



Section 4

Interpretation of Test Results

Levels of Analysis on the Critical Reading Inventory

Teachers and reading specialists will use the CRI for a variety of different purposes and so the type of interpretation they use will vary as well. If, for example, you use the CRI to investigate the reading needs of children with whom you will be working on a daily basis, you may not need a thorough and detailed analysis of results. You can presume that your daily teaching and observation of the children will provide you with ongoing insights into their needs. If, on the other hand, you are administering the CRI at the request of a teacher who needs comprehensive and structured input as to strengths, weaknesses, and optimum instructional strategies, your analysis will need to be thorough and detailed. The chances are good that you will not encounter those children in an instructional setting on a regular basis, so the more insights you can share with the teacher, the more helpful you are likely to be.

Because of your different needs for depth and detail of analysis, we have designated three different levels of interpretation of the CRI. These levels, although distinct, are by no means mutually exclusive. They are simply an attempt to address specific purposes.

Level One: Numerical Interpretation

The first level of analysis we have identified is *numerical interpretation*. Numerical interpretation is, in some respects, a concession to the fact that a rather artificial assessment constrained by time and circumstances can never replace the insights you can gain by means of daily interaction with children. But some schools and districts use informal reading inventories to gather assessment data on the reading performance of their children. If the CRI is used for this purpose, it can provide a broader cross section of a child's comprehension performance than can most inventories. It can do this because of the distinction among question types and the Retelling Rubric that is included with each passage. Numerical interpretation will include comparisons of a child's performance on several different dimensions of the CRI, such as performance on different comprehension item types, on oral versus silent reading, on reading in relation to grade level, on retellings, and so on.

It is important to note that numerical interpretation is by no means superficial, but that it seldom stands completely alone. Any insights you gain from a comparison of numbers should be verified on the basis of your observations of the child's actual performance. But numerical analysis can save a great deal of time and enable less experienced professionals to use the CRI effectively, while still providing a solid level of diagnostic information. Users may wish to employ the Automated Scoring and Interpretation Interview (ASII) feature of the CRI in cases where numerical analysis is called for.

Level Two: Analytical Interpretation

In cases where teachers or reading specialists will require a higher level of insight into a child's strengths and weaknesses (a situation that is nearly universal), we recommend the *analytical interpretation* of CRI results. The analytical interpretation goes beyond numbers to an examination of children's actual responses and their significance as evidence of processing skills, thinking strategies, or reading habits. For example, you will frequently find children who are capable of answering virtually any text-based items but who experience difficulty with inference or critical response items. The fact that there is a significant numerical difference in their performance on these items is important to note. But if you want to delve deeper into the nature of their difficulty, you must examine their responses to the questions that they could not answer. Many children, for instance, will regularly respond to difficult items with "I don't know." (Possible translation: "I have no idea how to approach this item or how I would even arrive at an answer.") Others may reply with "It didn't say in the passage." (Translation: "I expect every question to have a clear and direct answer and I expect to find it stated in the text.") Still others will respond with marvelously detailed and creative answers that have absolutely no connection to what they have just read. (Translation: "I have no idea that I must use information from the text to support my thinking.") Clearly there are different problems implicit in the patterns of responses elicited from these three types of children.

An analytical interpretation of CRI results will note signs of frustration or annoyance on the part of readers. It will attempt to describe the strategies that a child uses in response to unknown words, ranging from the lack of strategy indicated by frequent teacher-provided words, to an overemphasis on graphic cues from text, to the detriment of context clues. Whereas Level One interpretation can tell you, for example, that the child is making numerous meaning-violating miscues, including nonwords, Level Two interpretation can give you insight into the source of those problem areas. You can find out if the child is overemphasizing syllabication rules in his creation of nonwords. Or you might observe insensitivity to the syntax of the language that is reflected in the child's oral reading performance. Analytical interpretations also require you to examine retellings in detail, looking for signs of strategies such as attempts to memorize every detail as if they were equal, inclusion of extraneous details, or the inability to logically link ideas presented in text. It will include observations such as very fast oral or silent reading, a reluctance to elaborate on responses, a lack of enthusiasm or inflection in reading, or even the lack of an emotional response to text.

Analytical interpretation of all these factors, and many more, will play a part in the detailed analysis of any child's responses. Coupled with creative insight and a firm grasp of the nature of reading, analytical interpretation will enable teachers and specialists to draw a much clearer picture of any child's needs. It will, of course, also enable them to justify and explain more effectively the differences in the programs of instruction most likely to address those different needs.

