Overview of the *WJ III® Diagnostic Supplement to the Tests of Cognitive Abilities*

The *Woodcock-Johnson® III* (*WJ III*) *Diagnostic Supplement to the Tests of Cognitive Abilities* consists of eleven tests that can be used to supplement the tests and clusters that are included in the *WJ III Tests of Cognitive Abilities*. As an extension of the Standard and Extended Batteries of the *WJ III COG*, the *Diagnostic Supplement* provides important information when further diagnostic capabilities are desired. The *Diagnostic Supplement* is particularly useful for assessment of bilingual individuals and young children.

Normative data for the *Diagnostic Supplement* tests are based on the same sample that was administered the other *WJ III Tests of Cognitive Abilities* tests and the *WJ III Tests of Achievement* (*WJ III ACH*). The nationally representative standardization included over 8,800 individuals ranging in age from 2 years to over 90 years, including college and university undergraduate and graduate students. The demographic and community characteristics closely match the general U.S. population. Further information about the norming sample is located in the *WJ III Technical Manual*.

Relationship to the *WJ III Tests of Cognitive Abilities*

The addition of several tests, clusters, and interpretive procedures increases the diagnostic usefulness of the entire *WJ III* system. Following is a summary of the important information that can be obtained when using the *Diagnostic Supplement*.

- The 11 tests of the *Diagnostic Supplement* increase the breadth and depth of coverage of several broad and narrow abilities defined by the Cattell-Horn-Carroll (CHC) theory of human cognitive abilities.
- A General Intellectual Ability–Bilingual Scale (GIA-Bil) is available for use with English-dominant bilingual individuals. When used with the *WJ III ACH*, the GIA-Bil can be used as an ability measure in calculating ability/achievement discrepancies.
- An accommodation (Test 31: Bilingual Verbal Comprehension–English/Spanish) is available for assessing the overall verbal comprehension of English-Spanish bilingual individuals.
- A language-reduced thinking ability cluster (Thinking Ability–Low Verbal) is made available for diagnostic purposes, particularly with English-dominant bilingual individuals. This cluster can be used in the intra-cognitive–standard discrepancy procedure for evaluation of relative cognitive strengths and weaknesses.
- A broad-based cognitive ability cluster, Broad Cognitive Ability–Low Verbal (BCA-LV), that has relatively low verbal requirements overall is available. The verbal ability subtests (Test 1: Verbal Comprehension) are not included in this cluster.
- A General Intellectual Ability–Early Development Scale (GIA-EDev) is available for use with children at the preschool level. Additionally, this scale may be used with low-functioning individuals of any age. An interpretive procedure is included for identifying the presence and severity of developmental delay.
- The accompanying *WJ III Compuscore® and Profiles Program* Version 2.0 introduces two new achievement clusters for determining overall levels of pre-academic skills.
- The *Compuscore and Profiles Program* broadens the interpretation of the delayed recall tests and clusters by providing scores for performance on the task in the delayed recall condition and by providing a discrepancy calculation between initial and delayed task performance.

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Components of the *Diagnostic Supplement*

The Diagnostic Supplement contains one easel test book, a manual, a computer scoring program, test record, an audio recording, and a scoring guide for Test 26: Cross Out.

Test Book

The Test Book is in the same easel format as the other *WJ III* tests. Specific administration directions are provided page by page for all tests.

Manual

The Manual contains administration, scoring, and technical information for use with the *Diagnostic Supplement*. Special chapters are included on the primary and ancillary examiner team approach to bilingual assessment and use of the *WJ III* with young children.

WJ III Compuscore and Profiles Program

The *Compuscore and Profiles Program* quickly and accurately provides scores for all *WJ III COG* and *ACH* tests and clusters, including those from the *Diagnostic Supplement*. Version 2.0 includes two new interpretive clusters from the *WJ III ACH* and additional scores to enhance the interpretation of the delayed recall tests and clusters. The program also includes an option to plot and print age/grade and standard score/percentile rank profiles. To facilitate diagnostic usefulness, profiles of individual tests are arranged within clusters.

