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Composites with Multiple Effects

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1

This module deals with a slightly more complex situation that can occur with working with composites, that of multiple effects.

An appropriate citation for this material is

Grace, J.B., and Bollen, K.A. (2006) The interface between theory and data in structural equation models: U. S. Geological Survey Open-File Report 2006-1363, 33 p.

Note, see especially the example in Figure 12 in the above publication.

https://profile.usgs.gov/myscience/upload_folder/ci2012Nov2316254439968Grace%20and%20Bollen2006_USGS_OFR.pdf

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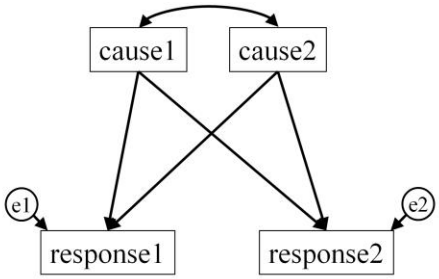
When composites represents two different types of effects, things get more involved.



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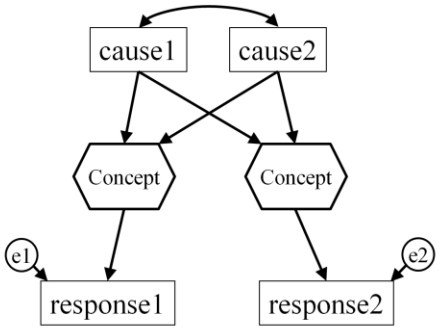
Previous modules on composites have dealt with the case where there is one response for which effects of multiple causes are being combined. However, it is quite possible there may be multiple responses to be modelled.

It is not typically the case that a single set of composite scores (i.e., a single composite) explains the joint effects of multiple causes on multiple responses.



Here we label the composites based on their conceptual definitions.

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3

We should not expect that the exact same weights would explain the combined effects of cause1 and cause2 on response1 and response2. In the more typical case, we would wish to specify separate composites for each response variable to capture the maximal effect of the combined causes on each response.

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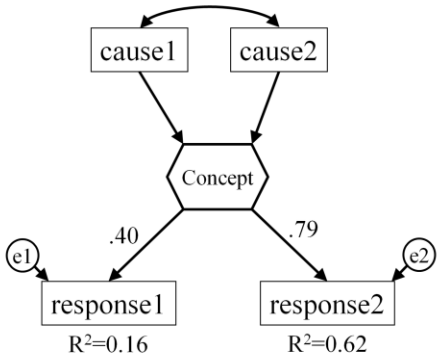
It is often more conceptually representative to omit some of the complexities from the diagram when reporting results from multiple composite effects.



In a case such as this one, you might simply results from a model such as the one on the previous page to avoid having the machinery distract from the message. I would omit path coefficients on the diagram for the links from causes to the concept/composite, but show the coefficients for links from concept to responses. Report all results in a table for full disclosure.

4

We are, as always, allowed some creative license when presenting the results in picture form because we wish to convey our results to the reader as simply as possible. ALWAYS present the full results, un abridged in a table or appendix.