Level Three: Comprehensive Interpretation

Finally, there is a third level of analysis that we have termed *comprehensive interpretation*. Comprehensive analysis goes one step beyond the qualitative assessment of children's responses to include the multiple sources of data that are available as a consequence of the time spent administering the CRI. For example, the children who consistently respond to inferential and critical response items with "I don't know" may be telling you that they have no idea how to respond. But your examination of their retellings during your Level Two analytical interpretation may indicate that they do not have a strategy for recalling or responding to text in an organized way. Your observation of these children during the CRI administration may lead you to conclude that they are reluctant to attempt anything associated with a risk of failure. Interviews with teachers, parents, or the children themselves may provide evidence of a regular avoidance of reading. Performance on district and state assessments of reading may provide further insights into the nature of the child's view of reading. In other words, comprehensive analysis is, as its name suggests, an exhaustive examination of all relevant factors that may be contributing to a child's performance on the CRI. More specifically, it is an attempt to piece together any and all facets of a child's performance to arrive at an educational profile that underlies that child's performance as a

 See ASII

Access the Automated Scoring and Interpretation Interview at www.readinginventory.net for scoring help, tutorials, and case studies.

reader. Comprehensive interpretation is the most challenging and in many respects the most rewarding use of the CRI. And needless to say, the greater your depth of understanding of the nature of reading and the factors that influence it, the more valuable your analysis is likely to be. Examples of all three levels of CRI interpretation (numerical, analytic, and comprehensive) can be found in our discussion of case studies available on the CRI website.

The Analysis of Reading Performance: What a Good Reader Does

Any analysis of a child's reading performance on the CRI must begin with an examination of the fundamental elements of good reading. At the same time, you need to be aware of the ways that these traits are evidenced throughout the administration of the CRI. We will first identify those traits of the good reader that we regard as axiomatic and then identify elements of CRI performance that may act as "red flags" relative to each trait.

1. *Good readers achieve a balance among text-based, inference, and critical response items in their comprehension of text.*

High achievement in text-based reading to the exclusion of inference and critical evaluation often indicates a reader whose view of reading is rooted in remembering factual information (Durkin, 1978–1979; Guthrie, 2001; Singer & Donlan, 1982). Inference items require the reader to draw logical conclusions based on both text and experience. Success in this arena is often associated with precision in concepts. Critical response items require that the reader express a point of view and defend it logically, using both experience and information from the text.

Warning signs:

- Consistent and large differences between scores in text-based, inference, and critical response items (for example, text-based scores that are consistently 20 or more percentage points higher than inference or critical response scores)
- Inability or unwillingness to elaborate on or explain responses to higher-level items
- Annoyance or frustration in response to items that have no clear answer stated in the text
- Retellings that may be characterized by attention to less significant details or that may reflect attempts to memorize the passage
- Reports from parents and/or teachers that proficient literal readers are viewed as "good readers"

2. *The good reader demonstrates solid comprehension in both oral and silent reading relative to his or her grade level.*

A consistent pattern of higher performance after oral reading may indicate that children are overly dependent on listening skills (Armbruster & Wilkinson, 1991; Lynch, 1988; Miller & Smith, 1990; Stauffer, 1969). This pattern is more likely to occur among younger children, particularly those with limited experience with silent reading. A pattern of higher performance after silent reading is more common among older children (Allington, 2001). Weak silent reading may suggest that the reader lacks strategies to approach word recognition and comprehension independently.

Warning signs:

- Consistent and large differences between average oral versus average silent reading comprehension scores (for example, average oral comprehension scores that are consistently 20 or more percentage points higher than silent comprehension scores)
- Very fast or unrealistically fast silent reading
- Consistently high MMI coupled with low comprehension after oral reading
- Frequent teacher-provided miscues during oral reading
- Expressions of annoyance or frustration at the need for silent reading

3. *The good reader responds or reacts to the ideas included in text.*

Other than the acquisition of knowledge, there is little purpose or joy in reading if one does not think about text, evaluate its messages, compare its ideas to one's own, or respond

to it, whether positively or negatively (Anderson, Wilkinson, & Mason, 1991; Cross & Paris, 1988; Hansen, 1981; Morrow, Tracey, Woo, & Pressley, 1999; Stauffer, 1969). Such thoughtful response to text lies at the heart of active thinking and construction of meaning.

