

Cognitive Assessment System, Second Edition (CAS2)

Guidance on using the battery within a diagnostic assessment for SpLDs

January 2024

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Publisher:	Pro-ed 2014
Date of Standardisation:	2008-2011
Age Range:	5:0-18:11 years
Access:	Hogrefe Level 2
Sample Size:	1,342 USA

NB: This document is guidance. It should be read in conjunction with detailed reading of the CAS2 manuals.

Test Content: what tests are included and what are they designed to measure/evaluate?

The battery is based on PASS theory which conceptualizes neurocognitive abilities as falling into four distinct categories: Planning, Attention, Simultaneous, and Successive:

- Planning –the ability to make decisions about how best to complete tasks, use strategies, monitor the effectiveness of strategies, change the plan when needed, and efficiently complete the tasks.
- Attention –the ability to focus and resist distractions in order to allocate resources and energy efficiently.
- Simultaneous –the ability to recognise and work with information that is organized into groups, understand how the separate elements fit together into a conceptual whole, and how shapes as well as words and verbal concepts are interrelated (e.g. understanding spatial relationships, comprehension of how the parts of a sentence contribute to its overall meaning)
- Successive –the ability to recognise and work with information that is in a specific serial order or sequence (e.g. word decoding, memorising number sequences, understanding how the order of items within a sentence affects meaning)

PASS theory takes a different view of intellectual ability from those reflected in tests such as the BAS, WISC, IDS and WRIT. The notion of 'intelligence' is reconceptualised as cognitive process. PASS theory uses Alexander Luria's theory of the three functional units of cognitive processing:

- The first unit, related to attention.
- The second unit, related to use of simultaneous and successive processing in order to receive, process and store information.
- The third unit, related to regulation and direction.

One key difference between the CAS model and other ability tests is its emphasis on the changeability of processes: *'normal cognitive development is a process of changeit is possible that traditional mental measurement has concentrated too much on the more stable aspects of cognition, ignoring aspects that may have more relevance to the cognitive changes we wish to promote.'* (Das, Naglieri and Kirby, 1994).

PLANNING SCALE

Describes "a child's ability to create a plan of action, apply the plan, verify that an action taken conforms to the original goal, and modify the plan as needed" (p10 Interpretive & Technical Manual).

Composite scale can be calculated either using 2 core subtests, or using 3 subtests (which includes a supplementary test):

1. *Planned Codes (PCd)* – similar in style to *SDMT*. There is a key at the top of each page showing Letters and their related Codes. The child writes as many correct codes as possible below 4 rows of letters. There are up to 4 sets – each one preceded by a practice sample. Each set is timed.
2. *Planned Connections (PCn)*. The child draws a line between randomly arranged numbers and/or letters, following a specified sequence. There are up to 7 sets and some practice samples. Each set is timed.
3. *Planned Number Matching (PNM) (supplementary)* – similar in style to *Number Pattern Matching* in *WJIV Cog*. The child finds and underlines two numbers that are the same in each row of numbers. There are practice samples and 3 sets, each with 8 rows of numbers. Each set is timed.

At the end of each planning subtest the child is asked to tell the assessor how they did the task. The child's responses can be compared and recorded in the Examiner Record Form against a checklist of the most commonly used strategies for each test.

Das et al's Assessment of Cognitive Processing:

The PASS theory of intelligence notes the following: 'structural analysis of a planning task indicates that such a test should require an individual to develop some approach to solving the task in an efficient and effective manner. This is the case in all the planning tests, and typically the actual task requirement is minimal (i.e. every item can be completed), but what leads to individual differences is the requirement that some effective means of solving the task must be developed. Therefore, these tasks do not have the same kind of progression of items on the basis of difficulty as those found in the simultaneous or successive scales. The hallmark of the planning tasks that have been used is that they require the development of an efficient system of completing a relatively simple task.'

The planning index is a broad reflection of the ability to work systematically, and the simplicity of the task therefore taps into underlying processes with minimal prior knowledge interference.

