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

Ann Kroll  
Lisa Krall  
Theodore J. Christ  

University of Minnesota  

Date Initiated: 12/14/2006  
Finalized Draft: 10/12/2010  
Reviewed by Advisory Board: TBA  

Preparation of this technical report was supported in part by a grant from the Office of Special Education Programs, U.S. Department of Education (H327A060014). Opinions expressed herein do not necessarily reflect the position of the U.S. Department of Education.
Abstract

The purpose of this report is to define the domain of Comprehension and illustrate how this domain is assessed. Comprehension is defined as an integration of skills, including vocabulary knowledge, and its development is marked by purposeful and interactive strategies (NRP, 2003). It is the process of information gathering that is dependent upon a given text and the reader’s personal background knowledge (NRP, 2003). The current report offers its own definition of the construct attempting to be measured, as well as sample items.

Keywords: comprehension, CBAS-R
### Research Log

<table>
<thead>
<tr>
<th>Activity</th>
<th>Lead Person</th>
<th>Timeframe</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommendations to PI’s</td>
<td>Ann Kroll &amp; Lisa Krall</td>
<td>01/2007</td>
</tr>
<tr>
<td>Writing</td>
<td>Ann Kroll &amp; Lisa Krall</td>
<td>01/2007</td>
</tr>
</tbody>
</table>
## Table of Contents

Abstract ............................................................................................................................................. 2

Introduction ..................................................................................................................................... 5
  Comprehension ............................................................................................................................. 5
  Sample Assessments ..................................................................................................................... 6

Procedure ....................................................................................................................................... 7
  Hierarchal Structure ..................................................................................................................... 7
  Comprehension Item Categories .................................................................................................. 7

References ........................................................................................................................................ 9

Appendix (Sample Items) ............................................................................................................... 10
  Literal Comprehension ................................................................................................................. 10
  Expository Comprehension ......................................................................................................... 11
  Inferential Comprehension ......................................................................................................... 12
Comprehension

The process of understanding what is heard and read. Comprehension, or constructing meaning, is the purpose of reading and listening. The NRP noted that “Comprehension has come to be viewed as the ‘essence of reading’ (Durkin, 1993), essential not only to academic learning but to lifelong learning as well” (NRP, 2000, p. 4-11). “Good readers have a purpose for reading” (Armbruster, p. 34), like learning how to do something, finding out new information, or for the enjoyment and entertainment that reading for pleasure brings. Good readers actively process the test “to make sense of what they read, good readers engage in a complicated process. Using their experiences and knowledge of the world, their knowledge of vocabulary and language structure, and their knowledge of reading strategies . . ., good readers make sense of the text and know how to get the most out of it. They know when they have problems with understanding” and they know “how to resolve these problems as they occur” (Armbruster, p. 48).

Comprehension occurs at different levels: literal comprehension, inferential comprehension, and evaluative or critical thinking comprehension. “Literal comprehension is concerned with the information and ideas that are explicitly stated in the” (Cooper, et al., 1979, p. 26) text. Literal comprehension uses lower order thinking skills requiring the reader to directly recall from the text. Inferential comprehension involves understanding ideas that are implied in the text, and is concerned with the skills of “drawing conclusions, generalizing, or interpreting” (Cooper et al., p. 27) the text. Evaluative comprehension, or critical thinking, “requires the reader to make an evaluative judgment” about some aspect of the text, and “integrates the reading and thinking processes” (Cooper et al., p. 29). The reader “must compare what he has read with his
values, previous experiences, or current knowledge” (Cooper et al., p. 29), or with external criteria. Both inferential and evaluative comprehension use higher order thinking skills requiring a reader to interact more with the text.

**Sample Assessments**

Comprehension assessments may include multiple choice and/or written response format asking readers to respond to questions such as:

1. **Literal:**
   a. What was the name of the character in the story?
   b. What happened first in the story?

2. **Inferential:**
   a. What do you think will happen next?
   b. Why did the character do ______?

3. **Evaluative:**
   a. Did the character do the right thing? Why or why not?
   b. What else could/should he have done?
Procedures

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.

Comprehension: Item Categories

A. Category 1: Listening Comprehension
   1. Subcategory 1: Answers Literal Questions
      a. One sentence
      b. Paragraph
   2. Subcategory 2: Answers Inferential Questions
      a. One sentence
      b. Paragraph
   3. Subcategory 3: Answers Evaluative Questions
      a. One sentence
      b. Paragraph

B. Category 2: Reading Comprehension
   1. Subcategory 1: Answers Literal Questions
      a. One sentence
      b. Paragraph
   2. Subcategory 2: Answers Inferential Questions
      a. One sentence
      b. Paragraph
3. **Subcategory 3: Answers Evaluative Questions**

   a. One sentence

   b. Paragraph
References


Appendix

Sample Comprehension Items

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

Literal Comprehension

Audio: “Choose the best answer.”


Which animals live in caves?

a. Frogs
b. Ducks
c. Bears
d. Fish

Audio: “Choose the best answer.”

A stream has an important function. The stream’s current allows fish and other animals to travel between bodies of water. This is important because many animals live in isolated habitats and the stream connects the habitats. The water in a stream usually comes from rain or snow.

What can we conclude from this paragraph?

a. Fish favor streams over other bodies of water.
b. Streams have a very fast current.
c. Streams are the smallest body of water.
d. Streams help different fish and animals merge.
Expository Comprehension

Audio: “Choose the best answer.”

Experiments need two types of variables. Independent variables are things that the experimenter changes. This lets the experimenter control what change is occurring so they can observe what happens. A good experiment should only have one independent variable. Dependent variables are results due to the change in the independent variable. Experimenters collect data on the dependent variables to understand what happened. Experiments can have multiple dependent variables.

What is the topic being discussed?

a. How to have a good experiment
b. Which type of variable is better
c. The two types of variables
d. How experimenters collect data

Audio: “Choose the best answer.”

Jim did not like to do homework. His teacher told him that if he turned in his homework in the morning, he could get a sticker. The homework was too hard so Jim asked his dad for help. When Jim finished, he was proud of himself. The next day, Jim got to pick a sticker.

Which title tells the main idea of this story?

a. Dad Has a Sticker
b. Jim Starts His Homework
c. Teachers Like Stickers
d. Jim Finishes His Homework
Inferential Comprehension

Audio: “Choose the best answer.”

On the way to the grocery store, our car began to sputter. Neither mom nor dad knew what the problem could be, so they pulled over to the side of the road.

What most likely happened next?

a. Mom and Dad got out of the car to inspect under the hood.
b. Mom called her mechanic friend.
c. We complained about the heat outside the car.
d. Mom and Dad suggested that they walk to the store.

Audio: “Choose the best answer.”

The daily newspaper warned that there would be a great storm coming through our small town. Everyone hurried to get ready to avoid as much damage as possible.

What do you think the townspeople did?

a. Cooked a week’s worth of dinner.
b. Took their children and pets inside.
c. Stored televisions in basements and secured lawn chairs.
d. Boarded up windows and secured lawn chairs.