Alberta Government-Provided Kindergarten to Grade 3 Literacy Screening Assessments

PAST, RAN, LeNS, and CC3 Interpretation Guide

David A. Kilpatrick
State University of New York College

George K. Georgiou
University of Alberta

Rauno Parrila, Anne Castles & Saskia Kohnen
Macquarie University Centre for Reading

Alberta

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PAST and RAN Interpretation Guide

The Phonological Awareness Screening Test (PAST) was developed by Professor David A. Kilpatrick (State University of New York College at Cortland) and is intended to measure children's phonemic awareness and proficiency. Phonemic awareness is defined as children's ability to identify and manipulate the sounds in oral language. Children who have well-developed phonemic awareness tend to be stronger at reading later. PAST was designed to measure children's phoneme deletion and phoneme substitution skills, both of which are integral aspects of phonological awareness. PAST has been normed on over 500 Albertan children in mid-Kindergarten and early Grade 1.

Rapid Automatized Naming (RAN), defined as the ability to name as fast as possible highly familiar visual stimuli such as digits, letters, colours, and objects, is an important predictor of reading fluency. Moreover, its contribution to reading has been found to be independent of phonological awareness. The RAN-Digit (RAN-D) cards were developed by Professor George K. Georgiou (University of Alberta) and is based on the original work of Denckla and Rudel (1974) and Wolf and Denckla (2005). The task has been normed on over 500 Albertan children in mid-Kindergarten and early Grade 1.

The Theory Behind PAST and RAN

Research has shown that for children to become accurate and fluent readers they need to rely on strong foundational skills, such as letter knowledge (assessed by Letter Name and Sound [LeNS]), phonemic awareness, and rapid automatized naming. Knowing the performance level of Kindergarten children in these skills allows us to predict with high accuracy if they will experience reading difficulties in the future. If we know that children are at high risk for reading difficulties, then we can provide early intervention to prevent reading difficulties from happening or becoming more severe.

Letter knowledge in word reading is important, as letters are the primary units in words. Children who do not know the letters cannot read the words. However, even if children recognize the letters included in a given word (e.g., <f>, <a>, and <n> in *fan*), they still have to retrieve the sounds associated with these letters from their long-term memory (captured by measures of RAN) and blend the sounds together to decode the word orally (captured by phonological awareness). According to the double-deficit hypothesis (Wolf & Bowers, 1999), children with both phonological awareness and rapid automatized naming difficulties tend to be struggling readers and spellers. The double-deficit hypothesis has been confirmed in several studies in English (e.g., Compton et al., 2001; Wolf et al., 2002), including some that recruited students from Alberta (e.g., Kirby et al., 2003).

Interpretation of the Scores

It is important to know whether or not children have age-appropriate phonological awareness and rapid automatized naming skills, as this can help determine whether children need extra assistance with foundational literacy skills. Because phonological awareness includes several sub-skills (e.g., syllable deletion, onset-rime deletion, phoneme deletion, phoneme substitution), knowing how children do in these sub-skills can also help determine where to put an emphasis while teaching phonemic awareness.

In PAST, teachers can obtain not only a total accuracy score but also a score for each of the sub-levels of phoneme deletion and substitution (syllabic level, onset-rime level, phoneme level). Assuming students struggle at the syllabic level, then teachers can provide more direct instruction at the syllabic level (e.g., syllable tapping, syllable blending, syllable deletion). Phonemic awareness activities should be delivered orally. However, phonemic awareness instruction could be more effective when accompanied by instruction in letter knowledge. For example, after asking children to delete the sound /k/ from the word <cat>, you can show them the letter <c> that makes the /k/ sound or ask them to select the correct letter among other letters.

In RAN, higher scores (i.e., longer response time) indicate poorer performance. Because digits like 2, 5, 4, and 7 should be highly familiar to children and can be named with automaticity, the same level of automaticity can be assumed in the future for naming high-frequency words (e.g., *an*, *the*, *for*, *is*). Children who have difficulty in this task may experience reading fluency problems in the future since reading fluency depends largely on quickly recognizing individual words in text.