Warning signs:

- Admission of a dislike for reading in the course of the interview
- Inability or reluctance to elaborate on or explain responses
- Frequent questions about when the testing will be over, sometimes even at the start of the testing
- Negative response to the testing situation
- Report from parent or teacher that the child is uninterested in reading

4. *The good reader detects the logical structure inherent in text and uses it as an aid to the organization and retrieval of ideas.*

Sensitivity to the ways that the writer has linked ideas together can go a long way toward promoting a reader's ability to process and retrieve those ideas (Beck & McKeown, 1991; Carnine & Kindler, 1985; Kameenui, Carnine, & Freschi, 1982). Passive reading or attempts to memorize ideas in text are far less effective because the ideas are not linked to existing schemata in the reader's mind.

Warning signs:

- Frequent responses of "I don't know" to higher-level questions
- No demonstration of personal response to text
- Obvious demonstrations of frustration or anxiety as reading materials become more challenging
- Low retelling scores and higher comprehension scores on same passage (child may use questions themselves as an aid to memory rather than the organization of ideas)
- Recall of extraneous details in retellings or attempts to memorize passage
- Omission of major story elements or central factual information
- Little or no evidence of logical links between ideas in retellings

5. *The good reader uses a range of strategies for recognizing unknown words and frequently self-corrects miscues that alter the sense or grammar of the text.*

Monitoring for comprehension is a hallmark of good reading and when a reader does this type of monitoring, miscues that make no sense are immediately detected and corrected (Adams, 1990; Allington, 1983, 2001; Biemuller, 1994; Clay, 1979; Eldredge, Quinn, & Butterfield, 1990; Foorman, Nory, Francis, & Lieberman, 1991; Goodman & Burke, 1972; Gray & Moody, 2000; Stahl, Duffy-Hester, & Stahl, 1998). By the same token, miscues that do not fit the grammatical structure of text simply do not "sound right" and will be corrected.

Warning signs:

- Lack of inflection in reading or word-by-word reading
- Overemphasis on graphic cues in word recognition
- Infrequent correction of even serious miscues
- Frequent teacher-provided miscues during oral reading, particularly at more challenging reading levels
- Identification by parents and/or teachers as a struggling reader (may even be labeled as "learning disabled")
- History of avoiding reading

6. *The good reader has developed an extensive sight vocabulary relative to his or her grade level.*

Sight vocabulary tends to grow as a consequence of solid attention skills and frequent reading. Much of a child's sight vocabulary is learned incidentally as a consequence of that reading. The broader the sight vocabulary, the easier and more fluent one's reading tends to be and the more likely one is to engage in the activity (Adams, 1990; Allington, 1983, 2001; Betts, 1954; Morrow et al., 1999). Thus the level of a child's sight vocabulary tends to be a classic case of the rich getting richer (Stanovich, 1986).

Warning signs:

- Flash percentage at child's current grade level lower than 70%
- Word recognition does not improve significantly when reading in the context of the actual selection (flash consistently higher than MMI)

- No demonstration of a systematic or consistent strategy for recognizing unknown words
- Infrequent or sporadic independent reading on the part of the child
- Low self-concept related to school

7. *The good reader enjoys reading and engages in it regularly for a wide variety of purposes.*

The ultimate goal of reading instruction is to help children arrive at the conclusion that reading is a rewarding and enjoyable activity (Allington, 2001; Baker & Wigfield, 1999; Gray & Moody, 2000; Guthrie, 2001; Wigfield & Guthrie, 1997). In order to arrive at this belief, children must experience the joys and rewards of seeing their own lives mirrored in those of characters about whom they read. They must be drawn in (Langer, 1995) to the transaction that will demand of them a full participation in the world of ideas that reading represents.

Warning signs:

- Failure to elaborate on or explain responses to test questions
- Lack of ease or comfort in the testing situation
- Tendency toward low sight vocabulary relative to grade level
- Expression of a dislike for reading in the interview
- Avoidance of reading in classroom and home settings

You can use these seven characteristics of the good reader as a starting point in the analysis of reading performance.

Reading Levels in the Critical Reading Inventory

As we mentioned earlier, setting reading levels with the CRI (as with any IRI) requires thoughtful attention to a fairly wide range of factors. Not only do you have to consider the children's reading performance on the CRI itself, but at the very least you must also take into consideration the type of instruction and your expectations that the children encounter on a daily basis. It goes without saying that any diagnostic information you gather about the child's reading and thinking, no matter what level of interpretation you use, will matter little if the child is expected only to recall details of the text in the classroom. If you do not have all the necessary information related to the instructional milieu, level setting can be tricky. Still, you must recognize that level setting is one of the most common uses of informal reading inventories, particularly because standardized test performance is unlikely to provide you with a great deal of help in determining the reading level at which you should instruct a child.

