# CONTENTS

#### Notation 5

### Preface 7

### Series Editor's Introduction 9

## 1. Introduction 11

Exploratory Versus Confirmatory Factor Analysis 11 Structural Relations Among Common Factors 15 Organization of the Monograph 17

# 2. Specification of the Confirmatory Factor Model 18

An Informal Introduction 18 A Formal Specification 22 The Covariance Structure 33

## 3. Identification of the Confirmatory Factor Model 34

Estimation and Identification 34 Identification 36 Conditions for Identification 42 Scale Indeterminacy and Setting a Metric 49

# 4. Estimation of the Confirmatory Factor Model 55

Unweighted Least Squares 57 Scale Dependency 57 Generalized Least Squares and Maximum Likelihood 58 Practical Considerations 60

#### 5. Assessment of Fit in the Confirmatory Factor Model 61

Examining Values of the Parameters 62 Variances and Covariances of the Estimates 63 Chi-Square Goodness-of-Fit Tests 63 Nested Models and Difference of Chi-Square Tests 65 Specification Searches 68 Standardization 77 6. Conclusions 79

Appendix I: Correlations and Standard Deviations from Wheaton/Hennepin Sample 82

Appendix II: Software to Estimate the Confirmatory Factor Model (CFM) 82

Notes 83

References 86

About the Author 88