint significance

\texttt{medserial}(rxm1=.3, rxm2=.3, rxy=-.35, rym1=-.5, rym2=-.5, rm1m2=.7,n=150)

## Power for \( n = 150 \), mediator 1 is 0.749

## Power for \( n = 150 \), mediator 2 is 0.273

## Power for \( n = 150 \), serial mediation is 0.748
Conditional Processes

- “Moderated Mediation”
- Many models possible
- I focus on Models 7, 8, 14, and 15 (I have no idea how these get numbered)

Why just these four?
- These were the only ones I saw in the literature
- I certainly will entertain requests to build for other models

These functions are not in the version of pwr2ppl on CRAN. Can only get them here and on my Github
Notation Guide

• I will likely update the notation on these beta functions
  • $r_{xy}$ – corr between $x$ and $y$
  • $r_{xm}$ – corr between $x$ and $m$
  • $r_{xw}$ - corr between $x$ and $w$
  • $r_{xxw}$ – corr between $x$ and $xw$ (interaction)
  • $r_{xmw}$ – corr between $x$ and $mw$ (interaction)
  • Etc. with all the different combinations
Conditional Process (Model 7)

Moderation is interaction between X and W predicting the mediator
New code rxw, rxwx etc. reflect W and WX terms

\texttt{modmed7}(rxm=.4, rxw=.4, rxxw=.3, rxy=.50, rmy=.3, rxwy=0, rwm=.45, rwxw=.25, rmxw=.2, rwy=.2, alpha=.05, rep=1000, n=400)

## Sample size is 400

## Power for Conditional Indirect Effect (Joint Significance) 0.091