Independent Level

Informal reading inventories are generally used to distinguish among three different reading levels (Johnson et al., 1987). The first is the *independent level*, where children can identify the vast majority of the words they encounter without difficulty, can develop a sense of the semantic and syntactic content of the text, can grasp the meaning intended by the author, and can think about and respond to what they have read. And they can do all of this without the help of either a teacher or a parent. The independent level is, of course, the level where homework should be assigned as well as where children should be doing a great deal (but by no means all) of their leisure reading. It is important for you to observe, when possible, your readers on the CRI reading at their independent level, most particularly to see if the strategies they are using when the material is fairly easy for them differ from the strategies they use when the material is more challenging.

Instructional Level

The second reading level that you want to estimate through the use of the CRI is the *instructional level*. This is the level where you can achieve the optimal match between the child's needs and the instruction that you provide in response to those needs. The instructional level is very much akin to Vygotsky's oft-cited Zone of Proximal Development (Vygotsky, 1978) in that the instruction that you provide matches the child's needs so well

that you help the child achieve a slightly higher level of competence in reading. Of course, your first requisite is a firm grasp of your students' needs, and those needs are best demonstrated when they are reading material that challenges and stretches their reading competence beyond their comfort level. In other words, children experience Piagetian disequilibrium (Piaget, 1973) in the instructional setting; otherwise, they have no reason to accommodate and change their way of doing things. A savvy observer who is in the presence of children reading at their instructional level will soon be able to spot shortcomings, confusions, strategic gaps, or distortions that are preventing children from progressing to the next stage in reading achievement. Of course, this type of diagnostic insight can be gained only when children are reading at their instructional level in the presence of a skilled teacher of reading. Consequently, instructional-level reading is most often meant for instructional situations, situations where skilled professionals can guide children and help meet their needs.

Frustration Level

The third level that you want to identify through the CRI is the *frustration level*. Children reach their frustration level when the reading material, whether by virtue of difficulty in word recognition or comprehension, becomes too difficult for them to handle and too complex for them to even benefit from instruction. There are simply too many things going wrong at the frustration level for teachers to address at one time. In the course of the administration of the CRI, you will ask children to read materials at their frustration level. You do this simply for the sake of the insights that you may gain when you observe how (or if) the children adjust to frustration in reading. For example, some children may revert to less sophisticated views of reading and attempt to use only graphophonemic clues when they encounter unknown words. Others increase their use of nonwords, simply attaching sounds to collections of letters with no attention to syntactic or semantic fit. Still others revert to attempts to memorize instead of think about what they have read. Others may shut down completely and give up any attempt to read what they perceive as materials that are beyond their scope. In any and all cases, you can gain some insights into their view of reading, their motivation to succeed, and the strategies that they fall back on when the going gets tough. It is our hope that the short-term discomfort of reading at one's frustration level will yield enough diagnostic information to make it worthwhile.

Keep in mind that your ultimate goal is to help every child read those very materials with a high level of success as soon as possible. The diagnostic information you gain may help bring about this ultimate success. It also never hurts to tell the children whom you test that no one expects them to succeed at every level, that you know they are reading at very high levels, and that mistakes are OK. You should even feel free to tell them that the authors who created this test insist that you make them read such difficult materials. Anything you can do to reassure the children may eventually pay off in solid diagnostic insights. For a video demonstration of the administration of the CRI, refer to the website that accompanies the CRI.

Listening Comprehension Level

The fourth reading level that we can use in certain circumstances is the *listening comprehension level*. You estimate the listening comprehension level by reading the passages aloud to the children and then measuring their comprehension just as you would if the children themselves had read the text. You will undoubtedly encounter children whose word recognition skills are so seriously problematic that they become insurmountable obstacles to comprehension. In such cases, it is beneficial to know what kinds of materials or conceptual levels the children could handle if they were relieved of the burden of sheer word recognition. When you observe that children are struggling mightily with word recognition and you suspect that they can comprehend at a much higher level if the materials are read to them, it is time to try to estimate the listening comprehension level. It is also valuable to use listening comprehension assessments at the reader's current grade level, if that level has not been tested as part of the typical CRI administration.