LeNS and CC3 Interpretation Guide

CC3 is a word reading test based on The Castles and Coltheart Reading Test 2 (CC2). CC2 was designed by researchers at Macquarie University, led by Professor Anne Castles, and was adapted to CC3 by Professor Rauno Parrila at Macquarie Centre for Reading. CC3 tests the functioning of the key processes in single-word reading–phonological decoding and whole-word recognition. In this way, CC3 is designed to identify the nature of a child's reading difficulties and provide directions for instruction and intervention. The original CC2 test was normed on over 1000 Australian children in grades 1 to 6, and the current CC3 has been normed on over 30 000 Albertan children in grades 1 to 4.

The Letter Name and Sound (LeNS) test was developed by Professor Rauno Parrila and Associate Professor Saskia Kohnen at Macquarie Centre for Reading. LeNS assesses the child's knowledge of the names of letters and the sounds of letters and common multi-letter graphemes. It is an expanded version of the Letter–Sound Test (LeST) developed by Larsen, Kohnen, McArthur and Nickels at Macquarie University. The assessment is designed to make sure that the child has the foundational phonics skills to develop into an independent reader. LeST was normed on 349 Australian children from Kindergarten to Grade 3 and LeNS on over 15 000 Albertan children from Kindergarten to Grade 2.

The Theory Behind CC3 and LeNS

When children first begin to learn to read, they are familiar with a large number of spoken words, but they cannot recognize these words in printed form. After some instruction and/or early experiences with reading, children begin to realize that letters correspond to sounds (e.g., the <t> at the beginning of the word *tap* is pronounced /t/). They are able to use this basic information about grapheme–phoneme correspondences (GPCs) to help them sound out other words (e.g., *tip*). Words that can be sounded out successfully using the GPCs are referred to as regular words (e.g., *bed*, *wedding*, *mustang*). As children's knowledge of rules for GCPs grow, they are able to sound out longer and more complex words. A large body of research shows that the most effective way to teach a child to read independently is to cover the common grapheme–phoneme correspondences explicitly and systematically. LeNS covers the most common correspondences with the exception of six letters (<j>, <s>, <w>, <y>, <q>, and <z>).

Sounding out using GPCs is a good strategy for reading words, but it is a slow process. Every time a child sounds out the word correctly, they gain valuable practice with that word. Rapidly, sometimes after only two attempts to sound out the word, they learn to recognize that word as a whole: when they see the word again, the pronunciation of the entire word is automatically activated and decoding each grapheme is no longer necessary. This is called whole word reading or sometimes sight reading. In addition to regular words children haven't yet decoded multiple times, about 25 percent of monosyllabic words in English cannot be read accurately using the GPC rules alone. These words are known as irregular words or exception words. Some examples of irregular words are *give*, *come*, and *iron*.

Different cognitive processes are needed to be successful in sounding out the words and recognizing them as wholes. These processes have been described by a cognitive model called the Dual Route Cascaded (DRC) model, which describes how words are read aloud (see Figure 1). The DRC has two reading "routes": the lexical route and the sub-lexical route. When a person sees a written word, it prompts a visual analysis of the letters in the word. This analysis triggers the sub-lexical route to convert letters into sounds via the GPC rules. This process is sometimes called phonological recoding or phonological decoding. The word also triggers the lexical route to search the memory store ("written-word recognition" in Figure 1) of already known written words for the same word, which, if found, activates a spoken version of the word ("spoken-word recognition" in Figure 1). This process is sometimes called visual-word recognition or whole-word reading. The output of both the sub-lexical and lexical routes is the pronunciation of the written word. If the child decoded the word using the sub-lexical route and the word is in their spoken vocabulary, it is then recognized on the basis of this pronunciation. If the word was recognized as a whole, its meaning and pronunciation were both activated simultaneously.

