Contents

List of Contributors v

PART I. THE BASIS OF COGNITIVE DIAGNOSTIC ASSESSMENT
1. Why Cognitive Diagnostic Assessment? 3
   Jacqueline P. Leighton and Mark J. Gierl
2. The Demand for Cognitive Diagnostic Assessment 19
   Kristen Huff and Dean P. Goodman
3. Cognitive Modeling of Performance on Diagnostic Achievement Tests: A Philosophical Analysis and Justification 61
   Stephen P. Norris, John S. Macnab, and Linda M. Phillips
4. Test Validity in Cognitive Assessment 85
   Denny Borsboom and Gideon J. Mellenbergh

PART II. PRINCIPLES OF TEST DESIGN AND ANALYSIS
5. Construct Validity and Cognitive Diagnostic Assessment 119
   Xiangdong Yang and Susan E. Embretson
6. Verbal Reports as Data for Cognitive Diagnostic Assessment 146
   Jacqueline P. Leighton and Mark J. Gierl
7. Test Construction and Diagnostic Testing 173
   Joanna S. Gorin

PART III. PSYCHOMETRIC PROCEDURES AND APPLICATIONS
   André A. Rupp and Robert J. Mislevy
## Contents

9. Using the Attribute Hierarchy Method to Make Diagnostic Inferences About Examinees’ Cognitive Skills 242
   *Mark J. Gierl, Jacqueline P. Leighton, and Stephen M. Hunka*

10. The Fusion Model Skills Diagnosis System 275
    *Louis A. Roussos, Louis V. DiBello, William Stout, Sarah M. Hartz, Robert A. Henson, and Jonathan L. Templin*

11. Using Information from Multiple-Choice Distractors to Enhance Cognitive-Diagnostic Score Reporting 319
    *Richard M. Luecht*

12. Directions for Future Research in Cognitive Diagnostic Assessment 341
    *Mark J. Gierl and Jacqueline P. Leighton*

*Author Index* 353

*Subject Index* 359