Evidence Summary for Pediatric Rehabilitation Professionals


1. **Summary**

   **Type:** Norm-referenced  
   **Purpose:** Discrimination, planning, evaluation  
   **Population:** Children at-risk for visual perceptual or visual-motor difficulties  
   **Age:** 4 – 10 years  
   **Time to Complete:** 30 – 60 minutes  
   **Equipment Needed:** DTVP-2 kit, table, chair

   e. Inclusion of a normative sample whose demographic characteristics are similar to the US population  
   f. Development of two new composite scores (motor-reduced visual perception and visual-motor integration) to assist with diagnosis  
   g. Expansion of age tested to include 10 year olds

2. **Overview**

   The purpose of the DTVP-2 is to:
   
a. Document the presence and degree of visual perceptual or visual-motor difficulties in individual children  
b. Identify candidates for referral to intervention programs  
c. Verify the effectiveness of intervention programs  
d. Serve as a research tool

   The DTVP-2\(^1\) (1993) is a revised version of the original DTVP\(^2\) (1966). Changes from the original version include:

   a. An increase in reliability of subtests to acceptable levels  
b. Evidence for content, criterion-related, and construct validity  
c. Completion of factorial analysis  
d. Demonstration of an absence of racial, gender, and handedness bias

   The DTVP-2 is intended to be administered by professionals with formal experience in assessment including testing statistics, test administration, scoring, interpretation, and evaluation of children.\(^1\)

   Test administration involves starting with item 1 of every subtest. All items of subtests 1 (eye-hand coordination) and subtest 7 (visual-motor speed) are administered. For all other subtests, testing continues until a ceiling score is achieved. For subtests 2, 4, 6, and 8, a ceiling level is achieved when a child misses three out of 5 consecutive items.
Outcome Measures: The DTVP-2

For subtests 3 and 5, a ceiling level is achieved when a child scores 0 on three consecutive items.\(^1\)

When scoring, a raw score is calculated by summing the total number of points a child receives for items in a subtest. The assessor can then use normative tables to convert raw scores into age equivalents, standard scores, and percentiles. Subtest standard scores can then be classified into descriptive categories of “very poor” to “very superior”.\(^1\) Composite quotients can be calculated by adding appropriate subtest standard scores and using a table to convert this sum. Descriptive categories can also be used to classify the composite quotients.\(^1\) Composite scores (or quotients) are considered the most useful values derived from the DTVP-2.\(^1\) These are the general visual perception quotient and two clinical composites: the motor-reduced visual perception quotient (considered to be the “purest” or most direct measure of visual perception) and the visual-motor integration quotient (where poor scores may not necessarily reflect poor visual perception but rather difficulties with eye-hand coordination).\(^1\)

3. Standardization Sample

The DTVP-2 was validated on a sample of 1972 children living in 12 states in 1992 and was stratified according to age, geographic region gender, race, residence, and handedness. Children with disabilities represented 3% of the sample.\(^1\)

4. Measurement Properties
   a. Reliability

   The DTVP-2 has established reliability. Internal consistency was measured using Cronbach’s coefficient alpha and results indicate acceptable item correlations ranging from 0.83 to 0.95.\(^1\)

   Test-retest reliability was measured by having 88 students between the ages of 4 and 10 years assessed twice within two weeks; reliability calculation scores range between 0.71 and 0.86 for the subtest scores and 0.89 and 0.93 for the composite scores.\(^1\)

   Inter-rater reliability was assessed by having two individuals score 88 completed DTVP-2 protocols. Correlation coefficients ranged between 0.93 and 0.99 for each subtest score and 0.95 to 0.98 for the composite scores.\(^1\)

   Standard error of measurement and confidence intervals were also measured.\(^1\)

b. Validity

   The DTVP-2 has established content, criterion, and construct-related validity. Content validity was established by basing the DTVP-2 test content on constructs articulated by area experts, comparing the DTVP-2 structure to other tests of visual perception as well as through item analysis. Results of the item analysis indicate that all test items satisfy requirements of content validity.\(^1\)

   Examination of the criterion-validity of the DTVP-2 involved exploring the test’s concurrent validity with the Motor Free Visual Perception Test\(^3\) (MVPT) and the Developmental Test of Visual-Motor Integration\(^4\) (VMI). Results indicate a high level of correlation between the MVPT and the DTVP-2’s motor-reduced visual perception composite (0.73) as well as between the VMI and the DTVP-2’s visual-motor
introduction composite (0.89). Correlations of the DTVP-2’s general visual perception composite with the MVPT and VMI are also good to excellent (0.78 and 0.87 respectively).\(^1\) Predictive validity of the DTVP-2 has not yet been examined.\(^1\)

Construct validity was examined by establishing that, as expected, children’s scores on the DTVP-2 improve with age as well as identifying that, although its’ subtests are somewhat related, these measure different aspects of visual perception (median \(r = 0.36\) between subtests).\(^1\)

Additionally, DTVP-2 scores were compared with scores from cognitive measures to determine whether, as research findings suggest, the DTVP-2 would correlate to a low degree (.20 to .60) with these measures. Comparisons of the DTVP-2 with the Comprehensive Scales of Student Abilities,\(^5\) the Comprehensive Tests of Basic Skills,\(^6\) and the Wechsler Intelligence Scale for Children-Revised,\(^7\) support the construct validity of the DTVP-2.\(^1\)

Finally, discriminant validity of the DTVP-2 was examined by evaluating the scores of 49 children with neurological disorders, a population known to have a disproportionate degree of perceptual-motor deficiencies. Below average results support the construct validity of the DTVP-2.\(^1\)

Factor analysis and item-test correlation results also support the construct validity of the DTVP-2.\(^1\)

5. Further Considerations

Research has found that culturally appropriate norms are necessary when using the DTVP-2 in Hong Kong where a ceiling effect was found on certain subtests when used with 6 and 7 year olds.\(^10\)

The DTVP-2 has been used in research regarding children with learning disabilities\(^8\) and children with hemiplegic cerebral palsy.\(^9\)

Further investigation into the test’s psychometric properties and use with different populations is needed.

References

This evidence summary is one part of a series on pediatric rehabilitation outcomes measures. Other summaries in this series include:

- Outcome Measures: A Primer
- Outcome Measures: The Alberta Infant Motor Scale (AIMS)
- Outcome Measures: The Bayley Scales of Infant Development, 3rd Ed. (BSID-III)
- Outcome Measures: The Bruininks-Oseretsky Test of Motor Performance, 2nd Ed. (BOT-2)
- Outcome Measures: The Gross Motor Function Measure (GMFM)
- Outcome Measures: The Movement Assessment Battery for Children, 2nd Ed. (MABC-2)
- Outcome Measures: The Peabody Developmental Motor Scale, 2nd Ed. (PDMS-2)
- Outcome Measures: The Sensory Profile (SP)