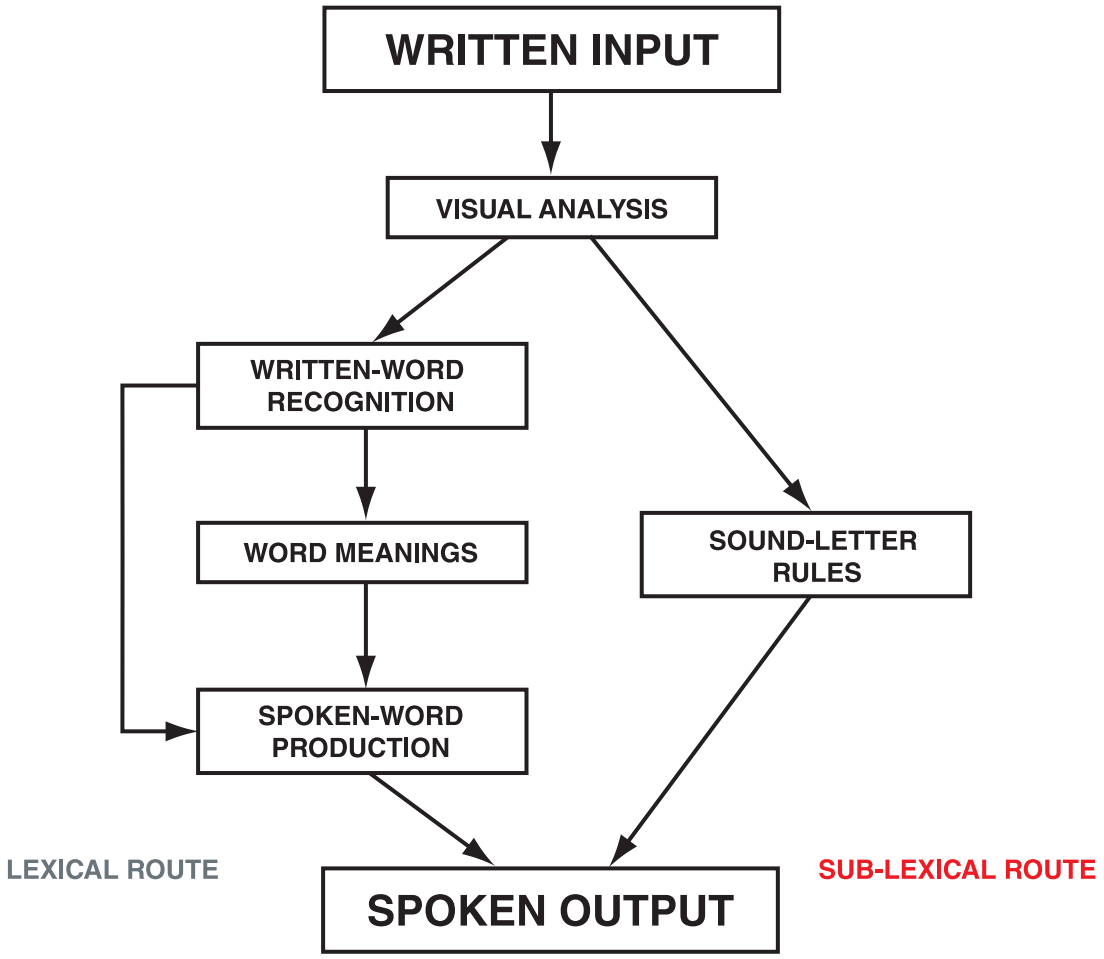

Figure 1. The Dual Route Model

In sum, the ability to read words aloud depends on multiple cognitive processes that fall into two processing routes. The sub-lexical route is critical for reading new words that are regular, whereas the lexical route is important for irregular words that cannot be fully sounded out and is also used to read all known regular words. As the child's reading skills develop, they recognize more and more words using the lexical route while the sub-lexical route remains as a backup strategy that they can use when they encounter unknown words. Due to the limitations of the human memory system, using the slower sub-lexical route when learning to read words is necessary because our visual memory system cannot support learning thousands of words by their visual features. We learn to associate spellings of words to their pronunciations in segments, not as wholes.

