

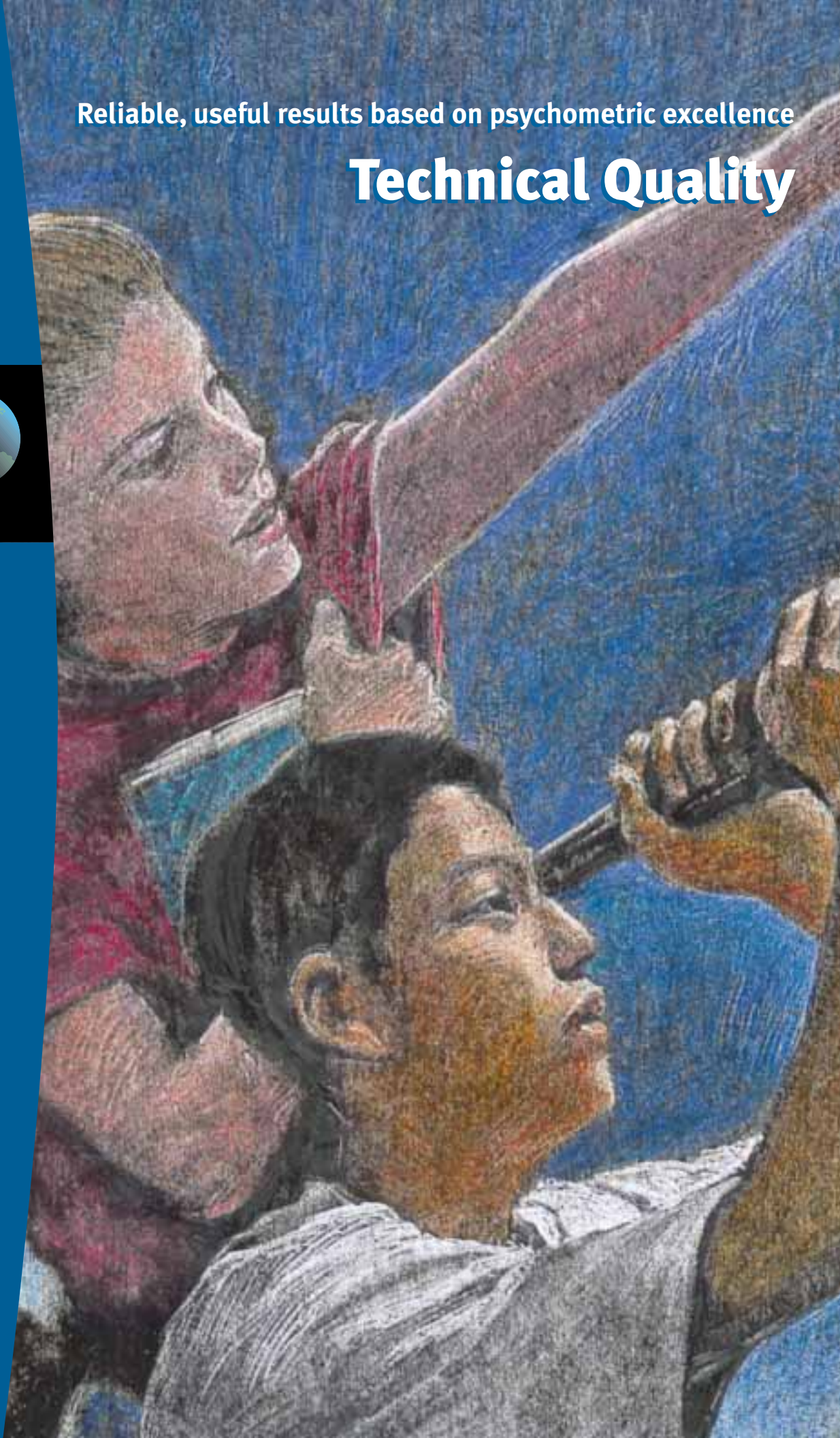
Reliable, useful results based on psychometric excellence

Technical Quality

TerraNova 

THE SECOND EDITION

 **CTB**
McGraw-Hill



EXCELLENCE IN ASSESSMENT:

Innovation combined with proven
research and development procedures.