Test Record

The Test Record contains guidelines for item-level scoring and is used to record identifying information, subject responses, raw scores, and other information that may be helpful in interpreting test results. Built-in scoring tables for most tests enable the examiner to obtain estimated age- and grade-equivalent scores immediately. The Test Record also contains the subject response pages for Test 26: Cross Out.

Audio Recording

An audio recording is provided for standardized administration of Test 23: Sound Patterns–Voice, Test 27: Memory for Sentences, and Test 29: Sound Patterns–Music.

Organization of the *Diagnostic Supplement*

Table 1-1 lists the tests included in the *Diagnostic Supplement*. Special notations following several tests indicate those that are administered using an audio recording (symbol-A) and those that are timed (symbol-T). The table also specifies the broad and narrow abilities measured by each test.

Table 1-1. Organization of the Diagnostic Supplement

Test Name	Broad CHC Ability	Narrow CHC Ability
Test 21: Memory for Names	Long-Term Retrieval (*Glr*)	Associative Memory
Test 22: Visual Closure	Visual-Spatial Thinking (*Gv*)	Closure Speed
Test 23: Sound Patterns—Voice (A)	Auditory Processing (*Ga*)	Sound Discrimination
Test 24: Number Series	Fluid Reasoning (*Gf*)	Quantitative Reasoning
Test 25: Number Matrices	Fluid Reasoning (*Gf*)	Quantitative Reasoning
Test 26: Cross Out (T)	Processing Speed (*Gs*)	Perceptual Speed
Test 27: Memory for Sentences (A)	Short-Term Memory (*Gsm*)	Auditory Memory Span
Test 28: Block Rotation	Visual-Spatial Thinking (*Gv*)	Visualization
Test 29: Sound Patterns—Music (A)	Auditory Processing (*Ga*)	Sound Discrimination
Test 30: Memory for Names—Delayed	Long-Term Retrieval (*Glr*)	Associative Memory
Test 31: Bilingual Verbal Comprehension	Comprehension-Knowledge (*Gc*)	Lexical Knowledge and Language Development

Purpose and Uses of the *Diagnostic Supplement*

The *Diagnostic Supplement* expands the diagnostic capabilities of the *WJ III COG* for educational, clinical, or research purposes from the preschool to the geriatric level. The *Diagnostic Supplement* includes a broad cognitive scale that has reduced language requirements as well as tests that are particularly useful for assessment of bilingual individuals and young children.

Further Diagnostic Capability Based on CHC Theory

The theoretical foundation of the *WJ III* is derived from the CHC theory of cognitive abilities. The *WJ III* is a measurement model of CHC theory. The *WJ III COG* and *WJ III ACH* batteries provide the greatest practical breadth of measurement of the broad and narrow CHC abilities.

Several of the tests in the *Diagnostic Supplement* can be combined with other tests in the *WJ III COG* to provide seven new two-test clusters for several additional narrow CHC abilities.

- Test 21: Memory for Names combined with Test 2: Visual-Auditory Learning provides an associative memory cluster.
- Test 23: Sound Patterns–Voice combined with Test 29: Sound Patterns–Music provides a sound discrimination cluster.
- Test 24: Number Series combined with Test 25: Number Matrices provides a numerical reasoning cluster.

- Test 26: Cross Out combined with Test 6: Visual Matching provides a perceptual speed cluster.
- Test 27: Memory for Sentences combined with Test 17: Memory for Words measures auditory memory span.
- Test 28: Block Rotation combined with Test 3: Spatial Relations measures visualization.
- Test 30: Memory for Names–Delayed provides a measure of recognition memory under delayed conditions. A two-test, delayed measure of associative memory can be obtained when Test 30: Memory for Names–Delayed is combined with Test 10: Visual-Auditory Learning–Delayed.

Some of the Diagnostic Supplement tests can be used to provide two new expanded measures of certain broad CHC abilities.