SIMULTANEOUS SCALE

Describes a child's ability to recognise how separate elements fit within an interrelated group (p10 Interpretive & Technical Manual).

Composite scale can be calculated either using 2 core subtests, or using 3 subtests (which includes a supplementary test):

1. *Matrices (MAT)* – similar in style to *Matrices* in WRIT. The child is shown a coloured geometric shape with part missing, or a sequence of coloured shapes, and selects which of 5 or 6 options would complete the shape or sequence. No time limit.
2. *Verbal-Spatial Relations (VSR)*. The child sees 6 pictures, with a printed description at the bottom of the page. The examiner reads out the description, and the child selects the picture which matches that description. No time limit.
3. *Figure Memory (FM) (supplementary)*. Child briefly sees a 2- or 3-dimensional geometric shape. The picture is removed and the child then sees a more complex geometric pattern with the original shape embedded within it, in the Response Booklet. The child is asked to identify and trace the original shape within the pattern using a red pen. The initial viewing is timed, but the response has no time limit.

ATTENTION SCALE

Describes a child's ability to "focus cognitively while detecting particular stimuli and inhibit response to irrelevant competing stimuli." (p10 Interpretive & Technical Manual)

Composite scale can be calculated either using 2 core subtests, or using 3 subtests (which includes a supplementary test):

1. *Expressive Attention (EA)* – has similarities to a Stroop test. Child is presented with 3 sets of items each with a different instruction relating to size (in younger age group) or colour (in older age groups). The sets contain different types of distracting stimuli (but all relating to size or colour). Each set is timed.
2. *Number Detection (ND)*. Child is presented with a page of around 200 numbers in different fonts. The task is to find and underline all the examples of a specific number, or a specific number in a specific font, ignoring the distractions of the same number in a different font, or other numbers in the same font. There are 4 sets and some practice examples. Each set is timed.
3. *Receptive Attention (RA) (supplementary)*. Child is presented with rows of objects or letters. Each set has an instruction to underline pairs of objects or numbers – but the instruction may relate to having the same name or the same size. 4 sets plus some practice samples. Each set is timed.

SUCCESSIVE SCALE

Describes a child's ability to "recall or comprehend a series organisation or events" (p10 Interpretive & Technical Manual).

Composite scale can be calculated either using 2 core subtests, or using 3 subtests (which includes a supplementary test):

1. *Word Series (WS)* - similar to Digits Forwards, but with words. Examiner reads out a sequence of single-syllable high frequency words at a specified rate and child then repeats them in the same order. Sequences grow progressively longer.
2. *Sentence Repetition (SR)* (age 5-7 only) Examiner reads out sentences which are syntactically correct but have no meaning. Child repeats the sentence. Sentences grow progressively longer with up to 2 clauses.
Sentence Questions (SQ) (age 8-18 only) Examiner reads out sentences which are syntactically correct but have no meaning, then asks a question. Child answers the question. Sentences grow progressively longer with up to 3 clauses.
3. *Visual Digit Span (VDS)* (supplementary)– similar to Digits Forwards but the presentation is visual rather than auditory. The child sees a sequence of numbers for a specific time. The sequence is then hidden, and the child verbally repeats the numbers in the same order. Sequences of numbers grow progressively longer.

ADDITIONAL SCALES

The following composite scales can also be calculated:

1. *Full Scale* – an index of "*the child's overall cognitive functioning*" (p10 Interpretive & Technical Manual). Calculated by combining all 8 core subtest scores or all 12 subtests.
2. *Executive Function without Working Memory* – a measure of the ability "*to achieve a goal by planning and organising a task while paying careful attention to the stimuli and resisting distractions within the environment*". (p12 Interpretive & Technical Manual). Calculated by combining the scores of Planned Connections and Expressive Attention.
3. *Executive Function with Working Memory* – similar to 2., but also requires "*keeping information in memory while problem solving*". Calculated by combining scores of Planned Connections, Expressive Attention, Verbal-Spatial Relations and either Sentence Repetition or Sentence Questions.
4. *Working Memory* – an index of the child's ability "*to store and mentally manipulate information for a short period*" (p12 Interpretive & Technical Manual) Calculated by combining scores of Verbal-Spatial Relations and either Sentence Repetition or Sentence Questions.
5. *Verbal Content* – measures ability "*to solve problems that require recall and/or comprehension of verbal concepts or words.*" (p12 Interpretive & Technical Manual). Calculated by combining scores of Verbal-Spatial Relations, Receptive Attention and either Sentence Repetition or Sentence Questions.
6. *Non-Verbal Content* – measures ability to "*problem solve with images*". (p12 Interpretive & Technical Manual). Calculated by combining scores of Matrices, Figure Memory and Planned Codes.
7. *Speed/Fluency* – a measure of "*general processing speed*" (p11 Speed/Fluency Index Supplement). Calculated using aspects of the Expressive Attention subtest.

ADMINISTRATION TIME

1 to 1.5 hours, dependent on whether the core or Extended Battery is used, and on how far the learner progresses before the discontinue rule is applied.

STRENGTHS

- The fundamental aim of the battery is not to establish how intelligent a child is, but to evaluate how well that child will cope with learning tasks and what obstacles to efficient learning the child may be experiencing. It is therefore, highly relevant to an assessment for specific learning difficulties. It also aligns well with dynamic assessment.
- The tasks are suitably challenging for the age range without being intimidating or undermining. There is emphasis throughout on ensuring that the child has understood the instructions and the nature of the task, and excellent guidance is given on how to do this without stepping over the boundary into training the child how to do the task.
- Although the battery is American, the amount of cultural influence is minimised. The tests require very little acquired knowledge, and the language used throughout is simple. For example, complexity in language content is introduced not through low frequency vocabulary or less common knowledge, but by increasing the length and complexity of the sentence structure.
- The style of many of the subtests within the battery will already be familiar as there are strong similarities to tests which other batteries may refer to as verbal working memory, visual memory, processing speed, non-verbal ability, listening comprehension . . .
- Instructions are easy to follow and unambiguous, and administration and scoring are straightforward, though scoring for certain subtests is multi-staged and will therefore need to be carefully checked.
- Stimuli books are large and well presented.
- Considerable assistance is given with identifying variations within the profile and evaluating whether those variations are clinically significant.
- The battery offers the opportunity to tease out a range of specific factors which may be contributing to difficulties with learning – including attention, verbal working memory, visual working memory, verbal comprehension, speed.
- There is no direct equivalent in CAS2 to a Digits Backwards test. However, the Sentence Questions test does require the child to sift, select and reorganise information in the working memory. It therefore offers useful insights into the type of listening task that forms the basis of much classroom learning.

ISSUES TO CONSIDER

- CAS2 takes a very different approach to traditional IQ and Attainment testing. Professionals transferring to using CAS2 will need training in its approach.
- Although many of the subtests are familiar in design, the way they are defined and interpreted is different. The tests are highly relevant to the diagnostic assessment of SpLDs but some thought has to be given to where they fit within SASC's Report Format. This is not unique to CAS2 – guidance on WJIV COG also had to consider carefully how the battery should be used and described within the Report Format. STEC and SASC are in the process of producing a paper that compares and contrasts the main intelligence/cognitive processing batteries that are most frequently used, to enable psychologists, specialist teacher assessors and training bodies to evaluate how each of these batteries fits within a diagnostic assessment.
- For the purposes of a diagnostic assessment of SpLDs it CAS2 would need to be supplemented with tests of phonological awareness and receptive vocabulary, as well as the normal range of attainment tests.
- The battery is only standardised up to 18 years 11 months. It is not, therefore, suitable for use with adults above this age.
- The standardisation is relatively old. However, there is no directly equivalent test based on the same underlying theory that is more up to date.