

Mediation and the APIM

Within the APIM both the causal variable and the mediator may be several variables and so it can be quite complicated.

Mediator between-dyads or within-dyads (2-1-2 Mediation)

Indistinguishable Dyads

2 Indirect Effects

Actor-Mediator (Blue-Green and Red-Tan)

Partner-Mediator (Red-Green and Blue-Tan)

Distinguishable Dyads (Boss and Employee)

4 Indirect Effects

Actor-Mediator

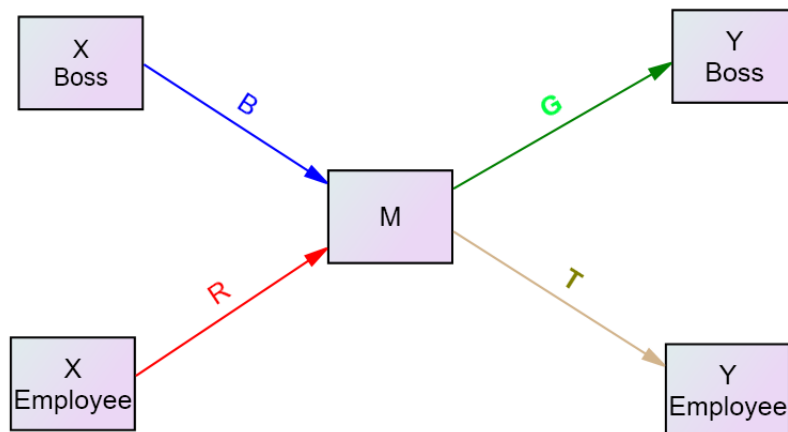
Boss (Blue-Green)

Employee (Red-Tan)

Partner-Mediator

Boss (Blue-Tan)

Employee (Red-Green)



Mediator mixed variable with actor and partner effects (2-2-2 Mediation)

Indistinguishable Dyads: 4 Possible Mediating or Indirect Effects

For the Actor Effect

Actor-Actor

Partner-Partner

For the Partner Effect

Actor-Partner

Partner-Actor

Distinguishable Dyads: 8 Indirect Effects

Actor-Actor: Man and Woman

Partner-Partner: Man and Woman

Actor-Partner: Man and Woman

Partner-Actor: Man and Woman

Example: Riggs Study

Distinguishable Dyads with a Mixed Mediator

Causal Variable: Abuse

Mediator: Anxiety (mixed)

Outcome: Satisfaction

There are four total effects (c) that can be mediated:

Woman Actor Effect from Abuse (Woman) to Satisfaction (Woman)

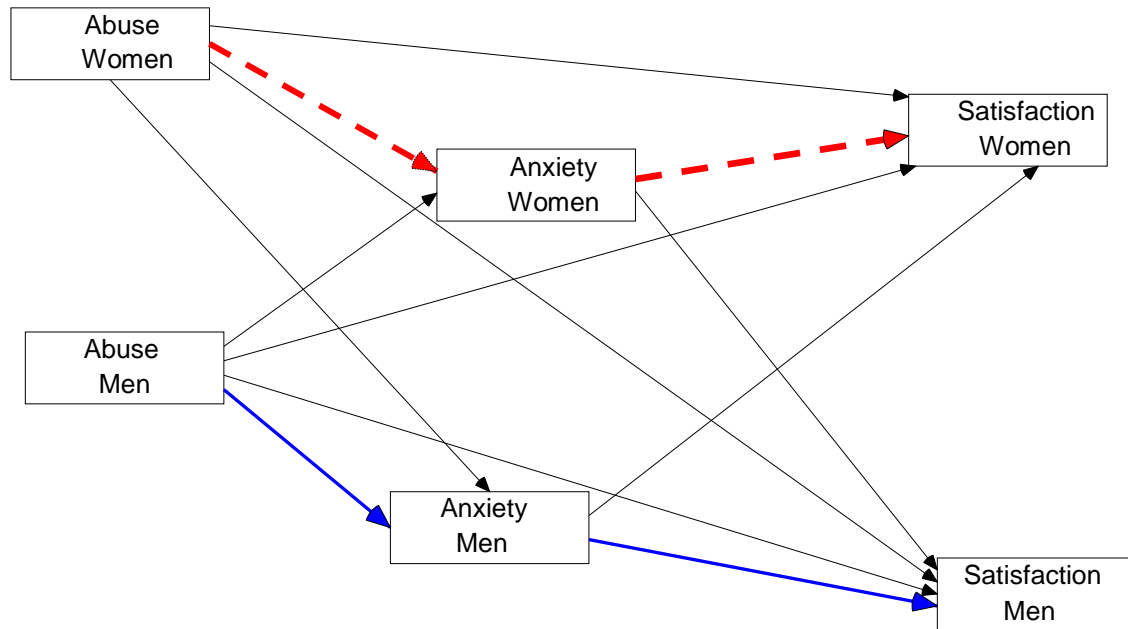
Man Actor Effect from Abuse (Man) to Satisfaction (Man)