- Test 22: Visual Closure combined with Test 3: Spatial Relations and Test 13: Picture Recognition yields a broad visual-spatial thinking cluster (*Gv3*) that includes three narrow abilities: visualization, spatial relations, and visual memory.
- Test 25: Number Matrices combined with Test 5: Concept Formation and Test 15: Analysis-Synthesis provides a broader index of fluid reasoning (*Gf3*) that includes measures of induction, general sequential reasoning (deduction), and quantitative reasoning.

When the component tests are administered, the additional CHC clusters can be included in the intra-cognitive–extended discrepancy procedure, providing the user with more diagnostic comparisons. Because the *Diagnostic Supplement* tests were co-normed with the tests in the *WJ III COG* and *WJ III ACH*, comparisons between and among the CHC abilities and areas of academic achievement can be made with greater accuracy and validity than would be possible by comparing scores from separately normed instruments. Table 1-2 contains a list of the additional clusters that can be included in the intra-cognitive–extended discrepancy procedure. The table lists the clusters that are required for calculation of the discrepancies as well as the additional optional clusters that can be included, but are not required. These clusters can also be included in the intra-individual (*WJ III COG* and *WJ III ACH* combined) discrepancy procedure, when the intra-individual discrepancy procedure includes the tests required for the intra-cognitive–extended discrepancy procedure.

Table 1-2. Clusters Included in the Intra-Cognitive–Extended Discrepancy Procedure

Required
Comprehension-Knowledge (*Gc*)
Long-Term Retrieval (*Glr*)
Visual-Spatial Thinking *(Gv)*
Auditory Processing *(Ga)*
Fluid Reasoning *(Gf)*
Processing Speed *(Gs)*
Short-Term Memory *(Gsm)*

Table 1-2. Clusters Included in the Intra-Cognitive–Extended Discrepancy Procedure (continued)

Optional	"Other" Score Evaluated Against*
Phonemic Awareness	*Ga*
Working Memory	*Gsm*
Visual-Spatial Thinking 3	*Gv*
Fluid Reasoning 3	*Gf*
Perceptual Speed	*Gs*
Associate Memory	*Glr*
Visualization	*Gv*
Sound Discrimination	*Ga*
Auditory Memory Span	*Gsm*
Numerical Reasoning	*Gf*

* The optional clusters are not included in the calculation of the Intra-Cognitive–Extended "Other" scores. Instead, each optional cluster is evaluated against the "Other" score that is calculated for the appropriate broad CHC ability.

Assessment with Reduced Language Requirements

A Broad Cognitive Ability–Low Verbal (BCA-LV) cluster is included that has relatively low overall expressive and receptive verbal requirements and specifically excludes a measure of verbal ability from the cluster composition. The verbal requirements for the subject are similar to those that would be required for the Performance IQ scale of the Wechsler scales for children and adults (Wechsler, 1989, 1991, 1992), and the cluster is intended for similar purposes (the Wechsler Performance IQ scales are sometimes used as non-verbal measures of intelligence). However, the cluster is broader in scope than most measures of non-verbal intelligence. Specifically, the cluster includes measures of six broad abilities, including visual-spatial thinking (Test 3: Spatial Relations), fluid reasoning (Test 5: Concept Formation), processing speed (Test 6: Visual Matching), short-term memory (Test 7: Numbers Reversed), long-term retrieval (Test 21: Memory for Names), and auditory processing (Test 23: Sound Patterns–Voice). Table 1-3 lists the tests and broad and narrow abilities included in the BCA-LV.

Table 1-3. Tests and Broad and Narrow Abilities Included in Broad Cognitive Ability–Low Verbal

Test Name	Broad CHC Ability	Narrow CHC Ability
Test 3: Spatial Relations	Visual-Spatial Thinking (*Gv*)	Visualization & Spatial Relations
Test 5: Concept Formation	Fluid Reasoning (*Gf*)	Induction
Test 6: Visual Matching (T)	Processing Speed (*Gs*)	Perceptual Speed
Test 7: Numbers Reversed (A)	Short-Term Memory (*Gsm*)	Working Memory
Test 21: Memory for Names	Long-Term Retrieval (*Glr*)	Associative Memory
Test 23: Sound Patterns—Voice (A)	Auditory Processing (*Ga*)	Sound Discrimination

Assessment of Bilingual Individuals

The entire *WJ III* is appropriate and useful for assessing English-dominant bilingual individuals. The *Diagnostic Supplement* augments and expands the usefulness of the *WJ III COG* for bilingual assessment by inclusion of a General Intellectual Ability–Bilingual Scale (GIA-Bil), a language-reduced bilingual thinking ability cluster (Thinking Ability–Low Verbal), and a procedure for assessment of verbal ability in English and Spanish combined.

