MODERATION VERSUS MEDIATION

OVERVIEW

Moderation and mediation are two essential concepts in social science research. Moderation and mediation analyses help researchers answer two important but very different questions. **Moderation** occurs when the relationship between two variables differs in magnitude, direction, or statistical significance based on the level of another variable. For example, the effect of a school disciplinary strategy on future behavior may be stronger for girls than boys. Moderation effects are also called *interactions*. If two variables interact, the effect of each on a third variable differs based on levels of the other. In the example above, the effect of discipline on behavior is moderated by gender; gender and discipline strategy interact to effect behavioral outcomes. In correlational research, moderation analyses allow us to understand how developmental processes may differ for students with different characteristics. In intervention research, moderation analyses allow us to answer the all-important question: for whom does an intervention work? In the example above, a moderation analysis can answer the question: Does a certain disciplinary approach work well for girls but not boys?

**Mediation** occurs when the effect of one variable (an independent variable, IV) on another variable (a dependent variable, DV) is explained by a third variable (a mediator). For example, imagine that a reading intervention (IV) is shown to improve standardized reading scores (DV) of students receiving the intervention. The reading intervention focused on word attack skills. Further analysis indicates that the reading intervention had a strong effect on word attack skills, and those skills in turn had a strong effect on standardized reading scores. In fact, when the attack skills are included in the regression analysis, the previously significant effect of the IV on the DV goes away. The effects of the intervention are *mediated or explained* by its effects on word attack skills. The intervention can also be said to have an *indirect effect* on the outcome through its effects on skills. Mediation effects can be full or partial. In the former case, the direct effect of the independent variable becomes non-significant with the mediator in the model. In the partial mediation case, the direct effect of the independent variable becomes smaller but remains statistically significant. **Mediation** tells us how one variable affects another; or, by what mechanism an intervention affects an outcome.

ARTICLES AND CHAPTERS

**Description of Method**


This is a classic article that describes the difference between moderation and mediation and lays out steps for testing for mediation using ordinary least squares regression.

Please see [www.rmc.ehe.osu.edu](http://www.rmc.ehe.osu.edu) for authorship contributions to this research guide.

The article provides an overview of how moderation and mediation can be used separately as well as in combination. The article includes practical examples for implementing moderation and mediation analysis in the evaluation of a prevention program. The authors also discuss the issue of power and provide recommendations for researchers.


This article provides a user-friendly explanation of the concepts of moderation and mediation.


The authors explain the conceptual distinction between moderation and mediation.

Applications

Papers about Moderated Mediation, including Examples

This link takes you to a page from which you can download papers about moderated mediation.

- [Link](#)

Special Issues and Extensions


The authors provide an illustration of an advanced approach of combining moderation and mediation in regression and path analysis. The article discusses analytical frameworks and provides instructions for interpretation. SPSS syntax is also provided.


The authors provide a review of historical literature about using mediation and moderation of treatment effects in randomized controlled trials. They introduce two methods, principal stratification and structural mean models, for testing regression effects in multiple groups.

TEXTS

This text explains mediation and moderation and a new method for testing moderated mediation. The book includes information about freeware developed by the author to test moderated mediation. Links to information about the freeware (Process Macro) are listed below.

SOFTWARE

R Packages

mediation: Conducts causal mediation analysis.
- Link

medmod: Performs simple mediation and moderation analysis.
- Link

Other statistical packages

Process Macro for SAS and SPSS
For Hayes’ methods of testing moderated mediation. You can download the Process Macro here.
- Link

SELECTED INTERNET RESOURCES TO GET YOU STARTED

Mediation versus Moderation (James W. Grice, Oklahoma State University)
This document explains the difference between mediation and moderation and provides SPSS syntax and output for both. It also contains sample APA style write up about both the methods.
- Link

Mediation and Moderation (David A. Kenny)
Two webpages by Dr. Kenny explain the mechanisms of mediation and moderation. These pages contain tutorials, special issues and references.
- Link
- Link