Instructional **relevance**.

Advanced **measurement capabilities**.

This is

TerraNova, The Second Edition

—the newest member of the *TerraNova* family.

Important educational decisions require precise and accurate measurement information. The technical superiority of *TerraNova, The Second Edition* offers you significant advantages in today's challenging assessment environment.

The Development Process for *TerraNova, The Second Edition*



CTB's test development and research professionals began the development of *TerraNova, The Second Edition* by conducting an extensive analysis of national, state, and local standards and curricula. Our staff worked with teachers, administrators, and curriculum specialists to ensure that the new assessments present content that matches instruction and reflects the design of contemporary classroom materials. Our test development staff created detailed specifications and learning objectives, including rigorous standards for content, page design, grade-level appropriateness, and equity.

Development of Assessment Materials

CTB's test development process starts with the assumption that a test is only as good as its items. All items in this edition are new items written by CTB's staff of professional item writers specifically for this new assessment series. Our item writers—many of them experienced teachers—researched, collected, and wrote the tryout material. To provide a large pool of items for the final test selection, they developed twice as many items as were needed. All assessment materials were carefully reviewed for content and editorial accuracy. Artists and designers worked with the writers during development to ensure graphic and textual consistency.

Content Documentation

An integral part of the development process was documentation of content using curriculum frameworks and major basals or textbooks. This procedure ensured that every item is sound in content and format and is appropriately targeted to the grades in which the associated skills are typically taught.


Items were tried out in schools throughout the country, and teachers who participated in the study were asked to critique the accuracy, validity, and grade-level appropriateness of the items. Their responses gave CTB's developers the benefit of actual classroom reaction from a large sample of educators. Teachers and other curriculum experts evaluated the items in all content areas during an additional, more comprehensive review process.

Minimization of Bias

The developers of *TerraNova, The Second Edition* gave careful attention to questions of ethnic, racial, gender, regional, and age bias. All materials were written and reviewed to meet CTB's stringent editorial policies for equitable assessment. These policies are defined in two widely respected publications: *Reflecting Diversity: Multicultural Guidelines for Educational Publishing Professionals*, and *Guidelines for Bias-free Publishing*.

Directions Brenda Wilson is a wildlife photographer. Do Numbers 7 through 10 about wildlife photography.


7 This Brenda Wilson print is available in four sizes. Which two sizes are similar rectangles?



Small	14 x 20
Medium	20 x 30
Large	30 x 50
Jumbo	70 x 100

A Small and Jumbo
B Small and Medium
C Medium and Large
D Medium and Jumbo

8 Brenda sells some of her work at Prime Photo.



Prime Photo
Specializing in *Brenda Wilson* Prints

- 53 Years Experience
- 77 Convenient Locations
- 85 Brands of Film
- 99% Customer Satisfaction

Which of these two-digit numbers from the advertisement is prime?

F 53 **H** 85
G 77 **J** 99

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Educators from different parts of the country and different ethnic groups reviewed all potential items to identify assessment materials that might reflect possible bias in language, subject matter, or representation of people. The reviewers' comments and suggestions were carefully considered during the revision and selection of items for the final tests.

Minimization of Speededness

CTB's test developers also considered speededness—the effect of time limits on student scores—in the development of *TerraNova, The Second Edition*. Unlike publishers who emphasize short testing times, we base our approach to administration times on a substantial body of research indicating that speededness should be avoided in achievement tests. (See, for example, Gulliksen, 1950; Jolly, Johnson, Jones, & Abalus, 1985; Lin, 1986; and Munger & Loyd, 1991.)

Research over the past 20 years demonstrates that students experiencing time constraints may guess randomly or may be unable to demonstrate what they truly know and can do. Moreover, little useful instructional information can be obtained from the fact that a student did not finish a test, while a great deal can be learned from student responses to questions.

TerraNova, The Second Edition is designed to minimize the effect of speededness and maximize the validity and instructional relevance of the test results. To ensure the most valid and useful measures of achievement possible, CTB set appropriate administration time limits that facilitate student completion of the assessments.