When specific *Diagnostic Supplement* tests are used with selected tests from the *WJ III COG* Standard Battery, a GIA-Bil score is available. The GIA-Bil consists of tests that measure seven different cognitive abilities. The GIA-Bil scale is based on the work of Alvarado (1999), who pioneered and standardized the procedure with the *Woodcock-Johnson Tests of Cognitive Ability–Revised*. Table 1-4 lists the tests included in the GIA-Bil cluster and the broad and narrow abilities measured by each test.

Table 1-4. WJ III General Intellectual Ability—Bilingual Scale

Test Name	Broad CHC Ability	Narrow CHC Ability
Verbal Ability		
Test 1: Verbal Comprehension	Comprehension-Knowledge *(Gc)*	Lexical Knowledge & Language Development
Test 31 Bilingual Verbal Comprehension	Comprehension-Knowledge (*Gc*)	Lexical Knowledge & Language Development
Thinking Abilities		
Test 3: Spatial Relations	Visual-Spatial Thinking *(Gv)*	Visualization & Spatial Relations
Test 5: Concept Formation	Fluid Reasoning *(Gf)*	Induction
Test 21: Memory for Names	Long-Term Retrieval (*Glr)*	Associative Memory
Test 23: Sound Patterns—Voice (A)	Auditory Processing *(Ga)*	Sound Discrimination
Cognitive Efficiency		
Test 6: Visual Matching (T)	Processing Speed *(Gs)*	Perceptual Speed
Test 7: Numbers Reversed (A)	Short-Term Memory *(Gsm)*	Working Memory

The GIA-Bil scale includes six tests that utilize a language-reduced test format. Additionally, for English-Spanish bilingual subjects, the GIA-Bil measures four aspects of verbal ability using a bilingual assessment procedure. This combination of language-reduced tests and bilingual testing of verbal ability allows the examiner the opportunity to explore relative strengths and weaknesses among the verbal ability, thinking ability, and cognitive efficiency capabilities of bilingual individuals.

Verbal Ability. Test 1: Verbal Comprehension includes four subtests that measure verbal ability, or the CHC broad ability of comprehension-knowledge (*Gc*). The test is administered in English. Items answered incorrectly on Test 1 can be subsequently administered in Spanish using Test 31: Bilingual Verbal Comprehension. This procedure provides a measure of verbal comprehension in English and Spanish combined. This score is used in calculation of the GIA-Bil score.

Alternatively, examiners can utilize the *Bilingual Verbal Ability Tests* (*BVAT*) to obtain a measure of bilingual verbal comprehension in several other languages for English-dominant bilingual individuals. The *BVAT* includes a more expansive set of verbal ability tests in English, with translations in Arabic, Chinese (Traditional and Simplified), French, German, Haitian-Creole, Hindi, Hmong, Italian, Japanese, Korean, Navajo, Polish, Portuguese, Russian, Spanish, Turkish, and Vietnamese. When included, the *BVAT* score serves as the measure of verbal comprehension in the GIA-Bil scale.

Thinking Ability. The four thinking ability tests included in the GIA-Bil scale were selected for inclusion because (a) the language requirements for each test are relatively low when compared to other alternatives for assessing the same broad CHC ability and (b) each test was appropriate for use with young children. That is, the language used in the test directions is at a sufficiently low level of abstraction that young, English-dominant bilingual individuals can be assessed. In some cases, the test's sample items, controlled feedback, and query procedures assist the examiner in ascertaining the subject's understanding. The following descriptions demonstrate the appropriateness of these tests as measures of thinking abilities for bilingual individuals.

