The Comprehensive Test of Nonverbal Intelligence (Hammill, Pearson, & Wiederholt, 1997) is designed to measure those intellectual abilities that exist independent of language. Designed as a measure of "higher-order" nonverbal abilities (generalization, discrimination, sequencing) rather than "lower-order" abilities like copying, the CTONI is basically a measure of the figural and symbolic domains described in the previous chapter.

The test is designed to measure three kinds of abilities: Analogies, Classification, and Sequencing. Each is measured in two ways: through the use of pictures (representational artwork) and of figures (abstract icons and symbols). There are six subtests (Pictorial Analogies, Geometric Analogies, Pictorial Categories, Geometric Categories, Pictorial Sequences, and Geometric Sequences). In the Analogies subtests, the student is given figures or pictures in an A:B::C:? format. The correct response must be selected from five response alternatives. In the categories subtests, the student is shown two members of a category and must pick from a five-item response bank another member of the category. In the sequencing subtests, the student is given sequences of pictures or figures with a relationship among them and must pick from a response bank the one that continues the relationship.

The CTONI is designed for use with children 6–0 through 18–11 years of age. It can be administered using either oral or pantomime directions. Thus, its authors argue that it is a useful device in assessing the learning aptitude of students who are deaf, have
hearing impairment, or are not English-speaking. In administering the test, the test giver begins at item one and continues until the student misses three of five items.

Scores

Scores available for the CTONI include raw scores, standard scores, percentiles, and age equivalents. In addition, three kinds of IQ scores are provided: Pictorial Nonverbal IQ, Geometric Nonverbal IQ, and Nonverbal IQ.

Norms

The CTONI was standardized on 2,129 people in 23 states. Two methods were used to select the standardization sample. First, the authors selected primary sites in each of four geographic regions. There is no indication of the extent to which the sites selected were representative of the regions from which they were selected. Test coordinators in each site coordinated the collection of data on 1,156 students. For a second method, names were selected from the file of test purchasers at Pro-Ed publishers. Letters were sent, asking people to give a number of CTONIs. As a result, 53 testers tested 973 students. The authors show the percentage breakdown of the sample for region, gender, race, residence, ethnicity, family income, educational attainment of parents, and disability status. They show how sample statistics compare with census statistics, and there is good agreement. They show stratification of the sample on age but do not provide cross-tabulations on other characteristics.
A strong case is made for use of this measure with students who have hearing impairments and those who speak English as a second language. Yet, the authors did not specifically standardize the test on these two populations. It would have helped to oversample individuals with these characteristics, so that differential item-response curves could be compared.

There are two alternative procedures for administering the CTONI, yet only one set of norms. The authors do provide limited data showing the equivalence of scores earned under pantomime versus verbal administration of the test. Nonetheless, separate norms should be provided for the two alternative procedures.

Reliability

Three kinds of reliability data are reported. Internal-consistency coefficients for all subtests exceed .80 and for all composites exceed .90. There is good evidence for the internal consistency of this test.

Results of a test–retest reliability study are reported. They are limited to the performance of 33 third-grade and 30 eleventh-grade students who are not described, but who attended a single school in Llano, Texas. The tests were given pantomime on the first administration and oral on the second. The reliabilities reported are greater than .80. However, the sample is not described, is limited to two grade levels, and is very limited in size. There is no evidence of test–retest reliability at other age levels.
To establish interscorer reliability, the authors had two staff people score 50 protocols for students ages 11–14 years. The coefficients all exceeded .95. However, the sample size and age range of the norm group are both incredibly small.

Validity

It is our contention that one of the most important kinds of validity for a measure of intelligence is *predictive validity*, evidence that test performance predicts performance in school. There is no evidence for the predictive validity of the CTONI.

As evidence of content validity, the authors show that the CTONI measures the behaviors we describe in the chapter "Assessment of Intelligence: An Overview." They show the chart reproduced in Table 18.6.

Evidence for criterion-related validity is limited. The authors compare performance on the CTONI, the TONI, the WISC-III, and the PPVT. The sample reported on is a group of 43 students with learning disabilities attending a separate private school in Dallas, TX. Correlations among subtests are moderate. We were surprised to learn that performance on the CTONI (Pictorial Nonverbal IQ, Geometric Nonverbal IQ, and Nonverbal IQ) correlated more highly with WISC-II Verbal than with WISC-II Performance IQs. The authors do not discuss this finding.

The authors also report on the comparative performance of 32 students who are deaf attending two Texas regional day schools. They show correlations between CTONI subtest scores and WISC-III performance subtest scores of from .39 to .88 and correlations for composites of from .67 to .90.
As evidence of construct validity, the authors show that scores on the CTONI increase with age. In the table they provide, we see an alarming fact. Scores do get higher with increasing age, but the mean score at each age changes little, if at all. For example, the average CTONI score on Pictorial Analogies is the same (15) for students who are 15, 16, and 17 years old. There is a 1-point difference in the average score earned on Geometric Categories by students who are 13 and by those who are 18 years old. We think this is illustrative of one of two difficulties with this test: a limited behavior sample (number of items), and virtually no discrimination ability in items.

Summary

The CTONI is an assessment of students' classification, analogies, and sequencing ability. Nonverbal stimuli (representational pictures and geometric figures) are used. The test can be administered using pantomime or verbal directions, but we think that the norms are for verbal directions only. We do not know in how many instances examiners used pantomime versus verbal directions during the norming of this test. We also raised some issues about the ways in which the standardization was carried out, and about the reporting of cross-tabulation information. Data on reliability and validity are very limited. The CTONI may be an adequate measure of nonverbal intelligence, but judgment about whether it is will need to await evidence of its reliability and both its construct and its predictive validity.