

# Contents

Preface	viii
---------	------

## Part I. Fundamentals

1	Introduction	3
1.1	A Scientist in Training / 3	
1.2	Questions of Whether, If, How, and When / 5	
1.3	Conditional Process Analysis / 9	
1.4	Correlation, Causality, and Statistical Modeling / 15	
1.5	Statistical and Conceptual Diagrams, and Antecedent and Consequent Variables / 19	
1.6	Statistical Software / 22	
1.7	Overview of This Book / 24	
1.8	Chapter Summary / 27	
2	Fundamentals of Linear Regression Analysis	29
2.1	Correlation and Prediction / 30	
2.2	The Simple Linear Regression Model / 35	
2.3	Alternative Explanations for Association / 46	
2.4	Multiple Linear Regression / 49	
2.5	Measures of Model Fit / 56	
2.6	Statistical Inference / 58	
2.7	Multicategorical Antecedent Variables / 67	
2.8	Assumptions for Interpretation and Statistical Inference / 70	
2.9	Chapter Summary / 75	

## Part II. Mediation Analysis

3	The Simple Mediation Model	79
3.1	The Simple Mediation Model / 80	
3.2	Estimation of the Direct, Indirect, and Total Effects of X / 84	
3.3	Example with Dichotomous X: The Influence of Presumed Media Influence / 88	



3.4	Statistical Inference / 95	
3.5	An Example with Continuous X: Economic Stress among Small-Business Owners / 110	
3.6	Chapter Summary / 117	
<b>4</b>	<b>Causal Steps, Scaling, Confounding, and Causal Order</b>	<b>119</b>
4.1	What about Baron and Kenny? / 119	
4.2	Confounding and Causal Order / 128	
4.3	Effect Scaling / 139	
4.4	Multiple Xs or Ys: Analyze Separately or Simultaneously? / 151	
4.5	Chapter Summary / 156	
<b>5</b>	<b>More Than One Mediator</b>	<b>159</b>
5.1	The Parallel Multiple Mediator Model / 161	
5.2	Example Using the Presumed Media Influence Study / 166	
5.3	Statistical Inference / 173	
5.4	The Serial Multiple Mediator Model / 180	
5.5	Models with Parallel and Serial Mediation Properties / 194	
5.6	Complementarity and Competition among Mediators / 197	
5.7	Chapter Summary / 200	
<b>6</b>	<b>Mediation Analysis with a Multicategorical Antecedent</b>	<b>201</b>
6.1	Relative Total, Direct, and Indirect Effects / 203	
6.2	An Example: Sex Discrimination in the Workplace / 209	
6.3	Using a Different Group Coding System / 219	
6.4	Some Miscellaneous Issues / 226	
6.5	Chapter Summary / 230	

## Part III. Moderation Analysis

<b>7</b>	<b>Fundamentals of Moderation Analysis</b>	<b>233</b>
7.1	Conditional and Unconditional Effects / 237	
7.2	An Example: Climate Change Disasters and Humanitarianism / 245	
7.3	Visualizing Moderation / 258	
7.4	Probing an Interaction / 263	
7.5	The Difference between Testing for Moderation and Probing It / 275	
7.6	Artificial Categorization and Subgroups Analysis / 278	
7.7	Chapter Summary / 281	



<b>8</b>	<b>Extending the Fundamental Principles of Moderation Analysis</b>	<b>283</b>
8.1	Moderation with a Dichotomous Moderator / 284	
8.2	Interaction between Two Quantitative Variables / 293	
8.3	Hierarchical versus Simultaneous Entry / 306	
8.4	The Equivalence between Moderated Regression Analysis and a $2 \times 2$ Factorial ANOVA / 308	
8.5	Chapter Summary / 317	
<b>9</b>	<b>Some Myths and Additional Extensions of Moderation Analysis</b>	<b>319</b>
9.1	Truths and Myths about Mean-Centering / 320	
9.2	The Estimation and Interpretation of Standardized Regression Coefficients in a Moderation Analysis / 329	
9.3	A Caution on Manual Centering and Standardization / 335	
9.4	More Than One Moderator / 336	
9.5	Comparing Conditional Effects / 358	
9.6	Chapter Summary / 363	
<b>10</b>	<b>Multicategorical Focal Antecedents and Moderators</b>	<b>365</b>
10.1	Moderation of the Effect of a Multicategorical Antecedent Variable / 366	
10.2	An Example from the Sex Discrimination in the Workplace Study / 370	
10.3	Visualizing the Model / 378	
10.4	Probing the Interaction / 383	
10.5	When the Moderator Is Multicategorical / 396	
10.6	Using a Different Coding System / 404	
10.7	Chapter Summary / 405	

## Part IV. Conditional Process Analysis

<b>11</b>	<b>Fundamentals of Conditional Process Analysis</b>	<b>409</b>
11.1	Examples of Conditional Process Models in the Literature / 413	
11.2	Conditional Direct and Indirect Effects / 417	
11.3	Example: Hiding Your Feelings from Your Work Team / 422	
11.4	Estimation of a Conditional Process Model Using PROCESS / 430	
11.5	Quantifying and Visualizing (Conditional) Indirect and Direct Effects / 433	
11.6	Statistical Inference / 439	
11.7	Chapter Summary / 450	
<b>12</b>	<b>Further Examples of Conditional Process Analysis</b>	<b>451</b>
12.1	Revisiting the Disaster Framing Study / 452	



12.2	Moderation of the Direct and Indirect Effects in a Conditional Process Model / 460	
12.3	Statistical Inference / 474	
12.4	Mediated Moderation / 481	
12.5	Chapter Summary / 489	
<b>13</b>	<b>Conditional Process Analysis with a Multicategorical Antecedent</b>	<b>491</b>
13.1	Revisiting Sexual Discrimination in the Workplace / 492	
13.2	Looking at the Components of the Indirect Effect of X / 502	
13.3	Relative Conditional Indirect Effects / 510	
13.4	Testing and Probing Moderation of Mediation / 513	
13.5	Relative Conditional Direct Effects / 517	
13.6	Putting It All Together / 523	
13.7	Further Extensions and Complexities / 524	
13.8	Chapter Summary / 525	

Part V. Miscellanea

<b>14</b>	<b>Miscellaneous Topics and Some Frequently Asked Questions</b>	<b>529</b>
14.1	A Strategy for Approaching a Conditional Process Analysis / 531	
14.2	How Do I Write about This? / 537	
14.3	Power and Sample Size Determination / 549	
14.4	Should I Use Structural Equation Modeling Instead of Regression Analysis? / 552	
14.5	The Pitfalls of Subgroups Analysis / 556	
14.6	Can a Variable Simultaneously Mediate and Moderate Another Variable’s Effect? / 561	
14.7	Interaction between X and M in Mediation Analysis / 565	
14.8	Repeated Measures Designs / 568	
14.9	Dichotomous, Ordinal, Count, and Survival Outcomes / 572	
14.10	Chapter Summary / 573	

Appendices

<b>A</b>	<b>Using PROCESS</b>	<b>579</b>
<b>B</b>	<b>Constructing and Customizing Models in PROCESS</b>	<b>651</b>
	<b>References</b>	<b>671</b>
	<b>Author Index</b>	<b>705</b>
	<b>Subject Index</b>	<b>716</b>
	<b>About the Author</b>	<b>732</b>

The companion website ([www.afhayes.com](http://www.afhayes.com)) provides data for all the examples, plus the free PROCESS download.