M to W Partner Effect from Abuse (Man) to Satisfaction (Woman)

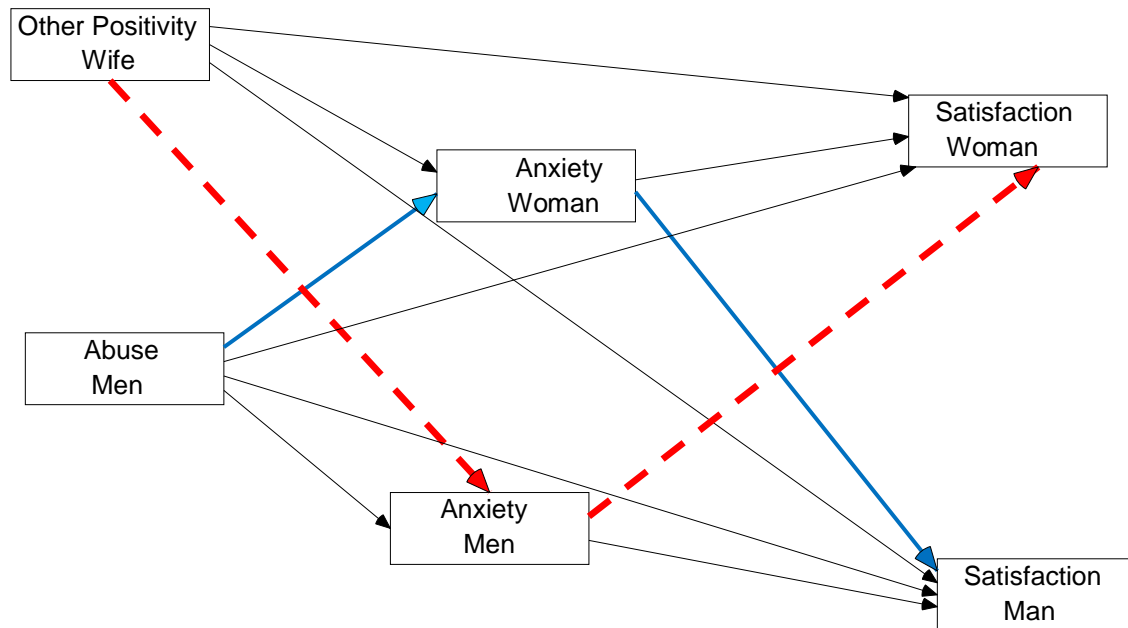
W to M Partner Effect from Abuse (Woman) to Satisfaction (Man)

Each of the four total effects had two indirect effects, creating are eight mediated or indirect effects. They each involve a tracing from Abuse to Satisfaction via Anxiety. Each indirect effect involves the product of two effects: a path from Abuse to Anxiety (a path) times a path from Anxiety to Satisfaction (b path). To differentiate effects, we note whose Satisfaction score we have. So Actor_w is the actor effect for the woman and Partner_{wM} is the partner effect for woman where the woman provides the outcome variable.