In Test 3: Spatial Relations, all subjects begin with an introduction and sample items that include a standardized procedure to ensure the subject understands the directions. Additionally, a pointing response may be used if the subject does not know the letter names. Test 3: Spatial Relations is a measure of visual-spatial thinking (*Gv*).

Test 21: Memory for Names measures long-term retrieval (*Glr*) in a controlled-learning format that assures all subjects are given identical opportunities to learn the task. Prior learning does not affect test performance. Additionally, the test utilizes a pointing response from the subject so there are no expressive language requirements. Incorrect responses are identified immediately. That is, the examiner acknowledges the incorrect response and then points to the correct response; this procedure helps clarify understanding of the task requirement.

Test 23: Sound Patterns–Voice is a measure of auditory processing (*Ga*). The test is appropriate for assessing the sound discrimination abilities of bilingual individuals because there are no meaningful language components in the test stimuli. For this test, the subject needs only to understand the concepts of "same" and "different."

Test 5: Concept Formation is a test of fluid reasoning (*Gf*). Although this test requires some basic English-language vocabulary knowledge (such as the words *different*, *drawing*, and *rule*), either beforehand or gained through the teaching/modeling characteristic of the test directions, bilingual subjects with English oral-language abilities at the age 4-0 level or higher typically have the English-language vocabulary required for this test. Through standardized introduction and sample items that utilize corrective feedback, all subjects are given the opportunity to learn the task demands.

These four thinking ability tests also comprise the Thinking Ability–Low Verbal cluster. This cluster provides a language-reduced composite of a subject's intentional cognitive processing capabilities.

Cognitive Efficiency. Two tests comprise the Cognitive Efficiency–Standard cluster, which measures the subject's rate and span of automatic cognitive processing. Test 6: Visual Matching is a measure of processing speed (*Gs*) and Test 7: Numbers Reversed is a measure of short-term memory (*Gsm*). Both of these tests have low receptive language requirements.

Two versions of Test 6: Visual Matching are available. Test 6: Visual Matching 1 requires the subject to point to two matching shapes in a row of four to five shapes. Test 6: Visual Matching 2 requires the subject to locate and circle the two identical numbers in a row of six numbers. There are no expressive language requirements for Test 6: Visual Matching.

Test 7: Numbers Reversed requires some basic English-language vocabulary knowledge (such as the words *numbers* and *backward* and the numeral names "one" through "nine"). However, bilingual subjects with English oral language abilities at the age 5-0 level or higher typically have the English-language vocabulary required for this test.

Examiners who administer the tests included in the GIA-Bil scale can obtain additional diagnostic information from the intra-cognitive–standard discrepancy procedure. When either Test 31: Bilingual Verbal Comprehension–English/Spanish or the *BVAT* has been administered, the verbal ability includes responses to items administered in the subject's first language. Also, the Thinking Ability–Low Verbal score is evaluated against the same "Other" score as Thinking Ability–Standard.

Assessment of Young Children

The *Diagnostic Supplement* contains selected tests that are particularly useful for assessment of young children or for individuals of any age who function at a preschool level. The tests include engaging tasks and colorful pictures that interest young children. As a practical consideration, the tests are time efficient, taking approximately 5 to 10 minutes per test to administer. This saves time and effort that normally would be expended on lengthy instruments. Additionally, natural breaks between tests allow examiners the option of dividing testing into two or more sessions. This can be helpful when the child's attention or response style is not optimal.

When used with selected tests from the *WJ III COG* Standard Battery, a General Intellectual Ability–Early Development Scale (GIA-EDev) is available consisting of tests that measure six different cognitive abilities. (The GIA-EDev cluster does not include a measure of fluid reasoning [*Gf*].) Table 1-6 lists the tests included in the GIA-EDev cluster and the broad and narrow abilities measured by each test.

