Computer Based Assessment System for Reading (CBAS-R) 1.0:
Hierarchy and Item Development for Phonemic Awareness

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Abstract

The purpose of this report is to define the domain of Phonemic Awareness and illustrate how this domain is assessed. Phonemes are the smallest units of sound in spoken language. Phonemic Awareness is the skill to identify and manipulate of phonemes in spoken words; these skills are centrally involved in decoding by blending and segmenting phonemes (NRP, 2000). Children who manipulate letters as they are learning to hear the sounds make better progress in early reading development (NRP, 2000, p. 2-4).

Keywords: phonemic awareness, CBAS-R
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Phonemic Awareness

Phonemic Awareness is the skill to identify and manipulate of phonemes in spoken words (NRP, 2000). Phonemes are the smallest units of sound in spoken language. "Depending on what distinctions are counted, there are between 36-44 phonemes in English, which is about average for languages" (Juel, 2006, p.418). According to Adams, “to the extent that children have learned to ‘hear’ phonemes as individual and separable speech sounds, the system will, through the associative network, strengthen their ability to remember or ‘see’ individual letters and spelling patterns” (1990, p. 304). Hearing and distinguishing individual letter sounds comes last (Goswami, 2000). Children who manipulate letters as they are learning to hear the sounds make better progress in early reading development (NRP, 2000, p. 2-4). Phonemic awareness skills are centrally involved in decoding by blending and segmenting phonemes (NRP, 2000). Phonemic awareness also helps children learn how to spell words correctly. Phonemic segmentation is required to help children retain correct spellings in memory by connecting graphemes to phonemes (NRP, 2000).

It is important for children to learn to distinguish the different sounds in words prior to phonics instruction. According to Snow et al., “because phonemes are the units of sound that are represented by the letters of an alphabet, an awareness of phonemes is key to understanding the logic of the alphabetic principle and thus the learnability of phonics and spelling” (1998, p. 52). Phonemic awareness may improve in conjunction with phonics instruction. With phonemic awareness instruction, children can learn to identify and manipulate sounds in language. There are eight methods of instruction:
1. Phoneme Isolation—Identifying sounds
2. Phoneme Identity—Recognizing individual sounds in words
3. Phoneme Categorization—Recognizing a word with an odd sound
4. Phoneme Blending—Blending sounds together
5. Phoneme Segmentations—Separating sounds
6. Phoneme Deletion—Removing sounds
7. Phoneme Addition—Adding sounds
8. Phoneme Substitution—Changing sounds

**Sample Assessments**

Phonemic awareness is often assessed by asking children, “What is the first sound in the word *mat*?” → /c/ or “What word does not belong? Sun, dog, sat” → “dog”.
Procedure

Hierarchical Structure

The contents of this section provide an overview of the a priori hierarchical structure for item and CAT development. This structure will be evaluated and updated as the items are developed and field tested.

Phonemic Awareness Item Categories

A. Category 1: Syllabication
   1. Subcategory 1: Can Identify the Number of Syllables in a Word

B. Category 2: Rhymes
   1. Subcategory 1: Identifies Rhyming Words
   2. Subcategory 2: Can Supply Rhyming Words

C. Category 3: Phoneme Isolation
   1. Subcategory 1: Identifies Beginning Sounds
   2. Subcategory 2: Identifies Middle Sounds
   3. Subcategory 3: Identifies Ending Sounds

D. Category 4: Phoneme Identity
   1. Subcategory 1: Recognizes the Same Sounds in Different Words

E. Category 5: Phoneme Categorization
   1. Subcategory 1: Recognizes Different Sounds

F. Category 6: Phoneme Blending
   1. Subcategory 1: Blends Phonemes to Make Words
   2. Subcategory 2: Blends Onsets and Rimes

G. Category 7: Phoneme Segmentation
1. Subcategory 1: Segments Phonemes in Words

H. Category 8: Phoneme Deletion
   1. Subcategory 1: Recognizes Words When a Phoneme is Deleted

I. Category 9: Phoneme Addition
   1. Subcategory 1: Creates a New Word When Adding a Phoneme

J. Category 10: Phoneme Substitution
   1. Subcategory 1: Substitutes One Phoneme for Another Phoneme
References

**Additional references used to determine categories for the Domain**


Appendix

Sample Phonemic Awareness Items

This section contains screen shots of sample test items in the hierarchical structure as defined in the Procedure section.

Phoneme Blending

Audio: “What word do these sounds make? /d/o/g/. Click on the picture of the /d/o/g./”

Audio: “What word do the sounds nu t make?”
**Phoneme Isolation**

Audio: “Click on the picture that begins with the /k/ sound.”

Audio: “Click on the picture that has the same middle sound as goat.”
Phoneme Categorization

Audio: “Click on the picture that has the same beginning sound as boy.”

Audio: “Click on the picture for the word that begins differently.”