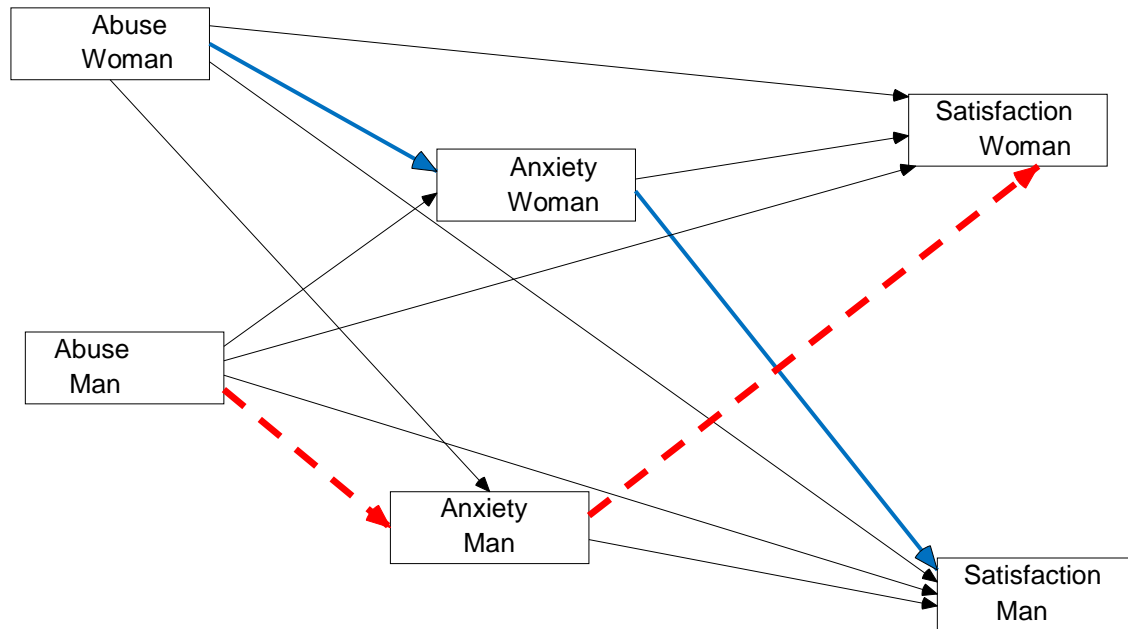
1. Actor-Actor:



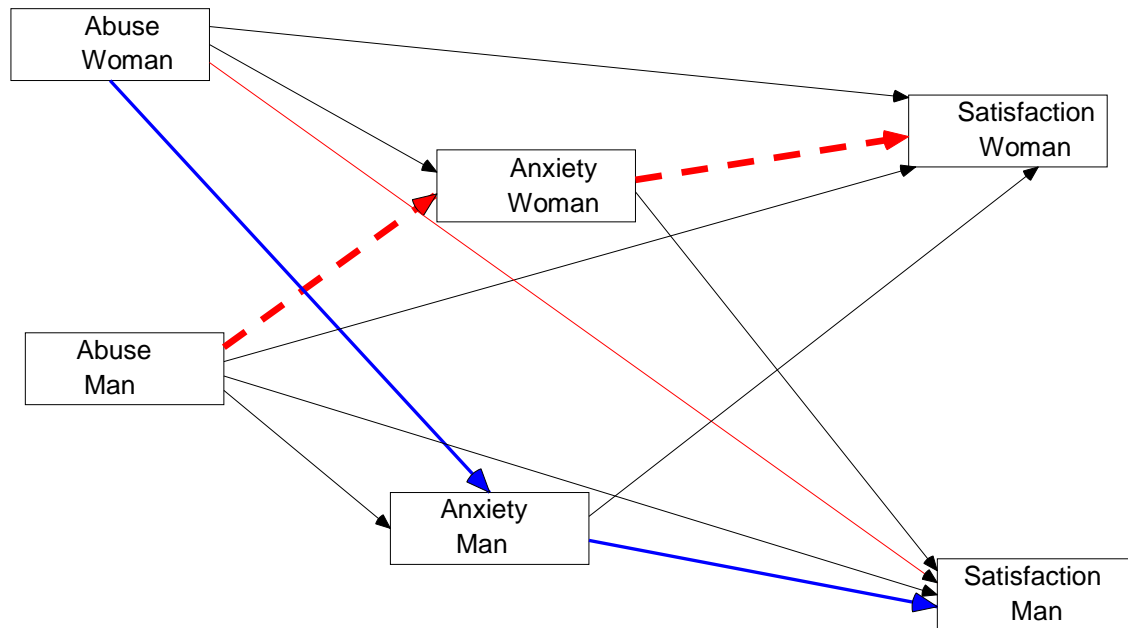
2. Partner-Partner



3. Actor-Partner



4. Partner-Actor



Testing Indirect Effects Using Multilevel Modeling

Sobel Test

Save effect estimates and standard errors.

