Table 5-4.
WJ IV ACH Test Content, Process, and Construct Descriptions

Achievement Test	Primary Broad CHC Ability *Narrow Ability*	Stimuli	Task Requirements	Cognitive Processes	Response
1: Letter-Word Identification	Reading & Writing Ability (*Grw*) *Reading decoding* (RD)	Visual (text)	Identifying printed letters and words	Feature detection and analysis (for letters) and recognition of visual word forms from a phonological lexicon; access of pronunciations associated with visual word forms	Oral (letter names, words)
2: Applied Problems	Quantitative Knowledge (*Gq*) *Mathematical achievement* (A3) Fluid Reasoning (*Gf*) *Quantitative reasoning* (RQ)	Auditory (questions) Visual (numeric, text)	Performing math calculations in response to orally presented problems	Construction of mental models via language comprehension, application of calculation and/or quantitative reasoning; formation of insight	Oral (numbers, words)
3: Spelling	Reading & Writing Ability (*Grw*) *Spelling ability* (SG)	Auditory (words)	Spelling orally presented words	Access to and application of knowledge of orthography of word forms by mapping whole-word phonology onto whole-word orthography, by translating phonological segments into graphemic units, or by activating spellings of words from the semantic lexicon	Motoric (writing)
4: Passage Comprehension	Reading & Writing Ability (*Grw*) *Reading comprehension* (RC)	Visual (text)	Identifying a missing key word that makes sense in the context of a written passage	Construction of propositional representations; integration of syntactic and semantic properties of printed words and sentences into a representation of the whole passage	Oral (words)
5: Calculation	Quantitative Knowledge (*Gq*) *Mathematical achievement* (A3)	Visual (numeric)	Performing various mathematical calculations	Access to and application of knowledge of numbers and calculation procedures; verbal associations between numbers represented as strings of words	Motoric (writing)
6: Writing Samples	Reading & Writing Ability (*Grw*) *Writing ability* (WA)	Auditory (text) Visual (text)	Writing meaningful sentences for a given purpose	Retrieval of word meanings; application of psycholinguistic rules of case, grammar, and syntax; planning and construction of bridging inferences in immediate awareness (auditory and/or visual buffer)	Motoric (writing)
7: Word Attack	Reading & Writing Ability (*Grw*) *Reading decoding* (RD) Auditory Processing (*Ga*) *Phonetic coding* (PC)	Visual (word)	Reading phonically regular nonwords	Grapheme-to-phoneme translation and accessing pronunciations of pseudowords not contained in the mental lexicon	Oral (words)

Table 5-4. *(cont.)*
WJ IV ACH Test Content, Process, and Construct Descriptions

Achievement Test	Primary Broad CHC Ability *Narrow Ability*	Stimuli	Task Requirements	Cognitive Processes	Response
8: Oral Reading	Reading & Writing Ability (*Grw*) *Reading comprehension* (RC) *Verbal (print) language comprehension* (V)	Visual (text)	Reading sentences orally with accuracy and fluency	Integration of orthographic, phonological, and semantic processes; articulatory planning and motor execution	Oral (sentences)
9: Sentence Reading Fluency	Reading & Writing Ability (*Grw*) *Reading comprehension* (RC) *Reading speed* (RS) Processing Speed (*Gs*)	Visual (text)	Reading printed statements rapidly and responding true or false (yes or no)	Speeded semantic decision making requiring reading ability and generic knowledge	Motoric (circling)
10: Math Facts Fluency	Quantitative Knowledge (*Gq*) *Mathematical achievement* (A3) Processing Speed (*Gs*) *Number facility* (N)	Visual (numeric)	Adding, subtracting, and multiplying rapidly	Speeded access to and application of digit-symbol arithmetic procedures	Motoric (writing)
11: Sentence Writing Fluency	Reading & Writing Ability (*Grw*) *Writing ability* (WA) *Writing speed* (WS) Processing Speed (*Gs*)	Visual (words with pictures)	Formulating and writing simple sentences rapidly	Speeded formation of constituent sentence structures requiring fluent access to semantic and syntactic knowledge	Motoric (writing)
12: Reading Recall	Reading & Writing Ability (*Grw*) *Reading comprehension* (RC) Long-Term Retrieval (*Glr*) *Meaningful memory* (MM)	Visual (text)	Reading and recalling details of stories	Construction of propositional representations and recoding	Oral (passages)
13: Number Matrices	Fluid Reasoning (*Gf*) *Quantitative reasoning* (RQ)	Visual (numeric)	Determining a two-dimensional numerical pattern	Access to verbal-visual numeric codes; transcoding verbal and/or visual representations of numeric information into analogical representations; determining the relationship between/among numbers on the first part of the structure and mapping (projecting) the structure to complete the analogy	Oral (numbers)
14: Editing	Reading & Writing Ability (*Grw*) *English usage* (EU)	Visual (text)	Identifying and correcting errors in written passages	Access and application of lexical and syntactic information about details of word forms and writing conventions	Oral (sentences)
15: Word Reading Fluency	Reading & Writing Ability (*Grw*) *Reading comprehension* (RC) *Reading speed* (RS) Processing Speed (*Gs*)	Visual (words)	Rapidly reading words and marking the two in each row that are semantically related	Speeded semantic decision making requiring reading ability	Motoric (slash marks)