Table 1-6. WJ III General Intellectual Ability—Early Development Scale

Test Name	Broad CHC Ability	Narrow CHC Ability
Verbal Ability		
Test 1: Verbal Comprehension	Comprehension-Knowledge *(Gc)*	Lexical Knowledge & Language Development
Test 31: Bilingual Verbal Comprehension	Comprehension-Knowledge *(Gc)*	Lexical Knowledge & Language Development
Thinking Abilities		
Test 8: Incomplete Words (A)	Auditory Processing *(Ga)*	Phonetic Coding: Analysis
Test 21: Memory for Names	Long-Term Retrieval (*Glr)*	Associative Memory
Test 22: Visual Closure	Visual-Spatial Thinking *(Gv)*	Closure Speed
Cognitive Efficiency		
Test 6: Visual Matching (T)	Processing Speed *(Gs)*	Perceptual Speed
Test 27: Memory for Sentences (A)	Short-Term Memory *(Gsm)*	Auditory Memory Span

Three of the six tests in the GIA-EDev scale are located in the *WJ III COG* Standard Battery. Test 1: Verbal Comprehension includes four subtests that measure lexical knowledge and language development, two narrow abilities in the broad CHC ability of comprehension-knowledge (*Gc*). Test 6: Visual Matching is a test of processing speed (*Gs*), and more specifically, the narrow ability of perceptual speed. Version 1 of Test 6 is designed specifically for use with preschool children and individuals who have developmental delays or reduced functioning. Test 8: Incomplete Words is a measure of phonetic coding, a narrow ability in the broad domain of auditory processing (*Ga*).

Three of the six tests in the GIA-EDev scale are located in the *Diagnostic Supplement*. Test 21: Memory for Names is a test of long-term retrieval (*Glr*), measuring the narrow ability of associative memory. Test 22: Visual Closure is a test of visual-spatial thinking (*Gv*). Although not a timed task, the test measures a narrow ability often called closure speed in the literature. Test 27: Memory for Sentences is a short-term memory (*Gsm*) task measuring the narrow ability of auditory memory span.

Items from Test 31: Bilingual Verbal Comprehension may also be administered to English-Spanish bilingual subjects. This procedure is an extension of Test 1: Verbal Comprehension and provides a measure of receptive and expressive verbal comprehension in the subject's two languages combined. Items answered correctly in Test 31: Bilingual Verbal Comprehension are subsequently added to the raw scores for the subtests in Test 1: Verbal Comprehension. The resulting Verbal Comprehension (and Verbal Ability) score may be interpreted as the subject's level of verbal comprehension ability regardless of language specificity.

In early childhood assessment, an understanding of the child's levels of early- or pre-academic skills often aids in interpreting the impact that any handicapping condition or developmental delay might have on the ability to perform in school. The *WJ III ACH* contain several tests that include pre-academic content that can provide interpretive clusters for this purpose. Because the *WJ III COG* and the *WJ III ACH* are co-normed, examiners can study the relationship of

pre-academic skills to cognitive development with more accuracy and validity than with a combination of instruments that are not co-normed.

The *Compuscore and Profiles Program* that is included with the *Diagnostic Supplement* provides additional interpretive options for assessment of young children by the addition of two pre-academic clusters. The Pre-Academic–Standard (Pre-Std) cluster identifies pre-reading and letter and word identification skills, developing mathematics skills, and skill in written production. It consists of three tests, *WJ III ACH* Test 1: Letter-Word Identification, Test 7: Spelling, and Test 10: Applied Problems. The Pre-Academic–Extended (Pre-Ext) cluster also includes these three tests, but also *WJ III ACH* Test 14: Picture Vocabulary and Test 19: Academic Knowledge. These two tests add measures of language development (the ability to name pictured objects) and early knowledge of the sciences, social studies, and humanities to the cluster. Table 1-7 lists the tests that are in the Pre-Std and Pre-Ext clusters of the *WJ III ACH*.

Table 1-7. Composition of the Pre-Academic Clusters from the WJ III Tests of Achievement

	Achievement Cluster	
WJ III ACH Test	**Pre-Academic (Std)**	**Pre-Academic (Ext)**
Letter-Word Identification	X	X
Spelling	X	X
Applied Problems	X	X
Picture Vocabulary		X
Academic Knowledge		X