The degree to which a test may be speeded can be assessed by examining the percentage of students who respond to the last and next-to-last items in the test. The Technical Report for *TerraNova, The Second Edition* provides data on the percentage of students

who responded to the last item and on those who omitted the last item but answered the next-to-last item during the tryout study. Based on our substantial research and experience, we are confident that we have set appropriate time limits that enable the great majority of students to complete our test.





References

- Allen, M. J., & Yen, W. M. (1979). *Introduction to measurement theory*. Monterey, CA: Brooks/Cole.
- Bock, E. Darrell (1997). A brief history of item response theory. *Educational Measurement: Issues and Practice*, 4, 21–33.
- Bock, R. D., & Aitkin, M. (1981). Marginal maximum likelihood estimation of item parameters: Application of an EM algorithm. *Psychometrika*, 66, 443–459.
- Burket, G. R. (1988). ITEMSYS [Computer program]. Unpublished.
- Burket, G. R. (1991). PARDUX [Computer program]. Unpublished.
- Fitzpatrick, A. R., Link, V., Yen, W. M., Burket, G. R., Ito, K., & Sykes, R. (1996). Scaling performance assessments: A comparison of one-parameter and two-parameter partial credit models. *Journal of Educational Measurement*.
- Green, D. R., Yen, W. M., & Burket, G. R. (1989). Experiences in the application of item response theory in test construction. *Applied Measurement in Education*, 2, 297–312.
- Gulliksen, H. (1950). *Theory of mental tests*. New York: John Wiley & Sons.
- Jolly, S. J., Johnson, R., Jones, B., & Abalus, J. (1986, April). *The effect of test speededness and random guessing on the validity of reading comprehension scores*. Paper presented at the annual meeting of the American Educational Research Association. San Francisco, CA.
- Lewis, D. M., Mitzel, H. C., Green, D. R. (1996). Standard Setting: A Bookmark Approach. In D. R. Green (Chair), IRT-Based Standard-Setting Procedures Utilizing Behavioral Anchoring. Symposium presented at the 1996 Council of Chief State School Officers 1996 National Conference on Large Scale Assessment, Phoenix, AZ.
- Lewis, D. M., Green, D. R., Mitzel, H. C., Baum, K., & Patz, R. J. (April, 1998). The Bookmark Standard Setting Procedure: Methodology and Recent Implementations. Paper presented at the 1998 National Council for Measurement in Education annual meeting, San Diego, CA.
- Lin, M. H. (1986, April). *The impact of time limits on test behaviors*. Paper presented at the annual meeting of the American Educational Research Association. San Francisco, CA.
- Linn, R. L., & Harnisch, D. (1981). Interactions between item content and group membership in achievement test items. *Journal of Educational Measurement*, 18, 109–118.
- Macmillan/McGraw-Hill. (1993). *Reflecting Diversity: Multicultural Guidelines for Educational Publishing Professionals*. New York, NY.
- McGraw-Hill. (1983). *Guidelines for Bias-free Publishing*. Monterey, CA.
- Munger, G. F., & Loyd, B. H. (1991). Effect of speededness on test performance of handicapped and nonhandicapped examinees. *Journal of Educational Research*, 85 (1), 53–57.
- Muraki, E. (1990). Fitting a polytomous item response model to Likert-type data. *Applied Psychological Measurement*, 14, 59–71.
- Muraki, E. (1992). A generalized partial credit model: Application of an EM algorithm. *Applied Psychological Measurement*, 16, 159–176.
- Patz, R. J., and Junker, B. W. (1999). Applications and extensions of MCMC for IRT: Multiple item types, missing data, and rated responses. *Journal of Educational and Behavioral Statistics*, 24, 342–366.
- Stocking, M. L., & Lord, F. M. (1983). Developing a common metric in item response theory. *Applied Psychological Measurement*, 7, 201–210.
- Thissen, D. (1982). Marginal maximum likelihood estimation for the one-parameter logistic model. *Psychometrika*, 47, 175–186.
- Yen, W. M. (1993). Scaling performance assessments: Strategies for managing local item dependence. *Journal of Educational Measurement*, 30, 187–213.



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