It is necessary to test both routes to understand how well a person can read. CC3 is specifically designed to assess how well children are able to use the sub-lexical and lexical routes to reading. In CC3, children are asked to read aloud three types of words: regular words, irregular words, and non-words.

Non-words (e.g., *gop*, *blick*, and *brennet*) are included because children have not seen them before. The only way that non-words can be read correctly is by sounding these words out using knowledge of GPC rules. In other words, non-words assess a child's ability to phonologically decode (via the sub-lexical route) words they have never seen before. LeNS, in turn, assesses more directly whether the child has the required GPC knowledge for successful decoding.

Irregular words (e.g., *break*, *brooch*, and *cello*) are included because these words cannot be correctly sounded out via the sub-lexical route. Children will only be able to read such words correctly if they have seen the words before and have stored the word's spelling and sound in their mental lexicon ("written-word recognition" box in Figure 1). That is, irregular words assess the functioning of the lexical route, but also their reading experience and vocabulary.

Regular words (e.g., *bed*, *drop*, and *mustang*) can be read either by sounding out or by recognizing the word as a whole if the word is stored in the mental lexicon. Therefore, regular words were included because these words are a way of measuring the combined functioning of both routes to reading.

Interpretation of the Scores

Knowing whether or not children have age-appropriate sub-lexical and lexical reading abilities, as this can help determine whether or not children need extra assistance with their reading. Assessment can also help you determine what type of assistance children need.

Most children will perform close to or above average on all tests. Their reading development is on track and, with continued practice and engagement with a variety of texts, you can expect their reading skills to continue to develop.

Many children have difficulty learning the relationships between spellings and sounds, and these children will have difficulty sounding out new words they encounter. In terms of CC3, these are children who clearly do not perform as well as their peers on non-word reading. With these children, it is important to establish whether they know the sounds of graphemes using LeNS. If a child's scores on both the non-word reading subscale and LeNS fall below the normal range, the child is likely to benefit from instruction in letter–sound correspondences and blending. A good starting point is to make sure the child knows the sounds of all the letters and the graphemes included in LeNS. In contrast, if LeNS performance is normal but non-word reading poor, then the child may simply need more decoding practice to increase their ability to apply their letter–sound knowledge correctly and quickly when reading. Some children decode accurately but so slowly that by the time they reach the end of the word, they no longer remember what was at the beginning and therefore fail to blend the sounds to a whole word.

Other children are able to sound words out, but they have difficulty learning and remembering the written forms of whole words. If a child's score on the irregular word reading scale falls below the normal range, this indicates that the child is likely to benefit from instruction on frequently appearing irregular words. It may be helpful to test the child's knowledge of commonly appearing irregular words, such as the most frequent 100 words in Dolch's or Fry's lists, and make sure the child knows know all of these words. The child may also have a limited vocabulary knowledge that contributes to their irregular word reading difficulties. If this is the case, you may want to provide the child with additional vocabulary instruction together with reading practice.

Of course, many children will have difficulties with both the sub-lexical and the lexical routes to reading. In this case, the child will need instruction in both of these areas. We also recommend that you examine their LeNS performance and make sure the child knows the sounds of all the letters and the graphemes included in LeNS. (If the child is in Grade 3, you may want to use LeNS as a diagnostic assessment to make sure the child does not have gaps in their grapheme–phoneme correspondence knowledge.) If the child does not know all the sounds of all the letters and the graphemes included in LeNS, the first step is to teach all the correspondences they missed in LeNS.