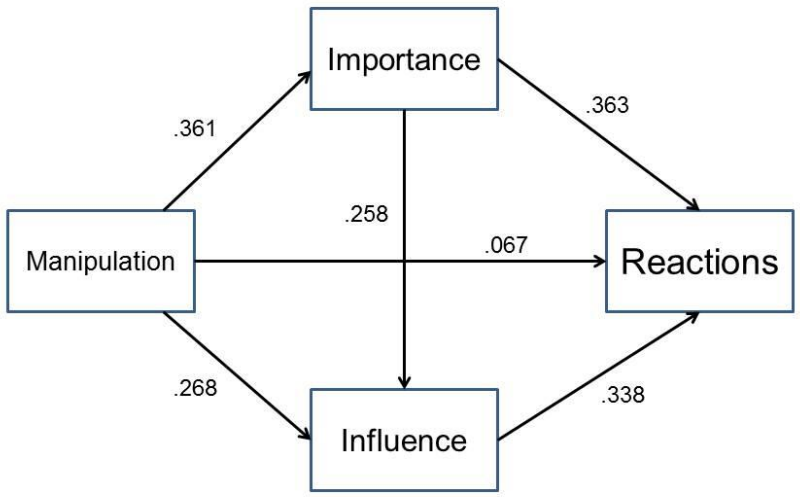
Serial Multiple Mediation

Consider the model that X has both direct and indirect effects on Y, and there are two or more mediators, with one of the mediators being a cause of the other mediator

Hayes (2013, pages 149 through 156) illustrates serial multiple mediation with data from research conducted by Tal-Or, Cohen, Tsfati, & Gunther (2010), the same data also used to illustrate parallel multiple mediation.



Manipulation: All subjects read an article about a sugar shortage being likely in the near future. For half of the subjects, it was said that the article would appear on the front page of a major newspaper. For the other half, it was to appear in an internal economic supplement.
Influence: Subjects' perceptions about how influential the article would be. **Importance:** Subjects' perceptions about how important the article's topic was.
Reactions: To what extent the article affected subjects' sugar buying and consuming behaviors.

If you have not done so already, download, from Process Hayes, the data files (hayes2013data.zip) as well as the programs (processv210.zip or more recent release). In folder "pmi" you will find the data for this example, in several formats. I am going to use process.sav, which has variable names, labels, and value labels. Rather than use SPSS for the analysis, I shall use SAS. SAS is able to import *.sav files.

Boot up SAS. Open and run the process.sas macro. Import the protest.sav data. During the process of importation, name the SAS work data set "pmi." Open the program editor (File, New Program) and enter and run this code: "Proc Contents; run;" The output will give you a terse description of the imported data, including variable names and labels.

If there were missing data, we would need deal with that first, creating a data file with no missing data. There are no missing data here. Although not necessary, I prefer to standardize continuous variables, so my next step is to create standardized scores. Do not that I have not standardized the two-level experimental manipulation (protest).

```
proc contents; run;
proc means; run;
data pmi2; set pmi;
  pmiZ=(pmi-5.6016260)/1.3212627;
  importZ=(import-4.2032520)/1.7365849;
  reactionZ=(reaction-3.4837398)/1.5502974; run;
```

Enter and run this code to do the mediation analysis.

```
%process (data=pmi2, vars=cond pmiZ importZ reactionZ,y=reactionZ,x=cond,m=importZ pmiZ,boot=10000,
total=1,normal=1,contrast=1,model=6);
```

References

- Tal-Or, N., Cohen, J., Tsfati, Y., & Gunther, A. C. (2010). Testing causal direction in the influence of presumed media influence. *Communication Research*, *37*, 801-824.
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*. New York, NY: Guilford.
- Hayes, A. F. (2012). PROCESS: A versatile computational tool for observed variable mediation, moderation, and conditional process modeling [White paper]. Retrieved from http://www.personal.psu.edu/jxb14/M554/articles/process2012.pdf, January, 2014.

- Annotated SAS Output
- Statistical Tests of Models That Include Mediating Variables
- Comparing Regression Lines From Independent Samples.
- Continuous Moderator Variables.
- Return to Wuensch's Statistics Lessons Page

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