Compute Z test.

Low power.

Viewed in 2017 as “old fashioned.”

Separately Test a and b

Also viewed old fashioned, actually very old-fashioned.

But may be making a comeback.

Bootstrapping

Difficult currently

See Pituch & Stapleton (*Multivariate Behavioral Research*, 2008) for a discussion of how to bootstrap in MLM.

Option available in some MLM programs.

Only for effects but not indirect effects.

Monte Carlo Method

Appears to be the method of choice for mediation with APIM using multilevel modeling.

Simplifying the Model

Avoid simple trimming of not significant effects

Capitalization on chance: 8 tests and the effective alpha, assuming independence, being .34

Colinearity issues: If you meet Step 2, paths from Steps 3 and 4 terms are collinear and have low power

Misses the pattern

Does not think that the non-significant indirect effect is significantly smaller than a statistically significant indirect effect.

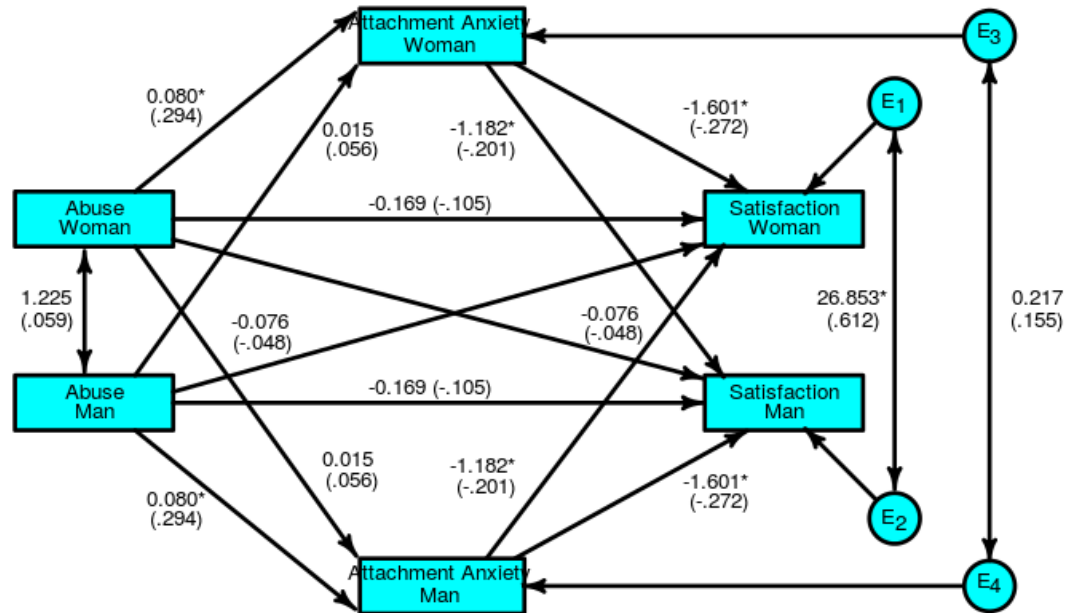
Combining Effects: Testing Distinguishability

Test of the differences between men and women (distinguishability):

Using SEM, $\chi^2(12) = 18.78, p = .094$

Conclusion: No gender differences.

APIM Mediation (Standardized Estimates)



Use of k in Tests of Mediation

The parameter k equals the partner effect divided by the actor effect. Recall that when k equals 1, there is a couple model, when k equals 0, there is an actor-only model, and when k equals -1, there is a contrast model. We can estimate the k for path a (path from X to M) and for path b (path from M to Y).

For the example using SEM with non-parametric bootstrapping (the regular bootstrap), we find

$$k_a = 0.189 \text{ (95\% CI from -0.161 to 0.556)}$$

$$k_b = 0.738 \text{ (95\% CI from 0.353 to 1.208)}$$

We see that the k for the a path might be zero, and for b path might be one. If fact, using SEM is we set k_a to 0 and k_b to 1, the fit of this model is $\chi^2(2) = 2.936$ ($p = .230$), thus the data are consistent with these values of k .

Advantages of Using SEM over MLM to Estimate and Test Mediation

- All paths in one run.
- Non-parametric bootstrapping can be done.
- The k parameter can be added.
- Sensitivity analyses can be easily conducted.
- Indirect effects are automatically computed.