Setting Reading Levels with the CRI

The traditional approach to level setting utilizes a combination of (a) the overall percentage of successful word recognition during oral reading, or the Reading Accuracy Index (RAI); and (b) the percentage of accurate responses to comprehension questions averaged across oral and silent reading at any given grade level (Betts, 1954). Thus, the numbers associated with different reading levels look like this:

Level	Reading Accuracy	Average Comprehension
Independent	99%	90%
Instructional	95%	75%
Frustration	90%	50%
Listening comprehension	N/A	75%

Even given the frequently stubborn refusal of numbers to fit neatly into the patterns just described, it is often a fairly straightforward process to estimate a child's reading levels using a combination of these two data sources. But you must also consider the nature of the reader's word recognition problems. Even though reading experts long suspected that not all miscues were equal in importance (Johnson, et al., 1987), that realization did not have widespread impact until the work of Goodman and Burke (1972) on miscue analysis became widely disseminated. Now the equation becomes a bit more complicated: One reader with 95% accuracy in oral reading at a given grade level may have made no serious miscues, whereas another reader with an identical score may have made many. In spite of the identical numbers, the problems experienced by each reader are very different and so, of course, are the instructional strategies that you would use to address them.

Therefore, in the CRI we ask you to consider not only the pure percentage of words that a child reads correctly (RAI), but also the percentage of words the child reads that preserve the sense of the text (MMI). Significant discrepancies between these two numbers, accompanied by problems with comprehension, may signal a failure to monitor for meaning that could severely hinder a child's growth in reading. Under these circumstances, the word recognition problems are often more severe and will affect the judgment you make about a child's ability to handle materials at any given reading level.

For example, the RAI for a child who reads a 200-word passage and who makes 12 scoreable miscues would be 94%. The RAI is calculated by subtracting the number of scoreable miscues from the number of words in the passage and then dividing by the number of words in the passage ($200 - 12 = 188$; $188/200 = 94\%$). Then you calculate the MMI by first examining each of the miscues and determining whether the miscue preserved the sense and grammar of the language. In this case, the child exhibited the tendency to look at the first part of any difficult word and simply guess at the rest. He frequently used nonwords in these cases and 8 of the 12 miscues noted were serious; that is, they distorted the meaning of the text. Therefore the MMI for this child would be 96% because the MMI is calculated by subtracting the number of meaning-altering miscues from the number of words in the passage and then dividing by the number of words in the passage ($200 - 8 = 192$; $192/200 = 96\%$).

An MMI score of 96% coupled with reading comprehension problems is a red flag. It suggests that readers are not actively monitoring the reading to ensure that what they read makes sense. Note that the MMI in this child's case is actually higher than the RAI. This will happen frequently. The RAI is based on the sum of the meaning-maintaining and meaning-violating miscues; the MMI is based on only meaning-violating miscues. Thus the MMI can never be lower than the RAI. But you should be less concerned with the absolute value of the MMI and more concerned with the fact that it represents a departure from the quintessential purpose of reading: making meaning. It is a teacher's hope that every miscue a

child makes is relatively minor and does not affect the overall sense of the text. In such cases, the child scores 100% on the MMI every time. If the child does not score 100% then you would do well to examine the nature of the miscues that took place during the oral reading and to contrast the MMI with overall comprehension scores as well as performance on different comprehension item types.

Another consideration in level setting is that the CRI attempts to identify not only the absolute comprehension of passages but also three different types of thinking called for by comprehension questions: text-based, inferential, and critical response. It is fairly common for children to demonstrate solid proficiency in text-based comprehension but serious difficulties with inferential and critical response comprehension. On a typical reading inventory, such children might be expected to perform quite well (Applegate et al., 2002). If these same children are taught in a classroom where the primary emphasis is on the recall of the details of text, they would be likely to perform equally well. However, their inability to think about or respond to text would be a significant disadvantage on the CRI (not to mention in their growth as readers and in their performance on state and national reading tests) and would clearly lower their overall reading level identified by any user of the CRI.

Thus users of the CRI would be well advised to think of diagnosis and level setting as an interaction between the child's instructional situation and the child's test performance. For example, many children are instructed in classrooms where teachers expect them to critically respond to ideas in text, discuss those ideas, and defend their interpretations. For these children, the CRI would be an effective diagnostic instrument that could predict their performance. If, however, a child is instructed in a classroom where text-based reading assessment is the norm, then that child's level may be underestimated by the CRI. Because research suggests that a significant amount of the nation's classroom reading instruction is characterized by text-based assessment (Brown, 1991; Allington, 2001), this is an issue that should be considered during the estimation of estimating reading levels.

It is our hope that users of the CRI become change agents who can effectively address the preponderance of literal thinking in the reading classroom. It is becoming increasingly important for teachers to foster a greater balance between thoughtful responses to test and memory for text details, particularly in light of the increased emphasis on the former that is beginning to emerge in state and national assessments of reading.