Table 5-4. *(cont.)*
WJ IV ACH Test Content, Process, and Construct Descriptions

Achievement Test	Primary Broad CHC Ability *Narrow Ability*	Stimuli	Task Requirements	Cognitive Processes	Response
16: Spelling of Sounds	Reading & Writing Ability (*Grw*) *Spelling ability* (SG) Auditory Processing (*Ga*) *Phonetic coding* (PC)	Auditory (letters, words)	Spelling letter patterns that are regular patterns in written English	Translating spoken elements of nonwords into graphemic units; phonologically mediated mapping of orthography	Motoric (writing)
17: Reading Vocabulary	Reading & Writing Ability (*Grw*) *Reading comprehension* (RC) Comprehension-Knowledge (*Gc*) *Lexical knowledge* (VL)	Visual (words)	Reading words and providing an appropriate synonym or antonym	Recognition of visual word forms; semantic access and activation; semantic matching	Oral (words)
18: Science	Domain-Specific Knowledge (*Gkn*) *General science information* (K1) Comprehension-Knowledge (*Gc*) *General (verbal) information* (K0)	Auditory (questions) Visual (text, pictures)	Responding to questions about science	Implicit, declarative category-specific memory	Oral (words, sentences)
19: Social Studies	Domain-Specific Knowledge (*Gkn*) *Knowledge of culture* (K2) *Geography achievement* (A5) Comprehension-Knowledge (*Gc*) *General (verbal) information* (K0)	Auditory (questions) Visual (text, pictures)	Responding to questions about social studies	Implicit, declarative category-specific memory	Oral (words, sentences)
20: Humanities	Domain-Specific Knowledge (*Gkn*) *Knowledge of culture* (K2) Comprehension-Knowledge (*Gc*) *General (verbal) information* (K0)	Auditory (questions) Visual (text, pictures)	Responding to questions about humanities	Implicit, declarative category-specific memory	Oral (words, sentences)

Empirical Evaluation of Test Content Characteristics

Most content validity evidence "usually takes the form of consensual professional judgments about the relevance of item content to the specified domain and about the representativeness with which the test content covers the domain content" (Messick, 1989, p. 36). Recent research has demonstrated, within academic curriculum domains, the potential for evaluating content validity via empirical methods. Li and Sireci (2013) demonstrated the potential value of using *multidimensional scaling* (MDS), augmented by cluster analysis and correlation analysis, to evaluate the correspondence between empirically identified content dimensions and professional judgment.

MDS is a complimentary or alternative method to factor analysis when dealing with large multidimensional data sets. As defined in the *APA Dictionary of Psychology* (VandenBos, 2007), MDS is "a scaling method that represents perceived similarities among stimuli by arranging similar stimuli in spatial proximity to one another, while disparate stimuli